

Curriculum Vitae

PD Dr. Rudolf Debelak

Born June 2, 1982 in Vienna, Austria

married

Altstetterstrasse 288, 8047 Zurich, Switzerland

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Academic Qualifications

2021 **University of Zurich**

Habilitation, Venia Legendi "Methoden der Psychologie"

[Psychological Methods]

2018 - 2021 **University of Hagen**

Master's degree studies, Mathematics

2013 - 2018 **University of Hagen**

Bachelor's degree studies, Mathematics

2007 - 2013 **University of Vienna**

PhD studies, Psychology, supervised by Prof. Dr. Georg Gittler

2000 - 2007 **University of Vienna**

Diploma studies, Psychology

Professional Experience

- Since 09/2024 **University of Zurich, Department of Education,
Chair for Research Methods in Developmental and Educational Sciences**
Advanced Senior Scientist and Research Group Leader
- Research, teaching, leading a research group on AI in Education
- 03/2018 - 08/2024 **University of Zurich, Department of Psychology,
Chair for Psychological Methods, Evaluation, and Statistics**
Senior Research Associate
- Research, teaching and statistical consulting
- 02/2016 - 03/2018 **University of Zurich, Department of Psychology,
Chair for Psychological Methods, Evaluation, and Statistics**
Assistant
- Research, teaching and statistical consulting
- 10/2021 - 03/2022 **Leipzig University, Wilhelm Wundt Institute for Psychology,
Work Group for Psychological Methods**
Substitution of a W2-Professorship
- Research and teaching
 - Management of the work group
- 05/2008 - 12/2015 **Test- and Training Developer, SCHUHFRIED GmbH**
(Publisher of Computerized Psychological Tests in Mödling, Austria,
about 60 Employees)
- Managing projects for psychological test development
 - Designing, supervising and evaluating data collections
 - Scientific presentations

Membership in Professional Associations

- German Psychological Society, Section Methods and Evaluation
- International Test Commission
- Psychometric Society

Selection of Certificates

Courses

- “Leadership Skills for Postdocs“, course offered by the Graduate Campus of the University of Zurich
- “Win-win negotiation skills“, course offered by the Graduate Campus of the University of Zurich
- “Fundraising strategies for successful academic careers“, course offered by the Graduate Campus of the University of Zurich
- Workshop “Inklusive Sprache“ [Inclusive language], course offered by the Office for Gender Equality and Diversity of the University of Zurich

Language Skills

German (Native Speaker), English (Fluent), French (Good), Spanish (Basic Knowledge)

Programming Languages

R (Excellent), Python (Good)

Other Software Skills

SPSS (Excellent), Microsoft Office (Excellent), Latex (Excellent), TensorFlow (Good)

Grants and External Funding

- Project „Innovative AI Approaches for Language Proficiency Testing in Switzerland“ funded by Innosuisse as a collaboration between EPFL, the University of Zurich and the Institut für Bildungsevaluation Zürich AG (as Project Manager; Overall project budget CHF 971.114, Innosuisse contributions CHF 398.990).
- Project “Development of a Toolbox for Psychological Test Development“ funded by the Swiss National Science Foundation (as Principal Investigator, CHF 183.665, April 2020 to June 2023, project number 188929). In May 2022, this project received additional funding by the Swiss National Science Foundation via a Mobility Grant (CHF 14.243).
- Scientific Exchange “Evaluation of Score-Based Tests in Educational Measurement“ funded by the Swiss National Science Foundation (as Principal Investigator, CHF 3.700, May 2019 to June 2019, project number 186516).

- Project “Entwicklung von Software zur Prüfung psychologischer Testverfahren“ [Development of Software for Checking Psychological Tests], funded by the foundation Stiftung Suzanne und Hans Biäsch zur Förderung der angewandten Psychologie (as Principal Investigator, CHF 12.900, October 2018 to May 2019, project number 2018-09).
- Project “ATStat: Active Training of Statistics“, funded by the Teaching Fund of the University of Zurich (as Co-Principal Investigator, CHF 39.600, February 2018 to April 2019; PI: Chatchavan Wacharamanotham, other Co-PIs: Carolin Strobl and Stella Bollmann).

