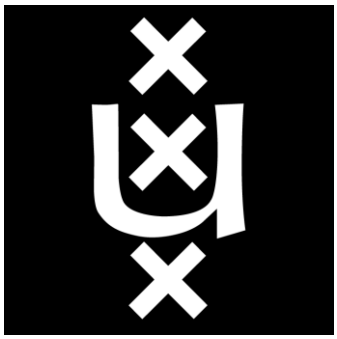
interuniversity graduate school of Psychometrics and Sociometrics

33rd IOPS Summer Conference
14-15 June 2018
University of Amsterdam



33rd IOPS summer conference, 14-15 June 2018

Conference host: University of Amsterdam
Conference location: Roeterseilandcomplex
Conference dinner: De Brug, Roeterseilandcomplex
Conference hotel: Suggestions at the end of this document (p.22)

All talks will be at the Roeterseilandcomplex, Building REC M, room 1.03 (Plantage Muidergracht 12)

Programme

Thursday 14 June 2017

10.30 - 12.00	IOPS Board meeting (REC G - Senaatszaal 1.22)	
11.30 - 12.00	Pre meeting IOPS PhD students (REC M 1.03)	
12.00 - 13.00	Registration / Welcome lunch (hallway REC M 1.03)	
13.00 - 13.05	Official opening by Rob Meijer, IOPS director (REC M 1.03)	
13.05 - 13.10	Welcome by Denny Borsboom, University of Amsterdam	
13.10 - 13.35	**Lisa Wijsen,** University of Amsterdam *What's on the mind of the psychometrician?*	**4**
13.35 - 14.00	**Iris Yocarini,** Erasmus University Rotterdam *Testing in higher education*	**5**
14.00 - 14.25	**Mariëlle Zwijnenburg,** University of Utrecht *Testing replication with the prior predictive p-value*	**6**
14.25 – 14.55	Break (hallway REC M 1.03)	
14.55 - 15.20	**Chris Hartgerink,** Tilburg University *"As-you-go" instead of "after-the-fact": Better practices by design*	**7**
15.20 - 16.40	Keynote Speaker: **Maarten Marsman,** University of Amsterdam *The Idiographic Ising Network Model*	**8**
16.40 - 16.50	IOPS Best Paper Award 2017	
16:50 - 17:00	IOPS Plenary Meeting (REC M room 1.03)	
17:00 – 18:30	Poster presentations & drinks (hallway REC M 1.03)	
	Olmo van den Akker, Tilburg University *What heuristics do researchers use when assessing the outcomes of multiple studies?*	**14**
	Anja Ernst, University of Groningen *Disentangling individual dynamics — probabilistic clustering of longitudinal data*	**15**
	Laura Kolbe, University of Amsterdam	**16**

	An illustration of generalizations of the polychoric correlation coefficient with empirical data	
	Letty Koopman, University of Amsterdam *Checking assumptions in two-level Mokken scale analysis*	**17**
	Duco Veen, University of Utrecht *Sample Size Determination for Bayesian Estimation Using Informative Priors*	**18**
	Wai Wong, University of Leuven *Reliability of within-person associations in ESM data*	**19**
19.00 - late	Conference dinner at De Brug & drinks afterwards	

Friday 15 June 2018

09.00 - 09.30	Welcome/ Coffee (Hallway REC M room 1.03)	
09.30 – 9.55	**Johnny van Doorn,** University of Amsterdam *Bayesian rank-based inference through data augmentation*	**9**
09.55 - 10.20	**Laura Boeschoten,** Tilburg University *Combining latent class analysis and multiple imputation to correct for misclassification in combined datasets*	**10**
10:20- 10:45	**Oisin Ryan,** University of Utrecht *Centrality and Interventions in Continuous-Time Dynamical Networks*	**11**
10.45 - 11.15	Break	
11.15 - 11.40	**Xinru Li,** Leiden University *Meta-CART: a flexible tool for multiple moderator meta-analysis*	**12**
11.40 - 12.05	**Jonas Dalege,** University of Amsterdam	**13**
12:05 - 12:15	IOPS Best Presentation and Poster Award/Closing	
12:15	Lunch (take-away)	

