[ΨΣ] interuniversity graduate school of
iops Psychometrics and Sociometrics

Annual report 2017

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

Contents

Foreword

The IOPS board has changed in 2017; Gunter Maris (University of Amsterdam and CITO) left the board to proceed his career in advanced psychometrics at ACT Next. Furthermore, two of our teachers went with retirement in 2017. We thank both prof. dr. Gunter Maris, dr. Marcel Croon (Tilburg University) and dr. Hans Vos (Unversity of Twente) for their work for IOPS.

The IOPS Best Poster Award was won by Tessa Blanken (Summer 2017) and Leonie Vogelsmeier (Winter 2017). Paulette Flore (Summer 2017) and Merijn Mestdagh (Winter 2017) won the IOPS Best Presentation Award. Sacha Epskamp won the IOPS Best Paper Award, with his paper *Generalized network psychometrics* published in *Psychometrika*.

We congratulate the eleven students who defended their thesis successfully. With two projects left unfinished, the number of IOPS students in 2017 decreased to 61.

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 31-12-2017)

Participating institutes			
Name institute	*# students*	*# prospective students*	*# staff*
Leiden University, Faculty of Social and Behavioural Sciences			
▪ Methodology and Statistics Unit, Institute of Psychology	5	0	9
▪ Education and Child Studies, Institute of Education	0	0	1
▪ Statistical Science for the Life and Behavioural Sciences, Mathematical Institute	5	0	1
University of Amsterdam, Faculty of Social and Behavioural Sciences			
▪ Psychological Methods, Department of Psychology	10	1	9
▪ Developmental Psychology, Department of Psychology	3	0	4
▪ Work and Organizational Psychology, Department of Psychology	0	0	0
▪ Methods and Statistics, Department of Development and Education	1	1	7
University of Groningen, Faculty of Behavioural and Social Sciences			
▪ Psychometrics and Statistics, Department of Psychology	3	4	7
▪ 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)	1	0	4
Tilburg University, Tilburg School of Social and Behavioural Sciences			
▪ Methodology and Statistics	14	8	18
Utrecht University, Faculty of Social and Behavioural Sciences			
▪ Methodology and Statistics	12	2	21
KU Leuven, University of Leuven, Belgium, Faculty of Psychology and Educational Sciences			
▪ Research Group of Quantitative Psychology and Individual Differences	7	2	5
Statistics Netherlands (CBS), Den Haag	0	0	2
Psychometric Research Center (Cito), Arnhem	0	0	4
Cooperating institutes			

University of Groningen, Faculty of Behavioural and Social Sciences			
▪ Department of Education	0	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	0	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 2017.
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, CITO (National Institute for Educational Measurement)
- Prof. A.G. (Ton) de Waal, CBS (Statistics Netherlands)

PhD representatives

Eva Zijlmans (Tilburg University) was appointed first representative, after being assistant representative in 2016.
Fayette Klaassen (Utrecht 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: **Dr. Laurien Hansma**
E-Mail: secretariaat.iops@rug.nl
Web: www.iops.nl
Phone: 050 36 32 668
Address: University of Groningen
Faculty of Social and Behavioral Sciences
Grote Kruisstraat 2/1
9712 TS Groningen, The Netherlands

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 2017 board meetings were held on 8 June and 14 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 8 June, and one on 14 December.

2.6 Archive

The IOPS archives the following:

- Registration of new PhD students *(aanmelddossier)*
  - 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 succesfully 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 Transparency in Science	UM UG	1 1	2016, 2018…	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 2017

In 2017 six courses of the IOPS curriculum were organized:

1. **Generalized latent variable modeling** (elective)

University of Tilburg, 12-13 January, 2017
Coordinator: Prof. J. Vermunt

2. **Statistical Learning** (elective)
   Leiden University, 25-27 January, 2017
   Lecturers: Dr M. Fokkema, Dr T. Wilderjans, Prof. M. de Rooij
3. **Applied Bayesian Statistics** (elective)
   Utrecht University, 6-10 March, 2017
   Lecturers: Prof. H. Hoijtink, Dr. N. Schuurman, Dr Milica Miočević, Dr E. Hamaker & F. Klaassen
4. **Statistical Consulting to Behavioral Scientists** – ***formerly Advising on Research Methods*** (mandatory)
   University of Amsterdam & Leiden University, 23-34 March & 6-7 April, 2017
   Lecturers: Dr E. Dusseldorp & Dr R.J. Zwitser
5. **Transparency in Science** (elective)
   University of Groningen, 19-20 April, 2017
   Lecturers: Dr D. van Ravenzwaaij, Dr R. Hoekstra & Dr L. Bringmann
6. **What is Psychometrics?** (mandatory)
   University of Amsterdam, 10-12 May, 2017
   Coordinator: Prof. D. Borsboom
7. **Survey Design** (elective)
   Utrecht University, 4-7 September, 2017
   Lecturers: Dr P. Lugtig & Dr B. Struminskaya
8. **Optimization & Numerical Methods in Statistics** (elective)
   KU University of Leuven , 21-22 November, 2017
   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 - 2017 are stated.

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

Transparency in Science					3

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 2017

- **27th IOPS Summer Conference**, 8 and 9 June 2017, University of Leuven.
  See appendix 2 for the programme.
- **27th IOPS Winter Conference**, 14 and 15 December 2017, University of Tilburg.
  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 "Statistical Consulting to Behavioral Scientists"), which are 5 EC in total. Exemption for these courses can be granted in case an equivalent course has been completed earlier.
- 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. Behavioural Sciences, Technical Sciences, Mathematics or Econometrics. They are appointed as PhD student, or as an indirectly financed PhD student. PhD students within IOPS are financed by internal research funds of the participating institutes, NWO (Netherlands Foundation of Scientific Research) or European funding, or other external funds of third parties.

4.2 Admissions, deregistrations and dissertations

	2011	2012	2013	2014	2015	2016	2017
Student admissions	15	22	18	14	21	20	11
Premature deregistrations	2	0	0	2	2	1	2
Dissertations	9	17	7	12	11	17	11
Projects that exceeded the project time limit on 31 December	4	3	4	5	11	8	7
Students on 31 December	48	53	61	60	62	65	61

Dissertations in 2017

1. Florian **Böing-Messing** (Tilburg University) - *Bayes Factors for Testing Equality and Inequality Constrained Hypotheses on Variances*
2. Sacha **Epskamp** (University of Amsterdam) – *Network Psychometrics*
3. Robert **Hillen** (Tilburg University) – *Modeling Psychological Attributes: Merits and Drawbacks of Taxometrics and Latent Variable Mixture Models*
4. Lianne **Ippel** (Tilburg University) – *Multilevel Modeling for Data Streams with Dependent Observations*
5. Hannah **Oosterhuis** (Tilburg University) – *Regression-Based Norming for Psychological Tests and Questionnaires*
6. Florian **Sense** (University of Groningen) – *Making the most of human memory*
7. Sara **Steegen** (University of Leuven) – *Towards better research practices in psychology*
8. Geert **van Kollenburg** (Tilburg University) – *Computer Intensive Methods for Evaluating Latent Class Model Fit*
9. Coosje **Veldkamp** (Tilburg University) – *The Human Fallibility of Scientists: Dealing with error and bias in academic research*

10. Mathilde **Verdam** (University of Amsterdam) – *Using Structural Equation Modeling to Investigate Change in Health-Related Quality of Life*
11. Marlies **Vervloet** (University of Leuven) – *Unraveling and unlocking the assets of principal covariates regression*

New projects in 2017

1. Elise **Crompvoets** (Tilburg University) – *Pairwise comparisons within education*
2. Niek C. **de Schipper** (Tilburg University) – *Big Data in the Social Sciences: Statistical methods for multi-source high-dimensional data*
3. Anne **Elevelt** (Utrecht University) – *Smart(phone) surveys*
4. Jonas **Haslbeck** (University of Amsterdam) – *Modeling Dynamics in Psychopathology*
5. Letty **Koopman** (University of Amsterdam) – *Scaling methods for multilevel test data*
6. Jules **Kruijswijk** (Tilburg University) – *On Hierarchical Structures in the Multi-Armed Bandit Problem*
7. Paul **Lodder** (Tilburg University) – *Latent variable prediction models in clinical and medical psychology*
8. Monika **Vaheoja** (extern) – *Application of IRT equating on high-stakes testing in Applied Universities of Teacher Education. Errors and error-analysis in the consistency and stability of pass/fail decision in tests with different sample sizes*
9. Erik-Jan **van Kesteren** (Utrecht University) – *New Dimensions in Social Science: Extending Structural Equation Models to Accomodate Novel Data Sources*
10. Leonie V.D.E. **Vogelsmeier** (Tilburg University) – *Understanding between – and within – person differences in experience sampling measurements using mixture factor analysis*
11. Jacqueline N. **Zadelaar** (University of Amsterdam) – *Why speeding on your scooter is a good idea: Decision strategies in childhood and adolescence*

Projects in progress beyond the project time limit

On December 31st 2017, 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. Kirsten **Bulteel** (KU Leuven) – *Dynamic network models for dyadic data*
2. Laura **Dekkers** (University of Amsterdam) – *Why speeding on your scooter is a good idea: Decision strategies in childhood and adolescence*
3. Abe **Hofman** (University of Amsterdam) – *Analysing developmental change with time-series data of a large scale educational monitoring system*
4. Michèle **Nuijten** (Tilburg University) – *Human factors in Statistics*

5. Annemiek **Punter** (University of Twente) – *Psychometric modeling of cultural bias in International Large-Scale Assessments*
6. Robbie **van Aert** (Tilburg University) – *Meta-analysis in the precense of publication bias and researcher degrees of freedom*
7. Leonie **van Grootel** (Utrecht University) – *Not as we know it: Developing and evaluating synthesis methods that incorporate quantitative and qualitative research*

Projects left unfinished

1. Thomas F. **Husken** (Utrecht University) – *Time-varying Covariates in Population Size Estimation with the Recurrent Events Model*
2. Nikky **van Buuren** (University of Twente) – *Bayesian Networks and Personalizes Learning Recommendations*

4.2 Dissertations

Florian Boïng-Messing
Bayes Factors for Testing Equality and Inequality Constrained Hypotheses on Variances

6 October 2017
Tilburg School of Social and Behavioral Sciences, Methodology and Statstistics
Supervisors: Prof.dr. J.K. Vermunt & Dr. J. Mulder
Financed by Tilburg University
1 September 2012 - 1 September 2017

Summary of thesis
There are often reasons to expect certain relations between the variances of multiple populations. For example, in an educational study one might expect that the variance of students' performances increases or decreases across grades. Alternatively, it might be expected that the variance is constant across grades. Such expectations can be formulated as equality and inequality constrained hypotheses on the variances of the students' performances. In this dissertation we develop automatic (or default) Bayes factors for testing such hypotheses. The methods we propose are based on default priors that are specified in an automatic fashion using information from the sample data. Hence, there is no need for the user to manually specify priors under competing (in)equality constrained hypotheses, which is a difficult task in practice. All the user needs to provide is the data and the hypotheses. Our Bayes factors then indicate to what degree the hypotheses are supported by the data and, in particular, which hypothesis receives strongest support.

Sacha Epskamp
Network Psychometrics

5 April 2017
Faculty of Social and Behavioral Sciences, University of Amsterdam
Supervisor: Prof.dr. D. Borsboom
Financed by University of Amsterdam
15 Augustus 2012 – 15 Augustus 2016

Summary of thesis

In recent years, research on dynamical systems in psychology has emerged, which is analogous to other fields such as biology and physics. One popular and promising line of research involves the modeling of psychological systems as causal systems or networks of cellular automat. The general hypothesis is that noticeable macroscopic behavior—the co-occurrence of aspects of psychology such as cognitive abilities, psychopathological symptoms, or behavior—is not due to the influence of unobserved common causes, such as general intelligence, psychopathological disorders, or personality traits, but rather to emergent behavior in a network of interacting psychological, sociological, biological, and other components. This dissertation concerns the estimation of such psychological networks from datasets.
While this line of research originated from a dynamical systems perspective, the developed methods have shown strong utility as exploratory data analysis tools, highlighting unique variance between variables rather than shared variance across variables (e.g., factor analysis). In addition, this dissertation shows that network modeling and latent variable modeling are closely related and can complement one-another. The methods are thus widely applicable in diverse fields of psychological research. To this end, the dissertation is split in three parts. Part I is aimed at empirical researchers with an emphasis on clinical psychology, and introduces the methods in conceptual terms and tutorials. Part II is aimed at psychometricians and methodologists, and discusses the methods in technical terms. Finally, Part III is aimed at R users with an emphasis on personality research.

Robert Hillen
Modeling Psychological Attributes: Merits and Drawbacks of Taxometrics and Latent Variable Mixture Models

23 June 2017
Tilburg School of Social and Behavioral Sciences, Methodology and Statistics
Supervisors: Prof. J.M. Wicherts, Prof. K. Sijtsma & Dr. W.H.M. Emons
2012-2016

Summary of thesis

The question whether constructs are dimensions or categories is a long-standing and on-going debate in psychology. As psychological constructs cannot be directly observed, they are commonly measured by means of psychometric models that formalize and analyze the responses to problems, questions, statements, and so on. Many psychometric models and other statistical procedures have been developed over the past century that either assume a dimensional latent variable, a categorical latent variable, or both.

Lianne Ippel
Multilevel Modeling for Data Streams with Dependent Observations

13 October 2017
Tilburg School of Social and Behavioral Sciences, Methodology and Statistics
Supervisors: Prof. J.K. Vermunt & Dr. M.C. Kaptein
1 October 2013-21 Augustus 2017

Summary of thesis

My PhD thesis concerns the estimation of well-known statistical models in a context where data are 'streaming in' over time. Estimating models in such a situation can be troublesome because some models require estimation methods which use all data in memory, for instance a multilevel model. When new data keep streaming in, estimating certain statistical models becomes infeasible, because when new data present themselves the models have to be re-estimated. Redoing the analyses every time a new data point enters is inefficient and time consuming and over time becomes infeasible. In this dissertation, I introduce a commonly used approach to deal with data streams: online learning, a method to update the result of an analysis while the data enter. Additionally, I developed an algorithm that updates rather than reestimates the model parameters of a multilevel model to deal with repeated measurements of individuals, a common data structure found in data streams. This algorithm (called SEMA, Streaming Expectation Maximisation Approximation) allows researchers to analyse data streams while keeping the nested or grouped structure of the data stream into account.

Hannah Oosterhuis
Regression-Based Norming for Psychological Tests and Questionnaires

12 April 2017
Tilburg School of Social and Behavioral Sciences, Methodology and Statistics
Supervisors: Prof.dr. K. Sijtsma & Prof. dr. L.A. van der Ark
1 September 2012 - 1 September 2016

Summary of thesis

The following issues are important for this project:

1. For most norms statistics, standard errors are currently not available. Standard errors and confidence intervals based on the standard errors quantify the precision with which the norm statistics have been constructed. Methods and software to derive standard errors of norms from the test data should be made available; these are necessary conditions for investigating the precision of norms. Also, test constructors should report standard errors to demonstrate the precision of the norms. For the sample mean, X, standard errors are available using the well-known formula $S(X) = S(X) / \sqrt{N}$, but not for almost all other norms.
2. It must be investigated whether the regression-based norming procedure is robust against violations of the assumptions of the linear regression model. Semel et al. (2004) and Tellegen and Laros (2011) suggested it was not robust, but it was never seriously investigated. Results should indicate the conditions under which regression-based norming produces unbiased results.
3. For conditions in which the regression-based norming procedure yields biased results, the norming procedure should be adapted to accommodate those violations. Semel et al. (2004) and Tellegen

and Laros (2011) constructed norms using nonlinear regression, but a rigorous justification for this approach is missing and badly needed. Alternatives for regression-based norming must be developed and investigated.

4. Whenever a person's test score is compared to a norm, it is tacitly assumed that the test score is perfectly reliable. This assumption is unrealistic as test scores are always measured with error, so that a test score cannot be taken at face value (Lord & Novick, 1968). Hence, the true, error free test score may correspond to a different percentile, stanine or standard score than the observed test score. A procedure is required that takes measurement error into account, when comparing a test score to norms.

