



R. Philip Chalmers, Ph.D.

Curriculum Vitae

Professional History

- 2019–Present **Assistant Professor**, *York University*, Toronto, Quantitative Methodology.
2017–2018 **Assistant Professor**, *University of Georgia*, Athens, Quantitative Methodology.

Education

- 2016 **PhD**, *York University*, Toronto, Ontario, Canada, Area: Quantitative Methods.
2012 **MA**, *York University*, Toronto, Ontario, Canada, Area: Quantitative Methods.
2009 **BSc**, *Nipissing University*, North Bay, Ontario, Canada, Major: Psychology.

Dissertation

- Title A Differential Response Functioning Framework for Understanding Item, Bundle, and Test Bias
Committee David Flora, Jolynn Pek, Robert Cribbie, Michael Friendly, Augustine Wong, and Daniel Bolt

Master's thesis

- Title Full-Information Maximum-Likelihood Estimation of Noncompensatory IRT Models
Supervisors David Flora and Michael Friendly

Honours and Awards

- 2014–2017 SSHRC Joseph-Armand Bombardier CGS Doctoral Scholarship (\$105,000)
2014–2017 SSHRC Doctoral Fellowship (\$60,000; Declined)
2015 Norman S. Endler Research Fellowship Award from York University (\$1000)
2014 Award for Outstanding Poster at the International Meeting of the Psychometric Society (IMPS; \$1000)
2014 OGS Research Scholarship (\$15,000; Declined)
2014 Certificate of Academic Excellence for Masters Thesis, awarded by the Canadian Psychological Association
2013 John M. Chambers Statistical Software Award (\$1000)
2013 OGS Research Scholarship (\$15,000)

4700 Keele Street – Toronto, ON, Canada, M3J 1P3

✉ chalmrp@yorku.ca

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- 2012 OGS Research Scholarship (\$15,000)
2012 Michael Friendly Research Award for Quantitative Methods in Psychology
2011 OGS Research Scholarship (\$15,000)
2010 MA 'Entrance Scholarship' from York University (\$4000)

Published Articles

Liu, C.-W. & **Chalmers, R. P.** (in press). A Note on Louis' Standard Error Estimation for IRT and Cognitive Diagnostic Models. *British Journal of Mathematical and Statistical Psychology*. <https://doi.org/10.1111/bmsp.12207>

Chalmers, R. P. & Adkins, M. C. (2020). Writing Effective and Reliable Monte Carlo Simulations with the SimDesign Package. *Tutorials in Quantitative Methods in Psychology*.

Counsell, A., Cribbie, R. A., & **Chalmers, R. P.** (2020). Comparing Means under Heteroscedasticity and Nonnormality: Further Exploring Robust Means Modeling. *Journal of Modern Applied Statistical Methods*.

Smits, N., Ogreden, O., Mauricio, G., Terwee, C. B., & **Chalmers, R. P.** (2020). A study of alternative approaches to non-normal latent trait distributions in item response theory models used for health outcome measurement. *Statistical Methods in Medical Research*

Chalmers, R. P. (2020). Partially and Fully Non-compensatory Response Models for Dichotomous and Polytomous Items. *Applied Psychological Measurement*.

Schneider, L., **Chalmers, R. P.**, Debelak, R., & Merkle, E. (2019). Model selection of non-nested and nested item response models using Vuong tests. *Multivariate Behavioral Research*, DOI: 10.1080/00273171.2019.1664280

Chalmers, R. P. (2018). Numerical Approximation of the Observed Information Matrix with Oakes' Identity. *British Journal of Mathematical and Statistical Psychology*, 17(3), 415–436. DOI: 10.1111/bmsp.12127

Chalmers, R. P. (2018). On misconceptions and the limited usefulness of ordinal alpha. *Educational and Psychological Measurement*, 78, 1056–1071. DOI: 10.1177/0013164417727036

Chalmers, R. P. (2018). Model-Based Measures for Detecting and Quantifying Response Bias. *Psychometrika*, 83(3), 696–732. DOI: 10.1007/s11336-018-9626-9

Chow, P., **Chalmers, R. P.**, Flynn, D. M., McLandress, A. J., and Steadman, V. G. L. (2018). A Technique to Measure College Students on the Depression-Elation Continuum. *College Student Journal*, 52, 177–186.

