Mirko Thalmann, Ph.D.

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Work History

2024/02 – current

Postdoc, *Helmholtz Institute for Human-Centered AI, Munich, Germany.*

- Leading research projects with the aim of understanding the adaptivity of mental representations, and the generality of learning and decision processes.
- Supervising PhD students and Master students.

2021/08 – 2024/01

Postdoc, *Max Planck Institute for Biological Cybernetics, Tuebingen, Germany.*

- Conducting a research project to understand the adaptivity of mental representations as a main researcher: study design, study execution, communication & presentation, publication.
- Co-supervising PhD students and Master students.

2018/04 – 2021/06

Senior / Data Scientist, *BonusCard.ch AG, Zurich, Switzerland.*

- Developing, evaluating, and putting machine-learning models into productive end-to-end pipelines.
- Conducting statistical analyses (e.g., survival models, regression models) and visualizing results for business stakeholders.
- Developing an SQL-based framework for scheduling model runs in different languages (SQL, python, and R), storing results in centralized location, and supervising models with a logging and monitoring system.

2014/03 – 2018/01

PhD in Cognitive & Mathematical Psychology, *Cognitive Psychology Unit, University of Zurich, Zurich, Switzerland.*

- Title: "Chunking & Rehearsal in Working Memory: A Matter of Central Attention?".
- Formulating hypotheses within statistical and/or computational models.
- Designing and programming experiments.
- Testing models on data and deriving conclusions.
- Written and oral communication of ideas and results.
- Lecturing seminar ”Debates in Cognitive Psychology”.

2021/08 – 2024/01

Doc.Mobility Research Stay, *School of Psychology, UNSW, Sydney, Australia.*

- Writing a grant proposal successfully (Grant received from Swiss National Science Foundation).
- Building a computational model predicting three different types of response data at once (recognition accuracies and RTs & recall on circular scale).
- Fitting the model and computing model predictions.

Education & Professional Training

09/2021 – 02/2022 **Mathematics for Machine Learning** with DeepLearning.AI at coursera.org.

11/2020 – 03/2021 **Deep Learning Specialization** with DeepLearning.AI at coursera.org.

04/2017 – 02/2021 **Books/Self-Taught:** Statistical Rethinking, R4DS, Advanced R, Python Crash Course, Python Data Science Handbook.

07/2016 **Scientific Programming with python**, Physics Institute, University of Zurich.

06/2015 **Comput. Modeling of Cognition**, Two-week workshop, Laufen, Germany.

01/2014 **MSc Psychology**, Major: Cognitive Psychology and Neuropsychology, Minor: Law, University of Zurich.

Skills

Languages German*****, English****, French***, Italian**, Spanish*.

Coding R, python, SQL, LaTeX, git, matlab, SPSS

Misc. Alpinism, Salsa, Cooking, Movies, Taekwondo (first Dan), Boxing

Ad-Hoc Review Activity

Cognitive Research: Principles and Implications, Cortex, Memory & Cognition, Open Mind, journal of cognition

References

Eric Schulz **Helmholtz Institute for Human-Centered AI,** Munich, Germany.

Klaus Oberauer **Cognitive Psychology Unit, University of Zurich,** Switzerland.

Evie Vergauwe **Working Memory, Cognition, & Development, Univ. of Geneva,** Switzerland.

Chris Donkin **Comp. Modeling in Psychology, Ludwigs Max. University,** Munich, Germany.

Research Publications

1. M. Thalmann and E. Schulz, "How can we characterize human generalization and distinguish it from generalization in machines?" *Current Directions in Psychological Science*, 2025, Accepted for publication. Preprint available at https://osf.io/k6ect_v3, DOI: 10.31234/osf.io/k6ect_v3.

2. S. Wu, M. Thalmann, and E. Schulz, "Two types of motifs enhance human recall and generalization of long sequences," en, *Communications Psychology*, vol. 3, no. 1, pp. 1–12, Jan. 2025, Publisher: Nature Publishing Group, ISSN: 2731-9121. DOI: 10.1038/s44271-024-00180-8. (visited on 03/05/2025).

3. K. Allen, F. Brändle, M. Botvinick, *et al.*, "Using games to understand the mind," en, *Nature Human Behaviour*, vol. 8, no. 6, pp. 1035–1043, Jun. 2024, Publisher: Nature Publishing Group, ISSN: 2397-3374. DOI: 10.1038/s41562-024-01878-9. (visited on 09/25/2024).

4. A. K. Jagadish, J. Coda-Forno, M. Thalmann, E. Schulz, and M. Binz, *Human-like Category Learning by Injecting Ecological Priors from Large Language Models into Neural Networks*, arXiv:2402.01821, May 2024. DOI: 10.48550/arXiv.2402.01821. (visited on 10/24/2024).

