interuniversity graduate school of Psychometrics and Sociometrics

Annual report 2013

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

Contents

Introduction

The end of 2013 implied for Leiden University the end of an era in which their faculty of Social and Behavioural Sciences was commissioner of the IOPS graduate school. After a period of thirteen year, Leiden University handed down both directorate and chairman duties to the faculty of Behavioral and Social Sciences of the University of Groningen.

First of all, we want to express our gratitude to the previous director Willem Heiser for his constructive work and, of course, we want to thank Susañña Verdel for the tremendous amount of work she has done for IOPS in those thirteen years. Their significant effort has been the driving force behind the success of our graduate school.

And successful 2013 was!
We congratulate the 7 students that defended their thesis successfully. And with 18 new projects, the number of students is increasing steadily. We were happy to welcome 12 young staff members and 2 senior staff members, and with 5 staff members leaving the IOPS, the magnitude of our staff is increasing also.

With respect to the grants awarded to staff members, 2013 was very satisfactory too. Hilde Huizenga was awarded with a NWO Vici and Joris Mulder with a NWO Veni grant. Five NWO Research Talent Grants and two other large NWO grants were rewarded to IOPS staff members. And last but not least, our research group in Leuven obtained two important Belgian grants.

People from Groningen are known as those of few words. Despite the fact that both the new director and the new secretary are from Amsterdam, they both gladly acclimatized to this characteristic. Consequently, this annual report is more compact than the previous one Hopefully you will appreciate this in times of information overload.

On behalf of the IOPS board,

Rob Meijer

1 Organization

1.1 Board

The IOPS Board consists of seven members delegated by the participating universities. At most three representatives of other research institutes may be appointed as an IOPS board member. Futhermore, the institute director and the dissertation students' representative attend the board meetings.

Members IOPS Board

On 31 December 2013 the IOPS Board consisted of:

- Prof. Dr. W.J. Heiser, Chair, Leiden University
- Prof. Dr. D. Borsboom, University of Amsterdam
- Prof. Dr. R.R. Meijer, University of Groningen
- Dr. G.J.A. Fox, Twente University
- Dr. L.A. Van der Ark, Tilburg University
- Prof. Dr. P.G.M. van der Heijden, Utrecht University
- Prof. Dr. F. Tuerlinckx, KU Leuven, University of Leuven
- Dr. A.A. Béguin, CITO (National Institute for Educational Measurement)
- (Vacancy), CBS (Statistics Netherlands)
- Prof. Dr. Henk Kelderman, Leiden University, advisory member

President / Sctientific Director

Prof. Dr. W.J. Heiser, Leiden University (until 1 January 2014).

PhD representative

Renske Kuijpers (Tilburg University), who served as asistant PhD student representative for a period of one year (1 January 2012 - 31 december 2012), was appointed as first representative as of 1 January 2013, for a period of one year. Marije Fagginger Auer (Leiden University) was appointed assistant PhD student representative as of 1 January 2013 for a period of one year.

Changes in the IOPS Board

In the IOPS Board meeting of 12 December 2013 three board members announced their departure from the IOPS Board as of 1 January 2014:

- Willem J. Heiser, Chair. As of 1 February 2014 the new Chair of the IOPS Board will be Prof. dr. R.R. Meijer (University of Groningen).
- Prof. Dr. J.G. Bethlehem, CBS (Statistics Netherlands).
- Prof. Dr. H. Kelderman, Leiden University, advisory member.
- Susañña Verdel, Secretary

Board meetings

The IOPS Board meets four times a year. In 2013 Board meetings were held on 19 April, 13 June, 17 October, and 12 December 2013.

1.2 Office

From October 2000 till 1 February 2014 the IOPS Graduate School held office at Leiden University. The secretariat was accommodated at:
Institute of Psychology
Faculty of Social and Behavioral Sciences
P.O. Box 9555, 2300 RB Leiden, The Netherlands
During this period Susañña Verdel was IOPS Secretary.

As of 1 February 2014 IOPS will hold office at the University of Groningen. The secretariat will be accommodated at:

Psychometrics and Statistics
Heijmans Institute, Faculty of Social and Behavioral Sciences
Grote Kruisstraat 2/1, 9712 TS Groningen, The Netherlands

Secretary: **Drs. Edith Ruisch-de Vries**
E-Mail: secretariaat.iops@rug.nl
Web: www.iops.nl

1.3 Participating institutes

Leiden University Faculty of Social and Behavioural Sciences	
Methodology and Statistics Unit Institute of Psychology	P.O. Box 9555, 2300 RB Leiden Secretary: Jacqueline Hartman 071 527 3761 j.hartman@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: Ellen Imthorn +31 71 527 7111
University of Amsterdam Faculty of Social and Behavioural Sciences	
Psychological Methods Department of Psychology	Weesperplein 4, 1018 XA Amsterdam Secretary: Ineke van Osch 020 525 6870 w.h.m.vanosch@uva.nl
Developmental Psychology Department of Psychology	Weesperplein 4, 1018 XA Amsterdam Secretary: Ellen Buijn 020 525 6830 e.buijn@uva.nl
Work and Organizational Psychology Department of Psychology	Weesperplein 4, 1018 XA Amsterdam Secretary: Joke Vermeulen 020 525 6860 j.h.vermeulen@uva.nl

Methods and Statistics Department of Child Developemnt and Education	Nieuwe Prinsengracht 130, 1018 VZ Amsterdam Secretary: Welmoed Torensma 020 525 1230 w.a.torensma@uva.nl
University of Groningen Faculty of Behavioural and Social Sciences	
Methods and Statistics Department of Psychology	Grote Kruisstraat 2/1, 9712 TS Groningen Secretary: Hanny Baan 050 363 63 66 j.m.baan@rug.nl
Theoretical Sociology Department of Sociology	Grote Rozenstraat 31, 9712 TG Groningen Secretary: Saskia Simon 050 363 6469 s.simon@rug.nl
Twente University Faculty of Educational Science and Technology	
Educational Measurement and Data Analysis Department of Education	P.O. Box 217, 7500 AE Enschede Secretary: Birgit Olthof-Regeling, T. 053 489 3555 Birgit.Olthof@utwente.nl
Tilburg University Tilburg School of Social and Behavioral Sciences	
Methodology and Statistics	P.O. Box 90153, 5000 LE Tilburg Secretary: Marieke Timmermans 013 466 2544 m.c.c.timmermans@tilburguniversity.edu
Utrecht University Faculty of Social and Behavioural Sciences	
Methodology and Statistics	P.O. Box 80.140, 3508 TC Utrecht Secretary: Chantal Molnar-van Velde 030 253 4438 c.molnar@uu.nl
KU Leuven, University of Leuven, Belgium	
Research Group of Quantitative Psychology and Individual Differences Department of Psychology	Tiensestraat 2B, 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) & Patricia Gillet 026-3521364) Rianne.vanderWerff@cito.nl; Patricia.Gillet@cito.nl

1.4 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: Marga Doyle 043 388 2395 marga.doyle@maastrichtuniversity.nl
Erasmus University Rotterdam	
Department of Econometrics	P.O. Box 1738, 3000 DR. Rotterdam Secretary: Tineke Kurtz 010 408 1370 / 1377 kurtz@ese.eur.nl
Psychology Institute	P.O. Box 1738, 3000 DR. Rotterdam Secretary: Hanny Langedijk, Susan Schuring 010 408 8799 / 9009 secretariaatpsychologie@fsw.eur.nl

Wageningen University	
Research Methodology Group	P.O. Box 8130, 6700 EW, Wageningen Secretary: Jeanette Lubbers-Poortvliet 0317 48 5454 Jeanette.Lubbers-Poortvliet@wur.nl

2 Staff

The members of the staff belong to the participating universities. 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.

Associated staff

In 1994, the establishment of graduate schools and the rearrangement of staff members as a result of this, caused IOPS to introduce a new category of staff for those who - for formal reasons - could not be a regular IOPS staff member. 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.

2.1 Professorships

As of January 1st 2013, Dr. Denny Borsboom (University of Amsterdam) was appointed professor of Foundations of Psychology and Psychometrics at the Faculty of Social and Behavioural Sciences University of Amsterdam.

2.2 Staff meetings

Plenary meetings for all IOPS members (staff and PhD students) are held twice a year during the IOPS conferences. In 2013 two plenary meetings took place, one on 13 June, and one on 12 December 2013.

2.3 Staff changes

Junior staff members admitted to IOPS in 2013

- Marianna **Avetisyan,** Twente University
- Angélique **Cramer,** University of Amsterdam
- Kim **De Roover,** KU Leuven
- Rebecca **Kuiper,** Utrecht University
- Suzanne **Jak**, Universiteit Utrecht
- Maurits **Kaptein,** Tilburg University
- Peter **Lugtig,** Utrecht University
- Dylan **Molenaar,** University of Amsterdam
- Daniel **Oberski,** Tilburg University)
- Mijke **Rhemtulla,** University of Amsterdam
- Floryt **Van Wesel**, VU Amsterdam
- Josine **Verhagen,** University of Amsterdam

Senior staff members admitted to IOPS in 2013

- Vera **Toepoel,** Utrecht University
- Stéphanie **Van den Berg,** Twente University

Junior staff members leaving IOPS in 2013

- Dr. Johan **Braeken,** Tilburg University
- Dr. Laurence **Frank**, Utrecht University

Senior staff members leaving IOPS in 2013

- Prof. Dr. Jelke **Bethlehem,** CBS (Statistics Netherlands)
- Dr. Gerty **Lensvelt-Mulders,** Utrecht University
- Dr. Gerard **Maassen,** Utrecht University

Honorary emeritus leaving IOPS in 2013

- Prof. Dr. Ivo **Molenaar** University of Groningen

	1 Januari 2013	31 December 2013
Junior staff members	20	30
Senior staff memebers	77	76
Honorary emeritus members	11	10

2.4 Staff members

Leiden University

Institute of Psychology, Methodology and Statistics Unit

- Dr. Mark **De Rooij** (senior): rooijm@fsw.leidenuniv.nl
- Prof. Dr. Willem **Heiser** (senior): heiser@fsw.leidenuniv.nl
- Dr. Marian **Hickendorff** (junior): hickendorff(at)fsw.leidenuniv.nl
- Prof. Dr. Henk **Kelderman** (senior): h.kelderman@fsw.leidenuniv.nl
- Dr. Kees **Van Putten** (senior): putten@fsw.leidenuniv.nl
- Dr. Matthijs **Warrens** (junior): m.j.warrens@fsw.leidenuniv.nl

Institute of Education and Child Studies

- Prof. Dr. Pieter **Kroonenberg** (senior): kroonenb@fsw.leidenuniv.nl
- Dr. Joost **Van Ginkel** (junior): jginkel@fsw.leidenuniv.nl

Mathematical Institute

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

University of Amsterdam

Department of Psychology- Methodology

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- Dr. Angélique (**Cramer** junior): a.o.j.cramer@uva.nl
- Prof. Dr. Paul **De Boeck** (senior): p.a.l.deboeck@uva.nl
- Dr. Conor **Dolan** (senior): c.v.dolan@uva.nl
- Dr. Raoul **Grasman** (senior): r.p.p.p.grasman@uva.nl
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- Porf. Dr. Gunter **Maris** (senior): g.k.j.maris@uva.nl
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- Dr. Mijke **Rhemtulla** (junior): m.t.rhemtulla@uva.nl
- Dr. Verena **Schmittmann,** University of Amsterdam (junior): v.d.schmittmann@uva.nl
- Prof. Dr. Han **Van der Maas** (senior): h.l.j.vandermaas@uva.nl
- Josine **Verhagen** (junior): a.j.verhagen@uva.nl
- Prof. Dr. Eric-Jan **Wagenmakers** (senior): e.m.wagenmakers@uva.nl
- Dr. Lourens **Waldorp** (junior): l.j.waldorp@uva.nl

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- Dr. Hilde **Huizenga** (senior): h.m.huizenga@uva.nl
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- Dr. Ingmar **Visser** (senior): i.visser@uva.nl

Department of Psychology - Work and Organizational Psychology

- Dr. Arne **Evers** (senior): a.v.a.m.evers@uva.nl

Department of Education - Methods and Statistics

- Dr. Rudy **Ligtvoet** (junior): r.ligtvoet@uva.nl
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- 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
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Department of Sociology

- Dr. Anne **Boomsma** (senior): a.boomsma@rug.nl
- Dr. Mark **Huisman** (senior): j.m.e.huisman@rug.nl
- Prof. Dr. Tom **Snijders** (senior): t.a.b.snijders@rug.nl
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Twente University

Department of Educational Measurement and Data Analysis

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Utrecht University

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- Dr. Edith **De Leeuw** (senior): e.d.deleeuw@uu.nl
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KU Leuven, University of Leuven

Department of Psychology

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- Prof. Dr. Iven **Van Mechelen** (senior): iven.vanmechelen@ ppw.kuleuven.be
- Dr. Wolf **Vanpaemel** (senior): wolf.vanpaemel@ppw.kuleuven.be

Statistics Netherlands (CBS)

As of 31 December, IOPS has no active CBS staff members

Psychometric Research Center (Cito), Arnhem

- Dr. Timo **Bechger** (senior), CITO (National Inst. for Educational Measurement), Arnhem: timo.bechger@cito.nl
- Dr. Anton **Béguin** (senior), CITO (National Inst. for Educational Measurement), Arnhem: anton.beguin@cito.nl
- Dr. Bas **Hemker** (senior), CITO (National Inst. for Educational Measurement), Arnhem: bas.hemker@cito.nl

2.5 Associated staff members

- Prof. Dr. Lidia **Arends** (senior), Psychology Institute, Erasmus University Rotterdam: arends@fsw.eur.nl
- Prof. Dr. Martijn **Berger** (senior), Methodology and Statistics, Maastricht University: martijn.berger@maastrichtuniversity.nl
- Dr. Samantha **Bouwmeester** (senior), Psychology Institute, Erasmus University Rotterdam: bouwmeester@fsw.eur.nl
- Dr. Math **Candel** (senior), Methodology and Statistics, Maastricht University: math.candel@maastrichtuniversity.nl
- Dr. ing Paul **Eilers** (senior), Department of Biostatistics, Erasmus Medical Center Rotterdam: p.eilers@erasmusmc.nl
- Prof. Dr. Patrick **Groenen** (senior), Faculty of Economics, Erasmus University Rotterdam: groenen@few.eur.nl

- Dr. Margo **Jansen** (senior), Department of Education, University of Groningen: g.g.h.jansen@rug.nl
- Dr. Marike **Polak** (junior), Psychology Institute, Erasmus University Rotterdam: polak@fsw.eur.nl
- Dr. Jan **Schepers** (junior), Methodology and Statistics, Maastricht University: jan.schepers@maastrichtuniversity.nl
- Dr. Niels **Smits** (senior), Department of Social and Organizational Psychology, VU University Amsterdam: n.smits@psy.vu.nl
- Dr. Frans **Tan** (senior), Methodology and Statistics, Maastricht University: frans.tan@maastrichtuniversity.nl
- Dr. Hilde **Tobi** (senior), Research Methodology, Wageningen University: hilde.tobi@wur.nl
- Dr. Gerard **Van Breukelen** (senior), Methodology and Statistics, Maastricht University: gerard.vbreukelen@maastrichtuniversity.nl
- Dr. Sophie **Van der Sluis** (junior), University of Amsterdam: s.vandersluis@uva.nl
- Dr. Floryt **Van Wesel** (junior), Dept. of Educational Neuroscience & Dept. of Methods, VU University Amsterdam: f.van.wesel@vu.nl
- Dr. Wolfgang **Viechtbauer** (senior), Psychiatry en Neuropsychology, Maastricht University: wolfgang.viechtbauer@maastrichtuniversity.nl

