Margherita Calderan | Ph.D.

Email address: margherita.calderan@gmail.com
ORCID: 0009-0005-5668-5162   https://orcid.org/0009-0005-5668-5162
GitHub: Mar-Cald   https://github.com/Mar-Cald
ResearchGate: Margherita-Calderan-2   https://www.researchgate.net/profile/Margherita-Calderan-2

Summary

I am a **postdoctoral researcher** at the University of Padova (Italy), Department of General Psychology, interested in **cognitive modeling of decision and learning processes**.

Research Interests

- Cognitive Psychology

- Computational models of cognition

- Bayesian statistics

Current Position

Postdoctoral Researcher – Department of General Psychology, University of Padova, Italy   Oct. 2024 - Present

* Tails or types? Testing the dimensional hypothesis in neurodevelopmental disorders

* Supervisor: Prof. Enrico Toffalini

* 1 year research grant

Education

Ph.D. in Psychological Sciences - cum laude – University of Padova, Italy   Oct. 2021 - Oct. 2024

* Thesis: Balancing stability and flexibility in cognitive control and learning: the effects of arousal

* https://researchdata.cab.unipd.it/1437/

* Supervisors: Prof. Roberta Sellaro, Prof. Nicola Cellini

M.S. in Cognitive Neuroscience and Clinical Neuropsychology - 110 cum laude – University of Padova, Italy   Oct. 2018 - Dec. 2020

* Thesis: Sleep characteristics in adults with high functioning autism: a polysomnographic study

* Supervisor: Prof. Nicola Cellini

B.S. in Cognitive Psychology and Psychobiology - 109/110 – University of Padova, Italy   Sept. 2015 - July 2018

* Thesis: Gender differences in the long-term consolidation of emotional memories

* Supervisor: Prof. Michela Sarlo

Research Experience

Postgraduate Internship – Psychophysiology Lab, University of Padova, Italy   Jan. 2021 - Dec. 2021

* Investigated the role of sleep characteristics in false memory formation and emotional reactivity.
* Processed and interpreted sleep data from healthy participants.
* Supervisors: Prof. Andrea Spoto, Prof. Nicola Cellini

Curricular Internship – Psychophysiology Lab, University of Padova, Italy   Dec. 2019 - Aug. 2020

* Analyzed polysomnographic data to examine sleep architecture in young adults with high-functioning autism.
* Collaborated with the University of Trento and the University of Tübingen.
* Supervisor: Prof. Nicola Cellini

Abroad

Visiting PhD student – Cognitive Psychology Unit, University of Leiden, the Netherlands   Feb. 2024 - Jun. 2024

* Worked on a research project investigating how mind-wandering affects cognitive flexibility, applying computational models (https://psyarxiv.com/quhns) to analyze behavioral data.
* Supervisor: Prof. Bryant Jongkees

Research Intern – Donders Sleep and Memory Lab, Donders Institute, the Netherlands   Jun. 2019 - Aug. 2019

* Studied associations between affective memory bias, medial prefrontal schema processing, and sleep in depressed patients and healthy controls.
* Assisted with a project on lucid dream induction.
* Supervisor: Prof. Martin Dresler

Erasmus + – Jaume I University, Spain   Feb. 2015 - July. 2015

* Completed a semester-long academic exchange as part of my undergraduate studies.

Training

Model-based Neuroscience Summer School – University of Amsterdam, the Netherlands   29/07/2024 - 02/08/2024

* Hands-on experience in both cognitive modeling using evidence-accumulation models and cognitive neuroscience methods. Three-day introduction to evidence-accumulation modeling using Bayesian inference. Two days focused on how to use the evidence-accumulation framework to formalize performance in complex experimental paradigms, how to construct joint models of multiple tasks using techniques such as hierarchical factor models, and how to combine evidence-accumulation and reinforcement-learning models.

* Lecturers: Prof. Andrew Heathcote, Prof. Dora Matzke, Dr. Michael Nunez, Dr. Steven Miletic, and Dr. Niek Stevenson

qHelp international seminar on Quantitative Psychology – Arrifana, Portugal   26/03/2023 - 02/04/2023

* A one-week intensive seminar covering Shiny and R Markdown for interactive data reporting, Copula theory and its applications in dependence modeling, numerical methods, and optimization techniques for computational analysis.