End of conference program

Lisa Wijsen, University of Amsterdam

What's on the mind of the psychometrician?
Interviews with Psychometric Society Presidents

When we think of psychometrics, we might think of important research traditions, such as IRT or factor analysis, or of its effects on society, such as the rise of mental testing. But who are the people behind these developments? And how do they reflect on their own research area? To collect the ideas of psychometricians about their own research area, I interviewed 20 presidents of the Psychometric Society, and asked them questions on their career, the relations between psychometrics and other disciplines, and the history and future of psychometrics. One of the interesting findings is that the interviewees differ greatly on what they consider is the role of psychometrics in relation to psychology. Some consider psychometrics as a science of consultation; others are convinced psychometrics itself should be strongly influenced by psychology and vice versa. Whereas the interviewees stress the importance of psychometrics' achievements, they also emphasize their frustration with the lack of proper psychometrics in psychological science and testing agencies. Furthermore, the interviewees vary highly on their ideas of the future of psychometrics: some argue psychometrics should open up to new developments such as neuroscience or data mining, others find it important to protect the skills and knowledge that are unique to the psychometrician. Besides preserving the testimonies of frontrunners of psychometrics, the interviews provide an interesting peek into the mind of the psychometrician.

Student discussant: Mariëlle Zwijnenburg
Staff discussant: Herbert Hoijtink

Iris Yocarini, Erasmus University Rotterdam

Testing in higher education

In higher education, tests are used to assess students' competence. These tests are often small-scaled, designed in-house by an individual academic for each course. For the multiple choice (MC) tests in higher education, where students' optimal and common strategy is to guess instead of omit an answer, a correction for guessing is often applied in estimating students' competence. In addition, different methods exist to transform responses on test items into grades. In the educational measurement literature most research on these measurement topics focus on the context of large-scale standardized high-stakes tests (such as the SAT). Most methods used to estimate students true scores (e.g. IRT models) or discussions on the correction for guessing in this context of high stake testing consequently do not generalize to the small-scaled, non-standardized tests in higher education. Two simulation studies were performed to assess the performance of different methods to correct for guessing in MC tests and to compare the accuracy of different cut-score methods that are feasible in higher education.

Student discussant: Laura Boeschoten
Staff discussant: Robert Zwitser

Marielle Zwijnenburg, University of Utrecht

Testing replication with the prior predictive *p-value*

In this presentation, I will explain how replication can be tested with the prior predictive *p*-value. One of the unique elements of the method that we propose is that original studies generate informative hypotheses for new studies. For example, for the ANOVA model these hypotheses can concern specific values for the group means, the ordering of the group means, or effect sizes for between group differences. I will explain the calculation of the prior predictive *p*-value step by step, and illustrate the method with examples.

Student discussant: Oisín Ryan
Staff discussant: Michele Nuijten

Chris Hartgerink, Tilburg University

“As-you-go” instead of “after-the-fact”: Better practices by design

The current scholarly communication system fulfills its functions in a narrow sense, but hardly facilitates research integrity. In light of the Web, the scholarly paper seems anachronistic and unnecessarily “after-the-fact”. Several of the issues in research integrity, such as hypothesizing after results are known and publication bias, could be mitigated by more modular and chronological reporting. For example, selective publication can only occur when results are known, and if the design and data have already been communicated the effect of not communicating a results section are less influential. As such, one of the limiting factors to make progress on research integrity is the scholarly paper; I will discuss how modular and chronological reporting could look, why it is worthwhile for individuals and scholarly research, and how it can be implemented in the very near future without harming people’s career opportunities.

