Max Welz

Postdoctoral researcher in Statistics – University of Zurich

✉ max.welz@uzh.ch   🌐 https://mwelz.github.io   🐙 [mwelz](https://github.com/mwelz)

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Research Interests

Robust and high-dimensional statistics, machine learning in behavioral, social, and health sciences, development of statistical software.

Affiliations

University of Zurich	**Zurich, CH**
Postdoctoral researcher	*Since November 2024*

Working in the group of Prof. Carolin Strobl

Erasmus University, Dept. of Econometrics	**Rotterdam, NL**
PhD Candidate	*2020 – 2024*

Supervisors: Prof. Patrick Groenen and Dr. Andreas Alfons
Thesis title: *[Robust categorical data analysis](#)*
Awarded the 2026 Dissertation Prize of the international *Psychometric Society*

Massachusetts Institute of Technology	**Cambridge, MA, USA**
Visiting PhD Student	*Fall 2023*

Invited by Prof. Victor Chernozhukov and Dr. Mert Demirer

Erasmus Medical Center, Dept. of Public Health	**Rotterdam, NL**
Researcher	*Since 2019*

- Master thesis on causal inference in lung cancer research
- Involvement in analyses of medical trials

Erasmus University, Dept. of Econometrics	**Rotterdam, NL**
Research Assistant	*2018 – 2019*

Assisted Prof. Philip Hans Franses for 10 hours a week

Education

Erasmus University	**Rotterdam, NL**
PhD Statistics	*2020 – 2024*

Date of defense: June 6, 2025

Erasmus University	**Rotterdam, NL**
MSc Econometrics	*2017 – 2020*

University of Mannheim	**Mannheim, DE**
BSc Economics (specialization in Econometrics)	*2014 – 2017*

Spent Fall 2016 at the Erasmus University in Rotterdam, NL

Grants and Awards

Grants

- *Erasmus Trust Fund Grant* (€2,500)
  - Awarded to support my research visit at Massachusetts Institute of Technology in fall 2023
  - Issued by the [Erasmus Trust Fund](#)

- *Open Mind Call 2021 Health and Technology* (€19,995.70)
  - Joint with Andreas Alfons (Erasmus University) and Kevin ten Haaf (Erasmus MC);
  - Issued by the Dutch *Convergence Alliance* (acceptance rate of $22/124 \approx 18\%$)
  - Awarded for the *CITRUS* project

Awards
- *2026 Dissertation Prize of the Psychometric Society*
  - Annually awarded by the international Psychometric Society for the best PhD thesis in psychometrics
  - Monetary prize of 2,000$ at-large, keynote presentation at the IMPS 2026 in Seoul (Republic of Korea), one-year membership in the *Psychometric Society*, invited manuscript in the journal *Psychometrika*

- *2024 Hannan Graduate Student Travel Award* [link]
  - Issued by the *Institute of Mathematical Statistics* to attend JSM 2024
  - Awarded for my job market paper "Robust estimation and inference in categorical data"
  - One of ∼20 recipients worldwide

- *2021 Convergence Health and Technology Open Research Award* [link]
  - Awarded for *"great commitment to open research"*
  - Issued by the Dutch *Convergence Alliance* and several open science initiatives
  - One of 12 recipients from various Dutch scientific institutions

- *Best PhD Student Presentation* at the Annual Meeting of the Dutch/Flemish Classification Society on October 14, 2022, in Tilburg, Netherlands

Publications

Working Papers

Welz, M., & Alfons, A. (2025). When respondents don't care anymore: Identifying the onset of careless responding [arXiv:2303.07167]. https://doi.org/10.48550/arXiv.2303.07167 *(under review)*

Bergh, D., Gallegos Quezada, J., Moelijker, R., Tang, Y., & Welz, M. (2024). Matched samples in strategic management research: Review and recommendations. (under review).

Welz, M. (2024). Robust estimation and inference for categorical data [arXiv:2403.11954]. https://doi.org/10.48550/arXiv.2403.11954

Welz, M., Archimbaud, A., & Alfons, A. (2024). How much carelessness is too much? Quantifying the impact of careless responding [PsyArXiv:8fj6p]. https://doi.org/10.31234/osf.io/8fj6p

Articles in Peer-Reviewed Journals

Welz, M. (2026). Robust estimation of polyserial correlation coefficients: A density power divergence approach. *Psychometrika*. https://doi.org/10.1017/psy.2026.10091. [Preprint | GitHub]

Welz, M., Mair, P., & Alfons, A. (2026). Robust estimation of polychoric correlation. *Psychometrika*. https://doi.org/10.1017/psy.2025.10066. [Preprint | GitHub]

Welz, M., van der Aalst, C., Alfons, A., Naghi, A., Heuvelmans, M., Groen, H. J., de Jong, P. A., Aerts, J., Oudkerk, M., de Koning, H., & ten Haaf, K. (2025). A comparative analysis of heterogeneity in lung cancer screening effectiveness in two randomised controlled trials. *Nature Communications*, *16, 8060*. https://doi.org/https://doi.org/10.1038/s41467-025-63471-6