2.6 Honorary emeritus members

- Prof. Dr. Wil **Dijkstra,** email: w.dijkstra@fsw.vu.nl
- Prof. Dr. Jacques **Hagenaars,** email: jacques.a.hagenaars@tilburguniversity.edu
- Prof. Dr. Gideon **Mellenbergh,** email: g.j.mellenbergh@uva.nl
- Prof. Dr. Robert **Mokken,** email: mokken@science.uva.nl
- Prof. Dr. Ab **Mooijaart,** email: mooijaart@fsw.leidenuniv.nl
- Prof. Dr. Willem **Saris**, email: w.saris@telefonica.net
- Prof. Dr. Jos **Ten Berge,** email: j.m.f.ten.berge@rug.nl
- Prof. Dr. Wim **Van der Linden,** email: wim_vanderlinden@ctb.com
- Prof. Dr. Hans **Van der Zouwen,** email: j.van.der.zouwen@fsw.vu.nl
- Dr. Norman **Verhelst,** email: norman.verhelst@gmail.com

3 Scientific awards and grants

3.1 Awards and grants honored to IOPS staff members

3.1.1 Scientific awards

In 2013, the following IOPS staff members were honored with a scientific award:

3.1.2 NWO Grants

NWO Veni, Vidi, Vici grants These are part of the NWO Innovational Research Incentives Scheme [*Vernieuwingsimpuls*]				
Borsboom, D. (2007), UvA Amsterdam	Causal networks for psychological measurement	Vidi	1 March 2008 – 1 March 2013	€ 600.000
Hamaker, E. (2010), Utrecht Un.	Time for change: Studying individual differences in dynamics	Vidi	1 May 2011 – 1 May 2016	€ 600.000
Huizenga, H. (2013), UvA Amsterdam	Why speeding on your scooter is a good idea: decision strategies in childhood and adolescence	Vici	1 Sept 2013 – 31 Aug 2019	€ 1.500.000
Klugkist, I. (2013), Utrecht Un.	A Different Angle: New Tools for Circular Data	Vidi	November 2013 – November 2018	€ 800.000
Moerbeek, M. (2008), Utrecht Un.	Improving statistical power in studies on event occurrence by using an optimal design	Vidi	1 February 2009 – 1 February 2014	€ 600.000
Morey, R. (2010), Un. of Groningen	A modelling-based approach to testing item-based versus resource-based working memory storage	Veni	1 May 2011 – 1 May 2014	€ 250.000
Mulder, J. (2013), Tilburg University	Testing competing theories	Veni	2013 - 2018	€ 250.000
Stegeman, A. (2008), Un of Groningen	Multi-way decompositions : Existence and uniqueness	Vidi	6 February 2009 - 5 February 2014	€ 600.000
Van de Schoot, R. (2011), Utrecht Un.	Integrating background knowledge about traumatic stress experienced after trauma into statistical models assessing individual change over time	Veni	January 2011 – January 2016	€ 250.000
Vermunt, J.K. (2010), Tilburg University	Stepwise model-fitting approaches for latent class analysis and related methods	Vici	23 June 2011 – 22 June 2016	€ 1.500.000
Wicherts, J.M. (2012), Tilburg University	Human Factors in statistics	Vidi	September 2012 – September 2017	€ 800.000

NWO Aspasia grants

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

Hamaker, E. (2011), Utrecht Un.	2011-2016	€ 100.000
Moerbeek, M. (2009), Utrecht Un.	1 February 2009 - 1 February 2014	€ 100.000

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.

De Rooij, M. (2010), Leiden Un.	Multivariate logistic regression using the ideal point classification model	PhD student: Haile M. **Worku**	1 Oct. 2010 – 1 Oct. 2014	€ 209.513
Timmerman, M.E. & **Meijer.** R.R. (2009), Un. of Groningen	Dimensionality assessment of polytomous Items	PhD student: M.T. **Barendse**	1 Sept. 2010 – 1 Sept. 2014	€ 209.513
Vermunt, J.K., **Van der Ark**, A. & **Sijtsma**, K. (2009), Tilburg Un.	Multiple imputation using mixture models	PhD student D. **Van der Palm**	1 Sept. 2009 – 30 Jan. 2014	€ 207.155
Wagenmakers, E.J., **Forstmann**, B., **Nieuwenhuis**, S. & **Van der Maas**, H. (2011), UvA Amsterdam	A dynamic and formal account of what people do before and after they make an error	PhD student: H. Steingroever	1 Sept. 2011 - 1 Sept. 2015	€ 208.193
Wagenmakers, E.J. & Forstmann, B. (2008), UvA Amsterdam	The anatomical and neurochemical foundations of decision-making under time pressure Proj. leader: Birte Forstmann	PhD student: Jasper Winkel	1 April 2009 - 1 April - 2013	€ 218.000
Wagenmakers, E.J., Forstmann, B., Nieuwenhuis, S., Bogacz, R., Brown, S., Serences, J., & **Van der Maas**, H. (2010), UvA Amsterdam	The neural basis of decision-making with multiple choice alternatives	Postdoc: Martijn Mulder	1 June 2010 - 1 June 2013	€ 231.635
Wicherts, J. (2009), UvA Amsterdam	Expectancy effects on the analysis of behavioral research data	PhD student: Marjan **Bakker**	1 April 2009 - 16 June 2014	€ 207.155

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.

Ark, A. van der (2013), Tilburg University	Improving norms for psychological and educational tests	PhD student Hannah **Oosterhuis**	1 Sept. 2012 – 1 Sept. 2016	€ 168.735
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

Borsboom, D. (2012), UvA Amsterdam	Network psychometrics	PhD student Sacha **Epskamp**	1 Aug. 2012 - 1 Aug. 2016	€ 167.576
Hoijtink, H. (2013), Utrecht Un.	Processing within person experimental and longitudinal data using Bayesian updating	PhD student Anouck **Kluytmans**	1 Sept. 2013 – 1 Sept. 2016	€ 168.735
Timmerman, M.E. & **Meijer**, R.R. (2012), Un. of Groningen	Understanding human behavioural processes with Bayesian dynamic models	PhD student: Tanja **Krone**	1 July 2012 – 1 March 2016	€ 161.363
Van der Maas, H.L.J. (2012), UvA Amsterdam	Analyzing developmental change with time-series data of a large scale educational monitoring system	PhD student: Abe **Hofman**	1 Sep. 2012 – 1 Sep. 2016	€ 168.576
Van Duijn, M.A.J., **Snijders**, T.A.B., & Niezink, N.M.D. (2013), Un. of Groningen	Co-Evolution of networks and real-valued actor attributes	PhD student: Niezink, N.M.D.	2013 - 2016	€ 166.235
Vermunt, J.K. (2012), Tilburg University	Power analysis for simple and complex mixture models	PhD student Dereje **Gudicha**	1 Sept. 2012 – 1 Sept. 2015	€ 165.000
Vermunt, J.K. (2013), Tilburg University	Multiple imputation of nested missing data using extended latent class models	PhD student Davide **Vidotto**	1 Sept. 2013 – 1 Sept. 2016	€ 165.000
Wichterts, J.M. (2013) Tilburg University	The psychometrics of stereotype threat	PhD student Paulette **Flore**	1 Sept. 2013 – 1 Sept. 2017	€ 165.000

Other NWO grants

Huizenga, H., **Grasman,** R., **Visser**, I. & **Hamaker**, E. (2011), UvA Amsterdam	A user-friendly website to improve evidence-based clinical practice	NWO Added Value for the Social Sciences by (“Meerwaarde”)	2012-2013	€ 40.000
Maric, M. & **Borsboom**, D. (2011), UvA Amsterdam	Evaluatie van werkingsmechanismen van behandelingen: De weg naar evidence-based practice	NWO Added Value for the Social Sciences (“Meerwaarde”)	1 Oct. 2011 – 1 Febr. 2013	€ 31.464
Schmand, B., **Huizenga**, H. & Murre, J. (2013), UvA Amsterdam	Advanced Neuropsychological Diagnostics Infrastructure (ANDI)	Investment Subsidy NWO Medium	1 Sept 2013- 31 Aug 2017	€ 450.000
Van Putten, K. (Leiden University) & **Béguin** A. (Cito)	Mathematics education in the classroom and students' strategy use and achievement in primary education	NWO-PROO	1 Sept. 2011 – 1 Sept. 2015	€ 299.850
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

3.1.3 International grants

International grants				
Brown, S., Eidels, A., Heathcote, A. & **Wagenmakers, E.J.** (2011), UvA Amsterdam	Rapid decisions: From neuroscience to complex cognition	Australian Research Council	2012-2014	AUS $ 134,000
Gu Xin and **Hoijtink**, H. (2011), Utrecht Un.	Bayesian Evaluation of Inequality Constrained Hypotheses	Chinese Scholarship Council	2011-2015	€ 65.000
Karayanidis, F., Lenroot, R., Parsons, M., Michie, P. & Eric-Jan **Wagenmakers** (2011), UvA Amsterdam)	Cognitive flexibility from adolescence to senescence: Variability associated with cognitive strategy and brain connectivity	Australian Research Council	2012-2014	AUS $ 387,000
Lugtig, P. (2012), Utrecht Un.	Subsidy for three year research project 'Trade-offs between nonresponse and measurement error in a panel survey'	ERSC Future Leaders Grant (United Kingdom)	2012 – 2015	€ 163.000
Wagenmakers, E.J., (2012), UvA Amsterdam	Cognitive Flexibility from Adolescence to Senescence: Variability Associated with Cognitive Strategy and Brain Connectivity	Partner investigator on the Australian Research Council	2012-2014	AUS $ 387.000
Wagenmakers, E.J. (2012), UvA Amsterdam	Rapid Decisions: From Neuroscience to Complex Cognitions	Partner investigator on the Australian Research Council	2012-2014	AUS $ 134.000
Wagenmakers, E.J. (2011), UvA Amsterdam	Bayes or Bust: Sensible hypothesis tests for social scientists	Consolidator grant by the European Research Council	1 May 2012-1 May 2017	€ 1.500.000
Wagenmakers, E.J., (2011), UvA Amsterdam	Engineering and Physical Sciences Research Council project "Decision making in an unstable world" (investigators: Iain Gilchrist, Roland Baddeley, Rafal Bogacz, Simon Farrell, David Leslie, Casimir Ludwig, and John McNamara).	External advisor	2011-2015	£ 1.858.354

Grants awarded to KU Leuven, University of Leuven				
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 2019	€ 310.000
Tuerlinckx, F. (2012): KU Leuven	Understanding the dynamics of the individual through	Grant by The National Fund for Scientific	31 Dec. 2012 - 31 Dec.	€ 296.518

	network analyses of Experience Sampling data	Research-Belgium [Fonds voor Wetensch. Onderzoek-Vlaanderen]	2018	
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
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
Van Mechelen, I., **Tuerlinckx**, F. & **Ceulemans**, E. (2008)	Formele modellering van de tijdsdynamiek van emoties	GOA	2008 - 2014	€ 1.400.000
Van Mechelen, I. (2011)	Disentangling the innate and adaptive response to vaccines	GSK (contract research) Van Mechelen -GSK Biologicals	2011-2015	€ 200.000
Vanpaemel, W. (2011)	The use of the prior predictive in modelling cognition	OT (Onderzoekstoelage) and CREA; Research Council KU Leuven	2011-2015	€ 294.240

Other Grants

Boeije, H. & Leferink, S. (2012), Utrecht University	Kwaliteitsverbetering in de hulpverlening aan slachtoffers door innovatie in effectmeting	Grant for PhD-project, funded by Fonds slachtofferhulp and Dept. of Methodology and Statistics, Utrecht Un.	Aug. 2012 – Aug. 2016	€ 120.000 by Fonds Slachtofferhulp and €120.000 by Dept. M&S, Utrecht Un.
Boersma, P., **Raijmakers**, M. & Bögels, S. (2009), UvA Amsterdam	Models and tests of early category formation: interactions between cognitive, emotional, and neural mechanisms	Cognition Program, Cognitive Science Center Amsterdam	2009 – 1 Sep 2015	€ 470.000
Candel, M. (2011), Maastricht Un.	Sample size calculation for nested cost-effectiveness RCTs (PhD student project)	ZonMw (The Nether-lands Organization for Health Research and Development)	April 2012 - April 2016	€ 115.000
Groeneveld, C. & **Van der Maas**, H. (2010), UvA Amsterdam	Computer Adaptieve Monitoring in het statistiekonderwijs	SURF Foundation Tender: Toetsing en Toetsgestuurd Leren	1 March 2011 - 28 March 2013	€ 348.821
Hoijtink, H. & **Maris**, G. (2011), Utrecht Un. / CITO	Unmixing Rasch Models	PhD project, funded by CITO and Dept. of Methodology and Statistics, Utrecht Univ.	2011-2015	€ 87.500 by CITO and € 87.500 by Dept. M&S, Utrecht Un.
Hox, J., Snijkers, G. (CBS)	Motivation of Respondents in Business Surveys	Grant for PhD-project, funded by CBS	Sept. 2010 – Sept. 2015	€ 238.000
Keijsers, L., Ter	Grant for Post-doc on	Utrecht University,	2013 - 2016	€ 96.000