Student discussant: Xinru Li
Staff discussant: Don van Ravenzwaaij

Maarten Marsman, University of Amsterdam

The Idiographic Ising Network Model

In recent years, it has been proposed to conceptualize psychometric constructs such as depression as networks of mutually reinforcing variables. In this new field of network psychometrics, graphical models such as the Ising model play an important role. A growing concern with these models is that they are commonly applied to model associations at the group level and assume that individuals are independent replications of the exact same topology. But the topology at the group level may be completely different from the topology at the individual level. In this presentation, I will introduce an idiographic Ising network model in which the topology of the network is allowed to vary over persons and we obtain the Ising model as an average of the individual topologies. With this idiographic network model we can study both the individual network structures and the group level phenomena. Several consequences of this formulation will be explored.

Student discussant: Joost Kruis
Staff discussant: Laura Bringmann

Johnny van Doorn, University of Amsterdam

Bayesian rank-based inference through data augmentation

Parametric assumptions are often violated under non-normality, outliers, or an ordinal measurement level. Rank-based methods, such as the Wilcoxon tests and rank correlations, offer a robust and powerful statistical alternative to their parametric counterparts. However, due to the nonparametric nature of rank data, there is a lack of an explicit likelihood function. This problem can be overcome by introducing a latent normal level to the observed data, which respects the ordinal information in the data. In doing so, Bayesian inference through posterior distribution and Bayes factors is enabled. To illustrate the latent normal methodology, it is applied to the Wilcoxon rank sum test.

Student discussant: Zhengguo Gu
Staff discussant: Joris Mulder

Laura Boeschoten, Tilburg University

Combining latent class analysis and multiple imputation to correct for misclassification in combined datasets

National Statistical Institutes (NSIs) often use large datasets to estimate population tables on many different aspects of society. A way to create these rich datasets as efficiently and cost effectively as possible is by utilizing already available administrative data. When more information is required than already available, administrative data can be supplemented with survey data. A major problem is however that both surveys and administrative data can contain misclassification.
To overcome the issue of misclassification in both sources, a method is developed which combines Multiple Imputation (MI) and Latent Class (LC) analysis (MILC). This method estimates the misclassification and simultaneously imputes a new variable that is corrected for that misclassification. Furthermore, uncertainty due to misclassification is incorporated by using multiple imputations. Edit rules can be incorporated in the MILC method, which prevent impossible combinations of scores from occurring in the multiply imputed dataset.
During my PhD, I worked on investigating the performance of MILC using simulation studies, on applying the method to combined datasets and to expand the method to handle practical issues. More specifically, we investigated how the method can be expanded to simultaneously impute missing values in covariates, how the method can be applied to longitudinal data and how the method can be expanded to include covariates at a later time-point.

Student discussant: Iris Yocarini
Staff discussant: Samantha Bouwmeester

Oisin Ryan, University of Utrecht

Centrality and Interventions in Continuous-Time Dynamical Networks

Centrality measures in dynamical networks offer an appealing method to identify targets (e.g., specific symptoms of psychopathology) for intervention. We develop new centrality measures for use with dynamical networks based on Continuous-Time VAR(1) models. We examine and compare the use of these new centrality measures with those based on traditional Discrete-Time VAR(1) models, from an interventionist perspective.

Student discussant: Diulio Flore
Staff discussant: Sacha Epskamp

Xinru Li, Leiden University

Meta-CART: a flexible tool for multiple moderator meta-analysis

In meta-analysis, heterogeneity often exists between studies. Knowledge about study features (i.e., moderators) that can explain the heterogeneity in effect sizes can be useful for researchers to assess the effectiveness of existing interventions and design new potentially effective interventions. When there are multiple moderators, they may amplify or attenuate each other's effect on treatment effectiveness. In this situation, we say that there are interaction effects between the moderators. Usually, interaction effects are neglected in meta-analytic studies. One reason for this is the lack of appropriate methods that are able to identify interactions between multiple moderators in situations without a priori hypotheses. To overcome this problem, a new approach called meta-CART was proposed with the advantage of dealing with many moderators and identifying interaction effects between them (Li et al., 2017). The method follows the paradigm of classification and regression trees (CART) to partition studies into more homogeneous subgroups by influential moderators, and simultaneously tests the subgroup meta-analysis results. In our presentation, we will introduce an improved version of meta-CART with fixed- or random-effects model assumptions and various options to control the partitioning process. We will also illustrate an R-package to apply the method on real-world meta-analytic data sets.