* Lecturers: Julian Mollenhauer, Ana Lourenço, Prof. Luciano Stefanutti, Prof. Hans Colonius, Prof. Francis Tuerlinckx, and Prof. Sérgio Moreira

Statistical Rethinking – Online Course   06/01/2023 - 10/03/2023

* Pre-recorded lectures and weekly meetings to discuss the material. This course teaches data analysis, focusing on scientific models: conceptual and causal models. Bayesian data analysis to connect scientific models to evidence.

* Lecturers: Prof. Richard McElreath

Fundamentals and Applications of Pupillometry – University of Padova, Italy   20 hours

* This course offers an introduction to the use of pupillometry in cognitive science, combining practical exercises in data processing with free software tools: OpenSesame for implementing classic cognitive psychology tasks and R for analyzing and visualizing continuous pupil diameter changes. Covering key topics such as noise sources, experimental design, data processing options, and the cognitive interpretation of pupillometric measures.

* Professor: Dr. Giulia Calignano

EEGLAB: analysis of electroencephalographic data – University of Padova, Italy   20 hours

* The EEGLAB and ERPLAB toolboxes, which operate within MATLAB, facilitate the analysis of electroencephalographic (EEG) data. This course offers foundational skills in data analysis and theoretical knowledge through practical examples, covering key topics such as data pre-processing and event-related potential (ERP) computation.

* Professor: Dr. Mattia Doro

Introduction to R – University of Padova, Italy   20 hours

* This course introduces the fundamentals of the open-source programming language R, teaching core programming concepts, data structures, and function creation through practical exercises to build versatile skills applicable across academic and professional settings.

* Professor: Dr. Filippo Gambarota

PsychoPy3: experimental programming – University of Padova, Italy   20 hours

* This course introduces participants to PsychoPy, an open-source Python-based software for designing and running behavioral science experiments, teaching them how to create, test, deploy, and manage experiments using its flexible and user-friendly graphical interface.

* Professor: Dr. Thomas Quettier

Publications

Published

1. **Calderan, M.**, Toffalini, E., Mirandola, C., & Cellini, N. (2025). Sleep does not affect false memory production on a script-based test. *Neuropsychologia*. https://doi.org/10.1016/j.neuropsychologia.2025.109210 [IF: 2, Quartile: Q3] (*Open Access*)

2. Toffoli, L., **Calderan, M.**, Del Popolo Cristaldi, F., Duma, G. M., Calcagnì, A., Pastore, M., Tarantino, V., & Mento, G. (2025). Can I afford one more candy? How motivational contexts shape adaptive cognitive control in children. *Developmental Psychology*. Advance online publication. https://doi.org/10.1037/dev0001976.**OSF** repo: https://osf.io/shuq2/ [IF: 3.1, Quartile: Q2]

3. Sobol, M., Bachnio, A., **Calderan, M.**, Degasperi, G., Mioni, G., Hryhorchuk, I., Pluciska, E., Stasiniewicz, J., Kwapiski, J., Jankowski, K., & Cellini, N. (2025). Balanced time perspective as a factor mitigating the negative consequences of sleep disruptions in the perinatal period. *Chronobiology International*, 1–12. https://doi.org/10.1080/07420528.2025.2490499 [IF: 2.2, Quartile: Q3]

4. **Calderan, M.**, & Visalli, A. (2024). Challenges of meta-learning and rational analysis in large worlds. *Behavioral and Brain Sciences*, 47, e148. https://doi.org/10.1017/S0140525X24000128.Target paper and commentaries: https://cldlab.org/static/papers/Binz/_2024/_BBS.pdf [IF: 16.6, Quartile: Q1]

Accepted for Publication

1. **Calderan, M.**, Jongkees, J.B., Gambarota, F., Pastore, M., Cellini, N., & Sellaro, R. Isolating working memory gating processes under stress. *Collabra::Psychology* (*Open Access*). https://doi.org/10.1525/collabra.140750, **OSF** repo: https://osf.io/d43vs/ [IF: 3.1, Quartile: Q1]

Under Review

1. Visalli, A., Calistroni, F. M., **Calderan, M.**, Donnarumma, F., Zorzi, M., & Ambrosini, E. A computational framework for integrating Predictive processes with evidence Accumulation Models (PAM). Under Review in *Behavior Research Methods*. **Preprint:** https://doi.org/10.48550/arXiv.2411.13203.