Membership in Editorial Boards and Referee Service

Membership in Editorial Boards

Psych, Psychometrics and Educational Measurement Section

Review Editor for *Frontiers in Psychology* (Computational Social Psychology, Quantitative Psychology and Measurement)

Referee Service

Applied Measurement in Education, Applied Psychological Measurement, Assessment, Behavior Research Methods, BMC Medical Research Methodology, BMC Public Health, British Journal of Mathematical and Statistical Psychology, Cambridge Elements, Cognition, Current Psychology, Diagnostica, Educational and Psychological Measurement, European Journal of Psychological Assessment, Frontiers in Psychology, Journal of Educational and Behavioral Statistics, Journal of Educational Measurement, Journal of the Korean Statistical Society, Journal of Mathematical Psychology, Mathematics, Memory & Cognition, Multivariate Behavioral Research, PLOS ONE, Psych, Psychological Test and Assessment Modeling, Psychometrika, Quantitative and Computational Methods in Behavioral Sciences, Spatial Cognition and Computation, Stats, Statistical Methods and Applications, Statistical Methods in Medical Research, Sustainability, Zeitschrift für Pädagogische Psychologie

List of Publications

Selected Preprints

Debelak, R., Aßenmacher, M., Koch, T., & Stachl, C. (2024). From embeddings to explainability: A tutorial on transformer-based text analysis for social and behavioral scientists. <https://doi.org/10.31234/osf.io/bc56a>

Walther, A., Eggenberger, L., **Debelak, R.**, Kirschbaum, C., Häberling, I., Osuna, E., Strumberger, M., Walitza, S., Baumgartner, J., Herter-Aeberli, I., & Berger, G. (2024). Major depressive disorder in children and adolescents is associated with reduced hair cortisol and anandamide (AEA): cross-sectional and longitudinal evidence from a large randomized clinical trial. <https://doi.org/10.31234/osf.io/kajdv>

Debelak, R., & Driver, C. C. (2023). Score-based measurement invariance checks for large-scale assessments. <https://doi.org/10.31234/osf.io/jw8xb>

Debelak, R., & Urban, C. J. (2022). An evaluation of deep learning approaches for factor analysis of response and response time data. <https://doi.org/10.31234/osf.io/9rphk>

Publications in Peer-Reviewed Journals

Psychometrics, Statistics and Machine Learning

Debelak, R., Meiser, T., & Gernand, A. (2024). Investigating Heterogeneity in IRTree Models for Multiple Response Processes with Score-Based Partitioning. *British Journal of Mathematical and Statistical Psychology*. Link to Preprint: <https://doi.org/10.31234/osf.io/8xmkb>

Zimmer, F., & **Debelak, R.** (2023). Simulation-based design optimization for statistical power: Utilizing machine learning. *Psychological Methods*. <https://doi.org/10.1037/met0000611>

Zimmer, F., Henninger, M., & **Debelak, R.** (2023). Sample size planning for complex study designs: A tutorial for the mlpwr package. *Behavior Research Methods*. <https://doi.org/10.3758/s13428-023-02269-0>

Debelak, R., Appelbaum, S., Debeer, D., & Tomasik, M. J. (2023). Detecting differential item functioning in 2PL multistage assessments. *Psych*, 5(2), 461–477. doi: 10.3390/psych5020031

Henninger, M., **Debelak, R.**, Rothacher, Y., & Strobl, C. (2023). Interpretable machine learning for psychological research: Opportunities and pitfalls. *Psychological Methods*. doi: 10.1037/met0000560

Fellinghauer, C., **Debelak, R.**, & Strobl, C. (2023). What affects the quality of score

transformations? Potential issues in true-score equating using the Partial Credit Model. *Educational and Psychological Measurement*. doi: 10.1177/0013164422114305

Henninger, M., **Debelak, R.**, & Strobl, C. (2023). A new stopping criterion for Rasch trees based on the Mantel-Haenszel effect size measure for differential item functioning. *Educational and Psychological Measurement*, 83(1), 181-212. doi: 10.1177/00131644221077135

Zimmer, F., Draxler, C., & **Debelak, R.** (2022). Power analysis for the Wald, LR, score, and gradient tests in a marginal maximum likelihood framework: Applications in IRT. *Psychometrika*. doi: 10.1007/s11336-022-09883-5

Debelak, R., Pawel, S., Strobl, C., & Merkle, E. C. (2022). Score-based measurement invariance checks for Bayesian maximum-a-posteriori estimates in item response theory. *British Journal of Mathematical and Statistical Psychology*, 75(3), 728–752. doi: 10.1111/bmsp.12275

Schneider, L., Strobl, C., Zeileis, A. & **Debelak, R.** (2022). An R toolbox for score-based measurement invariance tests in IRT models. *Behavior Research Methods*, 54, 2101-2113. doi: 10.3758/s13428-021-01689-0

Debelak, R., & Debeer D. (2021). An evaluation of DIF tests in multistage tests for continuous covariates. *Psych*, 3(4), 618-638. doi: 10.3390/psych3040040

Schneider, L., Chalmers, R. P., **Debelak, R.**, & Merkle, E. C. (2020). Model selection of nested and non-nested item response models using Vuong tests. *Multivariate Behavioral Research*, 55(5), 664-684. doi: 10.1080/00273171.2019.1664280.