Student discussant: Tessa Blanken
Staff discussant: Mattis van den Bergh

Jonas Dalege, University of Amsterdam

The Attitudinal Entropy (AE) Framework as a General Theory of Individual Attitudes

This talk introduces the Attitudinal Entropy (AE) framework, which builds on the Causal Attitude Network (CAN) model that conceptualizes attitudes as Ising networks. The AE framework rests on three propositions. First, attitude inconsistency and instability are two related indications of attitudinal entropy, a measure of randomness derived from thermodynamics. Second, energy of attitude configurations serves as a local processing strategy to reduce the global entropy of attitude networks. Third, directing attention to and thinking about attitude objects reduces attitudinal entropy. I discuss several determinants of attitudinal entropy reduction and show that several findings in the attitude literature, such as the mere thought effect on attitude polarization and the effects of heuristic versus systematic processing of arguments, follow from the AE framework.

Olmo van den Akker, Tilburg University

What heuristics do researchers use when assessing the outcomes of multiple studies?

In social and experimental psychology single studies are generally considered to be insufficient to test a theory and multiple study papers are the norm. In this project, we consider how researchers assess the validity of a theory when they are presented with the results of multiple studies that all test that theory. More specifically, we consider what researchers' beliefs in the theory are as a function of the number of significant vs. nonsignificant studies, and whether this relationship depends on the type of studies (direct or conceptual replications) and the role of the respondent (researcher or reviewer). We find that researchers' belief in the theory increases with the number of significant outcomes and that replication type and the respondent's role do not affect response patterns. In a preregistered follow-up analysis we look at individual researcher data to find out which heuristics researchers use when assessing the outcomes of multiple studies. We lump each researcher into one of six categories: those who use Bayesian inference (i.e. the normative approach), those who use deterministic vote counting, those who use proportional vote counting, those who average prior beliefs with the proportion of significant results, those with irrational response patterns, and those whose response patterns are inconsistent with any of the previous categories. This follow-up study highlights mistakes researchers make when assessing the outcomes of scientific papers and sheds light on the ways we can educate current and future researchers to avoid making these mistakes.

Anja Ernst, Marieke Timmerman & Casper Albers, University of Groningen

Disentangling individual dynamics — probabilistic clustering of longitudinal data

Studying idiographic dynamics through time series models is becoming increasingly popular in the social sciences. Often, researchers are interested in generalizing to a population of individuals, rather than being interested in the single individuals per se. As dynamics can be rather heterogeneous across individuals, one needs sophisticated tools to express the essential similarities and differences across individuals. A way to proceed is to identify subgroups of people who are characterized by qualitative differences in their dynamics. Recently, dynamic clustering methods have been proposed to discern groups of individuals who exhibit homogeneous dynamics. So far, these methods assume equal generating processes for individuals of a cluster. To avoid this, in empirical practice overly restrictive assumption, I will outline a probabilistic clustering approach based on the Gaussian finite mixture model that clusters on individuals' VAR coefficients, thereby allowing for individual deviations within clusters. I will contrast the proposed method to another time series clustering procedure drawing form the results of a simulation study and illustrating their performance on an empirical data set. The models are applied to *N*= 366 ecological momentary assessment data with external measures of depression and anxiety.