Under Consideration

1. **Calderan, M.**, Visalli, A., Degasperi, G., Toffoli, L., Sellaro, R., & Cellini, N. Predictions under sleep restriction: The effects of partial sleep deprivation on learning and inhibitory control. Under Consideration in *Royal Society Open Science*. **Preprint:** https://doi.org/10.31234/osf.io/x7m4z/_v3.

Preregistration

1. Sirota, M., rol, J., Lisi, M., Juanchich, M., Guglani, K., Silverstein, P., . . . **Calderan, M.**, . . . Schmidt, K. (2025, January 14). Mapping and Increasing Error Correction Behaviour in a Culturally Diverse Sample. **Preprint:** https://doi.org/10.17605/OSF.IO/WN4VX.

2. Toffalini, E., **Calderan, M.**, Feraco, T., & Gambarota, F. Link Functions and Generalized Linear Models in Interaction Testing within Psychological Research. https://osf.io/sjdu4

3. Toffalini, E., **Calderan, M.**, Pagan, R., & Tobia, V. A Critical Evaluation of Taxometric Analysis in the Study of Neurodevelopmental Disorders. https://github.com/EnricoToffalini/Taxometrics-Neurodevelopmental-Disorders/tree/main

In Preparation

1. Barbiero, J., **Calderan, M.**, & Mioni, G., The contribution of cerebellum in time perception: A systematic review and meta-analyses. In preparation for *Wiley Interdisciplinary Reviews-Cognitive Science*

2. Toffoli, L., **Calderan, M.**, Stefanelli, G., Duma, G.M., Del Popolo Cristaldi, F., Duma, G., Pastore, M., Frisina, S., Tarantino, V., & Mento, G., I am talking to you! Engagement modulates the effects of digital contents exposure on preschoolers' adaptive cognitive control. In preparation for *Developmental Sciences*.

3. van Dooren, R., **Calderan, M.**, Sellaro, R., & Jongkees, J.B., Dynamic and contextual modulation of constraints on cognitive control. In preparation for *Journal of Experimental Psychology: Human Perception and Performance*.

4. Mazzoni, N., Ciringione, L., **Calderan, M.**, De Falco, S., Venuti, P., Zinke, K., Born, J., Cellini, N., & Caria, A. Sleep characteristics in high-functioning Autism Spectrum Disorder. In preparation for *Sleep Medicine.*

Published Abstract

1. **Calderan, M.**, Visalli, A., Sellaro, R., & Cellini, N. (2024). Restless Sleep, Uncertain Minds: Learning and Inhibitory Control Under Partial Sleep Deprivation. Proceedings of the Annual Meeting of the Cognitive Science Society, 46. `https://escholarship.org/uc/item/65b2f0n7`.

2. **Calderan, M.**, Visalli, A., Sellaro, R., & Cellini, N., (2024). The Eects of Partial Sleep Deprivation on Adaptive Cognitive Control. *Sleep Medicine*, `https://doi.org/10.1016/j.sleep.2023.11.156`.

3. **Calderan, M.**, Visalli, A., Sellaro, R., & Cellini, N. (2024). Expecting the unexpected: a closer look at the effect of partial sleep deprivation on learning and inhibitory control. *Journal of Sleep Research*, `https://doi.org/10.1111/jsr.14291`.

4. Baldassarri, A., Colombo, C., Bergamo, D., **Calderan, M.**, Varanini, A., Ferrentino, A.,D'atri, A., & Cellini, N. (2024). Exploring the impact of oscillatory events during a nap on emotional memory consolidation. *Journal of Sleep Research*, `https://doi.org/10.1111/jsr.14291`

Conferences

1. Stefanelli G., Toffoli L., **Calderan M.**, Del Popolo Cristaldi F., Duma G. M., Tarantino V., Visalli A., Sellaro R., Mento G.Apprendimento associative implicito e volatilità ambientale nell'ADHD. **Video-Poster** at Giornate di aggiornamento sull'uso degli strumenti in Psicologia Clinica dello Sviluppo Bologna (Italy), February 2025.