Hillegers, M. Bogt, T., **Van de Schoot, R.,** Vollebergh, W., Cahn, W.	disentangling normative irritability from early signs of depression among adolescents with cell-phone micro-measures of daily mood swings	Youth & Identity Seed Project		
Klinkenberg, S. & **Van der Maas**, H. (2010), UvA Amsterdam	Nieuwe scoreregel voor digitale toetsen	SURF Foundation Tender: Toetsing en Toetsgestuurd Leren	1 March 2011 – 28 March 2014	€ 77.766
Klugkist, I. & Janssen, K. **Hoijtink**, H., Moons, C. (2009), Utrecht Un.		Grant for PhD-project in Focus area Epidemiology, Utrecht University	September 2009 - August 2013	€ 210.000
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.
Meijer, R.R. & **Tendeiro**. J. (2012), Un. of Groningen	Assessment of the validity of total scores in high-stakes testing through nonparametric statistical techniques	Law School Admission Council Research Grant (U.S.A)	February 2013 – Febrauary 2014	$ 100.000
Raijmakers, M. **Van der Maas,** H. & Haarhuis H. (2011), UvA Amsterdam	1. Mental models: Guiding knowledge development in the individual child 2. Optimizing materials for experimentation	Research Grant from the Platform Beta Techniek [TalentenKracht]	1 Jan 2012 – 1 jan 2016	€ 417.000
Ruiter, S.A.J., Van der Meulen, B.F.. **Timmerman, M.E.**& Ruijssenaars, W. (2009), Un. of Groningen	Programma "Zorg voor Jeugd: Handelingsgerichte diagnostiek voor jonge kinderen met cognitieve en/of functionele beperkingen"	ZonMw (The Netherlands Organization for Health Research and Development),	2009 - 2013	€ 449.510
Van der Heijden, P.	SURF	Learning Analytics stimuleringsregeling	July 2013 – July 2014	€ 10.000
Van der Heijden, P., Bakker, B. (CBS), (main appl); **Cruyff, M.**, Whittaker, J. (Lancaster Un.)	The estimation of population size and population characteristics using incomplete registries	Grant for PhD project, funded by CBS and Dept. of Methodology and Statistics, Utrecht Un.	Jan. 2012 – Jan. 2016	€ 100.000 by CBS and € 100.000 by Dept. M&S, Utrecht Un.
Van der Heijden, P., Cruyff, M.	Illegalenschatting 2012-2013	Ministerie van Justitie en Veiligheid, WODC	2012 – 2013	€ 20.600
Van der Heijden, P., Cruyff, M.	Omvang van huiselijk geweld in Nederland	Ministerie van Justitie en Veiligheid, WODC	2012 - 2014	€ 20.470
Van der Heijden, P., Cruyff, M.	Voorstel ontwikkeling nieuwe methodologie voor omvangschattingen van fluctuerende verborgen populaties	Ministerie van Justitie en Veiligheid, WODC	2011 – 2013	€ 21.000
Van der Heijden, P., Cruyff, M.	Schatting aantal arbeidsmigranten uit	Ministerie van Binnenlandse Zaken	2012 - 2013	€ 20.720

	Midden- en Oost-Europa			
Van der Heijden, P., Van Buuren, S., Hox, J., Pannekoek, J., Schouten, B. (CBS)		Grant for 2 PhD projects. Funded by CBS and Dept. of Methodology and Statistics, Utrecht University	Sept. 2009 – Sept. 2013	€ 263.105 by CBS and € 87.701 by Dept. M&S, Utrecht Un.
Van der Schaaf, M.F. **Van der Heijden,** P., Van Tartwijk, J.	WATCHME, Workplace-based e-Assessment Technology for Competency-based Higher Multi-professional Education	Utrecht University e.a.	2013 - 2014	€432.395
Van Loey, N., **Van de Schoot, R., Van der Heijden, P.** & Geenen, P.	The social impact of living with burn scars	Grant for PhD-project, funded by Nederlandse Brandwondenstichting	June 2011 – June 2013	€ 160.000
Van Tartwijk, J.**, Van der Heijden, P.** and others	Opbrengstgericht en data-gestuurd werken in het Utrechtse voortgezet onderwijs op alle niveaus	Samenwerkingsverband VO Utrecht, Universiteit Utrecht, Willibrord Stichting	Oct. 2013 – Oct. 2014	€ 432.905
Veldkamp, B. (2010), Twente Un.	Quality of performance tests (PhD student project)	ECABO	2010 – 2013	€ 250.000
Viechtbauer, W. (2009), Maastricht Un.	Helping more smokers to quit by COmbining VArenicline with COunselling for smoking cessation: The COVACO randomized controlled trial	Funded by Pfizer and the Stichting Gezondheidscentra Eindhoven. Principal Investigator: Daniel Kotz	2009 - 2013	€ 300.000

3.2 Awards and grants honored to IOPS PhD students

3.2.1 Scientific awards

In 2013, the following IOPS PhD students were honored with a scientific award:

- Jansen, B.R.J., Louwerse, J., **Straatemeier**, M., Van der Ven, S. H. G., Klinkenberg, S., & Van der Maas, S. H.G. (2013). The influence of experiencing success in math on math anxiety, perceived math competence, and math performance. *Learning and Individual Differences*. The "FMG Student Research Prize 2013".

3.2.2 Grants

- **Veldkamp**, B.P. (2013). Psychometric models in multi-media performance assessment. ECABO grant obtained for the PhD project *'Psychometric models in multi-media performance assessment'*
- **Veldkamp**, B.P. (2013). PTSD screening based on spoken language. SASS research grant
- **Veldkamp**, B.P. (2013). Response time modeling and its applications. Grant Law School Admission Council
- **Veldkamp**, B.P. (2013). Supporting lifelong learning with inquiry-based education. LIBE Grant
- **Veldkamp**, B.P. (2013). Validating the zelfredzaamheids matrix. HHM grant.

4 Students and projects

4.1 Introduction

Applicants for the IOPS dissertation training must have a Master's degree in one of the following disciplines. Behavioral Sciences, Technical Sciences, Mathematics or Econometrics. They are appointed as PhD student, or as an indirectly financed PhD student. PhD students within IOPS are financed by the participating universities or by NWO (Netherlands Foundation of Scientific Research).

PhD student projects in progress on 1 January 2013	53
New projects	18
Dissertations in 2013	7
PhD student projects in progress on 31 December 2013	61
Projects that exceeded the project time limit	4

Dissertations

1. Judith **Conijn** (Tilburg University): *Detecting and explaining Person Fit in non-cognitive measurement*
2. Angélique **Cramer** (University of Amsterdam): *The glue of (ab)normal mental life: Networks of interacting thoughts, feelings and behaviors*
3. Britt Qiwei **He** (Twente University): *Text mining and IRT for psychiatric and psychological assessment*
4. Suzanne **Jak** (university of Amsterdam): *Cluster bias: Testing measurement invariance in multilevel data*
5. Katarzina **Jóźwiak** : *Improving statistical power in studies on event occurrence by using an optimal design*
6. Jesper **Tijmstra**: *Evaluating model assumptions in Item Response Theory*
7. Daniel **Van der Palm** (Tilburg University): *Latent class models for density estimation, with applications in missing data imputation and test score reliability estimation*

New projects

1. Florian **Böing-Messing** (Tilburg University)
   Project: *Testing order-constrained hypotheses on variance components*
2. Susan **Boerma** (University of Groningen)
   Project: *A dynamic approach to analysing and predicting human behaviour after intervention*
3. Kirsten **Bulteel** (KU Leuven)
   Project: Dynamic network models for dyadic data
4. Mathijs **Deen** (Leiden University)
   Project: Resampling methodology for longitudinal data analysis
5. Janneke **De Kort** (VU University Amsterdam)
   Project: *Do our genes pave our way? Modeling GE-covariance, GxE interaction and moderated GE-covariance in longitudinal twin-models*

6. Dereje **Gudicha** (Universiteit van Tilburg)
   Project: *Power analysis for simple and complex mixture models*
7. Anouck **Kluytmans** (Utrecht University)
   Project: Processing within person experimental and longitudinal data using Bayesian updating
8. Geert **van Kollenburg** (Tilburg University)
   Project: *Diagnostics for latent class models*
9. Merijn **Mestdagh** (KU Leuven)
   Project: *Modeling and control of dynamical within-person networks*
10. Celica **Minica** (VU University)
    Project: *On modeling genetic association with addiction phenotypes*
11. Erwin **Nagelkerke** (Tilburg University)
    Project: Diagnostics for multilevel latent class models
12. Michele **Nuyten** (Tilburg University)
    Project: Human factors in statistics
13. Hannah **Oosterhuis** (Tilburg University)
    Project: *Improving norms for psychological and educational tests*
14. Inga **Schwabe** (Twente University)
    Project: Nurturing natural talents: A twin study
15. Florian **Sense** (University of Groningen)
    Pproject: *Bayesian inferential methods for state-trace plots*
16. Coosje **Veldkamp** (Tilburg University)
    project: *Human factors in statistics*
17. Mathilde **Verdam** (Universiteit van Amsterdam)
    Project: *Using Structural Equation Modeling to detect measurement bias in patient-reported quality-of-life outcomes to improve their interpretation*
18. Davide **Vidotto** (Tilburg University)
    Project: *Multiple imputation of nested missing data using extended latent class models*

Projects in progress beyond project time limits

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 summary of projects:

1. Khurrem **Jehangir** (Twente University)
2. Rogier **Kievit** (University of Amsterdam)
3. Marthe **Straatemeijer** (University of Amsterdam
4. Janke **Ten Holt** (University at Groningen)

Projects left unfinished

In 2013 there were no students leaving the IOPS Graduate School before completing the project.

4.2 Dissertations

Judith Conijn
Detecting and explaining Person Fit in non-cognitive measurement

27 March 2013
Department of Methodology, Faculty of Social Sciences, Tilburg University

Promotores:
prof.dr. K. Sijtsma, dr. W.H.M. Emons & dr. M.A.L.M. Van Assen

Project financed by NWO
Period: 1 October 2007 - 1 December 2012

Project: Person-misfit in item response models explained by means of nonparametric and multilevel logistic regression models
Performance on psychological tests and personality inventories may be unexpected. This may be due to cheating or test anxiety (achievement testing), or response inconsistency or lack of traitedness (personality). Traditional person-fit measures are primitive in that they only flag unexpected performance but do not provide explanatory information. Two recent approaches provide more explanatory information. One is flexible (i.e., nonparametric) but only suggests an explanation. The other is not as flexible (i.e., parametric) but explicitly uses auxiliary information in a multilevel framework. Both approaches are studied and integrated so as to provide a better understanding of individual test performance.

Angélique Cramer
The glue of (ab)normal mental life: Networks of interacting thoughts, feelings and behaviors

6 September 2013
Department of Methodology, University of Amsterdam

Promotores:
prof.dr. D. Borsboom & prof.dr. H.L.J. Van der Maas

Project financed by NWO
Period: 1 March 2008 - 1 March 2012

Project: Causal networks for psychological measurement
Current psychometric models conceptualize psychological constructs as latent variables. Latent variables function as the common cause of a number of observable 'indicator' variables; for instance, the latent variable 'depression' is taken to be the common cause of a number of observable depression symptoms, such as fatigue, depressed mood, and lack of sleep. Individual differences on the (aggregated) observable indicators are then used to infer individual differences in the constructs measured. This is the logic of construct validity theory, as it has been practiced in the past decades. For many important psychological attributes, however, it is unlikely that this conceptualization is correct. For instance, the correlation between sleep deprivation and fatigue is more likely to result from a direct effect (i.e., if you do not sleep, you get tired) than from a common cause, as hypothesized in a latent variable model. In such situations, a plausible hypothesis is that constructs like depression refer to causal networks that involve a set of observables, rather than to the common cause of these observables. Indicator variables that are relevant to a construct will, in such cases, be correlated; not,

however, because they result from the same underlying cause, but because they are part of the same causal system. Because this is fundamentally inconsistent with existing psychometric theory, to accommodate situations in which constructs form causal networks, a different methodological approach is needed. The present project aims to develop such an approach through three subprojects: a) the development of new psychometric theory based on the assumption that constructs are causal networks, b) the development of a methodological toolbox that allows for the implementation of this theory in empirical research, and c) an application of the theory to diagnostic systems used in clinical psychology.

Britt Qiwei He
Text mining and IRT for psychiatric and psychological assessment

3 October 2013
OMD / Toegepaste Onderwijskunde, Twente University

Promotores:
prof.dr. C.A.W. Glas & prof.dr.ir. Th. De Vries

Project financed by Stichting Achmea Slachtofferhulp Samenleving
Period: 1 February 2009 - 1 February 2013

Project: Computerized adaptive text-based testing in psychological and educational Measurement
Computerized adaptive testing (CAT, Wainer et al., 1990, van der Linden & Glas, 2002, 2010 (in Press)) has become increasingly popular during the past decade in both educational and psychological measurement. The flexibility of CAT combined with the possibilities of internet-based testing seems profitable for many operational testing programs (Bartram & Hambleton, 2006).
In CAT, the items are adapted to the level of the respondent, that is, the difficulty of the items is adapted to the estimated level of the respondent. If the performance on previous items has been rather weak, an easy item will be presented next, and if the performance on previous items has been rather strong, a more difficult item will be selected for administration. The main advantage of this approach is that the test length can be reduced considerably without loosing measurement precision. Besides, the respondents are administered items at their specific ability level, which implies that they won't get bored by to easy items or frustrated by too difficult ones. The measurement framework underlying CAT comes from Item Response Theory (IRT). One of the key features of IRT is that both item and person parameters are distinguished in the measurement model. For dichotomously scored items, the probability of a correct or positive response depends on person parameters such as the ability level of the person and on item parameters such as the difficulty-, discrimination- and pseudo-guessing parameter. For a thorough introduction to IRT, one is referred to Hambleton and Swaminathan (1985) or Embretson and Reise (1991).
In this PhD project, the focus is on open answer questions where more complicated automated scoring algorithms have to be developed. Applications are either within the context of psychological or educational measurement. The technology of CAT has been developed for multiple-choice items in the cognitive domain that are dichotomously or polytomously scored. For these items, both the correct and the incorrect answers are precisely defined and automated scoring can be implemented on the fly. For other item types, application of CAT is less straightforward. For example for open-answer questions, automated scoring rules can be much more complicated. Further, CAT is more and more applied outside the traditional cognitive domain. Initially, the present project will focus on the assessment of post traumatic stress disorder (PTSD).

Suzanne Jak
Cluster bias: Testing measurement invariance in multilevel data

27 September 2013
Department of Pedagogical & Educational Sciences, University of Amsterdam

Promotores:
prof.dr. F.J. Oort & prof.dr. C.V. Dolan

Project financed by University of Amsterdam
Period: 1 January 2009- 1 January 2014

Bias in the measurement of child attributes in educational research: Measurement bias in multilevel data

Background
The measurement of child attributes brings about problems because informants (e.g., the children themselves, their parents, their teachers, etc.) may have different frames of reference when answering test or questionnaire items. Such different frames of reference may result in measurement bias, so that observed differences and changes in test scores do not reflect true differences and changes in child attributes. Measurement bias thus complicates all research into child attributes (e.g., evaluation of intervention effects, sex differences, cultural differences, relationships with explanatory variables).

Objectives
We will extend existing structural equation modelling (SEM) procedures for the detection of measurement bias with procedures for bias detection in multilevel data, continuous and discrete.
We will investigate the feasibility of these new procedures, by applying them in secondary analyses of educational data, investigating the impact of measurement bias on the results of testing substantive hypotheses in educational research, and investigating different ways to account for apparent measurement bias.

Method
We will first investigate measurement bias in existing data sets of our department by means of secondary analyses. When we find measurement bias, we will account for this bias, and investigate whether the test results of the original hypotheses are different from the test results that are obtained when measurement bias is accounted for. Dependent on our findings, we may modify the SEM procedures, and further investigate the latent variable modelling procedures with simulated data, e.g., to investigate power, effect size indices, and the impact of measurement bias. This approach will be used with various sets of multilevel data, and various sets of discrete data.
Relevance
We will obtain additional knowledge of:

1. the psychometric properties of several measurement instruments that are commonly applied in educational research,
2. the extent of measurement bias in educational research,
3. the impact of possible measurement bias on substantive conclusions,
4. the robustness of educational research to possible measurement bias. Moreover, the research project is psychometrically relevant because it extends and further develops procedures for testing measurement bias in multilevel data, continuous and discrete. Methods to detect measurement bias and to account for measurement bias will result in stronger substantive conclusions.