Florian Sense

Making the Most of Human Memory. Studies on personalized fact-learning and visual working memory

20 April 2017
Psychometrics and Statistics, Behavioral and Social Sciences, University of Groningen
Supervisors: Prof.dr. R.R. Meijer & dr. R.D. Morey
Financed by: NWO grant
1 September 2012 - 1 September 2016

Summary of thesis

One of the major goals of psychological research is to elaborate latent processes that are necessary to explain specific psychological phenomena. Memory researchers, for instance, seek to determine what mental processes occur when remembering, or failing to remember, memoranda. The main difficulty of behavioral research, however, is that researchers cannot observe the processes directly; instead, the processes must be inferred from behavioral data. A fundamental question when analyzing behavioral data is how many processes are needed to explain the observed data. Are there separate storage processes for auditory and visual stimuli, or just one (Baddeley & Hitch, 1974; Cowan, 2001)? Is there a separate perceptual process for face recognition, or do faces rely on the same perceptual process as all other stimuli (Loftus, Oberg, & Dillon, 2004)? Is forgetting caused by interference alone, or do both interference and time decay play a role (Oberauer & Lewandowsky, 2008)? Are there distinct memory processes for remembering and/or knowing judgements or do they rely on the same process (Dunn, 2008)?
Traditionally, such inferences about dimensionality have mainly relied on dissociations: that is, one factor affects one dependent variable but not another, and vice versa for a second factor. However, Newell and Dunn (2008) point out that “a dissociation requires that a factor has no effect on a particular behavioral measure, an assertion that is impossible, in principle, to verify” (p. 285). Since it also is impossible to prove the absence of an effect, dissociations ” cannot truly be said to exist” (p. 287). Consequently, even if a dissociation is found, a one-dimentional model might still be able to account for the data – a fact often overlooked due to the way data is visualized/presented.
State-trace analysis (Bamber, 1979; Newell & Dunn, 2008) is a technique used by researchers to make inferences about the dimensionality of data. The basic idea behind state-trace analysis is that two dependent variables assumed to be influenced by the same latent system are plotted against one another. If the two dependent variables are mediated by a uni-dimensional latent system, their relationship must be monotonic. If monotonicity is violated in the so-called state-trace plot, uni-dimensionality is rejected and the system must be at least two-dimensional. Dunn (2008), for example, conducted a meta-analysis in order to

investigate whether remember-know judgements are best explained by a single or a dual-process model. We will use hypothetical data from an experiment that could have been included in Dunn's analysis and discuss two possible outcomes. It will be shown how dissociation logic leads to wrong interpretations and how state-trace analysis can be used to overcome such problems.

Sara Steegen
Towards better research practices in psychology

8 July 2016
Quantitative Psychology and Individual Differences, Psychology and Educational Sciences, KU Leuven
Supervisors: Prof.dr. W. Vanpaemel & Prof.dr. F. Tuerlinckx
1 October 2010 – 1 October 2016

Summary of thesis

Psychology faces a deep crisis of confidence and is at the risk of losing its credibility. Researchers are being criticized for the way they are conducting studies, analyzing data and reporting results. Confronted with this poor research quality in psychology, several recommendations have been made to overcome this problem. The goal of this dissertation is to make a contribution to this enterprise of improving research quality in the field of psychology.

In Chapter 1, we carry out a replication study, implementing the most commonly made recommendation for good research practices. In Chapter 2, we extend the class of recommendations that focus on transparency by highlighting the importance of an increased transparency about arbitrary choices in data processing. We suggest that instead of performing only one analysis, researchers should perform a multiverse analysis, which involves performing all analyses across the whole set of alternatively processed data sets corresponding to a large set of reasonable scenarios.
Chapters 3 and 4 cover topics concerning Bayes factors, which are being advocated as a Bayesian alternative for null hypothesis significance testing. In Chapter 3, we compare the Bayes factor with an alternative Bayesian model selection method: the Prior Information Criterion (PIC). We show that the PIC can lead to conclusions that not only widely differ from the conclusions based on the Bayes factor, but are also highly undesirable. Finally, in Chapter 4, we extend the core idea of Bayes factors - considering average fit rather than best fit - to qualitative data. We explore the potential of Parameter Space Partitioning - a model evaluation tool that focuses on qualitative data patterns - as a model selection method, focusing on average model fit with respect to the qualitative aspects of the data.

Geert van Kollenburg
Computer Intensive Methods for Evaluating Latent Class Model Fit

13 November 2017
Tilburg School of Social and Behavioral Sciences, Methodology and Statstistics
Supervisors: Prof.dr. J.K. Vermunt & Dr. ir. J. Mulder
Financed by NWO grant
1 July 2012 – 1 July 2017

Project description

I am working on a project funded by the NWO Vici grant *"Stepwise model-fitting approaches for latent class analysis and related methods*".
Assessment of model fit traditionally involves calculating p-values based on asymptotic reference distributions. However, this is not always appropriate or possible. When contingency tables are sparse, asymptotic reference distributions may lead to dramatically biased Type-I-error rates (Reiser & Lin, 1999). In other situations, statistics are used for which the sampling distribution is unknown. In these situations empirically derived sampling distributions can be obtained through resampling techniques.
In my first paper we applied the posterior predictive check (Gelman et al., 1996; Rubin & Stern, 1994) to obtain empirical p-values for a number of commonly used fit statistics within the context of latent class analysis.
In my second paper we are developing a calibration method for the posterior predictive check. The rest of my project will focus on developing diagnostics for latent class models in combination with resampling techniques.

Coosje Veldkamp

The human fallibility of scientists. Dealing with error and bias in academic research

8 November 2017
Tilburg School of Social and Behavioral Sciences, Methodology and Statstistics
Supervisors: Prof.dr. J.M. Wicherts, Prof.dr. M.A.L.M. van Assen
Financed by NWO Vidi grant
17 September 2012 – 17 September 2016

Project description

Inferential statistics play a key role in many sciences. Although the **normative** workings of these statistical tools are well established, surprisingly little is known about how researchers use them in practice, how often they make mistakes therein, and whether their expectations affect their (reported) statistical results. Recent results highlight a high prevalence of errors in the reporting of statistical results in peer-reviewed journals and show that these errors are predominantly in favor of the researcher's hypothesis. We argue that **human factors in statistics are a potential source of bias** in the (reported) outcomes of scientific studies.

In this project, we study how human factors affect the accuracy of reported statistical results in the scientific literature, and to what extent scientists differ from non-scientists with respect to human fallibility. Taking a social-psychological as well as a methodological perspective, we aim to learn more about the psychology of the use of statistics

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Mathilde Verdam

Using Structural Equation Modeling to Investigate Change in Health-Related Quality of Life

6 April 2017
Research Institute of Child Development and Education/Department of Medical Psychology, University of Amsterdam
Supervisors: Prof.dr. F.J. Oort & Prof.dr. M.A.G. Sprangers
Financed by Dutch Cancer Society (KWF)
1 June 2012 – 31 May 2016

Project description
Structural equation modeling (SEM) can be used to investigate different types of change in health-related quality of life (HRQL) outcomes, among which so-called 'response shift'. Response shift refers to a change in the meaning of one's self-evaluation, caused by a change in internal standards of measurement (i.e., recalibration), values regarding the relative importance of subdomains (i.e., reprioritization), or definition of the target construct (i.e., reconceptualization). Response shift effects may cause changes in observed scores that are not directly caused by changes in the construct of interest (e.g., HRQL). Therefore, taking into account possible response shift is important for a valid assessment of change.

This thesis focused on several methodological issues with regard to the SEM approach for the detection of response shift and the assessment of change in HRQL outcomes. We compared the SEM approach to the 'then-test' approach, which is one of the most commonly applied methods for the detection of response shift (Chapter 2). We extended the SEM approach for detection of response shift to the situation in which there are many measurement occasions (Chapters 3, 4 and 5), and for the analysis of discrete data (Chapters 6 and 7). Finally, we explained how to calculate and interpret effect-size indices of change to enable interpretation of the clinical significance of response shift (Chapter 8).
The overall aim of this thesis is to facilitate applications of response shift detection, and thereby contribute to a better understanding of response shift phenomena and thus change in HRQL.

Marlies Vervloet
Unraveling and unlocking the assets of principal covariates regression

26 September 2017
Quantitative Psychology and Individual Differences, Psychology and Educational Sciences, KU Leuven
Supervisors: Prof.dr. E. Ceulemans & Prof.dr. W. van den Noortgate
1 October 2010 – 1 October 2016

Project description
In the behavioral sciences, researchers often link a criterion to multiple predictors, using multiple linear regression. In almost all cases the main aim of the analysis is to obtain a better understanding of the unique and shared relations between the predictors and the criterion. A complication that is often encountered is that the set of potential predictors is rather large. This raises an interpretational burden, because the regression weights only reflect the unique effects of the predictors on the criterion and shed no light on shared effects. Moreover, the more predictors, the more chances increase that at least some of the predictors will be highly correlated with a linear combination of the other predictors. This so-called

multicollinearity phenomenon is problematic because it leads to unstable regression weights. A promising but overlooked method that was presented in chemometrics to deal with these complications is principal covariates regression (PCovR).
PCovR tackles the complications through a dimension reduction approach. It captures the main information in the predictors in a limited number of summarizing variables, called components. Simultaneously, PCovR uses these components to predict the criterion. The most important assets of PCovR are that this simultaneous optimization of reduction and prediction always has a closed form solution, and that users can choose to which degree reduction and prediction are emphasized through a weighting parameter. Nevertheless, PCovR is not often used in the behavioral sciences, because of some remaining obstacles, which we attempt to clear in this doctoral dissertation.
In Chapter 2, we zoom in on the weighting parameter. We report the results of a literature study and an extensive simulation study with regard to how to tune this parameter. Model selection in PCovR, however, does not only consist of selecting the weighting parameter value, but also of selecting the number of components. We propose four model selection strategies in Chapter 3 and put the performance of these strategies to the test in two simulation studies. Moreover, we compare the obtained PCovR solution to those that result from two more popular dimension-reductionbased techniques: partial least squares (PLS) and principal components regression (PCR), showing that PCovR outperforms the other two in recovering data generating components that explain variance in the criterion. Chapter 4 compares the performance of PCovR and exploratory structural equation modeling (ESEM). ESEM is a factoranalysis-based method that can be used to estimate PCovR-like models. Finally, in Chapter 5, we present the R package PCovR. This package allows users to perform all PCovR analysis steps: preprocessing the data, parameter estimation, model selection, and rotating the retained solution for easier interpretation.

4.3 New projects

Elise Crompvoets – *Pairwise comparisons within education*

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

Summary

The method of pairwise comparison is a data collection and scaling method for preference data. The method is used to create a rank order of objects, which is achieved by comparing pairs of objects on a trait. The method of pairwise comparison has been known for a long time, but it has only recently received attention in education. In education, administering a complete design of pairwise comparisons (e.g., of student assignments) is often unfeasible for judges (e.g., teachers) due to the large number of comparisons to be executed. Therefore, comparisons are selected based on an adaptive algorithm, but available algorithms may not be optimal. This research investigates the application of the method of pairwise comparison in education. First, we plan to develop an adaptive pair-allocation algorithm with optimal outcome quality taking the measurement error of the ordering into account. Second, we apply paired comparison judgment to peer evaluation of non-cognitive traits. Third, we model the evaluation of scripts using a scale rather than a dichotomous choice. Lastly, we develop a generic model to estimate a rank order of objects based on either paired comparison data, rank order data or rubrics data. Because we want to take the uncertainty of the parameters into account, we use a Bayesian modeling approach, which is well suited for uncertainty modeling. To conclude, we contribute to the data collection procedures and modeling approaches of pairwise comparison data in education. In this research project, we investigate available procedures for pairwise comparison in education, develop new designs for data collection and enhance modeling approaches using a Bayesian framework.

Niek C. de Schipper – *Big data in the Social Sciences: Statistical methods for multi-source high-dimensional data*

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

Summary

Social science research has entered the era of big data: Many detailed measurements are taken and multiple sources of information are used to unravel complex multivariate relations. For example, in studying obesity as the outcome of environmental and genetic influences, researchers increasingly collect survey, dietary, biomarker and genetic data from the same individuals. Such novel integrated research can inform us on health strategies to prevent obesity. Although linked more-variables-than-samples (called high-dimensional) multi-source data form an extremely rich resource for research, extracting meaningful and integrated

information is challenging and not appropriately addressed by current statistical methods. A first problem is that relevant information is hidden in a bulk of irrelevant variables with a high risk of finding incidental associations. Second, the sources are often very heterogeneous, which may obscure apparent links between the shared mechanisms. Hence, a statistical framework is needed to select the relevant groups of variables within each source and link them throughout data sources. Simultaneous component analysis methods are particularly powerful for high-dimensional data. In this project I will contribute to the development of a new framework by extending simultaneous component analysis to allow for the identification of common components defined by relevant clusters of variables in multi-source high-dimensional data.

Anne Elevelt – *Smart(phone) surveys*

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

Summary
Almost everyone has a mobile phone and more and more of such phones are capable of doing much more than calling. The fact that people carry their smartphone with them everywhere they go offers great opportunities for social scientists interested in studying attitudes and behaviors. Smartphones can for example track how much we move around, how active we are, how often we interact with people, take snapshot images, record sounds, and serve as a device for reaching people almost instantaneously. Opportunities abound.
In my dissertation, I focus on smartphone-only survey research. The goal of this PhD project is two-fold. Firstly, I want to generate empirical knowledge about smartphone-only surveys as fundamental methodological knowledge is lacking. For example by investigating non-response and measurement quality in a smartphone-only study. Secondly, I want to contribute to the optimization of smartphone research as scientists know very little about *how* to do research via smartphones. For example by investigating how we could effectively ask participants for consent to share sensor data, and how we could use sensor and paradata.

Jonas Haslbeck – *Modeling Dynamics in Psychopathology*

Psychological Methods, Faculty of Social and Behavioural Sciences
Supervisors: Prof.dr. D. Borsboom & Dr. L.J. Waldorp
Financed by ERC
1 December 2015-30 November 2019

Summary
The goal in this PhD project is to develop models that are (a) flexible enough to capture the complex dynamics of psychological disorders and (b) are interpretable and useful to inform treatment selection.

Letty Koopman – *Scaling methods for multilevel test data*

Department of Child Development and Education, Faculty of Social and Behavioural Sciences, University of Amsterdam
Supervisors: Prof.dr. L.A. van der Ark & Dr. B.J.H. Zijlstra
Financed by NWO Research Talent Grant
1 November 2016-31 October 2020

Summary

Several measurement instruments require multiple raters. Examples include an exam in which the responses of each student are rated by two instructors, and the Child Behavior Checklist in which both parents rate the child's behaviour. Data obtained with these measurement instruments have a multilevel structure, and traditional scaling and item analyses yield inaccurate results with respect to the quality of the measurement instrument. Using flexible measurement models, we develop flexible statistical methods to both construct and assess measurement instruments involving multiple raters. The resulting methods will be made available in user-friendly software.

Jules Kruijswijk – *On Hierarchical Structures in the Multi-Armed Bandit Problem*

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

Summary

In the canonical multi-armed bandit (MAB) problem a gambler stands in front of a row of slot machines, each with a (potentially) different payoff. It is up to the gambler to decide in sequence which machine to play and, during the course of sequentially playing the machines, she aims to make as much profit as possible by simultaneously learning from the previous observations and using the gained knowledge to steer future actions. The gambler needs to pick a strategy that dictates which arm to play next given the previous observations. The strategies that have been developed over the years have found numerous practical applications.
Noticeably, a very large number of (field) experiments in the social sciences can be formalized as a bandit problem (for example the random clinical trial). In the social sciences, we often encounter hierarchical structures (e.g., observations within individuals). Surprisingly, the performance of the MAB strategies when such hierarchical dependencies are present has hardly been studied. In traditional statistics, however, there is plenty of research on hierarchical models. We want to focus our effort towards contributing to the multi-armed bandit problem research by developing strategies that take hierarchical dependencies into account.