2. Stefanelli G., Toffoli L., **Calderan M.**, Duma G. M., Del Popolo Cristaldi F.,
Tarantino V., Visalli A., Sellaro R. & Mento G. Super Learning Bros: Developmental trajectories of probabilistic learning in volatile environment. **Talk** at the Cognitive Science Arena, Brixen (Italy), February 2025.

3. **Calderan, M.**, Visalli, A., Degasperi, G., Calistroni, F.M., Sellaro, R., & Cellini, N. Expecting the unexpected: a closer look at the eect of partial sleep deprivation on learning and inhibitory control. **Poster** presented at Sleep Europe 2024, Seville (Spain), September 2024.

4. **Calderan, M.**, Visalli, A., Degasperi, G., Calistroni, F.M., Sellaro, R., & Cellini, N. Restless Sleep, Uncertain Minds: Learning and Inhibitory Control Under Partial Sleep Deprivation. **Poster** presented at CogSci 2024: Dynamics of Cognition, Rotterdam (Netherlands), July 2024.

5. **Calderan, M.**, Visalli, A., Sellaro, R., & Cellini, N. The Eects of Partial Sleep Deprivation on Adaptive Cognitive Control. **Poster** presented at World Sleep Congress, Rio de Janeiro (Brasil), October 2023.

6. **Calderan, M.**, Visalli, A., Sellaro, R., & Cellini, N. The sleep-deprived predictive brain: modeling the eect of partial sleep deprivation on adaptive cognitive control. **Talk** at the XXIX Conference of the Italian Association of Psychology (AIP) - Experimental Psychology Section. Lucca (Italy), September 2023.

7. **Calderan, M.**, Cellini, N., Sellaro, R., Stressed Minds: Unraveling Acute-Stress Eects on Working Memory Processes. **Mini-Talk** at the Cognitive Science Arena, Brixen (Italy), February 2023.

8. **Calderan, M.**, Cellini, N., Sellaro, R., Exploring the Influence of Stress on Working Memory Gating Mechanisms. **Mini-Talk** at the XXX Conference of the Italian Association of Psychology (AIP). Padova (Italy), September 2022.

9. **Calderan, M.**, Cellini, N., Sellaro, R., Understanding stress-induced eects on Working Memory gating mechanisms. **Poster** presented at the 22nd meeting of the European Society for Cognitive Psychology (ESCoP), Lille (France), August 2022.

Awards and Grants

1. **Travel Grant**: European Conference on Visual Perception, Mainz, (Germany).

2. **Travel Grant**: qHelp international seminar on Quantitative Psychology. Arrifana (Portugal)

3. **Painter Award**: Best Poster, Cognitive Science Arena, Brixen, (Italy).

4. **Erasmus Placement Grant (2 Months)**: Donders Sleep and Memory Lab, Nijmegen (Netherlands).

5. **Erasmus Placement Grant (5 Months)**: Jaume I University, Castellón de la Plana, (Spain).

Invited Seminar and Academic Experience

Workshops

1. **A Practical Introduction to Evidence Accumulation Models in Visual Perception Research**. European Conference on Visual Perception, Mainz (Germany). Scheduled: 24 August 2025 (1 hr.). Program: `https://ecvp2025.uni-mainz.de/conference`.

2. **Introduction to Reproducible Science**. Pre-School workshop *Replicability Crisis in Science*, Padova (Italy). 6 June 2025 (2 hrs.). Material: `https://github.com/Mar-Cald/repro-pre-school`.

3. **Tempi di risposta**. Workshop on reaction time distributions, Univeristy of Padova, Padova (Italy). 10 June 2025 (1 hr.). Material: `https://mar-cald.github.io/tempi/`.

Seminars

1. **Introduction to R**. An intensive R programming course offered within the ARCA (Applied Research Course Academy) courses, Department of Developmental Psychology and Socialization, University of Padova. Material: `https://github.com/arca-dpss/course-R-2425`

   - December, 2024 (20 hrs.)
   - April, 2025 (20 hrs.)