Debelak, R., & Koller, I. (2020). Testing the local independence assumption of the Rasch model with Q_3 based nonparametric model tests. *Applied Psychological Measurement*, 44(2), 103-117. doi: 10.1177/0146621619835501

Huelmann, T., **Debelak, R.**, & Strobl, C. (2020). A comparison of aggregation rules for selecting anchor items in multi group DIF comparisons. *Journal of Educational Measurement*, 57(2), 185-215. doi: 10.1111/jedm.12246

Debelak, R. & Strobl, C. (2019). Investigating measurement invariance by means of parameter instability tests for 2PL and 3PL models. *Educational and Psychological Measurement*, 79(2), 385-398. doi:10.1177/0013164418777784

Debelak, R. (2019). An evaluation of overall goodness-of-fit tests for the Rasch model. *Frontiers in Psychology*, 9, 2710. doi: 10.3389/fpsyg.2018.02710

Debelak, R., & Tran, U.S. (2016). Comparing the effects of different smoothing algorithms on the assessment of dimensionality of ordered categorical items with parallel analysis. *PLoS ONE*, 11(2): e0148143. doi:10.1371/journal.pone.0148143

Debelak, R., & Tran, U.S. (2013). Principal component analysis of smoothed correlati-

on matrices as a measure of dimensionality. *Educational and Psychological Measurement*, 73(1), 63-77. doi: 10.1177/0013164412457366

Debelak, R., & Arendasy, M. (2012). An algorithm for clustering items and testing unidimensionality in Rasch measurement. *Educational and Psychological Measurement*, 72(3), 375-387. doi: 10.1177/0013164411426005

Substantive Research in Psychology

Paz Castro, R., Haug, S., **Debelak, R.**, Jakob, R., Kowatsch, T., Schaub, M. P. (2022). Engagement within a mobile phone-based life-skills intervention for adolescents and its association with participant characteristics and outcomes: a tree-based analysis. *Journal of Medical Internet Research*, 24(1), e28638. doi: 10.2196/28638

Becker, M. O., Dobrota, R., Garaiman, A., **Debelak, R.**, Fligelstone, K., Kennedy, A. T., ... & Distler, O. (2022). Development and validation of a patient-reported outcome measure for systemic sclerosis: the EULAR Systemic Sclerosis Impact of Disease (ScleroID) questionnaire. *Annals of the Rheumatic Diseases*, 81(4), 507-515. doi: 10.1136/annrheumdis-2021-220702

Walther, A., Grub, J., Ehlert, U., Wehrl, S., Rice, S., Seidler, Z.E., & **Debelak, R.** (2021). Male depression risk, psychological distress, and psychotherapy uptake: Validation of the German version of the male depression risk scale. *Journal of Affective Disorders Reports*, 4, 100107. doi: 10.1016/j.jadr.2021.100107

Luo, M., **Debelak, R.**, Schneider, G., Martin, M., & Demiray, B. (2021). With a little help from familiar interlocutors: Real-world language use in young and older adults. *Ageing & Mental Health*, 25(12), 2310-2319. doi: 10.1080/13607863.2020.1822288

Vetter, M., Schünemann, A.L., Brieber, D., **Debelak, R.**, Gatscha, M., Grünsteidel, F., Herle, M., Mandler, G. & Ortner, T. M. (2018). Cognitive and personality determinants of safe driving behavior in professional drivers. *Transportation Research Part F: Traffic Psychology and Behaviour*, 52 (1), 191-201. doi: 10.1016/j.trf.2017.11.008

Walther, A., Mahler, F., **Debelak, R.**, & Ehlert, U. (2017). Psychobiological protective factors modifying the association between age and sexual health in men: Findings from the Men's Health 40+ study. *American Journal of Men's Health*, 11(3), 737-747. doi: 10.1177/1557988316689238