Alfons, A., & Welz, M. (2024). Open science perspectives on machine learning for the identification of careless responding: A new hope or phantom menace? *Social and Personality Psychology Compass*, *18*(2), e12941. https://doi.org/10.1111/spc3.12941. [Preprint | GitHub]

Franses, P. H., & Welz, M. (2022a). Evaluating heterogeneous forecasts for vintages of macroeconomic variables. *Journal of Forecasting*, *41*(4), 829–839. https://doi.org/10.1002/for.2835. [GitHub]

Franses, P. H., & Welz, M. (2022b). Forecasting real GDP growth for Africa. *Econometrics*, *10*(1). https://doi.org/10.3390/econometrics10010003. [GitHub]

Published Software

Welz, M., Alfons, A., & Mair, P. (2024). `robcat: Robust categorical data analysis` [R package version 0.0.1]. https://CRAN.R-project.org/package=robcat

Welz, M., & Alfons, A. (2023). `carelessonset: Identifying the onset of careless responding` [R package version 0.0.1]. https://github.com/mwelz/carelessonset

Welz, M., ten Haaf, K., & Alfons, A. (2023). `predmod: Predictive modeling for heterogeneous treatment effects in medicine` [R package version 0.0.1]. https://github.com/mwelz/predmod

Welz, M., Alfons, A., Demirer, M., & Chernozhukov, V. (2022). `GenericML: Generic machine learning inference` [R package version 0.2.2]. https://CRAN.R-project.org/package=GenericML

Presentations

Seminar Presentations

- 2026/03 ETH Zurich (scheduled), *Robust estimation and inference for categorical data (with an application to structural equation models)*

- 2026/02: Erasmus Medical Center Rotterdam (scheduled), *Comparative analyses of heterogeneity in lung cancer screening effectiveness*

- 2025/10: London School of Economics, *Robust estimation and inference for categorical data (with an application to structural equation models)*

- 2025/02: Erasmus University Rotterdam, *Robust estimation and inference for categorical data*

- 2023/10: Massachusetts Institute of Technology, *Robust estimation and inference for categorical data*

- 2023/04: Tilburg University, *Identifying periods of careless responding in surveys: A deep learning approach*

- 2023/03: Erasmus University Rotterdam (PhD seminar), *On the impact of careless responding*

- 2022/06: Erasmus University Rotterdam (Social AI Seminar), *Identifying periods of careless responding in surveys: A deep learning approach*

Conference Presentations

*Invited talks are marked by an asterisk (*)*

2026

- International Meeting of the Psychometric Society* (IMPS, Seoul, KR, Keynote, scheduled), *Robust categorical data analysis*

- International Workshop on Psychometric Computing (Psychoco, Padua, IT), *Robust pairwise estimation of factor analyses of categorical data*

2025

- IMPS (Minneapolis, USA), *Robust estimation of structural equation models*

- International Conference on Robust Statistics* (ICORS, Stresa, IT), *Robust estimation of reliability coefficients with rating-scale data*

- Deutsche Arbeitsgemeinschaft Statistik (Berlin, DE), *Robust estimation and inference for categorical data*

- Psychoco (Ghent, BE), *Robust estimation of structural equation models*

2024

- European Conference on Data Analysis* (Sopot, PL), *Robust estimation and inference in categorical data*

- 11th World Congress in Probability and Statistics (Bochum, DE), *Robust estimation and inference in categorical data*

- Joint Statistical Meetings (Portland, USA), *Robust estimation and inference in categorical data*

- ICORS (Washington DC, USA), *Robust estimation and inference in categorical data*

- Summer Meeting of the European Econometric Society (Rotterdam, NL), *Robust estimation and inference in categorical data*

- Netherlands Econometric Study Group (NESG, Maastricht, NL), *Robust estimation and inference in categorical data*

- Psychoco (Rotterdam, NL), *Detecting the onset of careless responding with the R package* `carelessonset`

2023

- CMStatistics* (Berlin, DE), *Robust parameter estimation in discrete data*

- ICORS (Toulouse, FR), *Robustness properties of correlation measures in ordinal discrete data*

- Psychoco (Zürich, CH), *A machine learning approach for identifying the onset of careless responding*

- Society for the Improvement of Psychological Science (SIPS, Padua, IT), *Balancing data privacy and reproducibility in open science: An introduction to differential privacy*

2022

- CMStatistics* (London, UK), *Identifying periods of careless responding in surveys: A deep learning approach*

- Annual Meeting of the Dutch-Flemish Classification Society (Tilburg, NL), *Identifying periods of careless responding in surveys: A deep learning approach*

- ICORS (Waterloo, CA), *Identifying periods of careless responding in surveys: a deep learning approach*

- SIPS (Victoria, CA), *Identifying periods of careless responding in surveys: A deep learning approach*

- useR! (online), *Generic machine learning inference on heterogeneous treatment effects using the package* `GenericML`

2022

- ICORS (Vienna, AT), *Outlier detection in rating-scale data via autoencoders*

Miscellaneous Presentations and Outreach

- Lecture to econometrics undergraduate students about econometrics in the health sciences. Invited by the econometrics study association at Erasmus University (FAECTOR). March 15, 2023.
- Various Presentations in the reading group *"High-dimensional statistics"* at the Department of Econometrics at Erasmus University as core member. Since February 2023.
- Various Presentations in the reading group "Mathematical Statistics" at the math department of TU Delft. Since November 2021.