Katarzyna Jóźwiak
Improving statistical power in studies on event occurrence by using an optimal design

12 April 2013
Methodology and Statistics, Faculty of Social and Behavioural Sciences, Utrecht University

Promotores:
prof.dr. P.G.M. Van der Heijden & dr. Ir. M. Moerbeek

Project financed by NWO
Period: 1 January 2009 - 1 January 2013

Project: Improving statistical power in studies on event occurrence by using an optimal design
The main research question in studies on event occurrence is whether and when subjects experience a particular event, such as the onset of daily smoking or the shift to adulthood. The experience of such an event and its timing can be related to explanatory variables such as gender, socio-economic status, educational level, and, in the case of an experiment, treatment condition. Such a variable's effect should be identifiable with sufficient probability, so the power of a study on event occurrence should be controlled in the design phase. In studies on event occurrence subjects may be monitored continuously, or be measured at intervals. Interval measurement is often used in the behavioural sciences but sample size formulae for such trials are not readily available. The proposed research aims to remedy this deficiency by providing guidelines for the indices governing the number of subjects, the number of measurements per subject, the placement of the measurement points in time and the duration of the study. Where possible, mathematical formulae that relate sample size and duration to statistical power will be derived analytically.
Otherwise, the effect of these design factors on statistical power will be studied on the basis of simulation studies taking into account realistic conditions such as drop-out rates and the varying costs per treatment condition.
A study that is not carefully designed is a waste of resources. Therefore, ethical review committees and organizations funding scientific research frequently require research proposals to include power calculations. The proposed research will provide guidelines for efficient study-designs for use in event occurrence studies – ensuring that the financial cost and the number of subjects are minimized and sufficient power is guaranteed. From a scientific point of view this proposed research project is fundamental since it will enable future researchers to plan their research more efficiently.

Keywords: statistical power, cost-efficient designs, survival analysis, hypothesis testing.

Jesper Tijmstra
Evaluating model assumptions in Item Response Theory

15 November 2013
Methodology and Statistics, Faculty of Social and Behavioural Sciences, Utrecht University

Promotores:
prof.dr. P.G.M. Van der Heijden & prof.dr. K. Sijtsma

Project financed by Utrecht University
Period : 1 September 2008 -1 September 2013

Constant latent odds-ratios models for the analysis of discrete psychological data
The main objective of this project is developing statistical procedures for Constant Latent Odds-Ratios models (CLORs) for dichotomous item scores. Since under dichotomous CLORs models the total score, i.e., the unweighted sum of the item scores, is a sufficient statistic for the latent variable, sound statistical procedures for estimation and goodness of fit assessment are readily attainable. The development of such procedures will make the CLORs models available for practical use. Furthermore, the characteristic assumption of constant latent odds-ratios will be used to define new models for polytomous item scores.

Daniel Van der Palm
Latent class models for density estimation, with applications in missing data imputation and test score reliability estimation

6 December 2013
MTO, Tilburg School of Social and Behavioral Sciences, Tilburg University

Promotores:
prof.dr. J.K. Vermunt & prof.dr. K. Sijtsma

Project financed by NWO, Open Competition grant
Period: 1 September 2009 - 1 September 2013

Multiple imputation using mixture models
The main focus of this project is on the use of mixture models for multiple imputation (MI) of missing data, or more specifically, item nonresponse. Vermunt, Van Ginkel, van der Ark, and Sijtsma (2008) explored the use of a simple latent class model (Goodman, 1974), which is a mixture model for categorical response variables, as a tool for MI. Despite of being a very promising approach, various issues remain unresolved when applying mixture models for MI. The purpose of this project is to address four unresolved problems mentioned by Vermunt et al. (2008) in the discussion section of their article:

1. Whereas Vermunt et al. (2008) concentrated on imputation of data sets containing only categorical variables, most data sets contain combinations of categorical and continuous variables. The current project will investigate how imputation by means of mixture models can best be generalized to such mixed data sets.
2. It is not clear at all whether the decision which statistical model explains the data best (also known as model selection) in the context of mixture modeling for generating multiple imputations can be taken in the same way as when applying mixture models to build a substantively meaningful model. More specifically, standard model selection statistics such as information criteria (AIC, BIC) and overall goodness-of-fit tests seem to be less appropriate for deciding whether a model is a good imputation model.
3. An extended comparison between MI with mixture models and other MI approaches is lacking. In order to assess the usefulness of our approach, it is important to investigate in which situations it performs better than possible alternatives, such as MICE and hot deck imputation.
4. As most of the work on MI, the article by Vermunt et al. (2008) dealt with imputation of data sets containing independent observations. However, many studies in the social and behavioural sciences use designs yielding dependent observations, examples of which are studies using multilevel designs and longitudinal designs. A fourth aim of this project is to develop mixture MI models for dealing with such complex designs.

Besides addressing these four topics, the project should yield software implementations so that the MI methodology becomes available for applied researchers. We aim for making SPSS macro's available as freeware on the Internet.

4.3 New projects

Testing order-constrained hypotheses on variance components

Florian Böing-Messing
MTO, Tilburg School of Social and Behavioral Sciences, Universiteit van Tilburg

Supervisors : prof.dr. J.K. Vermunt & dr. Ir. J. Mulder

Financed by Tilburg University
Period: 1 September 2012 - 1 September 2016

Summary
When investigating differences between groups of people or between time points of the same individual, researchers generally focus on comparing the means. In order to fully understand the differences between groups or time points, however, it is also necessary to compare the degree of heterogeneity across groups or time points. Statistical tools for comparing variances, which capture the heterogeneity in a population, are either unavailable or underdeveloped. The goal of this project is to develop statistical procedures for comparing parameters for three well-known rsearch applications. The procedures will be implemented in user-friendly software.

A dynamic approach to analysing and predicting human behaviour after intervention

Susan Boerma
Heijmans Institute, Faculty of Behavioural and Social Sciences
University of Groningen

Supervisors: prof.dr. R.R. Meijer & dr. C.J. Albers

Financed by NWO (Netherlands Foundation of Scientific Research)
Period: 1 September 2013 - 1 September 2016

Summary
Thanks to modern technology, research designs with “big data” – large volumes of measurements over time – become more and more abundant. For such data, classical statistical techniques often are inadequate or, at best, suboptimal. The aim of this project is to develop novel statistical techniques for big data with a longitudinal compartment; thus measuring changes over time. These novel techniques will accurately describe the complicated underlying longitudinal patterns. The techniques will be applied to one of the most fundamental challenges of our time: that of influencing energy consumption. Software will be developed allowing these models to be used by applied researchers.

Dynamic network models for dyadic data

Kirsten Bulteel
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Supervisors: dr. E. Ceulemans, prof.dr. F. Tuerlinckx

Financed by FWO
Period: 1 October 2013 - 1 October 2017

Summary
Many disciplines in the behavioral sciences involve the study of dyadic relations. For example, one can think of the interactions that take place between mother and child or within romantic couples. Given dyadic data, interesting research questions pertain to who causes what. For instance, are the parents steering the behavior of the children, or is it exactly the opposite? Or is the relation in fact bidirectional? To fully grasp such interpersonal processes, the dyad is best recognized as a dynamic system. Modeling dyadic dynamics is quite challenging, however, because many variables may be involved and because interaction patterns may be different in specific subgroups.

In the envisaged project, we deal with these challenges by developing a dynamic network modeling framework for dyadic time series data. This approach produces an easy-to-read visualization of the results of the analysis, unraveling the structure of the interaction pattern. In a next step, the proposed methodology will be extended to handle a large number of variables. Furthermore, a clusterwise version of the network approach will be developed to reveal subgroups of dyads with similar interaction patterns. Finally, we will promote the use of the new network tools by developing software and by applying them to empirical data sets in close collaboration with substantive researchers.

Resampling methodology for longitudinal data analysis

Mathijs Deen
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Supervisors: dr. M. De Rooij & prof.dr. W.J. Heiser

Financed by Leiden University / Parnassia Groep
Period: 1 August 2013 - 1 August 2019

Summary
It is often thought that standard regression models, like multiple linear regression and logistic regression, cannot be used for the analysis of longitudinal data. The reason is that the observations are not independent of each other. Without missing data, however, the story is a bit more intricate. Standard regression models, in that case, do provide consistent parameter estimates. However, asymptotic standard errors obtained from such standard models are wrong invalidating test statistics, p-values, and conclusions. In this research project an alternative to the asymptotic theoretical standard errors is investigated: the cluster bootstrap. This methodology is investigated for continuous and binary response variables, under various forms of missing data, in combination with multiple imputation of missing values, and as a model selection tool.

Do our genes pave our way? Modeling GE-covariance, GxE interaction and moderated GE-covariance in longitudinal twin-models

Janneke De Kort
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Supervisors: prof.dr. C.V. Dolan & prof.dr. D.I. Boomsma

Financed by NOW Social Sciences, Research Talent Grant
Period: 1 October 2013 – 1 October 2017

Summary
A gap seems to exist between developmental processes in psychology and longitudinal twin-models in behavior genetics. Where theories in psychology often describe processes implying genotype by environment covariance (GE-covariance) and interaction (GxE-interaction), longitudinal models in behavior genetics assume, for statistical reasons, that these effects are largely absent. Extensions of longitudinal twin-models make such assumptions testable, allowing investigation of processes that underlie GE-covariance and interaction. After formulating these extended models, they are applied to empirical data collected in large twin-samples; focusing on cognitive abilities, personality and psychopathology. This will lead to understanding of how the genotype and the environment shape development.

Power analysis for simple and complex mixture models

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Supervisors: prof.dr. J.K. Vermunt & dr. F.B. Tekle

Financed by NWO
Period: 1 September 2012 - 1 September 2015

Summary
Mixture modeling has become a standard statistical tool for clustering and modeling individual differences. Whereas the field of mixture modeling is well developed in terms of available models and software implementations, little is still known about the requirements of the study design to achieve enough power for the relevant statistical tests. The aim of the proposed project is to make power analysis feasible for both simple mixture models for cross-sectional data and complex mixture models for longitudinal and multilevel data. Researchers will be able to use available resources more efficiently if tests have the required power levels.

Processing within person experimental and longitudinal data using Bayesian updating

Anouck Kluytmans
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Supervisors: prof.dr. H.J.A. Hoijtink, dr. A.G.J. Van de Schoot

Financed by NWO, Research Talent Grant
Period: 1 September 2013 – 1 September 2016

Summary
Bayesian updating is proposed as a new manner for the analysis of within person experimental and longitudinal data. Bayesian updating improves the analysis in four wyas: i) It maximizes power through theory driven statistical analyses, that is, hypotheses in which the theory is explicitly embedded, are evaluated; ii) Sequential processing of persons in the experiment ensures that an experiment is never underpowered (using too few persons) or overpowered (using more persons than necessary) with respect to the hypothesis of interest; iii) The research design may differ from person to person; iv) It embeds a straightforward manner of research replication.

Diagnostics for latent class models

Geert van Kollenburg
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Supervisors: prof.dr. J.K. Vermunt & dr.ir. J. Mulder

Financed by NOW, part of Vici grant Prof. dr J.K. Vermunt
Period: 1 July 2012 - 1 July 2017

Summary
This project is 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.

Modeling and control of dynamical within-person networks

Merijn Mestdagh
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Supervisors: prof.dr. F. Tuerlinckx, prof.dr. D. Borsboom & dr. P. Kuppens

Financed by FWO
Period: 1 October 2013 – 1 October 2017

Summary
Unraveling the within-person dynamics of psychological processes is increasingly seen as holding the key to understanding complex social and emotional phenomena as diverse as the formation of attitudes, the development of psychopathological symptoms, and the motivation of behavior. Recently, it has been suggested that such within-person dynamics operate as a network of thoughts, emotions, attitudes and physiological changes. As a result, researchers have started to generate large amounts of within-persons multivariate time series. However, the explosion of data stands in stark contrast to the relative lack of availability of mathematical tools suited to make sense of the resulting complex and noisy data. In this project, we will extend state of the art engineering methods to make them suitable for extracting meaningful within-person dynamical networks. First, we will build on existing linear models that are already capable of dealing with within-person data, but are however not yet appropriate to model larger systems or infer networks. To build more realistic models we will also turn to non-linear network identification techniques. Second, we will show how these models can be applied in practice. In particular, using the identified models it will be studied how these within-person networks can be optimally influenced and controlled. Throughout the project we will work towards the implementation of the developed techniques into user-friendly software packages.

On modeling genetic association with addiction phenotypes

Camelia Minica
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Supervisors: prof.dr. D.I. Boomsma, prof.dr. C.V. Dolan & dr. J. Vink

Financed by VU University Amsterdam
Period: 1 January 2012 - 1 January 2016

Summary
My PhD project aims to identify genes and gene networks associated with individual differences in the liability to substance use and abuse. A second focus of my project is to investigate whether the genetic factors involved in addiction have substance specific effects. Thirdly, I will study and implement in my analyses alternative methods of increasing the power of genome-wide association studies. To fulfill these aims I will make use of the vast wealth of the phenotypic and genotypic data of the Netherlands Twin Register .
To reliably identify susceptibility loci involved in experimental and regular substance use I will use and develop state of the art methodology like genome wide association (GWA) analyses and candidate gene approaches where the relationship between measured genetic markers and the measured complex phenotypes will be studied by using developmentally realistic latent class modeling, including mixtures of growth curve modeling (with regime switching), and Markov modeling, survival models, pathway-analysis.

As the phenotypes of interest are complex ones and require relatively large samples for detection, I will investigate alternative ways of increasing power to detect genetic association. For instance, I will inquire the power advantages conferred by the inclusion into association analysis of family-based imputed genotypes. We will also combine our results with those of other research groups worldwide to increase power and replicate our findings in, for example, meta-analyses.

Diagnostics for latent class models with dependent univariate and multivariate observations

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Supervisors: prof.dr. J.K. Vermunt & dr. D. Oberski

Financed by NWO, Research Talent Grant
Period: 1 February 2013 – 1 Febrauary 2017

Summary
Latent class (LC) analysis is used by social and behavioral scientists as a statistical method for building typologies, taxonomies, and classifications based on a set of observed characteristics. Examples include attitudinal typologies of citizens based on survey questions measuring their attitudes toward freedom of speech, subtypes of schizophrenia patients derived from recorded mood symptoms, classifications of developmental stages of children based on tests taken at different ages, taxonomies of delinquent youths derived from criminal records, classifications of consumers inferred from stated or revealed preferences, and taxonomies of temporal project networks based on characteristics of these projects and the related organizations.

The focus of this project is on allowing or improving the traditional model-fitting strategy in which diagnostics are used to check whether model assumptions hold, and if this is not the case to inform how the model should be modified. Local fit statistics that allow this approach are currently not available for several types of LC models, such as multilevel LC models and latent Markov models. The data sets to which these models are applied contain two types of dependencies, namely between the multiple responses of one individual and between the responses of different persons belonging to the same group, or for longitudinal data, between the multiple responses at one time point and between the responses at different time points.
Since the local independence assumption central to multilevel LC models implies that all responses should be independent of one another given the higher- and lower-level class memberships, diagnostics are required to test this. For the lower-level, local independence diagnostics can be very similar to those developed for standard LC models. However, special diagnostics should be developed to check whether associations between lower-level units belonging to the same higher-level units are detected correctly by the specified LC model.
Similar diagnostics may be developed for univariate cases. In such applications the assumption is that the nested responses are independent of one another conditional on the class membership of the individual or group. An example would be LC regression models, where tests for residual within-group associations between responses are required.