Debelak, R., Egle, J., Köstering, L., & Kaller, C. P. (2016). Assessment of planning ability: Psychometric analyses on the unidimensionality and construct validity of the Tower of London task (TOL-F). *Neuropsychology*, 30(3), 346-360. doi: 10.1037/neu0000238

Kaller, C.P., **Debelak, R.**, Köstering, L., Egle, J., Rahm, B., Wild, P.S., Blettner, M., Beutel, M.E., & Unterrainer, J. M. (2016). Assessing planning ability across the adult

life span: Population-representative and age-adjusted reliability estimates for the Tower of London (TOL-F). *Archives of Clinical Neuropsychology*, 31(2), 148-164. doi: 10.1093/arclin/acv088

Vetter, M., Schünemann, A. L., **Debelak, R.**, Gatscha, M., Herle, M., Mandler, G., & Ortner, T. M. (2015). Vorhersage von sicherheitsrelevantem Fahrverhalten bei Berufskraftfahrern: eine theoriegeleitete Validierung von Leistungs- und Persönlichkeitstests. *Zeitschrift für Verkehrssicherheit*, 61, 222–234.

Debelak, R., Gittler, G., & Arendasy, M. (2014). On gender differences in mental rotation processing speed. *Learning and Individual Differences*, 29, 8-17. doi: 10.1016/j.lindif.2013.10.003

Gmehlin, D., Fuermaier, A.B.M., Walther, S., **Debelak, R.**, Rentrop, M., Westermann, C., . . . , Aschenbrenner, S. (2014). Intraindividual variability in inhibitory function in adults with ADHD – An Ex-Gaussian approach. *PLoS ONE*, 9(12), e112298. doi:10.1371/journal.pone.0112298

Rodewald, K., Bartolovic, M., **Debelak, R.**, Aschenbrenner, S., Weisbrod, M., & Roeschely, D. (2012). Eine Normierungsstudie eines modifizierten Trail Making Tests im deutschsprachigen Raum. *Zeitschrift für Neuropsychologie*, 23(1), 37-48. doi: 10.1024/1016-264X/a000060

Textbooks

Strobl, C., Henninger, M., Rothacher, Y., & **Debelak, R.** (2024). *Simulationsstudien in R. Design und praktische Durchführung*. [Simulation studies in R. Design and practical implementation.] Springer.

Debelak, R., Strobl, C., & Zeigenfuse, M. (2022). *An Introduction to the Rasch Model with Examples in R*. Chapman & Hall /CRC Press.

Book Chapter

Debelak, R., & Strobl, C. (2024). Violations of unidimensionality and differential item functioning. In: S. Greiff, K. Schweizer, & S. Troche (Eds.) *Method Effects in the Psychological Measurement*. Hogrefe.

Invited Contribution

Bollmann, S., Cook, D., Dumas, J., Fox, J., Josse, J., Keyes, O., Strobl, C., Turner, H., & **Debelak, R.** (2017). A first survey on the diversity of the R community. *The R Journal*, 9, 541-552. Retrieved from <https://journal.r-project.org/archive/2017-2/forwards.pdf>

Publications in Blogs and Journals Without Peer-Review

Gloor, J., Strobl, C. & **Debelak, R.** (2020). DSI Insights: Wege aus der Angst vor Algorithmen [DSI Insights: Ways out of the fear of algorithms]. Inside IT Kolumne, www.inside-it.ch/de/post/dsi-insights-wege-aus-der-angst-vor-algorithmen-20201204

Vetter, M., Egle, J. & **Debelak, R.** (2011). Taking the next step: Vorstellung des Test-Training-Evaluation Konzepts am Beispiel des Wiener Testsystems und CogniPlus [Taking the next step: Presentation of the Test-Training-Evaluation concept using the example of the Vienna Test System and CogniPlus.]. *Psychologie in Österreich*, 31(2/3), 124-129.

Debelak, R. (2009). Einige Trends der computergestützten psychologischen Diagnostik der letzten Jahre [Some trends in computer-based psychological assessment in recent years.]. *Psychologie in Österreich*, 29(5), 440-448.

Invited Talks and Workshops

Garcon, B., & **Debelak, R.** (Planned). *Transforming education with machine learning: Practical applications and case studies*. Workshop planned for February 14, 2025, at Applied Machine Learning Days, EPFL, Lausanne, Switzerland.

Debelak, R. (Planned). *Advanced machine learning and natural language processing*. Invited Workshop planned at the University of Zurich, Zurich, Switzerland.