5. T. A. Schäfer, M. Thalmann, E. Schulz, C. F. Doeller, and S. Theves, *The hippocampus supports interpolation into new states during category abstraction*, en, May 2024. DOI: 10.1101/2024.05.14.594185. (visited on 07/18/2024).

6 M. Thalmann, T. A. J. Schäfer, S. Theves, C. F. Doeller, and E. Schulz, "Task imprinting: Another mechanism of representational change?" *Cognitive Psychology*, vol. 152, p. 101 670, Aug. 2024, ISSN: 0010-0285. DOI: 10.1016/j.cogpsych.2024.101670. (visited on 07/17/2024).

7 M. Thalmann, K. Witte, and E. Schulz, *How should we measure exploration?* en-us, Oct. 2024. URL: https://osf.io/tzuey (visited on 10/22/2024).

8 S. Wu, M. Thalmann, P. Dayan, Z. Akata, and E. Schulz, *Building, Reusing, and Generalizing Abstract Representations from Concrete Sequences*, arXiv:2410.21332 [cs], Oct. 2024. DOI: 10.48550/arXiv.2410.21332. (visited on 03/05/2025).

9 M. Thalmann and E. Schulz, "Simple, Idiosyncratic Decision Heuristics in a Two-Armed Bandit Task," en, in *2023 Conference on Cognitive Computational Neuroscience*, Oxford, UK: Cognitive Computational Neuroscience, 2023. DOI: 10.32470/CCN.2023.1240-0. (visited on 10/07/2024).

10 M. Thalmann, A. S. Souza, and K. Oberauer, "How does chunking help working memory?" *Journal of Experimental Psychology: Learning, Memory, and Cognition*, vol. 45, no. 1, pp. 37–55, 2019, Place: US Publisher: American Psychological Association, ISSN: 1939-1285(Electronic),0278-7393(Print). DOI: 10.1037/xlm0000578.

11 M. Thalmann, A. S. Souza, and K. Oberauer, "Revisiting the attentional demands of rehearsal in working-memory tasks," en, *Journal of Memory and Language*, vol. 105, pp. 1–18, Apr. 2019, ISSN: 0749-596X. DOI: 10.1016/j.jml.2018.10.005. (visited on 06/28/2021).

12 A. S. Souza, M. Thalmann, and K. Oberauer, "The precision of spatial selection into the focus of attention in working memory," en, *Psychonomic Bulletin & Review*, vol. 25, no. 6, pp. 2281–2288, Dec. 2018, ISSN: 1531-5320. DOI: 10.3758/s13423-018-1471-4. (visited on 02/22/2021).

13 M. Thalmann, M. Niklaus, and K. Oberauer, "Estimating Bayes Factors for Linear Models with Random Slopes on Continuous Predictors," *PsyArXiv*, Oct. 2017. DOI: 10.17605/OSF.IO/4XQVR. (visited on 11/19/2017).

14 M. Thalmann and K. Oberauer, "Domain-specific interference between storage and processing in complex span is driven by cognitive and motor operations," en, *Quarterly Journal of Experimental Psychology*, vol. 70, no. 1, pp. 109–126, Jan. 2017, ISSN: 1747-0218, 1747-0226. DOI: 10.1080/17470218.2015.1125935. (visited on 02/26/2021).

Talks (Selected)

2024/08/14 **Mindful Science,** Tuebingen, GER. Title: From Science to Industry – And All The Way Back. *Or*: Finetuning Your Importance Weights

Annual Meeting of the Society for Mathematical Psychology, Tilburg, NL. Title: Are Exploration Strategies Suitable for Individual Differences Research?

2024/06/29 **ASIC,** Molveno, IT. Title: Are Exploration Strategies Suitable for Individual Differences Research?

2024/04/18 **University of Geneva, Cognitive Development Chair, Faculty of Psychology and Educational Sciences** Geneva, CH. Masters Seminar. Title: From Science to Industry – And All The Way Back. Or: Finetuning your Importance Weights

University of Geneva, Cognitive Development Chair, Faculty of Psychology and Educational Sciences Geneva, CH. Title: Are Exploration Strategies Suitable for Individual Differences Research?

2023/08/31 **UCL, Department of Experimental Psychology,** London, UK. Title: How to (not) measure exploration strategies in a few-armed bandit task?

2023/07/04 **ASIC,** Kranjska Gora, SLO. Title: How to (not) measure exploration strategies in a two-armed bandit task

Talks (Selected) (continued)

2022/06/21 **ASIC,** Chamonix, FR. Title: Are Mental Representations Shaped by Task-Specific Goals?