Human factors in statistics

Michèle **Nuyten**
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Supervisors: dr. J.M. Wicherts, dr. M.A.L.M. Van Assen & prof.dr. J.K. Vermunt

Financed by NWO, Vidi grant nr 452-11-004
Period: 1 December 2012 - 1 December 2016

Summary
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 single studies and meta-analyses. Furthermore, we argue that such human factors are encouraged by the current publication system. A scientist's career is measured by the number of (high impact) publications, and there is evidence that many journals have a clear preference for articles with results that are both novel and significant. The combination of this publication bias and publication pressure might result in 1) questionable research practices to obtain significant results, and 2) in less replication studies, since these are not novel. In this project we aim to assess the prevalence of questionable research practices, study their effects, and investigate under what circumstances researchers are most prone to succumb to such practices. Also, we will investigate possible solutions to eliminate (the effects of) publication bias and questionable research practices.

Improving norms for psychological and educational tests

Hannah Oosterhuis
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Supervisors: dr. L.A. Van der Ark & prof.dr. K. Sijtsma

Financed by NWO, Research Talent Grant
Period: 1 September 2012 - 1 September 2016

Summary
Psychological and educational tests are used to make important decisions in people's lives. In almost all cases, a person's test score is only meaningful if it is compared against norms: that is, test scores of a group of people who have already taken the same test. Here lies the problem: Little is known about requirements for the construction of reliable and valid norms. We propose investigating requirements for norm construction so as to improve the practical usefulness of measurement by psychological and educational tests.

Nurturing natural talents: A twin study

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

Financed by NWO, PROO grant
Period: 1 January 2013 - 1 January 2016

Summary
The overarching goal of this project is to study the interaction of innate talent for educational achievement with environmental factors. By using data from twins, the nature of important environmental factors will be studied and how these interact with innate talent. To this end, we develop new statistical models and methodology to 1) disentangle the correlation among environmental and biological factors, and 2) handle the confounding of 'true' differences in twins with differences due to measurement unreliability. The project will identify environmental factors that make twins similar in achievement, and studies how innate talent interacts with environmental factors while taking into account the correlations between talent and environment. This project consists of a unique collaboration between the Netherlands Twin Register, Cito and the Methodology group at the University of Twente and is fully funded by NWO/PROO [PRogrammaraad voor het OnderwijsOnderzoek].

Bayesian inferential methods for state-trace plots

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Supervisors: prof.dr. R.R. Meijer & dr. R.D. Morey

Financed by NOW
Period: 1 September 2012 – 1 September 2016

Summary
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.

Human factors in statistics

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Supervisors: dr. J.M. Wicherts, dr. M.A.L.M. Van Assen & prof.dr. J.K. Vermunt

Financed by NWO, Vidi grant nr 452-11-004
Period: 1 December 2012 - 1 December 2016

Summary
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.

Using Structural Equation Modeling to detect measurement bias in patient-reported quality-of-life outcomes to improve their interpretation

Mathilde **Verdam**
Department of Child Development and Education, University of Amsterdam

Supervisors: prof.dr. F.J. Oort & prof.dr. M.A.G. Sprangers

Financed by Dutch Cancer Society (KWF)
Period: 1 June 2012 - 1 June 2016

Summary
Patient-reported quality of life is, by definition, measured through self-assessment. Self-assessment brings about the problem that patients may have different frames of reference when answering quality-of-life items. As a result, the measurement of quality of life may be biased. That is, people with similar quality of life may respond differently to quality-of-life measures because of different frames of reference due to clinical (e.g., tumour site, disease stage, treatment), individual (e.g., gender, age, mood, expectations), and environmental (e.g., culture, language) characteristics. We therefore need to distinguish between experienced quality of life (true effects) and characteristics affecting quality-of-life scores (bias). Differentiating between 'bias' and 'true effects' is needed whenever quality-of-life scores are compared, i.e., between and within patients, to render valid comparisons across groups and over time. To date, quality-of-life studies rarely, let alone routinely, take measurement bias into account. The proposed study is designed to break new ground as it will be among the first to investigate and resolve fundamental interpretation and validity problems due to the fact that patients adopt different frames of reference. The overall objective is to investigate measurement bias by using structural equation modelling (SEM) approaches. The specific objectives are to: (1) detect measurement bias in existing datasets, to account for this bias, and to assess true effects of unbiased quality of life, using available methods; (2) extend the detection of measurement bias by incorporating a variety of methodological innovations for application to multi-group, discrete, hierarchical (multi-level), and longitudinal data; (3) express the clinical significance of measurement bias and true effects on unbiased quality of life; and (4) devise guidelines and syntaxes of these analyses and effect sizes to facilitate their use in cancer clinical quality-of-life research.

Multiple imputation of nested missing data using extended latent class models

Davide **Vidotto**
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Supervisor: prof.dr. J.K. Vermunt

Project financed by NWO, Research Talent Grant
Period: 1 September 2013 - 1 September 2016

Summary
Social science researchers often make use of multilevel and longitudinal data sets, in which the occurrence of missing data is a well known problem. To prevent biased results, it is important to deal with missing data in an appropriate manner. This project develops new multiple imputation methods for such nested missing data using extended latent class models. These models can capture dependencies between observations within groups (within individuals in the longitudinal case) and deal with (possibly missing) variables measured at different hierarchical levels. The new imputation methods will be implemented in a freely available R package.

4.4 Running projects

Zsuzsa Bakk
Stepwise model-fitting approaches for latent class analysis and related methods
MTO, Tilburg School of Social and Behavioral Sciences, Universiteit van Tilburg
Financed by NWO, part of Vici grant Prof. Dr J.K. Vermunt
Period: 15 September 2011 - 15 September 2016
Supervisors: prof.dr. J.K. Vermunt (Tilburg University), dr. F.B. Tekle (Tilburg University)

Marjan Bakker
Expectancy effects on the analysis of behavioral research data
Department of Methodology, University of Amsterdam
Financed by NWO, Open Competion grant
Period: 1 March 2009 - 1 April 2013
Supervisors: prof.dr. H.L.J. Van der Maas , dr. J.M. Wicherts

Mariska Barendse
Dimensionality assessmentof polytomous items
Heijmans Institute, Faculty of Behavioural and Social Sciences, Univ. of Groningen,
Financed by NWO, Open Competion Grant
Period: 1 September 2010 - 1 September 2014
Supervisors: dr. M.E. Timmerman, prof.dr. R.R. Meijer

Annelies Bartlema
Measuring the complexity of psychological models
Quantitative Psychology and Individual Differences, Fac. of Psychology and Educational Sciences, KU Leuven
Financed by KU Leuven
Period: 1 October 2011 - 1 October 2016
Supervisors: prof.dr. W. Vanpaemel

Margot Bennink
Micro-macro multilevel analysis for discrete data
MTO, Tilburg School of Social and Behavioral Sciences, Universiteit van Tilburg
Financed by NWO
Period: 1 October 2010 – 1 October 2014
Supervisors : prof.dr. J.K. Vermunt, dr. F.B. Tekle

Maria Bolsinova
New applications of Rasch modelss in educational measurement
Methods & Statistics, Faculty of Social Sciences, Utrecht University
Financed by Utrecht University
Period: 15 September 2011 - 1 September 2015
Supervisors: prof.dr. H. Hoijtink, prof.dr. G.K.M. Maris

Laura Bringmann
Networks! New insights into time series data
Quantitative Psychology and Individual Differences, Faculty of Psychology and Educational Sciences, KU Leuven
Financed by KU Leuven
Period: 1 October 2011 - 1 October 2015
Supervisors: prof.dr. F. Tuerlinckx, prof.dr. D. Borsboom

Matthieu Brinkhuis
The theory and practice of item sampling
Psychometric Research Center (POC), CITO
Financed by Cito / RCEC
Period: 1 April 2008 - 1 November 2013
Supervisors: prof.dr. G.K.M. Maris

Dries Debeer
Psychometric models for differential item performance
Quantitative Psychology and Individual Differences, Faculty of Psychology and Educational Sciences, KU Leuven,
Financed by KU Leuven
Period: 1 October 2010 - 1 October 2016
Supervisor: prof.dr. R. Janssen

Sebastiaan de Klerk
Multimedia-Based Performance Assessment (MBPA) in Vocational Education and Training (VET) in The Netherlands
(Twente Univetrsity) Work: Kenniscentrum ECABO, Afd. Examinering
Period: 1 December 2012 - 1 December 2015
Supervisor: prof.dr. T.J.H.M. Eggen

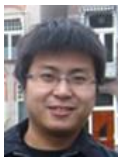
Lisa Doove
Methodology for detecting treatment-subgroup interactions
Faculty of Psychology and Educational Sciences, Quantitative Psychology and Individual Differences, KU Leuven
Financed by KU Leuven
Period: 1 October 2012 - 1 October 2016
Supervisors: prof.dr. I. Van Mechelen, dr. E. Dusseldorp, dr. K. Van Deun

Sacha Epskamp
Network psychometrics
Department of Methodology, University of Amsterdam
Financed by NWO, Research Talent Grant
Period: 15 August 2012 - 15 August 2016
Supervisors: prof.dr. D. Borsboom, prof.dr. P.A.L. de Boeck

Marije Fagginger Auer
Mathematics instruction in the classroom and students' strategy use and achievement in primary education
Methodology and Statistics Unit, Department of Psychology, Faculty of Social and Behavioral Sciences, Leiden University
Financed by NWO, PROO grant
Period: 1 September 2011 - 1 September 2015
Supervisor: dr. C.M. van Putten, dr. M. Hickendorff, prof.dr. W.J. Heiser, prof.dr. A. Béguin

Marjolein Fokkema
Fast adaptive diagnostic assessment for internet therapy
Fac. PPW / VU University Amsterdan, Clinical Psychology
Financed by VU University Amsterdam
Period: 1 April 2010 - 1 December 2014
Supervisors: prof.dr. H. Kelderman, prof.dr. P. Cuijpers, dr. N. Smits

Susanna Gerritse
The estimation of population size and population characteristics using incomplete registries
Methods & Statistics, Faculty of Social Sciences, Utrecht University
Financed by Utrecht University / Statistics Netherlands (CBS)
Period: 15 January 2012 - 15 January 2016
Supervisors: prof.dr. P.G.M. van der Heijden, prof.dr. B.F.M. Bakker, dr. M.L.J.F. Cruyff



Xin Gu
Bayesian evaluation of informative hypotheses in general statistical models
Methods & Statistics, Faculty of Social Sciences, Utrecht University
Financed by CSC (China Scholarship Council)
Period: 5 December 2011 - 5 December 2015
Supervisor: prof.dr. H. Hoijtink

Joke Heylen
Modeling multilevel time-resolved emotion data
Methodology of Educational Research, Faculty of Psychology and Educational Sciences, KU Leuven
Financed by KU Leuven
Period: 1 October 2011 - 1 October 2015
Supervisors: dr. E. Ceulemans, prof.dr. I. Van Mechelen

Abe Hofman
Analyzing developmental change with time-series data of a large scale monioring system
Psychological Methodology,Department of Psychology, FMG, University of Amsterdam
Financed by NOW, Research Talent grant
Period: 1 September 2012 - 1 September 2016
Supervisors: prof.dr. H.L.J. van der Maas, dr. I. Visser, dr. B. R. J. Jansen

Marianne Hubregtse
Competence based assessment in vocational education in The Netherlands
Department of Educational Measurement and Data Analysis, Faculty of Educational Science and Technology, Twente University
Financed by Twente University / KCH
Period: 1 September 2009 - 1 September 2013
Supervisor: prof.dr. T.J.H.M.Eggen

Ruslan Jabrayilov
Improving assesment of individual change in clinical, medical and health psychology
MTO, Tilburg School of Social and Behavioral Sciences, Tilburg University
Financed by NWO, Open Competition grant
Period: 1 December 2011 - 1 December 2016
Supervisors: dr. W.H.M. Emons, prof.dr. K. Sijtsma, dr. F.B. Tekle

Joran Jongerling
Modelling individual differences in intraindividual change and variability
Methods & Statistics, Faculty of Social Sciences, Utrecht University
Financed by Utrecht University
Period: 1 September 2009 - 1 April 2015
Supervisors: prof.dr. H. Hoijtink, dr. E. Hamaker

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)
Financed by IBM / SPSS Leiden
Period: 1 December 2012 - 1 December 2016
Supervisor: prof.dr. J.J. Meulman

Thomas Klausch
Nonresponse and response bias in mixed-mode surveys
Methods & Statistics, Faculty of Social Sciences, Utrecht University
Financed by Utrecht University / Statistics Netherlands (CBS)
Period: 1 November 2009 - 1 November 2013
Supervisors: prof.dr. J. Hox, dr. B. Schouten

Gabriela Koppenol-Gonzalez Marin
The influence of strategy use on working memory task performance
MTO, Tilburg School of Social and Behavioral Sciences, Tilburg University
Financed by Tilburg University
Period: 15 March 2009 - 15 March 2013
Supervisors: prof.dr. J.K. Vermunt, dr. S. Bouwmeester

Tanja Krone
Understanding human behavioural processes with Bayesian dynamic models
Psychometrie & Statistiek, Heijmans Instituut, Fac. Gedrags- en Maatschappij-wetenschappen, Universit of Groningen
Financed by NWO, Research Talent grant
Period: 1 July 2012 - 1 March 2016
Supervisors: prof.dr. R.R. Meijer, dr. M.E. Timmerman

Renske Kuijpers
Test construction using marginal models
MTO, Tilburg School of Social and Behavioral Sciences, Universiteit van Tilburg
Financed by NWO, Open Competition grant
Period: 1 September 2010 - 1 September 2014
Supervisors: prof.dr. K. Sijtsma, dr. M.A. Croon, dr. L.A. Van der Ark

Tam Thi Thanh Lam
Multi-way decompositions: Existence and uniqueness
Psychometrie & Statistiek, Heijmans Instituut, Fac. Gedrags- en Maatschappijwetenschappen, Rijksuniversiteit Groningen, Grote Kruisstraat 2/1, 9712 TS Groningen
Financed by NWO (Netherlands Foundation of Scientific Research), part of the *Vidi* grant of Dr. Alwin Stegeman
Period: 1 February 2011 – 1 February 2015
Supervisors: prof.dr. R.R. Meijer, dr. A. Stegeman

Maarten Marsman
Simulator-based automatic assessment of driving performance
Central Institute for Educational Measurement (CITO)
Financed by Cito Arnhem and RCEC (Twente University)
Period: 1 January 2009 - 1 january 2014
Supervisors: prof.dr. C.A.W. Glas, prof.dr. K. Brookhuis, dr. M.J.H. Van Onna

Marie-Anne Mittelhäuser
Application of mixed IRT models and person-fit methods in educational measurement
MTO, Tilburg School of Social and Behavioral Sciences, Tilburg University
Financed by Tilburg University / Cito Arnhem
Period: 1 October 2010 – 1 October 2014
Supervisors: prof.dr. K. Sijtsma, dr. A.A. Béguin