Strobl, C., & **Debelak, R.** (2024). *Simulationsstudien in R: Design und praktische Durchführung*. Workshop given at the Ludwig-Maximilians-Universität München, April 25.

Strobl, C., Henninger, M., & **Debelak, R.** (2024). *Machine Learning and Interpretable Machine Learning with R*. Workshop given at the General Meeting of the German Psychological Society, September 25, Vienna, Austria.

Debelak, R. (2023) *Violations of unidimensionality and differential item functioning in survey data: Their practical meaning and how we can detect them*. Invited Talk given at the University of Mannheim, December 12, Mannheim, Germany.

Debelak, R. (2023). *An evaluation of deep learning approaches for factor analysis of response and response time data*. Invited Talk given at the University of Tübingen, October 18, Tübingen, Germany.

Debelak, R. (2023). *Advanced machine learning and natural language processing*. Invited Workshop given at the University of Zurich, October 6-13, Zurich, Switzerland.

Debelak, R. (2023). *An evaluation of deep learning approaches for factor analysis of response and response time data*. Invited Talk, King's College London, July 18, London, United Kingdom.

Debelak, R. (2023). *Sample size planning in educational studies: Classical and new approaches*. Invited Talk, University of Bamberg, June 29, Bamberg, Germany.

Debelak, R. (2023). *Using machine learning for study planning in psychology*. Invited Talk, Vienna University of Economics and Business, May 28, Vienna, Austria.

Debelak, R. (2022). *An evaluation of deep learning approaches for factor analysis of response and response time data*. Invited Talk, King's College London, November 14, London, United Kingdom.

Debelak, R. & Fellinghauer, C. (2022). *Applied item response theory in R*. Pre-Conference Workshop at the 17th Meeting of the Swiss Psychological Society, September 4, Zurich, Switzerland.

Debelak, R. (2022). *Machine Learning: Grundlagen und Anwendungen in der Psychome-*

trie [Machine Learning: Foundations and Applications in Psychometrics]. Invited Workshop given at the Leibniz Institute for Science and Mathematics Education, March 29-30, Kiel, Germany.

Debelak, R. & Zimmer, F. (2021). *Die Optimierung statistischer Power in komplexen Studiendesigns in der Psychologie: Eine Anwendung von Machine Learning Methoden* [The Optimization of Statistical Power in Complex Study Designs in Psychology: An Application of Machine Learning Methods]. Invited Talk given at the Research Group for Psychological Diagnosis at the Department of Psychology, Humboldt-Universität zu Berlin, December 16, 2021, Berlin, Germany.

Debelak, R., Schneider, L., Zeileis, A., & Strobl, C. (2018). *Ein Überblick zu score-basierten Tests zur Erkennung von Differential Item Functioning* [An Overview to Score-Based Tests for the Detection of Differential Item Functioning]. Invited Talk given at the Division for Methods and Evaluation / Quality Assurance at the Department of Educational Science and Psychology, Freie Universität Berlin, April 2, Berlin, Germany.

Software (R Packages)

Zimmer, F., & **Debelak, R.** (2022). *mlpwr*: A power analysis toolbox to find cost-efficient study designs. <https://CRAN.R-project.org/package=mlpwr>

Zimmer, F., & **Debelak, R.** (2022). *irtpwr*: Power analysis for IRT models using the Wald, LR, score, and gradient statistics. <https://CRAN.R-project.org/package=irtpwr>

Zeileis, A., Strobl, C., Wickelmaier, F., Komboz, B., Kopf, J., Schneider, L., Dreifuss, D., & **Debelak, R.** (2022). *psychotree*: Recursive Partitioning Based on Psychometric Models. <https://CRAN.R-project.org/package=psychotree>

Zeileis, A., Strobl, C., Wickelmaier, F., Komboz, B., Kopf, J., Schneider, L., & **Debelak, R.** (2022). *psychotools*: Psychometric Modeling Infrastructure. <https://CRAN.r-project.org/package=psychotools>

Debelak, R. & Debeer, D. (2020). *mstDIF*: A Collection of Statistical Tests for DIF Detection in Multistage Tests. <https://CRAN.r-project.org/package=mstDIF>

Mair, P., Hatzinger, R., & Maier M. J. (2019). *eRm*: Extended Rasch Modeling. 1.0-0. <https://CRAN.R-project.org/web/packages/eRm/index.html> (as contributor)

Presentations at Scientific Conferences (Selection)

Debelak, R., Gernand, A., & Meiser, T. (2023). *IRTrees meet IRT Trees: Using model-based recursive partitioning to detect instabilities of response styles*. Presentation at the 16th Meeting of the Section Methods and Evaluation of the German Psychological Society, Konstanz, Germany, September 11 to 14.