Paul Lodder – Latent variable prediction models in clinical and medical psychology

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

Summary
Traditional prediction in health research involves the use of unweighted sum scores to predict health outcomes. The use of sum scores in prediction is problematic for several reasons. First, this approach lacks a measurement model, so it does not take into account measurement errors and the attenuated predictions that they create. Second, the absence of a measurement model inhibits researchers from answering some important substantive questions, like whether the latent variable underlying tests scores is itself responsible for a particular prediction or whether any of the test items (e.g., reflecting narrow symptoms) show any additional direct paths to the predicted outcome. A third limitation of prediction based on sum scores is their inability to detect which items are more or less informative for certain regions of the latent scale. Failing to model such item characteristics might lead to non-linear test characteristic curves and hence to non-linearity and/or heteroscedasticity in regression analyses. Fourth, predictions based on sum scores do not allow for differences between unobserved (latent) subgroups in the prediction and/or measurement model.
These limitations can be solved by latent prediction models, a specific type of latent variable model involving both a measurement model and a prediction model. In each project we will focus on assumptions underlying such prediction models (e.g. linearity; multivariate normality) and use simulation studies to investigate how violations of these assumptions affect Type I & II errors and the accuracy of parameter estimates. By doing so, we not only aim to be psychometrically innovative, but we also strive to answer important substantive questions in medical psychology. We will specifically investigate the relationship between health and Type D personality. As this personality type can be modeled as a statistical interaction between its two subcomponents, our projects will involve the modeling of latent interaction effects.

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

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

Summary
In psychological testing, or exams, three measurement aspects are important: tests have to be valid, reliable and fair for the test takers. Meaning that the chance of passing on an exam only needs to be related to measured ability of a test taker. To have a fair cut-score on each exam, tests need to be empirically equated, preferable with Item response theory (IRT), and the cut-score transferred from one exam to another. Unfortunately, IRT has large sample requirements. Besides sample size, also other aspects influence the estimation precision in statistical equating and in transferring the cut-score, such as, test length, samples ability, anchor test etc. This research is about studying these effects.

The main research question is '*Which of these sources of errors affect most the final cut-score, which has been determined by means of statistical equivalence, and is it possible to minimize those sources of error in such a way that the final cut-score that is transferred, has a small margin of error*?'

Erik-Jan van Kesteren – *New Dimensions in Social Science: Extending Structural Equation Models to Accomodate Novel Data Sources*

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

Summary

Using traditional data such as questionnaires, social and behavioural scientists have become highly familiar with Structural Equation Modelling (SEM) as a method to understand relationships between unobserved constructs. However, new technologies generating fundamentally different types of data are rapidly becoming available. Currently, SEM cannot be used with these often complex and high-dimensional data. This project aims to enable their use by (a) incorporating machine learning techniques into the SEM framework, and (b) extending those techniques to leverage substantive theory encoded in SEM. This opens new integrated ways of researching interdisciplinary social science questions.

Leonie V.D.E. Vogelsmeier – *Understanding between – and within – person differences in experience sampling measurements using mixture factor analysis*

Methodology & Statistics, Tilburg School of Social and Behavioral Sciences, Tilburg University
Supervisors: Prof.dr. J.K. Vermunt & Dr. K. de Roover
Financed by NWO Research Talent Grant
1 July 2017-30 June 2021

Summary

Experience sampling, in which participants are questioned repeatedly via smartphone apps, is popular for studying psychological constructs (e.g., wellbeing, depression) within subjects over time. The validity of such studies, e.g., regarding decisions about treatment allocation over time, may be hampered by distortions of the measurement of the relevant constructs, e.g., by response styles or substantively altered interpretations of questionnaire items. This project develops a new approach for disentangling the distortions from the actual construct measurements while taking the specific features of experience sampling studies into account. The method will be implemented in user-friendly existing software.

Jacqueline N. Zadelaar – *Why speeding on your scooter is a good idea: Decision strategies in childhood and adolescence*

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

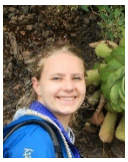
Summary
Children and adolescents may make decisions different from adults. We theorize that, whereas adults are able to integrate multiple decision attributes, children and adolescents are unable to do so. Specifically, we argue that children and adolescents use decision strategies in which attributes are treated sequentially: first, the most important attribute is considered, if options differ sufficiently on this attribute, a decision is made; if not, the second most important attribute is considered, etc. This strategy may yield suboptimal decisions, as positive differences on one attribute are not compensated by negative differences on others. As this may have far reaching consequences, it is important to investigate this phenomenon. We assess our theory by testing three key hypotheses. First, we test whether decisions of children and adolescents are better described by formal sequential models than by formal integrative models. Second, we test whether an intervention derived from our theory is beneficial for suboptimal decision makers. Third, we test whether decision related brain networks are characterized by features indicative of sequential decision strategies.

In the methodological projects, we develop methods to model decision strategies and to analyze strategy differences in neuroimaging data. In the empirical projects, we apply these methods to test the three key hypotheses. Therefore this research program provides a stringent test of our theory of decision making by children and adolescents, yields a new intervention, and provides new statistical methods that have wider applicability.

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



Hilde Augusteijn

Getting it right with meta-analysis: Assessing heterogeneity and moderator effect 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

Frank Bais

Respondent profiles and questionaire 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

Tessa Blanken

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

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

Nadja Bodner

Boolean Networks

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

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

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

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

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

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

Mathijs Deen

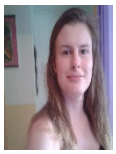
Resampling methodology for longitudinal data analysis

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



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

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

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

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

Zhengguo Gu

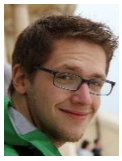
Monitoring Individual Change in Mental Health Care and Education

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

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



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 monioring 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

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

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

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

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 classifcation 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

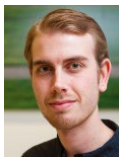
Tim Loosens

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

Merijn Mestdagh
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 Febrauary 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

Oisin 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

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

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

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

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

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

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

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

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

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

Lieke Voncken

Norming Methods for Psychological Tests

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

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

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

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

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

Jelte **Wicherts** was appointed professor on April 1st at Tilburg University on Methodology of Social and Behavioral Sciences.

5.2 Staff changes

Junior staff members admitted to IOPS in 2017

- Dr. Emmeke **Aarts** – Utrecht University
- Dr. Laura **Bringmann** – University of Groningen
- Dr. Angelique **Cramer** – Tilburg University
- Dr. Kyle M. **Lang** – Tilburg University
- Dr. Mathilde **Verdam** – University of Leiden

Junior staff members leaving IOPS in 2017

- Dr. Reza **Mohammadi** – Tilburg University

Senior staff members leaving IOPS in 2017

- Dr. Marcel **Croon** – Tilburg University (retirement)
- Dr. Gunter **Maris** – Cito, University of Amsterdam
- Dr. ir. Hans **Vos** – University of Twente (retirement)

Staff movements within IOPS in 2017

- Dr. Noémi **Schuurman** – From Utrecht to Tilburg

Emeritus status

IOPS proudly keeps in touch with its emeritus members.
No staff members entered the emeritus status in 2017.

	1 Januari 2017	31 December 2017
Junior staff members	37	41
Senior staff members	74	71
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 Mathilde **Verdam** (junior): m.g.e.verdam@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 Raoul **Grasman** (senior): r.p.p.p.grasman@uva.nl
  Dr Maarten **Marsman** (junior) - m.marsman@uva.nl
- Dr Dylan **Molenaar** (junior): d.molenaar@uva.nl
- Prof. Han **Van der Maas** (senior): h.l.j.vandermaas@uva.nl
- Prof. Eric-Jan **Wagenmakers** (senior): e.m.wagenmakers@uva.nl
- Dr Lourens **Waldorp** (senior): l.j.waldorp@uva.nl
- Dr Robert **Zwitser** (junior): r.j.zwitser@uva.nl

Department of Psychology - Developmental Psychology

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

Department of Psychology - Work and Organizational Psychology

-

Department of Child Development and Education - Methods and Statistics

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

University of Groningen

Department of Psychology

- Dr Casper **Albers** (senior): c.j.albers@rug.nl
- Dr Laura **Bringmann** (junior): l.f.bringmann@rug.nl
- Prof. Henk**Kiers** (senior): h.a.l.kiers@rug.nl
- Prof. 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
- Dr Stéphanie **Van den Berg** (senior): stephanie.vandenberg@utwente.nl
- Dr Bernard **Veldkamp** (senior): b.p.veldkamp@utwente.nl

Tilburg University

Department of Methodology and Statistics

- Dr Marjan **Bakker** (junior): m.bakker_1@tilburguniversity.edu
- Dr Angelique **Cramer** (junior): a.o.j.cramer@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 Kyle M. **Lang** (junior): k.m.lang@tilburguniversity.edu
- Dr Guy **Moors**, (senior): guy.moors@tilburguniversity.edu
- Dr Joris **Mulder** (junior): j.mulder3@tilburguniversity.edu
- Dr Noémi **Schuurman** (junior): n.k.schuurman@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 Emmeke **Aarts** (junior): e.aarts@uu.nl
- Dr Lakshmi **Balachandran Nair** (junior): l.balachandrannair@uu.nl
- Dr Maarten **Cruyff** (senior): m.cruyff@uu.nl
- Prof. Edith **De Leeuw** (senior): e.d.deleeuw@uu.nl
- Dr Ellen **Hamaker** (senior): e.l.hamaker@uu.nl
- Dr David **Hessen** (senior): d.j.hessen@uu.nl
- Prof. Herbert **Hoijtink** (senior): h.hoijtink@uu.nl
- Prof. Irene **Klugkist** (senior): i.klugkist@uu.nl
- Dr Rebecca **Kuiper** (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 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
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5.4 Associated staff members

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5.5 Honorary emeritus members

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- Prof. Wim **Van der Linden,** wim_vanderlinden@ctb.com
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- 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

- Prof. dr. Edith De Leeuw (2017). Helen Dinerman Award for ”life time contribution to the field of public opinion”. World Association of Public Opinion Research, July 20, 2017.
- Prof. dr. Edith De Leeuw (2017). Award for outstanding services to survey research. European Survey Research Association, July 15, 2017.
- Prof. dr. H.A.L. Kiers (Recipient) Reviewer Award, Psychometrika, July 21, 2017.
- D. Veen (Recipient), N.E.E. van Loey (Recipient), A.L. van Baar (Recipient), F.N.K. Wijnen (Recipient) & R. van de Schoot (Recipient), EADP/ERU Best Poster Award, received for the poster presented at the 18th European Conference on Developmental Psychology, August 30, 2017.
- Dr. Daniel Oberski (Recipient), Young Academy, KNAW, January 1, 2017.
- Mijntje ten Brummelaar (Recipient), Annemiek Harder (Recipient), Wendy Post (Recipient), Margrite Kalverboer (Recipient) & Erik Knorth (Recipient), Nominatie Horizon Academieprijs, 2017.
- L. Elffers & S. Jak (2017). NRO Overzichtsstudies, project: "Licht op schaduwonderwijs" €50.000.

6.1.2 NWO Grants

NWO Veni, Vidi, Vici grants
These are part of the NWO Innovational Research Incentives Scheme [*Vernieuwingsimpuls*]

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	€ 8**00.000**
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.	Testing competing theories	Veni	2013 - 2018	€ 250.000

(2013), Tilburg University				
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
Wagenmakers, E.J. (2017), University of Amsterdam	Monitoring evidential flow	Vici	September 2017 – September 2022	€ 1.500.000
Wicherts, J.M. (2012), Tilburg University	Human Factors in statistics	Vidi	September 2012 – September 2017	€ 800.000

NWO Aspasia grants

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

Hickendorff, M. (2016), Leiden University	Developing a classroom observation instrument (Sep 2016 – April 2018)	€ 13.500

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.

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. & J. Van Os (2016), UvA Amsterdam	Psychosis: Towards a Dynamical Systems Approach	PhD student Adela **Isvoranu**	1 Sept. 2016 - 1 Sept. 2020	
Hamaker, E. & Van der Heijden, P. (2015), Utrecht Un.	Not straightforward: Mediation and networks in continuous time	PhD student Oísin **Ryan**	1 Sept. 2015 - 1 Sept. 2019	€ 219.170
Hoijtink, H. (2015), Utrecht Un.	How to hedge our bets in educational testing:	PhD student Kimberly **Lek**	1 Sept. 2015 - 1 Sept. 2019	€ 219.170

	combining test results with teacher expertise			
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. (gestopt)	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
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 Duijn, M.A.J.	Co-Evolution of Networks and Real-Valued Actor Attributes'	PhD student Nynke M.D. Niezink	1 Sept. 2013 – 1 Sept. 2017	€ 160.235
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
Wicherts, J.M. (2013) Tilburg University	The psychometrics of stereotype threat	PhD student Paulette **Flore**	1 Sept. 2013 – 1 Sept. 2017	€ 165.000
Wagenmakers, E.J. (2017), University of Amsterdam	Blinded Analysis as a Cure for the Crisis of Confidence	PhD student Alexandra Sarafoglou	2017-2021	€ 224.201
Wilderjans, T.F. & Rombouts, S.A.R.B. (2016) Leiden University	Clusterwise Independent Component Analysis for multi-subject (resting state) fMRI data	PhD student Jeffrey **Durieux**	1 Sept. 2016 – 1 Sept. 2021	€ 219.474
Other NWO grants				
Hoijtink, H.	Individual development: Why some children thrive and others don't	PI in NOW Gravity Grant	2012-2022	€ 540.000
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
Marsman, M. (2017), University of Amsterdam	The psychometrics of learning	NWO Innovational Research Incentives Scheme Veni	2017 -	€ 250.000
Van Schaik, J.E. & **Raijmakers, M.E.J**. (2016).	The Element of Surprise: Variability as the trigger of science conceptualization and transfer in kindergartners	NRO-Postdocs in Education Research	2016-2019	€ 147.240

Veenstra, R., Dijkstra, J.K., Vollebergh, W., Harakeh, Z., **Van Duijn, M.,** & Steglich,C. (2013)	Social networks processes and social development of children and adolescents	NWO-PROO	2013 -	€ 717.326
Veldkamp, B.P. (2017), University of Twente	Data2Game: Enhanced efficacy of computerized training via player modelling and individually tailored scenarios	NWO	2017	€ 596.000
Veldkamp, B.P. (2017), University of Twente	Formatieve Evaluatie (with Oberon)	NRO	2017	€ 70.000
Veldkamp, B.P. (2017), University of Twente	Datagedreven onderwijsonderzoek	NRO	2017	€ 66.000

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
Fokkema, M.	Prediction rule ensembles: Interpretable models for psychological research	International Short Visit Grant by Swiss National Science Foundation (SNF)	2017	CHF 9.400 (≈€8.500)
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
Lugtig, P.J., **Toepoel**, V.	Funding for developing the infrastructure of the Gender and Generations Programme	GGP (ERC-grant)	1-1-2017-1-1-2019	€80.000
Wagenmakers, E.J. (2011), University of Amsterdam	Bayes or Bust: Sensible hypothesis tests for social scientists	Consolidator grant by the European Research Council	May 2012-May 2017	€1.500.000
Wagenmakers, E.J. (2017), University of Amsterdam	A unified framework for the assessment and application of cognitive modeling	European Research Council (ERC)	December 2017 – December 2022	€ 2.500.000

Grants awarded to KU Leuven, University of Leuven				
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
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., **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 Governement	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., **Tuerlinkx**, F. (2016)	Postdoc grant	Fund Scientific Research (FWO), Flanders, Belgium	1 Oct 2016-30 Sep 2019	3 years 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				
De Rooij, M.	Stacked Domain Learning for multi-domain data: a new ensemble method	Leiden Data Science Research Program (PhD student Wouter van Loon)	2017-2021	€100.000

Dingemans, A.	The effectiveness of an e-health intervention with expert patient support in individuals with an eating disorder: A randomized controlled trial	ZonMW – Onderzoeksprogramma GGZ Middellange termijn	2016-2017	€410.110
Hamaker, E.	Ontwikkelen onderdeel Mplus v8		1 dec 2015-15 apr 2017	€18.940
Hickendorff, M. (Leiden University)	Review study on the relation between teaching factors and student outcomes in methamatics education	PI in grant by NRO and Inspectorate of Education	1 feb 2017 – 1 jun 2017	€ 50.000
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
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.
Lugtig, P.	Review op uitgevoerde surveys voor Ministerie van Economische Zaken		Okt 2016-jul 2017	€27.500
Meijer, J., Imandt, M., Snoek, M., Van Blankenstein, F.M. & **Van der Ark**, L.A. (2015)	Voorspellende waarde, effecten en onderliggende mechanismen van selectieprocedures in de lerarenopleidingen	Research fund granted by Nationaal Regieorgaan Onderwijsonderzoek (NRO)	1 Feb 2016 31 Jan 2020	€598.200
Sachisthal, M., Peetsma, T., Van der Maas, L.J. & Raijmakers, M.E.J.	ASAP Science – Motivation in Science Video Watching: The Role of Individual Differences and Video Characteristics.	PhD grant awarded by the Yield Research Priority Area, University of Amsterdam	2016-2020	200K.