Cor Ninaber
Prediction of disease classes using resting rate state neuroimaging data
Methodology and Statistics Unit, Department of Psychology, Faculty of Social and Behavioral Sciences, Leiden University
Financed by NWO
Period: 1 March 2010 - 1 March 2014
Supervisors : dr. M. De Rooij, prof.dr. W.J. Heiser, prof.dr. S.A.R.B. Rombouts

Pieter Oosterwijk
Improving global and local reliability estimation in nonparametric item response theory
MTO, Tilburg School of Social and Behavioral Sciences, Tilburg University
Financed by Tilburg University
Period: 1 September 2011 - 1 September 2015
Supervisors: prof.dr. J.K. Vermunt, dr. F.B. Tekle

Silvia Rietdijk
Time for a change: Studying individual differences in dynamics
Methods & Statistics, Utrecht University
Financed by NWO, part of Vidi grant of Dr. Ellen Hamaker
Period: 1 September 2012 - 1 September 2016
Supervisors: prof.dr. H. Hoijtink, dr. E. Hamaker

Maryam Safarkhani
Heterogeneity in studies with discrete-time survival endpoints: Implications for optimal designs and statistical power analysis
Methods & Statistics, Faculty of Social Sciences, Utrecht University
Financed by NWO
Period: 1 January 2011 - 1 January 2015
Supervisors: prof.dr. P.G.M. Van der Heijden, dr. Ir. M. Moerbeek

Noémi Schuurman
Time for a change: Studying individual differences in dynamics with multilevel multivariate autoregressive models
Methods & Statistics, Utrecht University
Financed by NWO, part of Vidi grant of Dr. Ellen Hamaker
Period: 1 September 2012 - 1 September 2015
Supervisors: prof.dr. H. Hoijtink, dr. E. Hamaker

Iris Smits
The incremental value of Item Response Theory to personality assessment
Heijmans Institute, Faculty of Behavioural and Social Sciences
University of Groningen
Financed by University of Groningen
Period: 1 November 2009 - 1 November 2013
Supervisors: prof.dr. R.R. Meijer, dr. M.E. Timmerman

Maaike Van Groen
Methods for making classification decisions
Psychometric Research Center (POC), CITO
Financed by Cito /RCEC (Twente University)
Period: 1 September 2009 – 1 September 2013
Supervisor: prof.dr. T.J.H.M. Eggen

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
Financed by Utrecht University
Period: 1 August 2011 - 1 August 2017
Supervisors: dr. H.R. Boeije, dr. F. van Wesel, prof.dr. J. Hox

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
Financed by NWO
Period: 1 January 2012 – 1 January 2017
Supervisors: prof.dr. J.K. Vermunt, dr. G.D.B. Moors

Marlies Vervloet
Model construction in (multilevel) regression analysis
Methodologie van het Pedagogisch Onderzoek, Faculty of Psychology and Educational Sciences, KU Leuven
Financed by KU Leuven
Period: 1 October 2010 - 1 October 2016
Supervisors: dr. W. Vanpaemel

Gerko Vink
Restrictive imputation of incomplete survey data
Methodology and Statistics, Faculty of Social Sciences, Utrecht University
Financed by Utrecht University and Statistics Netherlands (CBS)
Period: 1 September 2009 - 1 September 2013

Supervisors: prof.dr. S. Van Buuren, dr. J. Pannekoek, dr. L.E. Frank

Ingrid Vriens
Comparing rating and ranking procedures for the measurement of values in surveys
MTO, Tilburg School of Social and Behavioral Sciences, Tilburg University
Financed by NWO
Period: 1 March 2011 - 1 March 2015
Supervisors: prof.dr. J.K. Vermunt, dr. J.P.T.M. Gelissen, dr. G.B.D. Moors

Rivka de Vries
A Bayesian approach to the analysis of individual change
Psychometrie & Statistiek, Heijmans Instituut, Fac. Gedrags- en Maatschappijwetenschappen, Rijksuniversiteit Groningen
Financed by University of Groningen
Period: 1 September 2010 - 1 September 2014
Supervisors: prof.dr. R.R. Meijer, dr. R.D. Morey, dr. M. Huisman

Haile Michael Worku
Multivariate logistic regression using the ideal point classification model
Methodology and Statistics Unit, Department of Psychology, Faculty of Social and Behavioral Sciences, Leiden University
Financed by Leiden University
Period: 1 October 2010 - 1 October 2014
Supervisors: dr. M. De Rooij, prof.dr. W.J. Heiser, prof.dr. P. Spinhoven

5 Graduate training program

5.1 Courses in the IOPS curriculum

In 2013 five courses of the IOPS curriculum were organized:

1. **Optimization and numerical methods** (elective)
   KU Leuven
   Instructors: Francis Tuerlinckx, Geert Molenberghs, Katrijn van Deun, and Tom Wilderjans
   Dates: 21, 22, 28, and 29 November 2013 (4 days)
2. **Survey Methods** (elective)
   Statistics Netherlands/Leiden University
   Instructors: Prof. Dr. Jelke Bethlehem
   Dates: 7-8 October 2012 (2 days)
3. **Advising on Research Methods** (mandatory)
   University of Amsterdam
   Instructor: Prof. dr. G.J. Mellenbergh and dr. H.J. Adèr
   Dates: April 17th & 24th, May 8th, 15th, and 22nd, 2013 (5 days)
4. **Applied Bayesian Statistics** (elective)
   Utrecht University
   Instructors: Irene Klugkist, Rens Van de Schoot, Joran Jongerling, Hennie Boeije, and Silvia Rietdijk
   Dates: 2-5 April 2013 (4 days)
5. **What is Psychometrics**? (mandatory)
   University of Amsterdam, Leiden University, and VU University Amsterdam
   Instructors: Denny Borsboom, Paul De Boeck, Willem Heiser, Henk Kelderman, Don Mellenbergh, Eric-Jan Wagenmakers
   Dates: 4-6 March 2013 (three days)

5.2 Conferences

5.2.1 28th IOPS summer conference

The 28th IOPS summer conference was held in Groningen on 13-14 June 2013. University of Groningen, co-organiser and host of the conference, welcomed ?? participants.

Invited speaker
Steven P. Reise, UCLA, United States
Title: *Integrating psychometrics with cognitive-neuroscience: Some conceptual issues and real data examples*

IOPS PhD students presentations

- Suzanne **Jak (**University of Amsterdam): *Measurement invariance with respect to unmeasured Level 2 variables in multilevel SEM*
- Gabriela **Koppenol-Gonzalez Marin (**Tilburg University): *Detecting verbal and visual memory processes in primary school children by means of latent class analyses*

- Daniël **van der Palm (**Tilburg University): *Divisive latent class modeling as a density estimation method for categorical data: The estimation algorithm and applications to incomplete data and test-score reliability estimation.*
- Iris **Smits** (University of Groningen): *On the importance of the skewness parameter in modeling latent traits*
- Peter **Kruyen** (Radboud University): *Assessing individual change using short tests and questionnaires*

IOPS PhD students poster presentations

- Zsuzsa **Bakk**, Tilburg University
- Annelies **Bartlema**, KU Leuven
- Maria **Bolsinova**, Utrecht University
- Lisa **Doove**, KU Leuven
- Sacha **Epskamp**, University of Amsterdam
- Susanna **Gerritse**, Utrecht University
- Xin **Gu**, Utrecht University
- Ruslan **Jabrayilov**, Tilburg University
- Sebastiaan **de Klerk**, University of Twente / ECABO
- Tanja **Krone**, University of Groningen
- Noemi **Schuurman**, Utrecht University
- Sara **Steegen**, KU Leuven
- Marlies **Vervloet**, KU Leuven
- Eva **van Vlimmeren**, Tilburg University
- Ingrid **Vriens**, Tilburg University

Lab presentations

During IOPS conferences the hosting university prepares a Lab Meeting where specific and new research of this group is presented and discussed. The following members of the Department of Psychometrics and Statistics of University of Groningen presented their research:

- Iris **Egberink**, University of Groningen:
  Dutch Committee on Tests and Testing (COTAN): Current trends in testing
- Richard **Morey**, University of Groningen :
  Statistical evidence and science

IOPS Best paper award 2012

During the 28th IOPS summer conference, the IOPS Best Paper Award 2012 was delivered to **Angélique Cramer,** University of Amsterdam, for her paper:. Cramer, A.O.J., Van der Sluis, S., Noordhof, A., Wichers, M., Geschwind, N.E., Aggen, S.H., Kendler, K.S., & Borsboom, D. (2012). Dimensions of normal personality as networks in search of equilibrium: You can't like parties if you don't like people. *European Journal of Personality, 26:* 414-431.

5.2.2 23rd IOPS winter conference

The 23rd IOPS winter conference was held on 12 and 13 December 2013 at Leuven, Belgium. KU Leuven, co-organiser and host of the conference, 42 participants.

Invited speaker presentations

- Eva **Ceulemans,** KU Leuven
  What's hampering measurement invariance: Detecting outlying variables using clusterwise simultaneous component analysis
- **Iris Smits, University of Groningen**
  Modeling latent traits: The relative distinction between measurement parameters and structural parameters

IOPS PhD students presentations

- Margot **Bennink, Tilburg University** : *Micro-macro multilevel analysis for discrete data*
- Laura **Bringmann (KU Leuven):** *Revealing the dynamic network structure of the Beck Depression Inventory-II*
- Dries **Debeer (KU Leuven):** *Modeling missing-data processes: A tree-based IRT approach*
- Leonie **van Grootel (Utrecht University):** *Combining quantitative and qualitative evidence on the review level in a multivariate model – what are the possibilities?*
- Maarten **Kampert, Leiden University:** *COSA: A Dissimilarity based Method for the Analysis of High-Dimensional Data*
- Geert **van Kollenburg, Tilburg University:** *Obtaining P-values and Developing Diagnostics for Latent Class Models*
- Maarten **Marsman, Twente University:** *Bayesian estimation of the Ising model*
- Jesper **Tijmstra, Utrecht University:** *Why we need to assess prior plausibility when evaluating model assumptions*
- Inga **Schwabe, Twente University:** *Integrating IRT measurement models and twin models*

Valedictory address

After having been IOPS director and Chair of the IOPS Board for four years, Prof. Dr. Willem Heiser will be succeeded by Prof. Dr. Rob Meijer as of 1 February 2014. On 13 December 2013, at the IOPS winter conference in Leuven, Willem Heiser held a valedictory address with the title *Diagnostic and prognostic psychometrics: The Inspiration of sabermetrics.*

IOPS PhD students poster presentations

- Florian **Böing-Messing** (Tilburg University)
- Dereje **Gudicha** (Tilburg University)
- Abe **Hofman** (University of Amsterdam)
- Michèle **Nuijten** (Tilburg University)
- Florian **Sense** (University of Groningen)
- Coosje **Veldkamp** (Tilburg University)
- Mathilde **Verdam** (University of Amsterdam)

6 Research output

6.1 Scientific publication

6.1.1 Dissertations by IOPS PhD students

Conijn, J. M. (2013, March 27). *Detecting and explaining person misfit in non-cognitive measurement* (Ridderkerk: Ridderprint). Tilburg University. Prom./coprom.: prof.dr. K. **Sijtsma**, dr. W.H.M. **Emons** & dr. M.A.L.M. **Van Assen**

Cramer, A.O.J. (2013, September 6). *The glue of (ab)normal mental life: Networks of interacting thoughts, feelings and behaviors.* University of Amsterdam. Prom./coprom.: prof.dr. D. **Borsboom**, prof.dr. H.L.J. **Van der Maas**

He, Qiwei (2013, October 3). *Text mining and IRT for psychiatric and psychological assessment.* UT Universiteit Twente (143 pag.) (Enschede: Twente University). Prom./coprom.: prof.dr. C.A.W. **Glas**, prof.dr.ir. T. de Vries & dr.ir. B.P. **Veldkamp**.

Jak, S. (2013, September 27). *Cluster bias: Testing measurement invariance in multilevel data.* University of Amsterdam. Prom./coprom.: prof.dr. F.J. **Oort**, prof.dr. C.V. **Dolan**

Jozwiak, K. (2013, April 12). *Improving Statistical Power in Studies on Event Occurrence by Using an Optimal Design.* Utrecht University (101 pag.). Prom./coprom.: prof.dr. P.G.M. **Van der Heijden** & dr. M. **Moerbeek**.

Tijmstra, J. (2013, November 15). *Evaluating model assumptions in item response theory.* Utrecht University ('s-Hertogenbosch: Uitgeverij BOXPress). Prom./coprom.: prof.dr. P.G.M. **Van der Heijden**, dr. K. **Sijtsma** & dr. J. Hessen.

Van der Palm, D.W. (2013, December 6). *Latent class models for density estimation, with applications in missing data imputation and test-score reliability estimation* (Ridderkerk: Ridderprint). Tilburg University. Prom./coprom.: prof.dr. J.K. **Vermunt** & prof.dr. K. **Sijtsma**

6.1.2 Other dissertations under supervision of IOPS staff members

Bakker, A. (2013). *Beyond Paediatric Burns.* Utrecht University. Supervisor(s) dr. M.van Son, prof.dr. P.G.M. **van der Heijden**, dr. N. van Loey.

Bexkens, A. (2013, December 16). *Risk-Taking in Adolescents with Mild-to-Borderline Intellectual Disability and/or Behavior Disorder. An Experimental Study of Cognitive and Affective Processes.* University of Amsterdam. Supervisors: **H.M. Huizenga**, Dr. A.M. Collot d'Escury, M.W. van der Molen

De Roover, K. (2013). *Component and HICLAS models for the analysis of structural differences in real-valued and binary multivariate multilevel data*. Supervisors: E.M. **Ceulemans**, M.E. **Timmermans** & P. Onghena. University of Leuven: Leuven, Belgium

Timmers, C.F. (2013, September 27). *Computer-based formative assessment: variables influencing feedback behaviour.* Twente University (125 pag.) (Enschede: Universiteit Twente). Prom./coprom.: prof.dr. C.A.W. **Glas**.

Van der Kleij, F.M (2013, December 19). *Computer-based feedback in formative assessment.* Twente University (196 pag.) (Enschede: Universiteit Twente). Prom./coprom.: prof.dr.ir. T.J.H.M. **Eggen**.

Van Duijvenvoorde, A.C.K. (2013, June 26). *On the art of choosing: Developmental changes and individual differences in decision making under risk*. University of Amsterdam (163 pag.). Supervisor(s): prof.dr. M.W. van der Molen, **dr. H.M. Huizenga & dr. B.R.J. Jansen**.

6.1.3 Refereed article in a journal

Alleva J., Jansen A., Martijn C., **Schepers** J., & Nederkoorn C. (2013). Get your own mirror. Investigating how strict eating disordered women are in judging the bodies of other eating disordered women. *Appetite*, *68*, 98-104.

Alnima T., de Leeuw P.W., **Tan** F.E., Kroon A.A.; Rheos Pivotal Trial Investigators. (2013) Renal responses to long-term carotid baroreflex activation therapy in patients with drug-resistant hypertension. *Hypertension*. 2013 Jun;61(6):1334-9. doi: 10.1161/HYPERTENSIONAHA.113.01159. Epub 2013 Apr 15. PubMed PMID: 23589562.