Debelak, R. & Urban, C. J. (2023). *Deep learning approaches for factor analysis of responses and response times*. Presentation at the International Meeting of the Psychometric Society 2023, College Park, Maryland, United States, July 25 to 28.

Debelak, R. & Driver, C.C. (2023). *Detecting parameter instability in large assessments: An adaptation of score-based tests*. Presentation at the Congress of the European Association of Measurement (EAM 2023), Ghent, Belgium, July 10 to 13.

Debelak, R. & Urban, C. J. (2023). *Deep learning approaches for factor analysis of responses and response times*. Presentation at the Congress of the European Association of Measurement (EAM 2023), Ghent, Belgium, July 10 to 13.

Debelak, R. & Zimmer, F. (2023). *Using machine learning for study planning in psychology*. Presentation at DSSV-ECDA 2023, Antwerp, Belgium, July 5 to 7.

Debelak, R. & Zimmer, F. (2023). *Optimizing statistical power in complex study designs in psychology: An application of machine learning*. Presentation at the 15th Workshop Psychoco - International Workshop on Psychometric Computing, Zurich, Switzerland, June 8 to 9.

Debelak, R., Strobl, C. & Zeileis, A. (2022). *PL Trees: DIF detection in logistic IRT models using recursive partitioning*. Presentation at the 52th Congress of the German Psychological Society, Hildesheim, Germany, September 10 to 15.

Zimmer, F. & **Debelak, R.** (2022). *Simulation-based sample size planning using machine learning*. Presentation at the 52th Congress of the German Psychological Society, Hildesheim, Germany, September 10 to 15.

Arnold, M., **Debelak, R.**, Strobl, C., Völkle, M. C., & Brandmaier, A. M. (2022). *Assessing and visualizing heterogeneity in structural equation model trees*. Presentation at the 52th Congress of the German Psychological Society, Hildesheim, Germany, September 10 to 15.

Henninger, M., Rothacher, Y., **Debelak, R.**, & Strobl, C. (2022). *PL Trees: Detecting interaction effects using interpretable machine learning*. Presentation at the 52th Congress of the German Psychological Society, Hildesheim, Germany, September 10 to 15.

Debelak, R. (2022). *A deep learning approach for estimating response time models*. Presen-

tation at the International Meeting of the Psychometric Society 2022, Bologna, Italy, July 11 to 15.

Zimmer, F. & **Debelak, R.**, & Strobl, C. (2022). *Utilizing machine learning for simulation-based design optimization*. Presentation at the International Meeting of the Psychometric Society 2022, Bologna, Italy, July 11 to 15.

Henninger, M., Rothacher, Y., **Debelak, R.**, & Strobl, C. (2022). *A critical view on interpretation techniques for machine learning methods*. Presentation at the International Meeting of the Psychometric Society 2022, Bologna, Italy, July 11 to 15.

Zimmer, F. & **Debelak, R.** (2022). *Simulation-based design optimization for statistical power: Utilizing machine learning*. Presentation at the DAGStat Conference 2022, Hamburg, Germany, March 28 to April 1.

Debelak, R., Pawel, S., Strobl, C., & Merkle, E. (2021). *Variations of Score-based Measurement Invariance Tests for Multiple Group Item Response Theory Models*. Presentation at the 15th Meeting of the Section Methods and Evaluation of the German Psychological Society, Online, September 15 to 17.

Zimmer, F., Draxler, C., & **Debelak, R.** (2021). *Power analysis for the Wald, LR, score and gradient test in a marginal maximum likelihood framework: Applications in IRT*. Presentation at the 15th Meeting of the Section Methods and Evaluation of the German Psychological Society, Online, September 15 to 17.

Henninger, M., Rothacher, Y., **Debelak, R.**, & Strobl, C. (2021). The impact of correlated predictor variables on interpretation tools for machine learning methods. Presentation at the 15th Meeting of the Section Methods and Evaluation of the German Psychological Society, Online, September 15 to 17.

Debelak, R. & Debeer, D. (2021). *Score-Based Measurement Invariance Tests for Multistage Testing*. Presentation at the Congress of the European Association of Measurement (EAM 2020), Valencia, Spain, July 21 to 23.