Chalmers, R. P. (2018). Improving the Crossing-SIBTEST statistic for detecting non-uniform DIF. *Psychometrika*, 83(2), 376–386. DOI: 10.1007/s11336-017-9583-8

Liu, C.-W. & **Chalmers, R. P.** (2018). Fitting Item Response Unfolding Models to Likert-scale and Pairwise Preference Data using mirt in R. *PLoS ONE*, 13(5). DOI: <https://doi.org/10.1371/journal.pone.0196292>

Chalmers, R. P., Pek, J., & Liu, Y. (2017). Profile-likelihood Confidence Intervals in Item Response Theory Models. *Multivariate Behavioral Research*, *52*(5), 533–550. DOI: 10.1080/00273171.2017.1329082

Chalmers, R. P. & Ng, V. (2017). Plausible-Value Imputation Statistics for Detecting Item Misfit. *Applied Psychological Measurement*, *41*, 372–387.

Sigal, M. & **Chalmers, R. P.** (2016). Play It Again: Teaching Statistics with Monte Carlo Simulation. *Journal of Statistics Education*, *21*, 1–21. DOI: 10.1080/10691898.2016.1246953

Pek, J., **Chalmers, R. P.**, & Monette, G. (2016). On the Relationship Between Confidence Regions and Exchangeable Weights in Multiple Linear Regression. *Multivariate Behavioral Research*, *51*, 719–739.

Chalmers, R. P. (2016). Generating Adaptive and Non-Adaptive Test Interfaces for Multidimensional Item Response Theory Applications. *Journal of Statistical Software*, *71*(5), 1–39.

Chalmers, R. P., Counsell, A., & Flora, D. B. (2016). It might not make a big DIF: Improved Differential Test Functioning statistics that account for sampling variability. *Educational and Psychological Measurement*, *1*, 114–140.

Chalmers, R. P., & Flora, D. (2015). faoutlier: An R package for detecting influential cases in exploratory and confirmatory factor analysis. *Applied Psychological Measurement*, *39*, 573–574.

Chalmers, R. P. (2015). Extended Mixed-Effects Item Response Models with the MH-RM Algorithm. *Journal of Educational Measurement*, *52*, 200–222.

Pek, J., **Chalmers, R. P.**, Kok, B. E., & Losardo, D. (2015). Visualizing Confidence Bands for Semiparametrically Estimated Nonlinear Relations among Latent Variables. *Journal of Educational and Behavioral Statistics*, *40*, 4, 402–423.

Pek, J. & **Chalmers, R. P.** (2015). Diagnosing Nonlinearity With Confidence Envelopes for a Semiparametric Approach to Modeling Bivariate Nonlinear Relations Among Latent Variables. *Structural Equation Modeling*, *22*, 2, 288–293.

Chalmers, R. P., & Flora, D. (2014). Maximum-likelihood estimation of non-compensatory IRT models with the MH-RM algorithm. *Applied Psychological Measurement*, *38*(5), 339–358.

Weiss, J. A., Robinson, S., Fung, S., Tint, A., **Chalmers, R. P.**, & Lunsky, Y. (2013). Family hardiness, social support, and self-efficacy in mothers of individuals with Autism Spectrum Disorders. *Research in Autism Spectrum Disorders*, *7*(11), 1310–1317.

Flora, D. B., LaBrish, C., & **Chalmers, R. P.** (2012). Old and new ideas for data cleaning and assumption testing with exploratory and confirmatory factor analysis. *Frontiers in Psychology*, *3*, 1–21.

Chalmers, R. P. (2012). mirt: A multidimensional item response theory package for the R environment. *Journal of Statistical Software*, *48*(6), 1–29.