2. **Learning in Dynamic Environments: A Tentative Implementation of the Volatile Kalman Filter in STAN.** Presentation (1 hr.) on a Bayesian-based implementation of a learning algorithm for the 2023/24 Psicostat meeting series: `https://psicostat.dpss.psy.unipd.it/meetings/slides/2024-03-22_calderan.pdf`

Integrative teaching (Didattica integrativa)

1. Preparation and correction of **practical group exercises** and exams for the course **Experimental Research Methods in Psychology** (Prof. Roberta Sellaro), Master's degree in Developmental and Educational Psychology, University of Padova (14 hrs.).

2. **Assistance** in the preparation of exercises and corrections for the course **General Psychology** (Prof. Enrico Toalini), Bachelor's degree in Techniques and Methods in Psychological Sciences, University of Padova (15 hrs.).

3. **Assistance** during lectures and preparation of **practical group exercise** for the course **General Psychology** (Prof.Giovanna Mioni),Bachelor's degree in Social and Work Psychological Sciences, University of Padova (14 hrs.).

Others

- **Representative of Research Fellows** in the Department of General Psychology, University of Padova. 02/2024 – Present

- **Co-supervision of students** for their internships and bachelor (2) and master theses (1)

Organizational Activities

Methodological School: Replicability Crisis in Science

Member of the of the **Organizing team**. The school aims to provide a broad and interdisciplinary perspective on replicability, along with tools that help participants explore aspects most relevant to their own field. Lectures cover the epistemological, philosophical, and statistical foundations of replicability and the so-called replication crisis. Students engage in guided group activities to discuss core issues and apply the course concepts to real data analysis. Padova (Italy). (https://psicostat.github.io/replicability-psy-unipd-phd)

- **Lecturers**: Prof. Branden Fitelson, Prof. Giovanni Parmigiani, Dr. Filippo Gambarota

International Winter School - The 4 Ms: Meta-research, Measurement, Multi-lab, and Multiverse data analysis in Behavioral Sciences

Member of the of the **Organizing team**. The Winter School aims to address the methodological challenges in behavioral sciences, which impact theory, measurement, and data analysis. Its main purpose is to introduce attendees to advancements in meta-research, providing both theoretical insights and practical tools to conduct rigorous research. Additionally, it aims to foster collaborative networks by enabling attendees to discuss their ongoing projects with teachers and peers, facilitating new collaborations and the application of the presented tools. Padova (Italy). (https://winterschool4ms.dpg.unipd.it/)

- **Lecturers**: Prof. Daniël Lakens, Prof. Dorothy Bishop, Prof. Jessica Flake, Prof. Lisa DeBruine, Prof. Ulrich Schimmack, Prof. Carlo Umiltà, Prof. Ettore Ambrosini, Dr. Filippo Gambarota, Dr. Giulia Calignano, Prof. Massimo Grassi, Prof. Livio Finos

ONIRICAMENTE

Member of the of the **Organizing team** of the one-day workshop dedicated to public outreach on the Psychology of Sleep. Padova (Italy) (https://sites.google.com/view/oniricamente/home-page?authuser=0)

Cognitive Neuroscience of Sleep Summer School

Member of the **Supporting team**. The Summer School examined methods for investigating sleep and memory in humans and animals. It also covered topics related to sleep medicine and dreaming. Nijmegen (Netherlands)

Research Groups Membership

Psicostat – University of Padova   2024 - Present

* I am a core team member of Psicostat, an interdisciplinary research group specializing in quantitative psychology, psychometrics, psychological testing, and statistics.
* https://psicostat.dpss.psy.unipd.it/people.html

SleePy – University of Padova   2019 - Present

* I am a member of SleePy, a research group focusing on sleep psychology.

Collaborations

Dr. Bryant Jongkees – Univeristy of Leiden, the Netherlands   2024 - Present

* Examining the influence of expectations and mind-wandering on cognitive control stability and flexibility using computational modeling approaches.

Dr. Antonino Visalli – University of Modena-Reggio Emilia, Italy   2023 - Present

* Integrating models of learning and control.