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 Renswoude, D., **Raijmakers**, M. & **Visser**, I.	Gaze-Patterns Tell the Tale: A Model-Based Approach to Free-Scene Viewing in Infancy	PhD Project granted by the research priority area Yield and the Psychology Research Institute from the University of Amsterdam	2016-2020	200 KE
Van der Heijden, P. & **Cruyff,** M. (Utrecht Un.)	Event history analysis for population size estimation of elusive populations	Grant for International PhD project, funded by the faculty of Social and Behavioural Sciences	1 Sept. 2015 1 Sept. 2019	€ 200.000
Van der Heijden, P. & **Cruyff,** M. (Utrecht Un.)	Nota omvangschattingen Huiselijk Geweld en Kindermishandeling met vangst-hervangst methoden	WODC-CBS	Jul 2017-1 feb 2018	€53.860
Van der Heijden, P. (Utrecht Un.)	WODC cybercriminaliteit		Jun 2016-nov 2017	€16.112,5
Van der Heijden, P. & **Cruyff,** M. (Utrecht Un.)	WODC Dark Number schatting		Jun 2016-Dec 2017	€20.475
Van der Heijden, P. (Utrecht Un.)	Applied Data Science	PhD-traject A. Bagheri	15 dec 2017-16 dec 2021	€100.000 van ITS Universiteit Utrecht en €50.000 van UMCU en €50.000 van M&S Utrecht
Van der Heijden, P. (Utrecht Un.)	Opstartfinanciering focusgebied Applied Data Science	Betaald door de faculteit Sociale Wetenschappen (Utrecht Un.)	1 aug 2017-1 apr 2018	€100.000
Van der Heijden, P. (Utrecht Un.)	PhD-traject “Respondent Profiles and Questionnaire Profiles is Surveys”	PhD-traject Frank Bais	1 jan 2014-1 jan 2018	€100.000 van CBS en €100.000 van M&S Utrecht
Visser, I., Colonnesi, C., Rodeburg, R., Van Oostrom, K. & Möller, E.	Infant Early Self-regulation, Attention and Joint-Attention Difficulties as Predictors of Later Self-Regulation Problems	PhD project granted by the research priority area Yield from the University of Amsterdam	2018-2022	215 KE
Wijngaards, L. (Utrecht Un.)	Matchingsproject		1 jan 2013-1 mrt 2018	€350.000

6.2 Awards and grants honored to IOPS PhD students

6.2.1 Scientific awards

In 2017, the following IOPS PhD students were honored with a scientific award:

- Tessa **Blanken**: IOPS Best Poster Award (Summer 2017)
- Paulette **Flore:** IOPS Best Presentation Award (Summer 2017)
- Merijn **Mestdagh**: IOPS Best Presentation Award (Winter 2017)
- Leonie **Vogelsmeier**: IOPS Best Poster Award (Winter 2017)
- Adela **Isvoranu**: Unilever Research Prize, 2017.
- **Nathalie Ramona de Vent** & Joost Agelink van Rentergem: ***ANDI – Advanced Neuropsychological Diagnostics Infrastructure.*** Amsterdam Science & Innovation Award 2017

6.2.2 Grants

Joost **Kruis:** Travel grant IMPS 2017 (21 July 2017).

7 Research output

7.1 Scientific publication

7.1.1 Dissertations by IOPS PhD students

Epskamp, S. (2017, April 5). Network psychometrics. Universiteit van Amsterdam. Prom./coprom.: prof.dr. D. Borsboom & dr. L.J. Waldorp.

Sense, F. (2017). Making the most of human memory: Studies on personalized fact-learning and visual working memory [Groningen]: University of Groningen.

Verdam, M. G. E. (2017). *Using structural equation modeling to investigate change in health-related quality of life.*

7.1.2 Other dissertations under supervision of IOPS staff members

Beau Oldenburg, Ph.D. thesis Bullying in Schools. The role of teachers and classmates, defended RuG, January 19, 2017.

Fissette, M. V. M. (2017). *Text mining to detect indications of fraud in annual reports worldwide* Enschede DOI: 10.3990/1.9789036544207.

Steingröver, H. M. (2017, April 21). Safe models for risky decisions. Universiteit van Amsterdam. Prom.: prof.dr. E.-J. Wagenmakers.

Tollenaar, N. (2017). Prediction modelling for population conviction data. Utrecht University.

Van der Bles, A.M. (2017). Societal discontent: Deciphering the Zeitgeist [Groningen]: Rijksuniversiteit Groningen

Wanders, R.B.K. (2017). Symtems and depression: It is time to break up [Groningen]: University of Groningen .

7.1.3 Refereed article in a journal

Aardoom J.J., Dingemans A.E., Fokkema M., Spinhoven P. & Van Furth E.F. (2017), Moderators of change in an Internet-based intervention for eating disorders with different levels of therapist support: what works for whom?, *Behaviour Research and Therapy* 89: 66-74.

Abebe, H. T., Tan, F. E. S., van Breukelen, G. J. P. & Berger, M. P. F. (2017). JMASM45: A computer program for Bayesian D-optimal binary repeated measurements designs (Matlab). *Journal of Modern Applied Statistical Methods,* 16, 1, p. 689-721 33 p.

Abebe, Haftom Temesgen; Tan, Frans E.S.; van Breukelen, Gerard J.P.; Berger, Martijn P.F. (2017). JMASM45: A computer program for Bayesian D-optimal binary repeated measurements designs (Matlab). *Journal of Modern Applied Statistical Methods*, Vol. 16, No. 1, 37, p. 689-721.

Agelink van Rentergem Zandvliet, J. A., Murre, J. M. J., & Huizenga, H. M. (2017). Multivariate normative comparisons using an aggregated database. *PLoS One, 12*(3), [e0173218].

Aghajani M., Klapwijk E.T., Van der Wee N.J., Veer I.M., Rombouts S.A., Boon A.E., Van Beelen P., Popma A., Vermeiren R.R. & Colins O.F. (2017), Disorganized amygdala networks in conduct-disordered juvenile offenders with callous-unemotional traits, *Biological psychiatry*, 82(4): 283-293.

Agnoli, F., Wicherts, J. M., Veldkamp, C. L. S., Albiero, P., & Cubelli, R. (2017). Questionable research practices among Italian research psychologists. *PLoS one*, *12*(3), [0172792]. DOI: 10.1371/journal.pone.0172792.

Albers, C., & Gower, J. (2017). Visualising interactions in bi- and triadditive models for three-way tables. *Chemometrics and Intelligent Laboratory Systems*, 167, 238-247. DOI: 10.1016/j.chemolab.2017.05.014.

Amir, Yufitriana; Tan, Frans E. S.; Halfens, Ruud; Lohrmann, Christa; Schols, Jos (02.2017). Pressure Ulcer Prevalence and Care in Indonesian Hospitals : A Multicenter, Cross-sectional Evaluation Using an Extended Donabedian Model. *Ostomy Wound Management*, Vol. 63, No. 2, p. 8-23.

Anguelova G.V., Rombouts S.A.R.B., Van Dijk J.G., Buur P.F. & Malessy M.J.A. (2017), Increased brain activation during motor imagery suggests central abnormality in Neonatal Brachial Plexus Palsy, *Neuroscience Research*, 123: 19-26.

Audigier, V., White, I. R., Jolani, S., Debray, T. P. A., Quartagno, M., Carpenter, J., ... Resche-Rigon, M. (2017). Multiple imputation for multilevel data with continuous and binary variables. *Statistical Science*.

Bachrach, N., Croon, M. A., & Bekker, M. H. J. (2017). The role of sex and autonomy-connectedness in internalizing and externalizing personality pathology, coping and axis-I pathology: Among psychiatric and healthy elderly. *Aging & Mental Health*, *21*(6), 642-650. DOI: 10.1080/13607863.2016.1146870.

Backhaus, Ramona; van Rossum, Erik; Verbeek, Hilde; Halfens, Ruud J. G.; Tan, Frans E. S.; Capezuti, Elizabeth; Hamers, Jan P. H. (19.01.2017). Relationship between the presence of baccalaureate-educated RNs and quality of care : a cross-sectional study in Dutch long-term care facilities. *BMC Health Services Research*, Vol. 17, 53.

Backhaus, Ramona; van Rossum, Erik; Verbeek, Hilde; Halfens, Ruud J. G.; Tan, Frans E. S.; Capezuti, Elizabeth; Hamers, Jan P. H. (01.2017). Work environment characteristics associated with quality of care in Dutch nursing homes: A cross-sectional study. *International Journal of Nursing Studies*, Vol. 66, p. 15-22.

Bais, F., Schouten, J. G., Lugtig, P. J., Toepoel, V., Arends-Tóth, J., DOUHOU, S., ... Vis, C. (2017). Can survey item characteristics relevant to measurement error be coded reliably? A case study on eleven Dutch general population surveys. *Sociological Methods and Research*, 1-33.

Bartel, K., van Maanen, A., Cassoff, J., Friborg, O., Meijer, A. M., Oort, F., ... Gradisar, M. (2017). The short and long of adolescent sleep: the unique impact of day length. *Sleep Medicine*, *38*, 31-36. DOI: 10.1016/j.sleep.2017.06.018.

Baumgartner S.E., Lemmens J.S., Weeda W.D. & Huizinga M. (2017), Measuring Media Multitasking. Development of a Short Measure of Media Multitasking for Adolescents, *Journal of Media Psychology*, 29(4): 188-197.

Bekker GA, Tobi H, Fischer ARH. Meet meat: An explorative study on meat and cultured meat as seen by Chinese, Ethiopians and Dutch. Appetite 2017, 114: 82-92. DOI: 10.1016/j.appet.2017.03.009.

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7.1.7 Conference contribution (proceeding)

Borsboom, D. (Invited speaker) (7 Oct 2017). Netwerkbenaderingen van psychopathologie. Anoiksis.

Borsboom, D. (Keynote speaker) (10 Nov 2017). Netwerkbenaderingen van psychopathologie. Vereniging voor Gedragstherapie en Cognitieve therapie (VGCt). Netherlands.

Borsboom, D. (Keynote speaker) (14 Nov 2017). Network approaches to psychopathology. Erasmus University Rotterdam.

Borsboom, D. (Keynote speaker.) (29 Sep 2017). Netwerkbenaderingen van psychopathologie. Stichting Onverklaarde Lichamelijke Klachten (SOLK).

Sacha Epskamp (Organiser) Eiko Fried (Organiser) (18-20-Jan 2017) Psychological network analysis: estimation, inference, and stability. Gent, Belgium.

Frans, N., Post, W., Oenema-Mostert, I. & Minnaert, A. (23 Aug 2017). Preschool and Kindergarten Teachers' Conceptions of Standardized Norm-Referenced Assessment.

Husken, T. F., Cruyff, M. J. L. F., & van der Heijden, P. G. M. (2017). Incorporating cyclical effects and time-varying covariates in models for single-source capture-recapture data. In M. Grzegorczyk, & G. Ceoldo (Eds.), *Proceedings of the 32 International Workshop on Statistical Modelling: Groningen, Netherlands, 3-7 July 2017* (Vol. 1, pp. 311-316). Groningen.

Jansen, B. (Speaker) (13 Oct 2017). Who's afraid of mathematics? KU Leuven Invited lecture at Faculteit Psychologie en Pedagogische Wetenschappen, Campus Kulak Kortrijk, KU Leuven.

Jansen, B. (Speaker) (14 Feb 2017). Als de vrees afneemt, komt er ruimte voor liefde... Conferentie Taal en Rekenen, Kenniscentrum Taal en Rekenen.

Jansen, E., Van Duijn, M., Post, W. & Landman, E. (2017) Studiesucces voorspellen?

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Meelissen, M. R. M., & Punter, R. A. (2017). Twintig jaar TIMSS in Nederland. In *Panama 2017: Goed en fout in het reken-wiskundeonderwijs.*

Molenaar, D. (Speaker) (25 Jul 2017). Workshop: Psychometric Modeling of Responses and Response Time Data. Deutschen Institut für Internationale Pädagogische Forschung (DIPF). Germany.

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Vischer, A-F.W.K., Grietens, H., Knorth, E.J. & Post, W.J. (2017). *Assessing parenting in the context of placement decisions on maltreated infants and toddlers: An evaluation study.*

Wagenmakers, E.J. (Organiser), Alexander Ly (Organiser),Quentin Gronau (Organiser),Johnny van Doorn (Organiser),Dora Matzke (Organiser),Michael Lee (Organiser) (2017). Seventh Annual JAGS and WinBUGS Workshop: Bayesian Modeling for Cognitive Science. http://bayescourse.socsci.uva.nl/index.php?src=home

Wagenmakers, E.J. (Organiser), Quentin Gronau (Organiser), Alexander Ly (Organiser), Johnny van Doorn (Organiser), Dora Matzke (Organiser) (28 – 29 Aug 2017). Theory and Practice of Bayesian Hypothesis Testing: A JASP Workshop. http://(https://jasp- stats.org/upcoming-events/jasp-workshop/.

Wagenmakers, E.J. (Speaker) (20 Apr 2017). "JASP: A Fresh Way to do Statistics". BBSRC STARS Course "Advanced Methods for Reproducible Science".

Wagenmakers, E.J. (Speaker) (20 Jun 2017). The maximum diagnosticity of the p-value. Workshop "Is there a future without null hypothesis significance testing?".

Wagenmakers, E.J. (Speaker) (2017). "Bayesian analysis with JASP: A fresh way to do statistics" 2017. Max Planck School for Language Sciences.

Wagenmakers, E.J. (Speaker) (2017). KNAW report: Replication studies. NAS.

Wagenmakers, E.J. (Speaker) (23 Feb 2017). "A personal perspective on the analysis of neuroscience data". 6th Berlin Winter School on Ethics and Neuroscience.

Wagenmakers, E.J. (Speaker) (Dec 2017). Barbecue chicken alert! BITTS, Berkeley, USA.

Wagenmakers, E.J. (Speaker) (Jun 2017). History and statistical foundation of preregistration. Tilburg University, Tilburg, the Netherlands.
Wagenmakers, E.J. (Speaker) (Mar 2017). “Bayesian Inference in Theory and Practice: A JASP Workshop”. Philips Research. Eindhoven, Netherlands.
Wagenmakers, E.J. (Speaker) (May 2017). “Bayesian Inference with JASP: A Fresh Way to Do Statistics". 29th Annual Convention of the Association for Psychological Science.
Wagenmakers, E.J. (Speaker) (Nov 2017). An introduction to JASP. Graduate School Neurosciences Amsterdam (ONWAR).
Wagenmakers, E.J. (Speaker) (Nov 2017). Hidden pseudoscience: Ailment, diagnosis, and cure. Amsterdam Skeptics in the Pub.
Wagenmakers, E.J. (Speaker) (Oct 2017). Redefine statistical significance with JASP. IMC.
Wagenmakers, E.J. (Speaker) (Oct 2017). The case for radical transparency in statistical reporting. ASA, American Sociological Association.
Wagenmakers, E.J. (Speaker) (Oct 2017). The why and how of testing a point-null hypothesis within a Bayesian framework. TU Delft.
Wagenmakers, E.J. (Speaker) (Sep 2017). “JASP Training Course” 20th Conference of the European Society for Cognitive Psychology (ESCoP).
Wagenmakers, E.J. (Speaker) (Sep 2017). Bayesian statistics without tears. Oxford University.
Wagenmakers, E.J. (Speaker) (Sep 2017). JASP/Evidence. BITTS.
Wagenmakers, E.J. (Speaker) (22 Feb 2017). The methodological metamorphosis of neuroscience. 6th Berlin Winter School on Ethics and Neuroscience.
Yildiz, D., van der Heijden, P. G. M., & Smith, P. W. F. (2017). *Estimating population counts with capture-recapture models in the contact of erroneous records in linked administrative data*. (pp. 1-27). (Vienna Institute of Demography; Vol. 15/2017). Vienna: Austrian Academy of Sciences.
Zwitser, R. (Speaker) (18 Jul 2017). On the Difference between Modeling DIF and Correcting for DIF. 82nd Annual Meeting of the Psychometric Society. Zurich, Switzerland.