Published Software

Friendly, M., Fox, J., and **Chalmers, R. P.** (2015). *matlib: Matrix Functions for Teaching and Learning Linear Algebra and Multivariate Statistics*. R package. <http://cran.r-project.org/web/packages/matlib/index.html>

Chalmers, R. P. (2015). *SimDesign: Structure for Organizing Monte Carlo Simulation Designs*. R package. <http://cran.r-project.org/web/packages/SimDesign/index.html>

Chalmers, R. P. (2014). *mirtCAT: Computerized Adaptive Testing with Multi-dimensional Item Response Theory*. R package. <http://cran.r-project.org/web/packages/mirtCAT/index.html>

Kok, B. E., Pek, J., Sterba, S., Bauer, D., and **Chalmers, R. P.** (2014). *plotSEMM: Graphing Nonlinear Relations Among Latent Variables from Structural Equation Mixture Models*. R package. <http://cran.r-project.org/web/packages/plotSEMM/index.html>

Chalmers, R. P., Smith, C., and Sigal M. (2012). *OLScurve: OLS Growth Curve Trajectories*. R package. <http://cran.r-project.org/web/packages/OLScurve/index.html>

Chalmers, R. P. (2012). *faoutlier: Influential Case Detection Methods for Factor Analysis and Structural Equation Models*. R package. <http://cran.r-project.org/web/packages/faoutlier/index.html>

Chalmers, R. P. (2011). *mirt: Multidimensional Item Response Theory*. R package. <http://cran.r-project.org/web/packages/mirt/index.html>

Convention Papers and Invited Presentations

- May 2020 **Chalmers, R. P.** An overview of multi-group differential item functioning methods [Conference session canceled]. CPA. Montreal, Quebec
- July 2020 **Chalmers, R. P.** Generalized SIBTEST and Crossing-SIBTEST statistics for multi-group DIF testing [Conference session canceled]. International Meeting of the Psychometric Society. Baltimore, Maryland
- September 2019 **Chalmers, R. P.** Approximating the asymptotic covariance matrix when using the EM algorithm. Quantitative Psychology Forum. York University.
- May 2019 **Chalmers, R. P.** Model-based Measures for Detecting and Quantifying Response Bias. CPA. Halifax, Canada
- November 2018 **Chalmers, R. P.** Approximating the asymptotic covariance matrix when estimating models with the EM algorithm. Quantitative Methods Colloquium. Vanderbilt University, Nashville, Tennessee.
- October 2018 Ogreden, O., Terwee, C. B., **Chalmers, R. P.**, Smits, N. Non-normality of Latent Trait Distribution: A Problem of Model Selection in IRT. PROMIS Health Organization. Dublin, Ireland
- July 2018 Schneider, L., **Chalmers, R. P.**, Debelak, R., & Merkle, E. Vuong tests for model selection of MIRT models. International Meeting of the Psychometric Society. New York City, New York.

- February 2018 Schneider, L., **Chalmers, R. P.**, Debelak, R., & Merkle, E. Applying Vuong Tests to Item Response Models Using mirt and nonnest2. International Workshop on Psychometric Computing (Psychoco). Tuebingen, Germany.
- July 2016 **Chalmers, R. P.**, Flora, D., & Counsell, A. Large-sample Hypothesis Tests and Confidence Intervals for Two Differential Test Functioning Measures. International Meeting of the Psychometric Society. Asheville, North Carolina.
- June 2015 **Chalmers, R. P.** Mixed regression effects in item response theory applications. Symposium presentation talk at the annual Canadian Psychological Association (CPA) meeting. Ottawa, Ontario.
- June 2015 Pek, J. & **Chalmers, R. P.** On the relationship between confidence regions and exchangeable weights in multiple linear regression. Symposium presentation at the annual Canadian Psychological Association (CPA) meeting. Ottawa, Ontario.
- May 2015 Flora, D., **Chalmers, R. P.**, & Counsell, A. Because it might not make a DIF: Assessing differential test functioning. Symposium presentation at the annual Modern Modeling Methods conference. Mansfield, Connecticut.
- February 2015 **Chalmers, R. P.** Multidimensional Item Response Theory Applications with mirt and mirtCAT. Keynote presentation at the International Workshop on Psychometric Computing (Psychoco). Amsterdam, Netherlands.
- July 2014 Pek, J. & **Chalmers, R. P.** Detecting nonlinearity of latent relationships with confidence envelopes for a semiparametric approach to modeling bivariate nonlinear relations among latent variables. Paper presented at the 2014 International Meeting of the Psychometric Society. Madison, Wisconsin.
- July 2014 **Chalmers, R. P.** & Pek, J. Graphical utilities for diagnosing nonlinear relationships in structural equation models. Poster presentation at the 2014 International Meeting of the Psychometric Society. Madison, Wisconsin.
- May 2013 Chow, P., & **Chalmers, R. P.** Adding a positive form to BDI-II can produce a full-spectrum scale measuring severe depression at one end and elation at the other end. Poster presentation, 2013 World Congress on Positive Psychology. Los Angeles, California.
- May 2013 Counsell, A., **Chalmers, R. P.**, Sigal, M. J., & Cribbie, R. (2013). Extending the Robust Means Modeling Framework. Paper presented at the Modern Modeling Methods conference. Storrs, Connecticut.
- 2012 **Chalmers, R. P.** Unidimensional and Multidimensional IRT Modeling with the mirt Package. Quantitative Psychology Forum. York University.
- June 2012 LaBrish, C., Flora, D. B., & **Chalmers, R. P.** Old and new ideas for data screening and assumption testing for exploratory and confirmatory factor analysis. Symposium conducted at the 73rd conference of the Canadian Psychological Association. Halifax, Nova Scotia.
- July 2012 **Chalmers, R. P.** mirt: A Multidimensional Item Response Theory Package in R. Invited Symposium Contribution, 2012 International Meeting of the Psychometric Society. Lincoln, Nebraska.