Zimmer, F., Draxler, C., & **Debelak, R.** (2021). *Power analysis for the Wald, LR, score and gradient test in a marginal maximum likelihood framework: Applications in IRT*. Presentation at the Congress of the European Association of Measurement (EAM 2020), Valencia, Spain, July 21 to 23.

Henninger, M., **Debelak, R.**, & Merkle, E. (2021). *Mantel-Haenszel Effect Size as a Stopping Criterion for Rasch Trees*. Presentation at the International Meeting of the Psychometric Society 2021, Online, July 20 to 23.

Debelak, R., Pawel, S., Strobl, C., & Merkle, E. (2021). *Variations of Score-based Measurement Invariance Tests for Multiple Group Item Response Theory Models*. Presentation at the

International Meeting of the Psychometric Society 2021, Online, July 20 to 23.

Zimmer, F., Draxler, C., & **Debelak, R.** (2021). *Power analysis for the Wald, LR, score and gradient test in a marginal maximum likelihood framework: Applications in IRT*. Presentation at the International Meeting of the Psychometric Society 2021, Online, July 20 to 23.

Debelak, R. & Debeer, D. (2020). *Score-Based Measurement Invariance Tests for Multistage Testing*. Presentation at the 12th Workshop Psychoco - International Workshop on Psychometric Computing, Dortmund, Germany, February 27 to 28.

Debelak, R., Pawel, S., Wang, Y., & Merkle, E. (2019). *Bayesian Score-Based Tests for Parameter Invariance in IRT Models*. Presentation at the 14th Meeting of the Section Methods and Evaluation of the German Psychological Society, Kiel, Germany, September 15 to 18.

Debelak, R., & Strobl, C. (2019). *Tree Based Methods for Detecting Violations of Measurement Invariance in Psychological Assessments*. Presentation at the PaEpsy 2019, Leipzig, Germany, September 9 to 12.

Debelak, R. & Koller, I. (2019). *Two New Nonparametric Local Independence Tests for the Rasch Model*. Presentation at the International Meeting of the Psychometric Society 2019, Santiago, Chile, July 15 to 19.

Debelak, R., & Pawel, S. (2019). *Measurement Invariance Tests for IRT Models Estimated by Bayesian MAP*. Presentation at the 11th Workshop Psychoco - International Workshop on Psychometric Computing, Prague, Czech Republic, February 22 to 23.

Experience in Teaching and Thesis Supervision

Lectures and Seminars

University of Zurich, Department of Psychology, since 2016

- Lecture *Statistik 1, Teil 2* [Statistics 1, part 2] for bachelor's students
(Spring Semester 2023; Introduction to linear regression and ANOVA.)
- Lecture *Statistik 2* [Statistics 2] for bachelor's students
(Spring Semester 2022; Introduction to complex statistical models and their implementation in R and RStudio.)
- Lecture *Rechnergestützte Datenauswertung* [Computer-Based Data Evaluation] for bachelor's students
(Fall Semester 2016-2020; Introduction to R, RStudio and SPSS, running basic statistical procedures in this software, correct interpretation of the output.)
- Seminar *Eine Einführung in Machine Learning*
[An Introduction to Machine Learning] for master's students
(Fall Semester 2022 and 2023; concepts and basic techniques of machine learning, including an introduction to the analysis of visual and text data.)
- Seminar *Eine Einführung zu Item Response Theorie in R*
[An Introduction to Item Response Theory in R] for master's students
(Spring Semester 2021; analyzing research data psychological tests and assessments in R software using item response theory.)
- Seminar *Robuste statistische Verfahren in R* [Robust Statistical Methods in R] for master's students
(Spring Semester 2018 and 2020; running classical and robust statistical procedures using R and RStudio, correctly interpreting the output.)
- Substitute Teaching Lectures *Statistik 1* [Statistics 1] and *Statistik 2* [Statistics 2] for bachelor's students in single lecture units
(Introduction to descriptive and inferential statistics; introduction to complex statistical models and their implementation in R and RStudio.)