7.2 Professional publication

De Leeuw, E. D. (2017). “You better start swimming”: van de telefoon naar de (niet) kanssteekproef. *CLOU : het magazine voor marketing research & digital analystics*.
De Leeuw, E. D. (2017). Na nepnieuws nu ook nepvragenlijsten. *CLOU : het magazine voor marketing research & digital analystics*, *82*.
De Leeuw, E. D. (2017). Survey-onderzoek en big data maken big survey. *CLOU : het magazine voor marketing research & digital analystics*, *84*.
Grasman, R. P. P. P. (2017). Meta-analysis in JASP.
Kruis, J. (Author). (2017). How theoretically distinct mechanisms can generate identical observations: Contribution for Psych Network Blog.
Sijtsma, K. (2017). Is de peer review in crisis? Welke crisis? *De psycholoog* 52 (9), 36-42.
Van der Maas, H. L. J. (2017). Feitenloze wetenschap speelt de post-waarheid politiek in de kaart. *Beleid & Maatschappij, 44*(2), 140-142.
Wagenmakers, E. M. (2017). Het zwaard van Alhazen. *Skepter, 30*, 34-35.

Wicherts, J. M. (2017). The weak spots in contemporary science (and how to fix them). *Animals*, *7*(12), [90]. DOI: 10.3390/ani7120090

7.2.1 Article in journal

Balachandran Nair, L. (2017). *Scientific Integrity in Qualitative Research (SCIQUAL) Seminar 2017. Utrecht University, Utrecht, the Netherlands; September 13-14, 2017: Conference Report*.

Gerritse, S. C., Bakker, B. F. M., & van der Heijden, P. G. M. (2017). *The impact of linkage errors and erroneous captures on the population size estimator due to implied coverage*. Den Haag/Heerlen: Statistics Netherlands.

Niessen, A.S.M., & Meijer, R. R. (2017). A review of the book Who Gets In? Strategies for Fair and Effective College Admissions, by R. Zwick. Journal of Educational Measurement, 54(4), 550-553. DOI: 10.1111/jedm.12160.

Niessen, S., & Meijer, R. (2017). Voorspellen in het kader van de studiekeuzecheck: Tijd voor verbetering. Onderzoek van onderwijs, 46(2), 5-7.

Ruiter, S.A.J., Hurks, P.P.M., & Timmerman, M.E. (2017). IQ-score is dringend aan modernisering toe: Naar een nieuwe interpretatie en classificatie van de geschatte intelligentie. Kind en Adolescent Praktijk, 16(1), 16-23. DOI: 10.1007/s12454-017-0005-y.

Schmand, B. A., Agelink van Rentergem Zandvliet, J. A., de Vent, N. R., Murre, J. M. J., & Huizenga, H. M. (2017). Advanced Neuropsychological Diagnostics Infrastructure (ANDI): Voor een scherpere neuropsychologische diagnostiek. *Tijdschrift voor Neuropsychologie, 12*(2), 114-124.

Vugteveen, J., Timmerman, M., de Bildt, A., & de Wolff, M. (2017). Hoe goed signaleert de SDQ problemen bij jongeren? Kind en Adolescent Praktijk, 16(3), 34-36. DOI: 10.1007/s12454-017-0033-7

7.2.2 Report

Hickendorff, Mostert, T. M. M., Van Dijk, C. J., Jansen, L. L. M., Van der Zee, L. L., & Auer, M. F. F. (2017). *Rekenen op de basisschool. Review van de samenhang tussen beïnvloedbare factoren in het onderwijsleerproces en de rekenwiskundeprestaties van basisschoolleerlingen*. Universiteit Leiden. Published on NRO-website https://www.nro.nl/nro-projecten-vinden/?projectid=405-17-920.

Houtman, I. L. D., Eekhout, I., Venema, A., Bakhuys Roozeboom, M., & van Buuren, S. (2017). *Health and safety risks at the workplace: a joint analysis of three major surveys*. Luxembourg: European Agency for Safety and Health at Work (EU-OSHA). DOI: 10.2802/835406.

Lugtig, P. J., ter Mors, E., & Bethlehem, J. G. (2017). *Het meten van de gevolgen van aardbevingen op de leefbaarheid in Groningen: Een methodologische review naar leefbaarheidsonderzoeken*. Nationaal Coordinator Groningen.

Rebber, A. I., van den Berg, S. M., & Meelissen, M. R. M. (2017). *Secundaire analyses op de data van TIMSS-2015: een nadere analyse van leerkrachtpercepties en de referentieniveaus voor rekenen en natuuronderwijs*. Enschede: Universiteit Twente.

Smits, M., van Maanen, A., Meijer, A. M., van der Heijden, K., & Oort, F. (2017). Cognitive, health and psychosocial effects of melatonin and light therapy in childhood insomnia. Double-blind placebo-controlled study. *Sleep Medicine*, *40*(Supplement 1), [e310]. DOI: 10.1016/j.sleep.2017.11.912.

Veldkamp, B. P., Schildkamp, K., Keijsers, M., Visscher, A. J., & de Jong, A. J. M. (2017). *Verkenning data-gedreven onderwijsonderzoek in Nederland*. Universiteit Twente.

7.3 Popular publications

Albers, C. (2017). Lies, damn lies en tijdreeksen. Nieuw Archief voor Wiskunde, 05/18(2), 99-101.

Albers, C. (2017). Slim tellen. Nieuw Archief voor Wiskunde, 18(1), 23-25.

Albers, C. (2017). The statistician Alan Turing. Nieuw Archief voor Wiskunde, 5/18(3), 209-210.

Albers, C. (2017) Column van het jaar. Nieuw Archief voor Wiskunde, 5/18 (4).

Albers, Casper | Computer kan aan een foto zien of iemand homo of hetero is - klopt dit wel?21/09/2017De Volkskrant (National), Netherlands, Printhttps://www.volkskrant.nl/wetenschap/computer-kan-aan-een-foto-zien-of-iemand-homo-of-hetero-is-klopt-dit-wel~a4517703/.

Albers, Casper | Ionica ging voor u op zoek naar het Getal van het Jaar 30/12/2017 De Volkskrant (National), Netherlands, Printhttps://www.volkskrant.nl/binnenland/ionica-ging-voor-u-op-zoek-naar-het-getal-van-het-jaar~a4551596/?utm_source=link&utm_medium=social&utm_campaign=shared%20content&utm_content=paid&hash=0b40d9d5bee6d83dbdcb422c1426ecbd91a604dd.

Albers, Casper | Controversial software is proving surprisingly accurate at spotting errors in psychology papers, Science Magazine 28-11-2017.

Albers, Casper | “Waarom statistici willen dat de wetenschap strenger wordt”, De Volkskrant 29-09-2017.

Albers, Casper | “Klopt dit wel? Het twee keer zo veel uitvallen van Max Verstappen is geen toeval meer, toch?”, De Volkskrant 7-9-2017.

Albers, Casper | “Pas op, cijfers! Lees eerst deze instructies”, De Volkskrant, 10-6-2017.

Albers, Casper | “Het CBS wil cijfers vlotter gaan presenteren”, De Volkskrant 10-6-2017.

Hickendorff, Marian | Leraar24 press release ‘Weinig verschillen tussen scholen in rekenprestaties’. 7 December 2017. https://www.leraar24.nl/412667-2/.

7.4 Other results

Van Assen, A., Dickscheit, J., Post, W., Grietens, H., Walma, L. & Van Driel, M. (2017). *Kinder- en jeugdcoaching voor kinderen en jongeren in gezinnen met meervoudige en complexe problematiek: effectief en preventief?* Pending grant application at Pro Juventute.

7.4.1 Editorial activities

Albers, C. (Editor) : Computers & Education (Journal) (since Nov 2015).

Candel, M.J.J.M. (Statistical advisor). BMC Medical Research Methodology.

De Rooij, M. (Associate editor). Behaviormetrika. (since 2016).

De Rooij, M. (Associate editor). Statistica Neerlandia. (since 2017).

De Rooij, M. (Associate editor). Electronic Journal of Applied Statistical Analysis. (since 20??).

Fokkema, M. (Associate editor). European Journal of Psychological Assessment. (since 2015).

Hickendorff (Guest Editor). Learning and Individual Differences. Special Issue “Modelling individual differences in students' cognitions and development: Latent variable mixture model approaches” (2016-2018).

Hoijtink, H., & Chow, S. M. (2017). Bayesian hypothesis testing: Editorial to the special issue on Bayesian data analysis. *Psychological Methods*, *22*(2), 211-216. DOI: 10.1037/met0000143.

Kiers, H. (Editor) : Psychometrika (Journal) (since 1994).

Meijer, R. (Editor) : Journal of Personality Assessment (Journal) (since 2014).

Timmerman, M. (Editor) : Psychometrika (Journal) (since 2007).

Van Duijn, M.A.J. Co-Editor Statistica Neerlandica.

Visser, I. (associate editor). British Journal of Mathematical and Statistical Psychology (since 2014).

7.4.2 Software and test manuals

Gu, Z., & Van Deun, K.*RegularizedSCA: Regularized simultaneous component based data integration. R package version 0.4.2.*

Kampert, M.M., Meulman, J.J. & Friedman, J.H. J Classif (2017). rCosa: A Software Package for Clustering Objects on Subsets of Attributes. 34: 514. https://doi.org/10.1007/s00357-017-9240-z.

Li, X., Dusseldorp, E., Liu, K. and Meulman, J. (2017), Meta-CART: A Flexible Approach to Identify Moderators in Meta-Analysis. R package version 1.1-2.

Visser, I. (2017). glba: General Linear Ballistic Accumulator Models. R package version 0.2. https://CRAN.R-project.org/package=glba.

Zeileis, A., Gruen, B., Leisch, F., Umlauf, N., Smits, N., Birbaumer, M., & Ernst, D. *Package ‘exams’: Automatic generation of exams in R.*

Vink, G. (Author), & Lugtig, P. J. (Author). (2017). Ampute.

Gu, X. (Author), Hoijtink, H. J. A. (Author), & Mulder, J. (Author). (2017). Bain.

Mulder, K. T. (Author). (2017). CircGLMBayes.

Zondervan - Zwijnenburg, M. A. J. (Author). (2017). complexity: Calculate the Proportion of Permutations in Line with an Informative Hypothesis.

Veen, D. (Author). (2017). DAC.

Mulder, K. T. (Author). (2017). flexcircmix.

Vink, G. (Author). (2017). Mice: ad hoc methods and the mice algorithm.

Vink, G. (Author), & van Buuren, S. (Author). (2017). Mice: Algorithmic convergence and interference pooling.

Vink, G. (Developer), & van Buuren, S. (Developer). (2017). Mice: An approach to sensitivity analysis.

Vink, G. (Developer), & van Buuren, S. (Developer). (2017). Mice: Imputing multilevel data.

Vink, G. (Developer), & van Buuren, S. (Developer). (2017). Mice: Passive imputation and post-processing.

Vink, G. (Author), & van Buuren, S. (Author). (2017). Mice: The imputation and nonresponse models.

Vink, G. (Author). (2017). Parlmice: faster, paralleler, micer.

7.4.3 (Paper) presentation

Andre, L., Peetsma, T. T. D., van Vianen, A., & Oort, F. J. (2017). *Future time perspective in education, work, and health domain: Conceptualizations and relationships with attitudes and behaviors*. Paper presented at Theoretical and Empirical Issues of Future Time Perspective: Research Paths, Lima, Peru.

Bron, R., Endedijk, M. D., & Veldkamp, B. P. (2017). *Exploring higher education teacher team learning using text mining analysis*. Paper presented at EARLI 2017, Tampere, Finland.

Candel M.J.J.M. Optimizing the predictive power of individual polynomial growth curves in linear mixed model regression, presentation at the 6th Channel Network Conference of the International Biometric Society, April, 24-26, 2017, Hasselt, Belgium.

Fokkema, M. (2017) *Prediction Rule Ensembles, or a Japanese Gardening Approach to Random Forests*. Invited lecture at University College London & Anna Freud Centre for Children and Families, Evidence Based Practice Unit.

Fokkema, M. (2017) *Introduction to Classification and Regression Trees, Rendom Forests and Model-Based Recursive Partitioning in R*. Invited workshop at the Zurich R Courses (a continuing education program of ETH and University of Zurich).

Fokkema, M. (2017) *Recursive Partitioning Methods*. Invited lecture at the Feedback Research Expert Meeting, Leiden University, Dept. of Clinical Psychology.

Fokkema, M. (2017) *Prediction Rule Ensembles, or a Japanese Gardening Approach to Random Forests*. Invited lecture at ETH Zurich, Seminar for Statistics.

Hickendorff, M. & Stevenson, C.E. (2017): *Learning to solve figural analogies: the paths children take*. Paper presentation EARLI 2017, Tampere, Finland, September 2017.

Hickendorff, M. (2017): *Third to sixth graders' word-problem solving*. Paper presentation EARLI 2017, Tampere, Finland, September 2017.

Huber-Mollema, Y., Rodenburg, H. R., Lindhout , D., & Oort, F. J. (2017). *Neurocognitive development of children prenatal exposure to antiepileptic drugs: preliminary results of the Dutch observational study Eurap&Development (NL)*. Poster session presented at 32nd International Epilepsy Congress Barcelona , Barcelona, Spain.

Huber-Mollema, Y., Rodenburg, H. R., Lindhout , D., & Oort, F. J. (2017). *Social cognition of children exposed to antiepileptic drugs in utero*. Poster session presented at 32nd International Epilepsy Congress Barcelona , Barcelona , Spain.

Koopman, V. E. C., de Rooij, M., Zijlstra, B. J. H., & van der Ark, L. A. (2017). *Bias of two-level scalability coefficients and their standard errors*. Paper presented at 82nd International Meeting of the Psychometric (IMPS) 2017, Zürich, Switzerland.

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Niessen, A. (2017). Predicting academic achievement in college admission procedures. Abstract from 12th Dutch-Flemish Research Meeting on Personnel Recruitment and Selection, Ghent, Belgium.

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Roorda, D. L., Jak, S., Zee, M., Oort, F. J., & Koomen, H. M. Y. (2017). *Teacher-student relationships and students' achievement: Using a meta-analytic approach to test the mediating role of engagement*. Poster session presented at Biennial Meeting of the Society for Research in Child Development (SRCD) 2017, Austin, United States.

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Van der Zwaan, J. M., Smink, W. A. C., Sools, A. M., Westerhof, G. J., Veldkamp, B. P., & Wiegersma, S. (2017). *Flexible NLP Pipelines for Digital Humanities Research*. Paper presented at 4th Digital Humanities Benelux Conference 2017 , Utrecht, Netherlands.

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Van Rijn-van Gelderen, L., Bos, H. M. W., Jorgensen, T. D., Ellis-Davies, K., Winstanley, C. A., Golombok, S., ... Lamb, M. E. (2017). *Wellbeing of gay fathers with children born through surrogacy*. Paper presented at 18th European Conference on Developmental Psychology, ECDP 2017, Utrecht, Netherlands.

7.4.4 In press

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7.4.5 Miscellaneous

Balachandran Nair, L. (2017). Re: Assessing quality in qualitative research. *British Medical Journal*.