- 2012 Flora, D. B., & **Chalmers, R. P.** Strange signs in confirmatory factor analysis: Illustration using ADHD symptom data. Quantitative Psychology Forum. York University.
- 2011 **Chalmers, R. P.** \LaTeX , Sweave, and SVN: An introduction to writing, maintaining, and sharing structured documents. Quantitative Psychology Forum. York University.
- 2010 Flora, D. B., & **Chalmers, R. P.** Strange signs in confirmatory factor analysis: Illustration using ADHD symptom data. Quantitative Psychology Forum. University of North Carolina at Chapel Hill.

Professional Activities

Workshops

- March 2017 **Chalmers, R. P.** *Multidimensional Computerized Adaptive Testing with mirtCAT*. Workshop to be presented at the Jena Spring School on Educational Measurement at Friedrich-Schiller-University Jena, Germany.
- February 2015 **Chalmers, R. P.** *Unidimensional and multidimensional item response theory in R*. Two day workshop in the workshop series jointly organized by ETH Zürich and the University of Zürich, Switzerland.
- February 2015 **Chalmers, R. P.** *Introduction to R graphics*. One day workshop in the workshop series jointly organized by ETH Zürich and the University of Zürich, Switzerland.
- September 2013 **Chalmers, R. P.** *mirt: Item Response Theory in R*. Invited Workshop Contribution, Methods and Evaluation section of the German Psychological Society, Klagenfurt, Austria.
- September 2013 **Chalmers, R. P.** *mirt: Item Response Theory in R*. Invited Workshop Contribution for University of Tübingen, Germany.

Other Professional Experience

- 2016 Consultant for Multi-Health Systems Inc. (MHS), Toronto, ON, Canada.
- 2013-2015 Student coordinator for the Quantitative Methods Forum at York University.
- 2013-2015 Statistical consultant for undergraduate and graduate students with Statistical Consulting Services (SCS) at York University

Ad hoc Reviewer

Psychometrika

Applied Psychological Measurement

Multivariate Behavioral Research

Psychological Methods

Journal of Educational and Behavioral Statistics

Journal of Educational Measurement

British Journal of Mathematical and Statistical Psychology

Educational and Psychological Measurement

Journal of Statistical Software

Behavior Research Methods

4700 Keele Street – Toronto, ON, Canada, M3J 1P3

✉ chalmrp@yorku.ca

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Journal of Computerized Adaptive Testing
Psychological Tests and Assessment Modeling
Journal of Statistical Computation and Simulation
Journal of Experimental Education
Journal of Clinical Psychology
The R Journal
Psicologica
Statistics and Its Interface
International Journal of Methodology and Experimental Psychology
Quality of Life Research
Psychological Medicine
The Open Psychology Journal
Communications in Statistics - Simulation and Computation
AERA Open
Psych — Open Access Journal
WIREs Computational Statistics