Anacleto, O., Queen, C., & **Albers**, C.J. (2013). Forecasting multivariate road traffic flows using Bayesian dynamic graphical models, splines and other traffic variables. *Australian and New Zealand Journal of Statistics, 55*(2), 69-86, doi:10.1111/anzs.12026

Anacleto, O., Queen, C., & **Albers**, C.J. (2013). Multivariate forecasting of road traffic flows in the presence of heteroscedasticity and measurement errors. *Journal of the Royal Statistical Society, Series C: Applied Statistics, 62*(2), 251 - 270. doi:10.1111/j.1467-9876.2012.01059.x

Arntz A, Sofi D, **Van Breukelen** G.J.P. (2013). Imagery rescripting as treatment for complicated PTSD in refugees: a multiple baseline case series study. *Behaviour Research and Therapy* , *51*(6), 274-283.

Asendorpf, J. B., Conner, M., de Fruyt, F., de Houwer, J., Denissen, J. J. A., Fiedler, K., ... **Wicherts**, J. M. (2013). Recommendations for increasing replicability in psychology. *European Journal of Personality*, *27*(2), 108-119. 10.1002/per.1919

Asendorpf, J. B., Conner, M., de Fruyt, F., de Houwer, J., Denissen, J. J. A., Fiedler, K., ... **Wicherts**, J. M. (2013). Replication is more than hitting the lottery twice. *European Journal of Personality*, *27*(2), 138-144.

Bachrach, N., Bekker, M. H. J., & **Croon**, M. A. (2013). Autonomy-connectedness and internalizing-externalizing personality psychopathology, among outpatients. *Journal of Clinical Psychology*, *69*(7), 718-726. 10.1002/jclp.21940

Bakk, Z., **Tekle**, F. B., & **Vermunt**, J. K. (2013). Estimating the association between latent class membership and external variables using bias-adjusted three-step approaches. *Sociological Methodology*, *43*(1), 272-311. 10.1177/0081175012470644.

Bakker, A., **Van der Heijden**, P.G.M., Van Son, M.J.M. & Van Loey, N.E. (2013). Course of traumatic stress reactions in couples after a burn event to their young child. *Health Psychology, 32*(10), 1076-1083.

Barendse, M. T., **Oort**, F.J., **Jak**, S., & **Timmerman**, M.E. (2013). Multilevel exploratory factor analysis of discrete data. *Netherlands Journal of Psychology, 67*(4), 114-121.

Bennink, M., **Croon**, M. A., & **Vermunt**, J. K. (2013). Micro–macro multilevel analysis for discrete data: A latent variable approach and an application on personal network data. *Sociological Methods and Research*, *42*(4), 431-457. 10.1177/0049124113500479

Bennink, M., **Moors**, G. B. D., & **Gelissen**, J. P. T. M. (2013). Exploring response differences between face-to-face and web surveys: A qualitative comparative analysis of the Dutch European Values Survey 2008. *Field Methods*, *25*(4), 319-338. 10.1177/1525822x12472875

Bergsma, W. P., **Croon**, M. A., & **Hagenaars**, J. A. P. (2013). Advancements in marginal modeling for categorical data. *Sociological Methodology*, *43*(1), 1-41. 10.1177/0081175013488999

Bergsma, W. P., **Croon**, M. A., & **Hagenaars**, J. A. P. (2013). Rejoinder: Advancements in marginal modeling. *Sociological Methodology*, *43*, 123-126. 10.1177/0081175013493400

Bergsmann, E., **Van de Schoot**, R., Schober, B., Finsterwald, M. & Spiel, C. (2013). The effect of classroom structure on verbal and physical aggression among peers: A short-term longitudinal study. *Journal of School Psychology, 51*, 159-174.

Bicanic, I., Postma, R. Van der Putte, E., Sinnema, G., De Roos, C., **Van Wesel, F,** & Olff, M. (2013). Salivary Cortisol and Dehydroepiandrosterone Sulfate in Adolescent Rape Victims with Post Traumatic Stress Disorder.*Psychoneuroendocrinology,* 38(3), 408-415.

Binswanger, J., Schunk, D. & **Toepoel**, V. (2013). Panel Conditioning in Difficult Attitudinal Questions. *Public Opinion Quarterly*.

Bock, H. H., Ingrassia, S., & **Vermunt**, J. K. (2013). Special issue on "Model-based clustering and classification". *Advances in Data Analysis and Classification*, *7*(3), 237-240. 10.1007/s11634-013-0148-0

Boeije, H.R. & Willis, G (2013). The Cognitive Interviewing Reporting Framework (CIRF): towards the harmonization of cognitive interviewing reports. *Methodology, 9*(3), 87-95.

Boeije, H.R., Slagt, M.I. & **Van Wesel**, F. (2013). The contribution of mixed methods research to the field of childhood trauma: A narrative review focused on data integration. *Journal of Mixed Methods Research, 7*(4), 347-369. DOI: 10.1177/1558689813482756.

Boeije, H., **Van Wesel, F.** & Slagt, M.I. (2013). Guidance for deciding upon use of primary mixed methods studies in research synthesis: Lesson learned in childhood trauma. *Quality & Quantity.* DOI 10.1007/s11135-012-9825-x

Bongers, B.C., De Vries, S.I., Obeid, J., **Van Buuren**, S., Helders, P.J.M. & Takken, T. (2013). The steep ramp test in dutch white children and adolescents: age- and sex-related normative values. *Physical Therapy, 93*(11), 1530-1539.

Boomsma, A. (2013). Reporting Monte Carlo studies in structural equation modeling. *Structural Equation Modeling, 20*, 518–540.

Boonen, A., Van der Schoot, M., **Van Wesel**, F., Van Vries, M. & Jolles, J. (2013). Processes underlying mathematical word problem solving: A path analysis in sixth grade children. *Contemporary Educational Psychology, 38,*271-279.

Borsboom, D. & Markus, K.A. (2013). Truth and evidence in validity theory. *Journal of Educational Measurement, 50*(1), 110-114. 10.1111/jedm.12006.

Borsboom D. & Cramer, A.O.J. (2013). Network analysis: an integrative approach to the structure of psychopathology. *Annual Review of Clinical Psychology, 9*, 91-121. 10.1146/annurev-clinpsy-050212-185608.

Borsboom, D. & Haig, B.D. (2013). How to practise Bayesian statistics outside the Bayesian church: What philosophy for Bayesian statistical modelling? *The British Journal of Mathematical & Statistical Psychology, 66*(1), 39-44. 10.1111/j.2044-8317.2012.02062.x.

Braeken, J., Kuppens, P., De Boeck, P., & **Tuerlinckx**, F. (2013). Contextualized personality questionnaires: A case for copulas in structural equation models for categorical data. *Multivariate Behavioral Research*, *48*, 845-870. doi:10.1080/00273171.2013.827965

Bringmann, L., Scholte, S. & **Waldorp, L.J.** (2013). Matching Structural, Effective, and Functional Connectivity: A Comparison Between Structural Equation Modeling and Ancestral Graphs. *Brain Connectivity*, 3 (4): 375-385.

Bringmann, L.F., Vissers, N., Wichers, M., Geschwind, N., Kuppens, P., Peeters, F., **Borsboom**, D. & **Tuerlinckx**, F. (2013). A Network Approach to Psychopathology: New Insights into Clinical Longitudinal Data. *PLoS One, 8*(4), e60188. 10.1371/journal.pone.0060188.

Brouwer, D., **Meijer**, R. R., & Zevalkink, J. (2013). On the Factor Structure of the BDI-II: G is the key. *Psychological Assessment, 25,* 136-145.doi: 10.1037/a0029228.

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Bruijn, K.M.J. de, **Arends**, L.R., Hansen, B.E., Leeflang, S., Ruiter, R. de & Eijck, C.H.J. van (2013). Systematic review and meta-analysis of the association between diabetes mellitus and incidence and mortality in breast and colorectal cancer. *British Journal of Surgery*, 100(11), 1421-1429.

Bunte, T.L., Laschen, S., Schoemaker, K., **Hessen**, D.J., **Van der Heijden**, P.G.M. & Matthys, W.C.H.J. (2013). Clinical usefulness of observational assessment in the diagnosis of DBD and ADHD in preschoolers. *Journal of Clinical Child and Adolescent Psychology, 42*, 749-761.

Bulteel, K., Wilderjans, T. F., **Tuerlinckx**, F., & **Ceulemans**, E. (2013). CHull as an alternative to AIC and BIC in the context of mixtures of factor analyzers. *Behavior Research Methods*, *45*, 782-791. doi:10.3758/s13428-012-0293-y.

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Ceulemans, E., Hubert, M., & Rousseeuw, P. (2013). Robust multilevel simultaneous component analysis. *Chemometrics and Intelligent Laboratory Systems*, *129*, 33-39. doi:10.1016/j.chemolab.2013.06.016.

Conijn, J. M., **Emons**, W. H. M., **van Assen**, M. A. L. M., Pedersen, S. S., & **Sijtsma**, K. (2013). Explanatory, multilevel person-fit analysis of response consistency on the Spielberger State-Trait Anxiety Inventory. *Multivariate Behavioral Research*, *48*(5), 692-718. 10.1080/00273171.2013.815580

Cooper, R., Doehrmann, O, Fang, A, Gerlach, A.L., **Hoijtink**, H. & Hofmann, S.G. (2013). Relationship between social anxiety and perceived trustworthiness. *Anxiety, Stress and Coping: An International Journal*.

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Kocken, P, Pannebakker, F, Fekkes, M., **Kuiper**, R.M., Gravesteijn, C & Diekstra, R (2013). Effecten van het lesprogramma 'Levensvaardigheden' op gezondheid en gedrag van leerlingen van het voortgezet onderwijs. *Tijdschrift voor Jeugdgezondheidszorg, 45*, 104-105.

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Ten Vergert-Jordans, E.M.J., Bocca-Tjeertes, I.F.A., Kerstjens, J.M., Van Buuren, S., De Winter, A.F., Reijneveld, S.A. & Bos, A.F. (2013). Hoe groeien te vroeg geboren kinderen in Nederland gedurende de eerste vier levensjaren? *JGZ Tijdschrift voor jeugdgezondheidszorg, 45*(4), 78-87.

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6.2.2 Report

Brouwer, D. (2013). *Modern psychometric perspectives on the evaluation of clinical scales. Gedrags- en maatschappijwetenschappen. Supervisors: R.R.* ***Meijer*** *and J. Zevalkink. University of Groningen, Faculty of Behavioural and Social Sciences, Groningen.*

Cruyff, M.J.L.F, Gils, G. van & Van der Heijden, P.G.M. (2013). *Simulatie recurrent event model. (In opdracht van het ministerie van Veiligheid en Justitie).* Utrecht: Universiteit Utrecht, Departement Methoden en Technieken.

Eggen, T., Van der Kleij, F. & **Veldkamp**, B. (2013). *Digitaal toetsen in het onderwijs*. Enschede: RCEC.

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Feskens, R.C.W. & **Béguin**, A. (2013). *Mogelijkheden voor een (digitale) adaptieve eindtoets in 2018. Cito notitie voor het Ministerie van OC&W.* Arnhem: Cito.

Geurts, B., & **Hemker**, B. (2013). *Balans van het Engels aan het einde van de basisschool 4: uitkomsten van de vierde peiling.* Arnhem: Cito.

Hoijtink, H., & Sies, A. (2013). *Diagnostische Tussentijdse Toets: Onderzoek.* Arnhem: Cito.

Kordes, J., **Bolsinova**, M., Limpens, G., & Stolwijk, R. (2013). *Resultaten PISA-2012 in vogelvlucht : praktische kennis en vaardigheden van 15-jarigen : Nederlandse uitkomsten van het Programme for International Student Assessment (PISA) op het gebied van wiskunde, natuurwetenschappen en leesvaardigheid in het jaar 2012.* Arnhem: Cito

Kuhlemeier, H., Van Til, A., Feenstra, H., De Klijn, W, & **Hemker**, B. (2013). *Balans van de schrijfvaardigheid in het basis- en speciaal basisonderwijs 2. Uitkomsten van de peiling in 2009 in groep 5, groep 8 en de eindgroep van het SBO (PPON-reeks nummer 53)*. Arnhem: Cito.

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Scheerens, J., **Glas**, C.A.W., **Jehangir**, K., Luyten, H. & Steen, R. (2013). *Trends in equity, Thematic report based on PISA 2009 data.* Enschede: University of Twente.

Scheerens, J., Hendriks, M., Luyten, H., Sleegers, P. & **Glas**, C. (2013). *Productive time in education. A review of the effectiveness of teaching time at school, homework and extended time outside school hours.* Enschede: Universiteit Twente.

Scheltens, F., **Hemker**, B., & Vermeulen, J. (2013). *Balans van het reken-wiskundeonderwijs aan het einde van de basisschool 5: uitkomsten van de vijfde peiling in 2011*. Arnhem: Cito.

Tendeiro, J.N. & **Meijer** RR. (2013). *The Probability of Exceedance as a Nonparametric Person-Fit Statistic for Tests of Moderate Length*. Law School Admission Council Research Report 13-06 November 2013.

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Van Berkel, S., Engelen, R., **Van Groen**, M., Hilte, M., Wouda, J., Van der Zanden, M. (2013). *Wetenschappelijke verantwoording Entreetoets Begrijpend luisteren groep 3*. Arnhem: Cito.

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Van der Maas, H.L.J. & **Straatemeier**, M. (2013). Hoe rekent de Nederlander: een typologie. In: M. van Zanten (red.) Rekenen-wiskunde op niveau. Utrecht: Panama, FIsme, Universiteit Utrecht. p. 47-56.

Van Weerden, J., **Hemker**, B., Straat, J. H., & Mulder, K. (2013). *Peiling van de rekenvaardigheid en de taalvaardigheid in jaargroep 8 en jaargroep 4 in 2012.* Arnhem: Cito.

Van Weerden, J.J., **Hemker**, B.T., Straat, H., & Mulder, K.T. (2013). *Jaarlijks Peilingsonderzoek van het Onderwijsniveau – vijfde meting.* Arnhem, Cito.

Veldkamp, B.P. & Paap, M.C.S. (2013). *Robust Automated Test Assembly for Testlet-Based Tests: An Illustration With the Analytical Reasoning Section of the LSAT.* (LSAC research reports RR 13-02). : LSAC.

Weekers, A., & **Hemker**, B. (2013). *Suggesties voor verbetering van de verwerking van de Eindtoets Basisonderwijs.* Arnhem: Cito.

6.3 Popular publications

6.3.1 Contribution to daily, weekly or periodical

Albers, C.J. (2013, september 24). *Rankings Pimpen Hoort Niet*. Universiteitskrant Groningen

6.4 Other results

6.4.1 Editorship of a book

Buskens, V.W. & Raub, W. (2013). Rational choice social research on social dilemmas: Embeddedness effects on trust. In R. Wittek, T.A.B. **Snijders** & V. Nee (Eds.), *Handbook of Rational Choice Social Research* (pp. 113-150). Stanford, CA: Stanford University Press.