Involvement in Research Groups

National Project on Malpractice in Psychological Research

Collaborative initiative aimed at identifying and addressing **methodological malpractice** in psychological science, with Enrico Toffalini (University of Padova), Filippo Gambarota (University of Padova) and Tommaso Feraco (University of Padova). My contributions include:

- Toffalini, E., **Calderan, M.**, Feraco, T., & Gambarota, F. Link Functions and Generalized Linear Models in Interaction Testing within Psychological Research. https://osf.io/sjdu4

- Toffalini, E., **Calderan, M.**, Pagan, R., & Tobia, V. A Critical Evaluation of Taxometric Analysis in the Study of Neurodevelopmental Disorders. https://github.com/EnricoToffalini/Taxometrics-Neurodevelopmental-Disorders/tree/main

National Project on Adaptive Cognitive Control in Children

Part of a national research group focused on investigating adaptive cognitive control in typical, at-risk, and atypical populations within a Neuroconstructivist framework, with Giovanni Mento (University of Padova), Fiorella Del Popolo Cristaldi (University of Padova), Lisa Toffoli (University of Padova), Giulia Stefanelli (University of Padova), Gian Marco Duma (Epilepsy and Clinical Neurophysiology Unit, IRCCS E. Medea). The group has contributed to multiple peer-reviewed publications, conference presentations, and posters. My contributions specifically focused on the application of **Bayesian methods**, including **generalized multilevel models** and **survival analysis** techniques, in the following selected works:

- Stefanelli G., Toffoli L., **Calderan M.**, Del Popolo Cristaldi F., Duma G. M., Tarantino V., Visalli A., Sellaro R., Mento G.Apprendimento associativo implicito e volatilità ambientale nell'ADHD. **Video-Poster** at Giornate di aggiornamento sull'uso degli strumenti in Psicologia Clinica dello Sviluppo Bologna (Italy), February 2025.

- Stefanelli G., Toffoli L., **Calderan M.**, Duma G. M., Del Popolo Cristaldi F., Tarantino V., Visalli A., Sellaro R. & Mento G. Super Learning Bros: Developmental trajectories of probabilistic learning in volatile environment. **Talk** at the Cognitive Science Arena, Brixen (Italy), February 2025.

- Toffoli, L., **Calderan, M.**, Del Popolo Cristaldi, F., Duma, G. M., Calcagnì, A., Pastore, M., Tarantino, V., & Mento, G. (2025). Can I afford one more candy? How motivational contexts shape adaptive cognitive control in children. *Developmental Psychology*. Advance online publication. https://doi.org/10.1037/dev0001976.

Scientific Societies Membership

Cognitive Science Society – https://cognitivesciencesociety.org/ — 2024 - Present

Italian Reproduciblity Network – https://www.itrn.org/ — 2023 - Present

European Sleep Research Society – https://esrs.eu/ — 2023 - Present

AIP, Sezione Sperimentale – https://aipass.org/psicologia-sperimentale/ — 2022 - Present

Society for the Improvement of Psychological Science – https://improvingpsych.org/ — 2022 - 2023

European Society for Cognitive Psychology – https://www.escop.eu/ — 2021 - 2023

Languages

- Italian 🇮🇹: Mother Tongue
- English 🇬🇧 🇺🇸: Upper Intermediate
- Spanish 🇪🇸: Beginner

Programming Languages

R/R Studio – Proficient

* Data handling, pre-processing, visualization, Bayesian Hierarchical Modelling, Evidence Accumulation Models, Reinforcement Learning Models.

STAN – Intermediate

* Bayesian Hierarchical Modelling

JAGS – Basic

* Bayesian Hierarchical Modelling

Phyton – Basic

* Data handling, pre-processing

MatLab – Basic

* Data handling, pre-processing

Research and Project Management Skills

PsychoPy/Pavlovia and OpenSesame/OSWeb – Intermediate

* Task development for behavioral research.

GitHub and GitLab – Intermediate

* Version control and collaboration.
* https://github.com/Mar-Cald, https://gitlab.pavlovia.org/mar.cald

Docker – Basic

* Development and deployment of containers.

Google Suite, Office Suite – Intermediate

* Gmail, Calendar, Drive, Meet, Docs, Forms, Sheets.

Operating Systems –

* MacOS (Proficient)
* Windows (Intermediate)
* Linux (Intermediate)

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