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Van den Berg, S. M., Schwabe, I., & Janss, L. (2017). Can we validate twin studies? A census-based heritability estimate of educational achievement. *Behavior genetics*, 47(6), 695-695. DOI: 10.1007/s10519-017-9879-6

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Van Weert, J. C. M., Bol, N., Smets, E. M. A., Verdam, M. G. E., & Linn, A. J. (2017). *Communicatie-op-maat met ouderen met kanker: adviezen aan zorgverleners op basis van patiëntprofielen*. Abstract from Geriatriedagen, Den Bosch, Netherlands.

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8 Finances

8.1 Financial statement 2017

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 2017. The participation fee for 2017 was € 700 per PhD student. Associated institutes with PhD students in the IOPS Graduate School, participated on the same terms.
Apart from the above mentioned annual contributions, no other funds are available for the IOPS Interuniversitary Graduate School.

This resulted in a credit balance for the year 2017 of € 4.274,76

8.2 Summary of receipts and expenditures in 2017

Receipts		**Expenditures**		
		Salaries IOPS office		
		Secretary, 0,4 fte	26.907,83	
Contribution participating institutions	48140,00	Salary director 0,1fte	17.489,31	
		Course	3.600,00	
		Subtotal		47.997,14
		Printed matter	9,89	
		Office supplies	30,73	
		Travel	531,74	
		Representation costs	3.845,26	
Subtotal Receipts	48140,00	Subtotal		4.417,62
Negative financial outcome 2016	4.274,76			
Total receipts	52.414,76	**Total expenditures**		52.414,76

8.3 Balance sheet 2017

IOPS Own Funds 2017			
Debet	**Euro**	**Credit**	**Euro**
Own Funds 31-12-2017	63.381.97	Own Funds 01-01-2017	67.656,73

		Results 2017	-4.274.76
Total Debet	63.381,97	Total Credit	63.381,97

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: 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: Louise Stutterheim 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	Grote Kruisstraat 2/1, 9712 TS Groningen

Department of Psychology	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/Anne-Marie Heijden 013 466 2544 m.c.c.timmermans@tilburguniversity.edu / a.m.j.heijden@uvt.nl
Utrecht University Faculty of Social and Behavioural Sciences	
Methodology and Statistics	P.O. Box 80.140, 3508 TC Utrecht Secretary: Chantal Molnar-van Velde 030 253 4438 c.molnar@uu.nl
KU Leuven, University of Leuven, Belgium Faculty of Psychology and Educational Sciences	
Research Group of Quantitative Psychology and Individual Differences	Tiensestraat 102 box 3713, B-3000 Leuven, Belgium Secretary: 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 Amsteram Secretary: Sherida Slijmgaard 020 598 8951, s.r.slijmgaard@vu.nl
Department of Biological Psychology	Van der Boechorststraat 1, 1081 BT Amsteram Secretary: Stephanie van de Wouw 020-598 8792 s.b.vande.wouw@vu.nl
Maastricht University Faculty of Health, Medicine and Life Sciences & Faculty of Psychology & Neuroscience	
Department of Methodology and Statistics	P.O. Box 616, 6200 MD Maastricht Secretary: Edith van Eijsen 043 388 2395 e.vaneijsden@maastrichtuniversity.nl
Erasmus University Rotterdam	
Department of Econometrics	P.O. Box 1738, 3000 DR Rotterdam Secretary: Research Office 010 408 1370 / 1377 researchoffice@ese.eur.nl
Department of Psychology, Education & Child Studies	P.O. Box 1738, 3000 DR Rotterdam Secretariat D-PECS 010 408 8789 / 8799 sec-dpecs@fsw.eur.nl
Wageningen University	
Biometrics	P.O. Box 8130, 6700 EW, Wageningen Secretary: Dinie Verbeek and Hanneke Ommeren 0317 48 5702 biometris@wur.nl

Appendix 2: IOPS Summer Conference 2017

27th IOPS Summer Conference
8-9 June 2017
Leuven

Conference venue:	Justus Lipsiuszaal (LETT 08.16) Erasmushuis, Blijde-Inkomststraat 21, 3000 Leuven
Dinner:	Bistro Julia en Elias Busleidengang 6D, 3000 Leuven

Emergency Number KU Leuven:+32 (0)16 32 **2222**

Program prior to the conference Thursday 8 June

10:30-12:00 IOPS Board Meeting (Room LETT 06.15)

Program Thursday 8 June

12:00-13:00 Registration/Lunch (entrance hall - ground floor)

13:00-13:15 IOPS PhD student meeting

13:15-13:30 Official opening by Rob Meijer, IOPS director

13:30-13:55 **Geert van Kollenburg**, Tilburg University
Computer intensive methods for testing model fit 7

13:55-14:20 **Chris Hartgerink**, Tilburg University
Validity of using statistics to detect data fabrication 9

14:20-14:45 **Kirsten Bulteel**, KU Leuven
Improved insight into network dynamics by combining VAR and dimension reduction 11

14:45-15:15 Break (entrance hall - ground floor)

15:15-15:40 **Mattis van den Bergh**, Tilburg University
Latent class trees 13

15:40-16:40 **Invited speaker Paul De Boeck**,
The Ohio State University & KU Leuven
How ordinal are responses on ordinal response scales? 15

16:40-17:00 IOPS plenary meeting

17:00-18:30	Poster Session & Drinks (entrance hall - ground floor)	
	Tessa Blanken, Free University Amsterdam *From heterogeneous insomnia to (more) homogeneous subtypes – results of a latent class cluster analysis*	**28**
	Nadja Bodner, KU Leuven *A dynamic network approach to affective family interactions*	**29**
	Sopiko Gvaladze, KU Leuven *A permutation based test for detecting outlying variables in simultaneous component analysis*	**30**
	Adela Isvoranu, University of Amsterdam *A network approach to psychosis*	**31**
	Maliheh Namazkhan, University of Groningen *Statistical modelling of energy saving measures*	**32**
	Don van den Bergh, Eline Van Geert, Anna Schnell, University of Amsterdam & KU Leuven *Exhibition of Shiny apps developed for the TquanT project*	**33**
19:00-	Conference dinner at Bistro Julia & Elias	

Program Friday 9 June

09:00-09:30	Registration/Coffee (entrance hall)	
09:30-09:55	**Robbie van Aert**, Tilburg University *Estimating replicability of science by taking statistical significance into account*	17
09:55-10:20	**Paulette Flore**, Tilburg University *The psychometrics of stereotype threat*	19
10:20-10:45	**Tim Loossens**, KU Leuven *Surfing the emotional landscape*	21
10:45-11:15	Break (entrance hall)	
11:15-11:40	**Pia Tio**, Tilburg University & University of Amsterdam *Estimating cross-source relationships from big data using component- and networks-analysis*	23
11:40-12:05	**Alexandra de Raadt**, University of Groningen *Properties of Cohen's kappa*	25
12:05-12.50	**Wolf Vanpaemel**, KU Leuven *Prior predictive modelling in psychology*	27
12:50-13:00	Closing by Rob Meijer, IOPS director	
13:00	(Take away) Lunch (entrance hall)	

Computer intensive methods for testing model fit

Geert van Kollenburg (Tilburg University)

The assessment of model fit is an important part of statistical analysis. The researchers' interest may lie with specific aspects of a model, or in the global aggregated fit. Asymptotic p-values are not available for every conceivable statistic and even when they are available they may not be valid when sample sizes are not very large. To get more reliable p-values, researchers may resort to resampling methods. Some of these methods are time consuming, while others may provide p-values which are not uniform under the null-hypothesis. The most common resampling methods to test model fit will be illustrated in Latent Class analysis and linear regression analysis. A recently proposed calibration of the posterior predictive p-value, will be discussed. Finally, a very fast new resampling scheme is presented, which does not require multiple model estimations.

Student discussant: *Mattis van den Bergh*
Staff discussant: *Tom Wilderjans*

Validity of using statistics to detect data fabrication

Chris Hartgerink (Tilburg University)

We investigate the performance of general statistical methods to detect data anomalies due to data fabrication. With these methods, we tried to discern genuine- and fabricated data in two studies, focusing on either summary results or raw data. Because we do not know how researchers fabricate data, we asked actual researchers to fabricate data for experimental studies instead of simulating datasets ourselves. The results indicate that there is a clear heuristic for detecting data fabrication in papers: too large effect sizes. The presentation will provide an overview of these methods and their efficacy.

Student discussant: *Robbie van Aert*
Staff discussant: *Eva Ceulemans*

Improved insight into network dynamics by combining VAR and dimension reduction

Kirsten Bulteel (KU Leuven)

To understand within-person psychological processes, a VAR(1) model is often fitted to time series and the resulting VAR(1) coefficients are displayed in a network figure. However, this approach is not without problems. First, we often expect substantial contemporaneous correlations between the variables, yielding multicollinearity problems and thus unstable regression estimates. Second, the VAR(1) coefficients offer a fairly limited insight in the dynamics because the regression coefficients only capture unique direct effects of the variables and not the shared effects. In addition, the network figure is uninterpretable when the number of variables is large. In this paper, we show that the strategies that have been proposed in dynamic network analysis --the use of relative importance metrics, and applying the lasso-- are unsatisfactory. As a way out, we propose to combine dimension reduction of the variables and VAR(1) modeling. We will inspect two possibilities: The novel easy-to-apply principal components VAR(1) (PC-VAR(1)) model, and exploratory process factor analysis (EPFA), a dynamic factor analysis counterpart of PC-VAR(1). By means of an application, we show that the networks based on PC-VAR(1) or EPFA give a more informative representation of both the lagged and the contemporaneous relations among the variables.

Student discussant: *Merijn Mestdagh*
Staff discussant: *Sacha Epskamp*

Latent class trees

Mattis van den Bergh (Tilburg University)

Researchers use latent class analysis to derive meaningful clusters from sets of categorical observed variables. However, especially when the number of classes required to obtain a good fit is large, interpretation of the latent classes in the selected model may not be straightforward. To overcome this problem, we propose an alternative way of performing a latent class analysis, which we refer to as latent class tree modelling. For this purpose, we use a recursive partitioning procedure similar to those used in divisive hierarchical cluster analysis; that is, classes are split until the model selection criterion indicates that the fit does no longer improve. The key advantage of the proposed latent class tree approach compared to the standard latent class analysis approach is that it gives a clear insight into how the latent classes are formed and how solutions with different numbers of classes are linked to one another. We also propose measures to adjust the tree in certain conditions, extend the method for longitudinal data and show how to relate class membership with external variables. Empirical examples will be used to clearly illustrate the benefits of latent class trees.

Student discussant: *Jed Cabrieto*
Staff discussant: *Dylan Molenaar*

How ordinal are responses on ordinal response scales?

Paul De Boeck (The Ohio State University & KU Leuven)

More and more studies indicate that responses on ordinal response scales such as Likert scales are multidimensional. Different latent variables seem to play a role depending on where on the response scale the response is selected. Among the major causes of response scale multidimensionality are response styles. In my presentation I will discuss a taxonomy of models for multidimensional response scales based on: (1) the three families of IRT models: difference models, divide-by-total models, and sequential models (IRTree models), the first of which corresponds to the default choice for ordinal factor analysis, and (2) the type of ordinality violations induced by the multidimensionality. Using these multidimensional response scale models it is possible to investigate how much information is available on the target latent variable in the extreme and midpoint response options. Empirical results will be presented from an analysis of big five personality inventory data.

Student discussant: *Chris Hartgerink*
Staff discussant: *Herbert Hoijtink*

Estimating replicability of science by taking statistical significance into account

Robbie van Aert (Tilburg University)

Consider the following common situation in science nowadays: A researcher reads about a (statistically significant) effect in the literature and replicates the original study. As a result, the researcher has two effect size estimates, and his/her key objective is to evaluate effect size based on these two study outcomes. This objective is particularly challenging if, opposed to the original effect size, the replication's effect size is small and not statistically significant. These challenging situations are omnipresent in science. For instance, 63.9% and 31.3% of the replicated studies in the Reproducibility Project Psychology (RPP) and the Experimental Economics Replication Project (EE-RP) were characterized by a statistically significant effect size in the original study and nonsignificant replication effect size.
The RPP and also EE-RP assessed effect size using fixed-effect meta-analysis. However, fixed-effect meta-analysis yields overestimated effect sizes because it does not take into account the statistical significance of the original study. We developed the snapshot Bayesian hybrid meta-analysis method (snapshot hybrid for short) that does take into account the statistical significance of the original study. This method quantifies the amount of evidence in favor of a zero, small, medium, or large underlying true effect size by computing posterior model probabilities. We will explain snapshot hybrid, and show the results of analytically approximating its statistical properties. We will also present results of applying the method to data of the RPP and EE-RP.

Student discussant: *Alexander Savi*
Staff discussant: *Rink Hoekstra*

The psychometrics of stereotype threat

Paulette Flore (Tilburg University)

The theory on stereotype threat is a popular explanation for the gender gap in mathematical test performance in high school and college students, and has been heavily researched by social psychologists. In those studies stereotype threat was either induced or alleviated through experimental manipulations, and subsequently led to a gender gap in math performance or the lack of a gender gap respectively. Whereas the studies on stereotype threat have been numerous, several methodological issues were (often) ignored, like power analysis, the nested structure of the data, random assignment to conditions on an individual level, and tests for measurement invariance. By means of a meta-analysis, two replication efforts and item level analyses we studied the psychometrics of stereotype threat.

Student discussant: *Aniek Sies*
Staff discussant: *Rob Meijer*

Surfing the emotional landscape

Tim Loossens (KU Leuven)

Despite a vast amount of theoretical and empirical research, there is still a large degree of isolation between the study of the neurobiology and the psychology of affect. We propose a neurobiologically inspired computational model to bridge this explanatory gap. The model is based on the emerging collective behavior of pooled populations of stochastic binary neurons, which excite one another within a pool and typically inhibit one another between pools (comparable to the Ising Decision Maker in choice RT). It can naturally account for nonlinear dynamical and non-dynamical features, such as bimodalities, metastable states, and sudden transitions, features which are observed in affective data samples.

Student discussant: *Kirsten Bulteel*
Staff discussant: *Don van Ravenzwaaij*

Estimating cross-source relationships from big data using component- and networks-analysis

Pia Tio (Tilburg University & University of Amsterdam)

Network analysis has successfully been applied to many different types of psychological data, including personality, cognitive performance, and clinical symptoms. While investigating these different areas in single domains is useful, a better understanding of their structure requires an integrated analysis with several domains or sources of information. Investigating such cross-source relationships often requires large data sets containing information about individuals from multiple sources (big data). Such data are becoming more and more commonplace. However, estimating a network using big data is not without its challenges. The dimension of the dataset, often containing more variables than observations, hinders accurate estimation of relations, even when some form of regularisation (e.g. lasso penalty) is used. Reducing the number of variables would be a straightforward way to remove (or at least reduce) this problem, except that we do not yet know which variables are involved in cross-source relationships. An additional challenge is that big data contains data from different sources that inherently may have different characteristics. For example, indicators of cognitive performance are expected to correlate much higher with one another than with indicators of gene expression. Applying network analysis to such data without taking this difference into account again leads to inaccurate estimation of relationships. We propose the Sparse Network and Component (SNAC) model, which combines regularized simultaneous component analysis with the network framework. Here we present the results of a simulation study demonstrating the benefits of SNAC in estimating cross-source relationships from big data.

Student discussant: *Xinru Li*
Staff discussant: *Laura Bringmann*

Properties of Cohen's kappa

Alexandra de Raadt (University of Groningen)

The first one is about how kappa coefficients are affected by missing data. Cohen's kappa coefficient is commonly used for assessing agreement between two nominal classifications of the same group of persons or objects. Three extensions of Cohen's kappa that can handle missing data are studied. Data are considered missing if there is only one rating of a person or object available. It is shown how the values of the kappas are affected by the amount of missing data using simulations.

The second one is about presenting the Pearson correlation instead of kappa coefficients. For example, in the presence of ordinal subscales, weighted kappa is commonly used to assess the degree of agreement between raters. Using a weighting scheme the distances between the categories are defined, but the form of the scheme is subjective. To avoid this subjectivity, we test whether the Pearson correlation is an effective statistic to present inter-rater reliability. In this study we use real data to calculate Cohen's kappa, the linearly kappa, the quadratically kappa, ICC(3,1), Pearson correlation and Spearman correlation. The Pearson correlation is used to examine whether there are correlations between the different statistics.