Organization Service

Local Organization Committee

- *Data Science, Statistics & Visualization and European Conference on Data Analytics 2021* (joint conference). July 7–9, 2021. Erasmus University Rotterdam, NL (online)
- *Data Science, Statistics & Visualization 2020*. July 29–31, 2020. Duke University, USA (online)

Misellaneous organization service
- Co-organizer of a reading group on high-dimensional statistics at the econometrics department at Erasmus University; spring 2023. Together with Chen Zhou, Alberto Quaini, Nick Koning, and Xiaomeng Zhang.

Teaching

(FS = Fall semester, SS = Spring semester)

University of Zurich (UZH; study programs in psychology)

2024–25

- Leitung Tutorate in *Statistics I (Part I)* (FS, BSc, part of a module with a grand total of 18 ECTS) Statistics I (Part I) is the first statistics course in the Bachelor's degree program in Psychology at UZH and is attended by over 700 students. Students learn fundamental methodological concepts such as descriptive statistics, data visualization, and hypothesis testing.

- *Dirty Data: Outliers and Missing Values in Statistics and Psychology* (SS, 4 ECTS, seminar, MSc) In this Master's seminar, students learn methods for analyzing data with missing values (imputation and hypothesis testing with imputed datasets) as well as outliers (outlier detection and outlier-robust regression), along with corresponding software packages in R.

Erasmus University Rotterdam (EUR; study programs in econometrics)

2023–24

- *Seminar in Machine Learning* (SS, 12 ECTS, BSc) In this bachelor-level seminar, the students learn the fundamentals of machine learning (e.g., regularized regression, neural networks, and random forests) as well as applications in the economic and social sciences.

2022-23

- *Seminar in Machine Learning* (SS, 12 ECTS, BSc)

- *Machine Learning* (FS, 4 ECTS; MSc) In this Master's course, students learn advanced concepts in machine learning (e.g., clustering, boosting, hyperparameter tuning) and applications in the economic and social sciences.

2021-22

- *Seminar in Machine Learning* (SS, 12 ECTS, BSc)

2020-21

- *Academic Skills* (SS, 4 ECTS) This Bachelor's course teaches students fundamental scientific skills, such as academic writing, research ethics and integrity, open science practices, and professional presentation skills.

- *Seminar in Econometrics* (FS, 12 ECTS, BSc, online) This Bachelor's seminar consists of group projects in which students, working in teams, solve a predefined empirical problem using the methods they have learned during their studies. The solution is documented in a scientific report.

2019-20

- *Academic Skills* (SS, 4 ECTS, BSc, online)

- IT-Support für *Introduction to Statistics* (SS, 6 ECTS; BSc)
  Due to the onset of the pandemic, this course had to be moved online at short notice. I was responsible for the course's online integration. This course is the first statistics course in the Bachelor's program. Students learn the fundamentals of descriptive and inferential statistics.

2018-19
- Studentischer Tutor für *Introduction to Multivariate Statistics* (FS, 4 ECTS; BSc)
  I led a weekly tutorial for this course. In this course, students learn the fundamentals of multivariate statistics, for example factor models and dimension-reduction methods.

More information such as teaching evaluations can be found on my teaching webpage.

Scientific Organizations

I am a member of the following organizations:
- Psychometric Society
- Institute of Mathematical Statistics
- International Association for Statistical Computing
- Open Science Community Rotterdam
- Dutch-Flemish Classification Society

Skills

Software: C, C++, Java, Julia, LaTeX, Matlab, Python, R, Stata, Bash, Zsh, Windows, macOS, Linux (e.g. Ubuntu, Fedora)

Human languages: German (native), English (fluent), Dutch (fluent), French (intermediate)

Hobbies

Long-distance running (marathon + trail), cycling, chess, skiing, reading (nonfiction), cooking.

References

Andreas Alfons
Associate Professor of Statistics
Dept. of Econometrics
Erasmus University
✉ alfons@ese.eur.nl

Patrick J.F. Groenen
Professor of Statistics
Dept. of Econometrics
Erasmus University
✉ groenen@ese.eur.nl

Whitney K. Newey
Professor of Economics
Dept. of Economics
MIT
✉ wnewey@mit.edu

Carolin Strobl
Professor of Statistical Methods in Psychology
Dept. of Psychology
University of Zurich
carolin.strobl@psychologie.uzh.ch