Laura Kolbe, Suzanne Jak, Frans J. Oort, University of Amsterdam

An illustration of generalizations of the polychoric correlation coefficient with empirical data

In structural equation modeling, the association between two ordinal variables can be measured by means of a polychoric correlation coefficient. This coefficient is based on the assumption that responses to ordinal variables are generated by two underlying continuous variables that follow a bivariate normal distribution. If the assumption of underlying bivariate normality holds, the polychoric correlation coefficient is the correlation between the two underlying continuous variables. However, previous studies have shown that the underlying bivariate normality assumption rarely holds in empirical data. A violation of the assumption can result in bias in the polychoric correlation estimate. Generalizations of the polychoric correlation coefficient have therefore been proposed based on other distributional assumptions. In this poster presentation, various generalizations will be illustrated with empirical data.

Letty Koopman, University of Amsterdam

Checking assumptions in two-level Mokken scale analysis

Currently, Mokken scale analysis for two-level data is being developed. This scaling procedure allows test constructors to investigate the scalability, reliability, and validity of multi-rater measurement instruments. The nonparametric IRT models that underlie Mokken scale analysis consist of four main assumptions: unidimensionality, local independence, monotonicity, and invariant item ordering. These assumptions imply certain observable properties of the data. For example, local independence and monotonicity imply conditional association; for dichotomous items scores, monotonicity implies manifest monotonicity; and invariant item ordering implies manifest invariant item ordering. Mokken scale analysis provides methods to investigate the assumptions of the nonparametric IRT models by investigating the observable properties. When dealing with multi-rater data, some adjustments of the assumptions are necessary. For example, the monotonicity assumption concerns the latent trait of the subject combined with the rater effect. In addition, multi-rater data require a different way to estimate the item probabilities. As a result, the methods to investigate observable properties must be adapted for multi-rater data. This poster presentation focusses on explaining the various concepts and discussing the necessary adaptation to make the methods from Mokken scale analysis useful in a multi-rater context.

Duco Veen, University of Utrecht

Sample Size Determination for Bayesian Estimation Using Informative Priors

When limited data is available, Bayesian statistics are often mentioned as a possible solution. Yet, for Bayesian statistics to provide real benefits over classical analyses in small data situations, specification of prior information is key. If prior and data agree with each other, using informative priors will results in quick convergence to a stable estimate for the model. If the priors and the data however do not agree with each other this will lead unstable results and the idea that prior and data will form a compromise in the posterior is only true for a very small region of sample size. We show that with informative priors and prior-data conflict, mean parameters tend to either the data or the prior and variance parameters will overestimate the variance due to the prior-data conflict (even with accurate priors on the variance). We demonstrate how prior-data conflict can be detected for each parameter using the Data Agreement Criterion and show how we can identify if we are making decisions based on the prior or the data. By identifying the region of prior-data compromise for the posterior distribution, we also identify the regions in which the data or the prior dominates. Based on that information, one can determine how small a sample can be used with informative priors, even if they are wrong, whilst still being able to make data driven conclusions.

Wai Wong, University of Leuven

Reliability of within-person associations in experience sampling method data

Researchers collecting experience sampling method (ESM) data are often interested in the within-person association between some response and one or more predictor variables. For example, participants were asked to rate the pleasantness of the most important recent event and their affect level multiple times throughout the day for a number of days in various ESM studies. As expected, there is considerable variability in how strongly these variables are related to each other across subjects (reflecting differential sensitivity of mood to pleasant/stressful events) and also across groups (e.g., patients versus healthy controls). However, at the moment, we do not have a clear understanding of how reliable our estimates of such within-person relationships actually are. In this presentation, methods for estimating the reliability of such within-person relationships (using Cronbach's alpha or some similar measure based on the correlation of day-specific random slope effects) will be demonstrated. In addition, since there is a positive association between the length (i.e., the number of days) of an ESM study and the reliability with which we can estimate such person-specific associations, we can consider for how many days an ESM study should be conducted in order to achieve acceptable levels of reliability. This presentation will also show how researchers can predict the reliability for various durations of an ESM study (using the Spearman-Brown equation). This approach can therefore also help researchers decide for how many days data should be collected in their ESM study.

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