The third one is about the effect of deleting a bad category. The number of categories used in various classification schemes varies from the minimum number of two to five in many practical applications. If two categories are easily confused, they cause some disagreement and it may be useful to combine them. However, sometimes there is a single category that is confused with several other categories. In this case the category could e.g. be removed from the scale. In this project it is studied how to deal best with a bad category.

The fourth one is about reporting a category kappa instead of an overall value. In reliability and agreement studies researchers usually want to express the agreement between the raters in a single number. However, the patterns of agreement and sources of disagreement are often too complex to be summarized by a single number. In this project it is argued and illustrated with examples that reporting category kappas for the individual categories is much more informative than reporting a single overall value.

Student discussant: *Eva Zijlmans*

Staff discussant: *Marcel van Assen*

Prior predictive modelling in psychology

Wolf Vanpaemel (KU Leuven)

In this talk, I highlight that predictions are being underused in psychology. This is unfortunate, since they serve many important goals, such as quantifying model complexity, assessing model falsifiability, and evaluating models. To be able to unlock the promise of using predictions in psychology, modellers need to embrace informative parameter priors, augment their models with what can be termed a data prior, and overcome their hypochondriacal fear of subjectivity.

Student discussant: *Giulio Flore*
Staff discussant: *Jelte Wicherts*

From heterogeneous insomnia to (more) homogeneous subtypes – results of a latent class cluster analysis

Tessa Blanken (Free University Amsterdam)

Despite the high prevalence and moderate heritability of insomnia, it has proved remarkably difficult to pinpoint consistent characteristics and mechanisms, suggesting unrecognized heterogeneity. We considered the possibility that insomnia comes in different subtypes of pathophysiology that are differentially reflected in traits and other stable characteristics, and not necessarily also in the specificity of sleep complaints, as commonly assumed.

In N=2,224 participants of the Netherlands Sleep Registry that suffer from insomnia we extensively assessed sleep, life history, cognitive affect, and personality traits. We used latent class cluster analysis for a data-driven search for subtypes, and network analysis to quantify differential associations between their characteristics.

The latent class cluster analysis consistently identified five subtypes, or profiles, that show differential patterns across, most notably, personality factors, affect and life history.

Identifying subtypes facilitates a better understanding of the heterogeneous character of insomnia, which may (i) result in better classification of people with insomnia; (ii) benefit research on underlying mechanisms; and (iii) ultimately improve our ability to optimally tailor personalized treatments.

A dynamic network approach to affective family interactions

Nadja Bodner (KU Leuven)

Family processes have been identified as a key factor of successful adjustment in middle childhood and adolescence. In this study, we explored how affective behaviors differ between families with a depressed adolescent and families with a non-depressed one. During a problem solving interaction, mother's, father's and adolescent's behavior was coded in second-to-second intervals for the presence and absence of angry, dysphoric and happy affect. In the analyses of the resulting binary time series data, we focused on three features of the interaction pattern: frequencies of different affects, concurrent expressions of affect, and the temporal sequencing of affective behaviors. To this end, we computed Jaccard similarity indices on the simultaneous and on the lagged data and visualized the obtained values in networks.

A permutation based test for detecting outlying variables in simultaneous component analysis

Sopiko Gvaladze (KU Leuven)

When closely examining the component structure of multiple variables in different groups of participants, it often happens that the structures strongly resemble each other, but differ for a few variables. Detecting those outlying variables is of great interest as it may reveal interesting group differences. Moreover, having an identical component structure is a prerequisite for further comparisons (i.e., in the measurement invariance framework). To trace outlying variables, De Roover et al. (2014, in press) proposed to combine clusterwise simultaneous component analysis with a detection heuristic based on the Tucker congruence coefficient. However, this heuristic yields many false positives in difficult settings and it is not clear how high the Tucker congruence coefficient should be when no outlying variables are present. As a way out, in this presentation we propose to combine clusterwise SCA with a permutation based significance test. The behavior of both proposals is studied in a simulation study.

A network approach to psychosis

Adela Isvoranu (University of Amsterdam)

In recent years, network models in the fields of psychopathology and psychiatry have gained considerable attention and recognition. In such network models, psychological processes are conceptualized as complex systems in which observable psychological behavior, such as the critical transition to a psychotic episode, is assumed to arise from interactions between symptoms and other psychological, biological, and sociological agents rather than reflective of an unobserved disorder.

Here we used such network models (Borsboom & Cramer, 2013) to investigate how different types of traumatic childhood experiences relate to specific symptoms of psychotic disorders and to identify pathways that may be involved in the relationship between CT and psychosis. We used data of patients diagnosed with a psychotic disorder (n = 552) from the longitudinal observational study Genetic Risk and Outcome of Psychosis Project (Korver et al., 2012) and included the five scales of the Childhood Trauma Questionnaire-Short Form and all original symptom dimensions of the Positive and Negative Syndrome Scale. Our results show that all five types of CT and positive and negative symptoms of psychosis are connected through symptoms of general psychopathology. These findings are in line with the theory of an affective pathway to psychosis after exposure to CT, with anxiety as a main connective component, but they also point to several additional connective paths between trauma and psychosis: e.g., through poor impulse control (connecting abuse to grandiosity, excitement, and hostility) and motor retardation (connecting neglect to most negative symptoms). Overall, these findings suggest that several symptoms of general psychopathology may mediate the relationship between trauma and psychosis, providing evidence for multiple paths between trauma and psychosis. In addition, they re-emphasize the idea that CT is connected to a wide array of symptoms that are present in several mental conditions, and thus are not only specific to psychotic symptoms.

Statistical modelling of energy saving measures

Maliheh Namazkhan (University of Groningen)

To reduce households' energy consumption, using cost-effective energy saving measures such as insulation, solar panels and heat recovery systems will be beneficial for consumers, the energy industry and the environment. Such a reduction in dependency to fossil energy consumption requires household behavioural change. Inducing the necessary changes in household behaviours, not only requires a precise understanding of the energy consumption patterns of households but also a deep insight on house characteristics, household demographics, psychological variables, such as attitudes and beliefs of inhabitants, as well as external factors influencing energy consumption such as the weather, energy prices, inflation, etc. The objective of this project is to enabling industry to offer consumers guaranteed savings and to assists consumers in making informed decisions on investing in energy saving measures given their demographic and psychological characteristics. Mathematical-statistical model(s) incorporating a comprehensive list of variables will be developed to determine the probability distribution of the expected energy savings due to implementation of energy saving measures. The modelling framework will use several existing statistical, psychometric and econometric techniques such as regression, correlation, quality control and discriminant analysis as well as techniques from machine learning. The model(s) will be used to predict gas and/or electricity consumption of existing homes after a proposed energy saving measure, based on a wide range of relevant variables. The model will also be used in determining a minimum guaranteed saving. For households contemplating such an investment, this is important information. In our project, we use data on household characteristics and daily energy consumption patterns from the Dutch and possibly other European households that will be gathered through a survey and by our industrial partners respectively. The model will be developed, calibrated and tested on data from about 15 thousand participating households. Expected results will provide information on the projected short and long-run financial and energy savings due to various energy saving measures, taking into account potential behaviour changes of the households. Implications for the society as a whole, from the effectiveness of various measures in reducing fossil energy consumption and lower energy prices will be analyzed and reported. Furthermore, we will investigate which psychological variables are key influencers in energy consumption.

Exhibition of Shiny apps developed for the TquanT project

Don van den Bergh, Eline Van Geert, Anna Schnell
(University of Amsterdam & KU Leuven)

TquanT stands for "*Tools for Quantitative Thinking*" and it is collaborative project of 13 European universities (among which the University of Amsterdam and KU Leuven). The project is aimed at improving quantitative thinking of students and adult learners. To achieve this, the partners have committed themselves to develop and exchange interactive software with tasks and exercises for teaching quantitative thinking. Here we will show some of the output achieved during the first year of TquanT. TquanT is funded by the Erasmus+ Program of The European Commission.

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Psychometrics and
Sociometrics

Appendix 3: IOPS Winter Conference 2017

27th IOPS Winter Conference Tilburg

Tilburg, 14-15 December 2017

27th IOPS Winter Conference, 14-15 December 2017

Conference location: Tilburg University campus, Simon Building room SZ 31
Dinner: Tilbury 3, Tilburg University campus

Program prior to the conference - Thursday 14 December

10.30 - 12.00 **IOPS Board meeting (Simon building room: S801)**
11.30 - 12.00 **IOPS PhD student meeting (Simon building room: SZ 31)**
12.00 - 13.00 **Lunch and registration (Simon building room: S8 pavilion)**

Program Thursday 14 December (room: SZ 31)

13.00 - 13.05 **Official opening** by Rob Meijer and welcome by local organizer Jelte Wicherts

13.05 - 13:30 **Presentation Alexander Savi,** University of Amsterdam
A network approach to the development of intelligence
Discussants: Davide Vidotto & Gerko Vink

13.30 - 13.55 **Presentation Eva Zijlmans,** Tilburg University
Methods to Estimate Item-Score Reliability
Discussants: Iris Yocarini & Joost van Ginkel

13.55 - 14.20 **Presentation Merijn Mestdagh,** KU Leuven
Prepaid parameter estimation without likelihoods
Discussants: Yasin Altinisik & Noémi Schuurman

14.20 - 14.45 **Presentation Kees Mulder, Utrecht University**
What to do when you inevitably encounter circular data
Discussants: Annemiek Punter & Francis Tuerlinckx

14.45 - 15.15 **Break (S8 pavilion)**

15.15 - 15.40 **Presentation Jolien Cremers,** Utrecht University
One Direction? On the Modelling of Circular Data in Psychology
Discussants: Sara van Erp & Florian Böing-Messing

15.40 - 16.30 **Invited speaker Katrijn Van Deun,** Tilburg University
Big Data in the Social Sciences: Statistical methods for multi-source high-dimensional data
Discussants: Jolien Cremers & Ton de Waal

16.30 - 16.50 **Plenary meeting IOPS staff and students**

16.50 - 18.00 **Poster Session and Drinks (S8 pavilion)**

Elise Crompvoets, Tilburg University
Jeffrey Durieux, Leiden University
Anne Elevelt, Utrecht University
Paul Lodder, Tilburg University
Alexander Savi, University of Amsterdam
Niek de Schipper, Tilburg University
Sanne Smid, Utrecht University
Leonie Vogelsmeier, Tilburg University

18.30 **Conference dinner Tilbury 3**

Program Friday 15 December (room: SZ 31)

09.00 - 09.30	**Registration / Coffee (Foyer Simon building)**
09.30 - 10.15	**Presentation IOPS Best Paper Award 2016 Winner: Sacha Epskamp** New Developments and Future Directions in Network Psychometrics Discussants: Nitin Bushan & Kyle Lang
10.15 - 10.40	**Presentation Riet van Bork**, University of Amsterdam Focusing on the residual to understand item responses as a random variable Discussants: Merijn Mestdagh & Jelte Wicherts
10.40 - 11.05	**Break (S8 Pavilion)**
11.05 - 11.30	**Presentation Jed Cabrieto,** KU Leuven Testing for the presence of correlation changes in a time series: A permutation based approach **Discussants: Riet van Bork & Katrijn Van Deun**
11.30 - 11.55	**Presentation Annemiek Punter,** University of Twente Psychometric Modelling in International Large-Scale Assessments; a Presentation of Two Bi-Factor IRT Applications Discussants: Aniek Sies & Dylan Molenaar
11.55 - 12.20	**Presentation Aniek Sies,** KU Leuven Getting insight into a forest of decision trees Discussants: Jed Cabrieto & Marcel van Assen
12.20 - 12.35	**IOPS Best Poster/Presentation Award Ceremony 2017**
12.35 - 12.45	**Closing** by Rob Meijer
12.45	**Take away Lunch (Foyer Simon building)**

A network approach to the development of intelligence

Alexander Savi (University of Amsterdam)

The construct of general intelligence is deeply embedded in the complex dynamical system of cognitive development. It is the product of a great variety of both genetic and environmental influences, and their interactions. Current stationary factor models fail to reflect those complex dynamics, which in the most favorable scenario fiercely hampers our understanding of intelligence. Guided by generative network models and developmental phenomena, in this talk I briefly report on our ongoing efforts to incorporate the dynamics of development into a formal model of intelligence.

Student discussant: Davide Vidotto

Staff discussant: Gerko Vink

Methods to Estimate Item-Score Reliability

Eva Zijlmans (Tilburg University)

Reliability is usually estimated for a test score, but it can also be estimated for item scores. A higher item-score reliability indicates a higher degree of repeatability of the item score and is therefore important when evaluating the quality of an item. Three studies will be discussed. In the first study methods to estimate item-score reliability are discussed and investigated with regard to bias and accuracy by means of a simulation study. In the second study the three most promising methods are applied to a collection of empirical-data sets to investigate values one can expect in practice and to formulate a *possible* lower bound for item-score reliability estimates. Also, the relationship between the three item-score reliability methods and four other item functioning indices is investigated. A third study further investigates the performance of the three item-score reliability methods for a range of values for the population item-score reliability and the relationship of the three item-score reliability methods with the four item functioning indices.

Student discussant: Iris Yocarini

Staff discussant: Joost van Ginkel

Prepaid parameter estimation without likelihoods

Merijn Mestdagh (KU Leuven)

In various scientific fields, complex models are used that lack an analytically tractable likelihood. In these cases, parameter estimation requires extensive Monte Carlo simulations which comes with a substantial computational burden. However, while searching the parameter space, different model users with different data are likely to perform a number of very similar computations, all independent from each other. In each of these individual explorations, simulations are done that are potentially useful for other users with different data sets. Therefore, instead of focusing on improving the estimation process for a single dataset estimation, we propose a pooling of resources. Starting from a massive random sample of parameter values, we generate for each parameter set a very large data set under a given model. Next, we condense these data sets into summary statistics, thereby creating a giant lookup table. Combined with efficient interpolation techniques, this database can then be used to solve any individual estimation problem in a fraction of the time that is traditionally required. The bulk of the computational effort is prepaid, and does not increase with the number of estimates. Both frequentist and Bayesian estimation is possible. To demonstrate the efficacy and the versatility of the method, databases were developed for three challenging estimation problems. It is shown through extensive simulation studies that our method greatly outperforms current state-of-the-art estimation techniques in both speed (with a 23,000 to 100,000-fold speed up) and accuracy. In addition, the prepaid method can tackle estimation problems for which existing methods up until now have not produced satisfactory results. A prepaid database can be directly distributed or alternatively a cloud based model estimation service can be set up, allowing any researcher to fit a complex model to their dataset in a matter of seconds, on any device that supports an internet browser.

Student discussant: Yasin Altinisik

Staff discussant: Noémi Schuurman

What to do when you inevitably encounter circular data

Kees Mulder (Utrecht University)

In the vast majority of data analyses, the observed data is taken to be either continuous or categorical, that is, lie on the real line or in the natural numbers. However, it is also possible to observe angles, measured in degrees or radians. In social and behavioural sciences, this type of data occurs in eye movement studies, cognitive psychology experiments related to human perception of orientation, or in the analysis of so-called circumplex models, such as Leary's rose. Modeling circular data with our usual linear methods can potentially have devastating consequences.

In order to make sure that you will never have to face these consequences, I'll give an introduction into the field of circular statistics. Because of the fundamental differences between linear statistics and circular statistics, the concepts of distances, means and variances must be redefined. I'll show how to recognize circular data, cover basic circular models as well as performing regression on circular outcomes. Bayesian modeling for several different circular data settings can be performed through a set of R packages.

Student discussant: Annemiek Punter

Staff discussant: Francis Tuerlinckx

One Direction? On the Modelling of Circular Data in Psychology

Jolien Cremers (Utrecht University)

In psychology, there are numerous examples of data that can be regarded and analysed as circular data. Research areas from psychology in which circular variables arise include: personality measurement, cognitive maps, visual perception of space, visual working memory and more.

Despite there being numerous examples of circular data being collected in different areas of psychology, the knowledge of this type of data is not well-spread and literature in which these types of data are analysed with more complex methods than a one-way ANOVA for circular data is scarce.