Leipzig University, Wilhelm Wundt Institute for Psychology, Winter Semester 2021/2022

- Lecture *Einführung in die Methodenlehre* [Introduction to Methodology] for bachelor's students
(Teaching of competencies for planning, conducting and evaluating empirical scientific investigations.)
- Lecture *Statistik 1* [Statistics 1] for bachelor's students
(Introduction to descriptive statistics and acquisition of an inventory of methods for testing statistical hypotheses.)
- Lecture *Multivariate Statistik, Evaluation und Forschungsmethodik I*
[Multivariate Statistics, Evaluation and Research Methodology I] for master's students
(Advanced study of multivariate statistics, especially modeling with regression, multilevel, and structural equation models, as well as the computer-based implementation of these methods.)

Thesis Supervision

- Michelle Schneeberger (Ongoing, until 2026): Evaluation of a new therapeutic method for the treatment of depression. PhD thesis, psychology (as co-supervisor).
- Keegan Evangelista (Ongoing, until 2024): Evaluation and comparison of different approaches for the detection of differential item functioning. Master thesis, psychology.
- Jan Radek (Ongoing, until 2024): A critical evaluation of PL Trees. Master thesis, psychology.
- Felix Zimmer (Until March 2023): Development of a Toolbox for Psychological Test Development. PhD thesis, psychology (as main supervisor).
- Nebil Bel Hedi (2022): Poweranalyse bei IRT-Modellen. [Power Analysis in IRT models.] Master thesis, psychology.
- Nicola Schamberger (2022): Auswirkungen verzerrter Itemparameter auf die Genauigkeit der Personenparameterschätzung. [Effects of biased item parameters on the accuracy of person parameter estimation.] Master thesis, psychology.
- Lennart Schneider (2019): sonic: Fast and Efficient Marginal Maximum Likelihood Estimation of Item Response Models in R. Master thesis, psychology (as co-supervisor, University of Tübingen).
- Jonathan Nagel (2017): A comparison of three- and four-parametric logistic models when used in computer-based adaptive testing. Master thesis, psychology.
- Yanis Isenring (2022): Ein Überblick zu Deep Learning in der Psychologie. [An overview of deep learning in psychology.] Bachelor thesis, psychology.

- Stephan Herzog (2021): Theoretical overview of computerized adaptive testing (CAT). Bachelor thesis, psychology.
- Oliver Burger (2020): Peeking inside the Black Box: Applications of model-agnostic visualization methods for the interpretation of supervised black box machine learning in psychology. Bachelor thesis, psychology.
- Alain Stocker (2018): Netzwerkmodelle in der Psychologie. Eine Alternative zu latenten Variablenmodellen. [Network models in psychology. An alternative to latent variable models.] Bachelor thesis, psychology.
- Robert Staeck (2018): Methoden zur Berechnung der internen Konsistenz eines psychologischen Tests. [Methods for calculating the internal consistency of a psychological test.] Bachelor thesis, psychology.
- Mladena Aleksic (2017): Robuste Statistik: Gruppenvergleiche jenseits des t-Tests. [Robust statistics: group comparisons beyond the t-test.] Bachelor thesis, psychology.
- Michelle Roth (2016): Verfahren zur Aufgabenauswahl bei adaptiver Testvorgabe. [Task selection procedures in adaptive test setting.] Bachelor thesis, psychology.
- Alexandra Imbach (2016): Determining the dimensionality of data using exploratory factor analysis and principal components analysis. Bachelor thesis, psychology.

Teaching Scripts for Students

Debelak, R., & Strobl, C. (2017): Einführung in Simulationsstudien mit R. [Introduction to simulation studies with R.]

Supervision of Student Internships (with student's university).

- Marc Egli (ETH Zurich, 2023): Checking the usability and user-friendliness of the R package `mlpwr`.
- Jan Radek (University of Zurich, 2023): Checking the usability and user-friendliness of the R package `irtpwr`.
- Alain Stocker (University of Zurich, 2021): Checking the usability and user-friendliness of the R package `psychotree`.
- David Dreifuss (ETH Zurich, 2020/2021): Extending the functionality of the R package `psychotree`.
- Valentina Tomasulo (University of Zurich, 2019): Checking the usability and user-friendliness of newly developed R functions for the analysis of psychological assessments.

- Yu Wang (ETH Zurich, 2019): Running simulation studies for the evaluation of Bayesian methods for psychological test analysis.
- Samuel Pawel (University of Zurich, 2018): Development and evaluation of Bayesian methods for psychological test analysis.
- Lennart Schneider (University of Tübingen, 2017): Evaluation of new psychological methods for checking measurement invariance of psychological scales.

Teaching Awards

“Teacher of the Hour“-Award (University of Zurich, Spring Semester 2020).