Flap, H.D. & Völker, B.G.M. (2013). Social Capital. In R. Wittek, V. Nee & T. **Snijders** (Eds.), *Handbook of Rational Choice Social Research* (pp. 220-251). Redwood City, CA: Stanford University Press.

Stokman, F.N., Van der Knoop, J., & Van Oosten, R.C.H. (2013) Modeling collective decision making. In V. Nee, T.A.B. **Snijders** & R. Wittek (Eds.), *Handbook of Rational Choice Social Research* (pp. 151-182), Stanford, CA: Stanford University Press.

Wittek, R. & Witteloostuijn, A. van (2013). Rational Choice and Organizational Change. In R. Wittek, T.A.B. **Snijders**, & V. Nee (Eds.), *The Handbook of Rational Choice Social Research* (pp. 556-588). Palo Alto: Stanford University Press.

6.4.2 Software and test manuals

Ingmar Visser

My software package depmixS4 saw 1 major and 2 minor updates during 2013, see: http://cran.r-project.org/web/packages/depmixS4/index.html

6.4.3 (Paper) presentation

Bechger, T.M., & **Maris**, G. (2013, July). *Differential items functioning: A cartographer's view*. Paper presented at the International Meeting of the Psychometric Society, Arnhem, The Netherlands.

Bechger, T.M. & **Maris**, G. (2013). *About the identifiability of the 3PL*. Paper presented at the RCEC workshop on IRT and Educational Measurement, Enschede, The Netherlands.

Béguin, A., & Feskens, R.C.W. (2013, April). *The Effect of Multilevel Structure and Model Dependency on the Standard Error of IRT Linking in a Nonequivalent Groups Design.* Paper presented at the National Council on Measurement in Education (NCME), San Francisco, USA.

Béguin, A. & Wools, S. (2013, April). *Vertical Comparison using Reference Sets*. Paper presented at AERA, San Francisco, USA.

Béguin, A. & Wools, S. (2013, August). *Vertical Comparison using Reference Sets.* Paper presented at EARLI, München, Germany.

Béguin, A. & Wools, S. (2013, July). *Vertical Comparison using Reference Sets*. Paper presented at the International Meeting of the Psychometric Society, Arnhem, The Netherlands.

Béguin, A. & Wools, S. (2013, May). Vergelijkingsonderzoek Referentiesets. Paper presented at the Onderwijs Research Dagen, Brussels, Belgium.

Bollen, K., Tueller, S., & **Oberski**, D. L. (2013). Issues in the Structural Equation Modeling of Complex Survey Data. In *Proceedings of the 59th World Statistics Congress 2013 (International Statistical Institute).* Hong Kong: Unknown Publisher.

Bolsinova, M., & **Maris**, G. (2013, July). *'Can IRT solve the missing data problem in test equating?'* Paper presented at the International Meeting of Psychometric Society, Arnhem, The Netherlands.

Brinkhuis, M. (2013, September). *Psychometrics for large scale computer adaptive practice.* Paper presented at the E-ATP, Malta.

Brinkhuis, M. (2013, July). *Detection of differential development*. Paper presented at the International Meeting of the Psychometric Society, Arnhem, The Netherlands.

Eggen, T. (2013, July) *Developments in computerized adaptive testing in education.* Invited address at the International Meeting of the Psychometric Society, Arnhem, The Netherlands.

Eggen, T., & Straetmans, G. (2013, January). *Resultaten en effecten van de WISCAT-pabo*. Panama conferentie, Utrecht, The Netherlands.

Eggen, T. (2013, August). *Multi segment computerized adaptive testing in education*. EARLI, Munich, Germany.

Eggen, T. (2013, October). *Computerized adaptive testing serving educational testing purposes.* Paper presented at the International Association for Educational Assessment conference, Tel Aviv, Israel.

Eggen, T. (2013, November). *Applying Item Response Theory: Computerized Adaptive Testing*. Workshop at the Annual conference of the Association for Educational Assessment – Europe, Paris, France.

Eggen, T. (2013, November). *Doelbewuste kwaliteit van toetsen doelbewust getoetst*. Keynote at the NVE Conferentie, Nunspeet.

Fox, J.P. (2013). Exploring Feedback Behaviour: A Multivariate Multilevel Modelling Approach. The 9th International Multilevel Conference, Utrecht, March 27-28, 2013: Utrecht (2013, maart 27 - 2013, maart 28).

Heiser, W.J., *A Chorus Line: How Psychology in Leiden Turned West*. Invited Lecture at the Occasion of the 50th Anniversary of the Faculty of Social and Behavioural Sciences (FSW). Leiden, The Netherlands, March 26 and November 20, 2013.

Heiser, W.J., *Diagnostic and Prognostic Psychometrics: the Inspiration of Sabermetrics*. Valedictory Address at the Winterconference of the Interuniversity Graduate School of Psychometrics and Sociometrics (IOPS). Leuven, Belgium, December 12-13, 2013.

Hemker, B.T. (2013, May). *De vijfde jaarlijkse peiling van de reken- en taalvaardigheid in groep 8.* Paper presented at the Onderwijs Research Dagen, Brussels, Belgium.

Hemker, B.T. (2013, May). *Het effect van motivatie op toets-prestaties: "Wat heb ik er eigenlijk aan?"* Paper presented at the Onderwijs Research Dagen, Brussels, Belgium.

Hemker, B.T. (2013, November). *Optimal performance and typical performance: ''What's in it for me?''* Paper presented at the Annual conference of the Association for Educational Assessment – Europe, Paris, France.

Marsman, M., **Bechger**, T., **Maris**, G., & Glas, C. (2013, July). *Bayesian estimation of complex IRT models.* Paper presented at the International Meeting of the Psychometric Society, Arnhem, The Netherlands.

Marsman, M., **Bechger**, T., **Maris**, G., & Glas, C. (2013). *Bayesian estimation of the Ising model.* Paper presented at the Interuniversity Graduate School of Psychometrics and Sociometrics winterconference, Leuven, Belgium.

Marsman, M., **Bechger**, T., **Maris**, G., & Glas, C. (2013). *A non-parametric estimator of latent variable distributions*. Paper presented at the RCEC workshop on IRT and Educational Measurement, Enschede, The Netherlands.

Marsman, M., **Bechger**, T., **Maris**, G., & Glas, C. (2013). *Turning simulation into estimation.* Paper presented at the Workshop on Simulation, Rimini, Italy.

Nikolaus, S., Bode, C., Taal, E., **Glas**, C.A.W. & Van de Laar, M.A.F.J. (2013). Ontwikkeling van een computer adaptieve test voor vermoeidheid bij reumatoide artritis. Najaarsdagen Reumatologie, Nederlandse Vereniging voor Reumatologie: Arnhem, Netherlands (2013, september 27).

Oberski, D. L. (2013). Conditional Design Effects for Structural Equation Model estimates. In *Proceedings of the 59th World Statistics Congress 2013 (International Statistical Institute).* Hong Kong: Unknown Publisher.

Oberski, D. L. (2013). Local dependence in latent class models: application to voting in elections. In E. Brentari, & M. Carpita (Eds.), *SIS 2013 conference proceedings.* Milan: Unknown Publisher.

Partchev, I., & **Maris**, G. (2013, July). *A Bayesian approach to observed score equating*. Paper presented at the International Meeting of the Psychometric Society, Arnhem, The Netherlands.

Riggi, M., & **Vermunt**, J. K. (2013). Students reading motivation: A multilevel mixture factor analysis. In W. A. Gaul, A. Geyer-Schulz, L. Schmidt-Thieme, & J. Kunze (Eds.), *Challenges at the interface of data analysis, computer science, and optimization; Studies in classification, data analysis, and knowledge organization.* (pp. 567-573). Berlin: Springer.

Roelofs, E., **Bolsinova**, M., & Van Onna, M., & Vissers, J. (2013). *Development and Evaluation of a Competence Based Exam for Prospective Driving Instructors.* Paper presented at the sixth international conference on Driver behaviour and Training, Helsinki, Finland.

Siemons, L., Ten Klooster, P.M., Vonkeman, H.E., **Glas**, C.A.W. & Van de Laar, M.A.F.J. (2013). Distinct trajectories of disease activity over the first year in early rheumatoid arthritis patients following a treat-to-target strategy. Najaarsdagen Reumatologie: Arnhem (2013, september 27 - 2013, september 27).

Straat, J. H., & **Maris**, G. (2013, July). *An IRT-based Integration of Standard Setting Methods.* Paper presented at International Meeting of the Psychometric Society (IMPS), Arnhem, The Netherlands.

Ten Klooster, P.M., Oude Voshaar, M.A.H., Gandek, B., Rose, M., Bjorner, J.B., Taal, E., **Glas**, C.A.W. & Van de Laar, M.A.F.J. (2013). Development of a crosswalk between the SF-36 physical functioning scale and the Health Assessment Questionnaire in rheumatoid arthritis. Najaarsdagen Reumatologie: Arnhem (2013, september 25 - 2013, september 27).

Van der Kleij, F.M., **Eggen**, T.J.H.M. & Engelen, R.J.H. (2013). Naar valide rapportages in het computerprogramma LOVS: een herontwerp studie. Onderwijs Research Dagen, ORD: Brussel (2013, mei 29 - 2013, mei 31).

Van der Kleij, F.M., Vermeulen, J.A., Schildkamp, K. & **Eggen**, T.J.H.M. (2013, January). *In Towards an integrative formative approach of data-based decision making, assessment for learning, and diagnostic testing.* 26th International Congress for School Effectiveness and Improvement.

Van der Kleij, F., Feskens, R.C.W., & **Eggen**, T. (2013, April). *Effects of Feedback in a Computer-Based Learning Environment on Students' Learning Outcomes: A Meta-Analysis.* Paper presented at the National Council on Measurement in Education (NCME), San Francisco, USA.

Van der Kleij, F., Feskens, R.C.W., & **Eggen**, T. (2013, October). *Effects of feedback in a computer-based learning environment on students' learning outcomes: A meta-analysis.* Paper presented at the International Association for Educational Assessment conference, Tel Aviv, Israel.

Van der Kleij, F. M., Vermeulen, J. A., Schildkamp, K., & **Eggen**, T. J. H. M. (2013, November). *Data-based decision making, assessment for learning, and diagnostic testing in formative assessment.* Keynote presentation at the conference of the European Association for Educational Assessment, Paris, France.

Van Groen, M. M. (2013). *Multidimensional Computerized Adaptive Testing for Classifying Examinees on Several Constructs.* Paper presented at the RCEC workshop on IRT and Educational Measurement, Enschede, The Netherlands.

Van Groen, M. M., **Eggen**, T. J. H. M., & **Veldkamp**, B. P. (2013, July). M*ultidimensional computerized adaptive testing for classifying examinees*. Paper presented at the International Meeting of the Psychometric Society, Arnhem, The Netherlands.

Vermeulen, J. A., & **Eggen**, T. J. H. M. (2013). *Feedback over de aftrekmethoden van leerlingen via de lege getallenlijn: mogelijkheden en uitdagingen.* Werkgroeppresentatie op de 31e panamaconferentie 2013, Utrecht, The Netherlands.

Vermeulen, J. A., & **Eggen**, T. J. H. M. (2013, May). *Feedback over de aftrekmethoden van leerlingen via de lege getallenlijn: mogelijkheden en uitdagingen.* Symposiumbijdrage symposium Effectieve feedback: inhoud, vorm en de rol van kenmerken van feedbackontvangers Onderwijs Research Dagen, Brussels, Belgium.

Vermeulen, J. A., & **Eggen**, T. J. H. M., Scheltens, F., & **Béguin**, A. (2013, May). *De ontwikkeling van een diagnostisch instrument voor rekenen-wiskunde in groep 5.* Symposiumbijdrage PROO-Symposium 'Rekenen in het primair onderwijs' op de Onderwijs Research Dagen 2013, Brussels, Belgium.

Vermeulen, J. A., & **Eggen**, T. J. H. M. (2013, August). *Diagnosing Grade 3 Students' Conceptual and Procedural Knowledge of Subtraction with the Empty Number Line.* Paper presented at the EARLI, München, Germany.

Verschoor, A., & **Eggen**, T. (2013, July). *A Optimizing the Content and Routing of a MST.* Paper presented at the International Meeting of the Psychometric Society, Arnhem, The Netherlands.

Zwitser, R.J., & **Maris**, G. (2013, July). *Ordering Individuals with Sum Scores: the Introduction of the Nonparametric Rasch Model.* Paper presented at the International Meeting of the Psychometric Society, Arnhem, The Netherlands.

6.4.4 Under revision

Chow, S.-M., Witkiewitz, K., **Grasman**, R. P. P. P., & Maisto, S. A. (2013). The Cusp Catastrophe Model as a Regime-Switching Structural Equation Model. *under revision for Psychological Methods*

Hamaker, E. L., & Grasman, R. P. P. P. (2013). Studying inertia in a multilevel autoregressive model: Should the lagged predictor be cluster mean centered? *under revision*

Hamaker, E. L., Kuiper, R. M, & Grasman, R. P. P. P. (2013). A Critique of Cross-Lagged Panel Models. *under revision for Psychological Methods*

Cramer, A. O. J., van Ravenzwaaij, D., Matzke, D., Steingroever, H., Wetzels, R., Grasman, R. P. P. P., Waldorp, L. J., & Wagenmakers, E.-J. (2013). Hidden multiplicity in multiway ANOVA: Prevalence, consequences, and remedies. *under revision*

7 Finances

7.1 Financial statement 2013

Receipts

The participating institutes of Leiden University, University of Amsterdam, University of Groningen, Twente University, Tilburg University, Utrecht University, KU Leuven (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 2013. The participation fee for 2013 was € 700 per PhD student. Associated institutes with PhD students in the IOPS Graduate School, participated on the same terms.
Apart form 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 2013 of € 3.272,68

7.2 Summary of receipts and expenditures in 2013

Receipts		Expenditures		
		Salaries IOPS office		
		Secretary, 17 hours per week	30.795,27	
Contribution participating institutions	37.100,00	hiring extra personnel	6.200,00	
(53 PhD students)			subtotal	36.995,27
		IOPS office		
Other contributions	775,00	Office supplies	10,96	
		Printed matter	128,59	
		Hosting website	33,00	
			subtotal	172,55
		Reprensation costs		
		Reprensation costs	313,70	
		Travelcosts	821,20	
		Presents	207,51	
Subtotal Receipts	37.875,00		subtotal	1.342,41
		Courses		
		Congres Heiser	895,00	
negative financial outcome 2013	3.272,68	Catering Survey Design	249,72	
			subtotal	1.144,72
		Special		
		Cost of KU Leuven (2014)		1.492,73
Total receipts (include result 2013)	**41.147,68**	**Total expenditures**		**41.147,68**

7.3 Balance sheet 2013

IOPS Own Funds 2013			
Debet	Euro	Credit	Euro
Own Funds 31-12-2013	115.607,55	Own Funds 01-01-2013 Preliminary Results 2013	118.880,23 3.272,68
Total Debet	115.607,55	Totaal Credit	115.607,55

The total own funds of € 115.607,55 is at the start of the calendar year 2014 transferred to University of Groningen as administrator of IOPS.