More complex models for circular data however do exist. One of these models is a projected normal mixed-effects model. The interpretation of effects from this model is not straightforward and we introduce new tools that alleviate this problem. Additionally, an R-package was created that allows applied researchers to use the new interpretation tools and fit both projected normal regression models and mixed-effects models. By means of step-by-step analyses of example data from the field of cognitive psychology we outline the use of the tools from the package and their usefulness to applied researchers.

Student discussant: Sara van Erp

Staff discussant: Florian Böing-Messing

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

Katrijn Van Deun (Tilburg University)

Research in the behavioural and social sciences has entered the era of big data: Many detailed measurements are taken and multiple sources of information are used to unravel complex multivariate relations. For example, in studying obesity as the outcome of environmental and genetic influences, researchers increasingly collect survey, dietary, biomarker and genetic data from the same individuals.

Although linked more-variables-than-samples (called high-dimensional) multi-source data form an extremely rich resource for research, extracting meaningful and integrated information is challenging and not appropriately addressed by current statistical methods. A first problem is that relevant information is hidden in a bulk of irrelevant variables with a high risk of finding incidental associations. Second, the sources are often very heterogeneous, which may obscure apparent links between the shared mechanisms.

In this presentation we will discuss the challenges associated to the analysis of large scale multi-source data and present state-of-the-art statistical approaches to address the challenges.

Student discussant: Jolien Cremers

Staff discussant: Ton de Waal

New Developments and Future Directions in Network Psychometrics

Sacha Epskamp (University of Amsterdam)

The novel field of *network psychometrics* focuses on the estimation of network models aiming to capture interactions between observed variables. I will discuss recent advances in this field, as well as future directions and challenges the field has yet to face. First, I will discuss the estimation of Gaussian graphical models (GGM; a network of partial correlation coefficients) in datasets ranging from data with independent cases (e.g., cross-sectional data) to datasets of multiple time-series (Epskamp, Waldorp, Mõttus, & Borsboom, 2017). Second, I will discuss the formalization of the GGM as a formal psychometric model, which allows for its combination with the general framework of Structural Equation Modeling (Epskamp, Rhemtulla, & Borsboom, 2017). I present two generalizations of the network model that encompass latent variable structures. Finally, I discuss future directions in network psychometrics such as the handling of missing data, ordinal data, and network-based adaptive assessment.

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Student discussant: Nitin Bushan

Staff discussant: Kyle Lang

Focusing on the residual to understand item responses as a random variable

Riet van Bork (University of Amsterdam)

In classical test theory as well as in modern test theory, the response variable is conceived as a random variable. This paper focusses on the interpretation of the residual to make sense of the response variable as a random variable. It is argued that while both the stochastic subject rationale and the repeated sampling rationale provide possible interpretations of the response variable as a random variable, the residual is decisive in which interpretation is appropriate. We show that the interpretation of the response variable as a random variable depends on whether unreliable factors, which we call "circumstance variables" or reliable factors which we will call "characteristic variables" constitute the residual. The result is that the stochastic subject interpretation and repeated sampling interpretation are not just two alternative interpretations of the chance experiment underlying the item responses but they also imply different theories on what the residual component comprises.

Student discussant: Merijn Mestdagh

Staff discussant: Jelte Wicherts

Testing for the presence of correlation changes in a time series: A permutation based approach

Jed Cabrieto (KU Leuven)

Change point detection methods can be used to signal whether and where one or more correlation changes occur in a time series. For most of these methods, the first step is to test whether the time series actually contain a change point. To this end, they detect the most plausible change point and compare the before and after correlations using a significance test. In this seminar, we will show that this binary segmentation approach may suffer from low power when there is actually more than one change point present in the data. To deal with this drawback, we will propose a permutation based significance test that employs the KCP (kernel change point) variance criterion. We will evaluate the comparative performance in a simulation study and provide three illustrative applications on epileptic seizure detection, psychopathology and stock returns.

Student discussant: Riet van Bork

Staff discussant: Katrijn Van Deun

Psychometric Modelling in International Large-Scale Assessments; a Presentation of Two Bi-Factor IRT Applications

Annemiek Punter (University of Twente)

International large-scale assessment studies play a major role in the evaluation of the state of educational systems, in guiding educational policy and in more theory oriented educational effectiveness research. However, they are not free from criticism and an important point of concern is that constructs in these cross-cultural studies may not be measured and understood similarly across groups. That is, differential item functioning (DIF) may occur, leading to biased outcomes.

In this presentation a bi-factor item response theory (IRT) model to identify and model group-specific DIF is introduced and illustrated by two applications. In this model the main component pertains to the latent construct of interest and the second component is defined as a group specific-noise component.

In the first application we set out to model dimensions of parental involvement across 42 counties based on the PIRLS 2011 data, taking potential cultural DIF into account. Here the bi-factor IRT model is applied with loadings on the second component indicating cultural DIF. The method and results are compared to other DIF approaches such as the use of random item parameters and the application of group-specific parameters for countries showing strong DIF according to the Lagrange multiplier test statistics.

The second application involves the modeling of math ability based on the TIMSS 2015 data from four countries and evaluating potential item bias for students with different linguistic backgrounds. Here the main component pertains to math ability and the second component reflects the noise component which in this context may pertain to linguistic demands for students not used to speaking the test language at home.

Student discussant: Anniek Sies

Staff discussant: Dylan Molenaar

Getting insight into a forest of decision trees

Aniek Sies (KU Leuven)

Often tree-based accounts of prediction problems yield multiple decision trees which together constitute a forest. Reasons for this include examining tree instability, improving prediction accuracy, accounting for missingness in the data and taking into account multiple outcome variables. A key disadvantage of forests, unlike individual decision trees, is their lack of transparency. Hence, an obvious challenge reads whether it is possible to recover some of the insightfulness of individual trees from a forest. In this presentation, we will propose a conceptual framework and methodology (along with an associated R-package) to do so by reducing forests into one or a small number of summary trees, which may be used to gain insight into central tendency as well as variability within the forest. We will illustrate the proposed methodology and the use of the R-package with two applications, one on the prediction of the abuse of several types of drugs on the basis of personality characteristics, and one on the estimation of optimal tree-based treatment regimes on the basis of a randomized clinical trial to compare the efficacy of several anti-depressant treatments.

Student discussant: Jed Cabrieto

Staff discussant: Marcel van Assen

Optimal Designs for Pairwise Comparison in Education

Elise Crompvoets (Tilburg University)

The European government wants schools to teach 21st century skills, such as critical and creative thinking, to their students. As part of teaching, they want to measure these skills to know the skill levels of their students and to monitor them. However, analytical measurement methods that are commonly used in education are not suited for these skills with inherently ambiguous definitions. Pairwise comparison was introduced as an alternative, holistic measurement method. Pairwise comparison is a method where a few raters compare objects in pairs on a certain trait in order to obtain a rank order of these objects on this trait. However, pairwise comparison asks a lot from the raters/teachers because many pairwise comparisons are needed for the measurement to be reliable. To reduce the number of comparisons, incomplete designs are used in which comparisons are selected based on heuristic adaptive algorithms. Because current algorithms may be suboptimal, we developed an adaptive algorithm that maximizes the information from the comparisons. In a simulation study we investigated the performance of the algorithm in terms of reliability, rank order accuracy and on the uncertainty of the parameters in comparison with a random algorithm under various conditions. We varied the number of objects to be compared and the proportion of total comparisons. The commonly-used Bradley-Terry-Luce model was used to analyze the data. Although the uncertainty of the parameters was lower using the adaptive algorithm, the reliability and rank order accuracy did not improve. In addition, the reliability estimate used for pairwise comparison designs strongly overestimated the true reliability.

Cluster Independent Component Analysis for analyzing multi-subject resting state fMRI data

Jeffrey Durieux (Leiden University)

Jeffrey Durieux[1,2], Serge A. R. B. Rombouts[1,2], & Tom F. Wilderjans[1,2,3]

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An emerging challenge in the study of brain diseases and mental disorders, like dementia and depression, consists of revealing systematic differences and similarities between subgroups of patients in functional connectivity patterns (FCPs), that is, coordinated activity across brain regions. As such, existing subtypes of the disease may be characterized in terms of FCPs and disease subtypes may get detected which transcend the current diagnostic boundaries and which show a differential development and prognosis of the pathology.

In order to obtain FCP's, researchers often collect resting-state functional Magnetic Resonance Imaging (rs-fMRI) data and analyze this data with Independent Component Analysis (ICA). ICA is a technique that decomposes a multivariate observed signal into a set of underlying independent source signals and a mixing matrix. In an fMRI context, the sources represent spatial maps, which corresponds to FCPs, and the mixing matrix contains the associated time courses.

Analyzing the brain data of each patient separately with ICA has as major drawback that each patient will be characterized by different FCPs, which makes it difficult to detect the systematic differences and similarities in FCPs between (groups of) patients. Therefore, we propose *Cluster Independent Component Analysis* (C-ICA). The goal of this method is to cluster the patients into homogenous groups based on the similarities and differences in their FCPs. As such, patients allocated to the same cluster are assumed to have similar connectivity patterns, whereas patients belonging to different clusters will be described by different FCPs. This allows a data-driven detection of disease/disorder subtypes based on different FCPs'.

Doing a Time Use Survey on smartphones only: What factors predict nonresponse at different stages of the survey process

Anne Elevelt (Utrecht University)

The increasing use of smartphones opens up opportunities for novel ways of survey data collection, but also poses new challenges for researchers. We can collect GPS data and ask intensive longitudinal questions, but the questions we ask can get increasingly intrusive and we risk over-asking participants. In order to investigate the effects of taking a traditional diary for the Dutch Time Use Survey to a mobile setting, we study nonresponse and nonresponse bias in survey questions, diary data and recording sensor data. The five stages of this mobile Time Use Survey were as follows: 1) accept invitation to participate in the study, 2) fill out a questionnaire on the web, 3) participate in the smartphone Time Use Survey (diary), 4) answer pop-up questions and 5) give permission to record sensor data (GPS locations and call data).
Results show that the correlates of nonresponse are somewhat different at every stage, and that nonresponse does occur as only a specific group is willing to participate in the smartphone parts.

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Modeling Interactions Between Latent Variables

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We used a simulation study to investigate the bias and precision of four common methods to model interactions between latent variables: (1) The sum score method models the interaction as a product between the sum scores of two variables. (2) The single indicator method constructs a latent interaction variable with one indicator resulting from the product between the highest loading indicators of both constructs. (3) The matched pairs method is similar to the single indicator method, but uses all available items of both constructs. Indicator pairs with a similar factor loading ranking are multiplied and used as a new indicator for the latent interaction. (4) The Latent Moderated Structural Equations (LMS) method does not multiply sum scores or indicators, but directly takes into account the non-normality of the latent interaction effect by modeling the joint distribution of all indicator variables as a mixture of normal distributions. Method 1 is analyzed with an ordinary least squares regression analysis, while methods 2, 3 and 4 are analyzed by using structural equation modeling. In our simulation we varied the sample size (250,500,3000), the skewness of the latent traits (0,1,2), the size of the interaction effect (0, 0.04, 0.08, 0.16) and the scale of the item responses (continuous or 1-5 Likert scale). Our main outcome was the bias and precision of the estimated interaction. The amount of bias was computed as the difference between the true interaction and the mean estimate of the 500 replications. We assessed precision based on the width of the 95% confidence interval. In continuous scenarios, as the true size of the interaction increased, the sum score method overestimated- and the single indicator method underestimated the interaction effect. The matched pairs showed least bias, while the LMS method showed most, especially when sample size was low and skewness was high. The sum score method was most precise, followed by the matched pairs method. High skewness and lower sample sizes resulted in less precise estimates, especially for the single indicator and LMS methods. The percentage of false positive results was approximately 5% for the single indicator and matched pairs methods. The sum score and LMS methods produced more false positive findings, especially when sample size was large and skewness was high. In ordinal scenarios, all methods showed biased estimates of the interaction effect. All methods resulted in precise estimates when the sample size was large, but precision decreased with smaller sample sizes, especially for the latent variable methods. Both the sum score and LMS methods were not able to distinguish between true results and null effects. Significance tests were not available for the single indicator and matched pairs methods due to non-invertible standard error matrices. In this simulation study, we showed that the four methods differ in the accuracy and precision of the estimated interaction effects. For interactions based on continuous item scores, we recommend researchers to use the matched pairs method. We advise researchers to use continuous measures whenever possible, because modeling interactions based on ordinal rather than continuous item scores resulted in more bias, less precision and more false positive findings.

Delaying Access to a Problem-Skipping Option Increases Effortful Practice: Application of an A/B Test in Large-Scale Online Learning

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We report on an online double-blind randomized controlled field experiment (A/B test) in Math Garden, a computer adaptive practice system with over 150,000 active primary school children. The experiment was designed to eliminate an opportunity to game the system and promote active and effortful practice. The intervention delayed the opportunity to skip seemingly difficult problems, and results reveal an increase in effortful practice without adverse effects on engagement. The experiment additionally demonstrates some of the advantages of A/B tests, such as the unique opportunity to apply truly blind randomized field experiments in educational science.

https://osf.io/preprints/socarxiv/m6jqe/

Revealing the joined mechanisms in traditional data linked with Big Data

Niek de Schipper (Tilburg University)

In this era of Big Data, psychological researchers are faced with a situation where they can supplement the data they are accustomed to with novel sources of data. Revealing the joint mechanisms in these integrated or linked data is challenging from a data analysis point of view because of the complex nature of these data. Linked data often contains more variables than cases and relations between data blocks are often dominated by relations specific to certain data blocks. To overcome these challenges we propose an adaptation of Sparse Simultaneous Component Analysis (SSCA), which is specifically aimed at identifying relations shared between multiple data sources. This novel procedure tries to identify these joint mechanisms by taking the block structure of the linked data into account. To assess the performance of the proposed procedure we performed a simulation study. Results from the simulation study indicate that taking into account the block structure of the linked data will result in more accurate estimates compared to estimates obtained from regular SSCA.

SEM with small samples: Bayesian vs. frequentist methods

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In social sciences, small data sets are very common, due to small or hard-to-access target groups or prohibitive costs. Bayesian estimation is frequently suggested as a viable estimation method in small sample contexts. We therefore investigated in a systematic literature review, whether it is legitimate to broadly apply Bayesian methods to address small sample sizes for structural equation models, instead of using frequentist methods (e.g. maximum likelihood estimation). We included papers in which a simulation study was used to investigate and compare the performance of Bayesian parameter estimation to frequentist estimation in structural equation models with small sample sizes. Based on the included studies, we conclude that Bayesian estimation requires the inclusion of prior information for it to perform well with small samples. In fact, the use of only default (i.e., diffuse) priors can cause more bias than frequentist methods, especially for the variance parameters in the model. Researchers with small data sets therefore have to be careful: the smaller the sample size, the more important it is to include prior information and carefully choose prior distributions!

Latent Markov Factor Analysis for Exploring Measurement Model Changes in Time-Intensive Longitudinal Studies

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Abstract
New technology facilitates the collection of time-intensive longitudinal data to study daily-life dynamics of psychological constructs (such as wellbeing) within persons over time (e.g., by means of Experience Sampling Methodology; ESM). However, the measurement quality can be affected by time- or situation-specific artefacts such as response styles or substantive changes in item interpretation. These distortions can be traced as changes in the measurement model (MM), which evaluates the constructs that are underlying a participant's answers. If not captured, these changes might lead to invalid inferences about the targeted psychological constructs. Existing methodology can only test for a priori hypothesized changes in the MM. However, typically we have no prior information on (changes in) the MMs. Thus, an exploratory method that detects and models MM changes is needed before we can benefit from the full potential of ESM data. To this end, we present a method called latent Markov factor analysis (LMFA). In LMFA, a latent Markov chain captures the changes in MMs over time by clustering observations per subject into a few states and the data are factor-analyzed per state. The states indicate for which time points the construct measurements may be validly compared and within-subject MM differences can be explored by comparing the state-specific MMs. A simulation study shows a good performance of LMFA in recovering parameters under a wide range of conditions.

Keywords: experience sampling, measurement invariance, factor analysis, latent Markov modeling.

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