



Dr. Tommaso Ghilardi

Postdoctoral Researcher in Developmental science

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- <https://tommasoghilardi.github.io>
- DevStart

Short Bio

I am a Postdoc at the Centre for Brain and Cognitive Development, Birkbeck University, studying how young minds learn to predict events and interact with their environment. My research combines behavioural experiments, eye-tracking, brain imaging, and computational modelling to explore the development of children's predictive abilities and strategies for navigating the world.

In addition, I share my knowledge through **DevStart**, a website I created to offer simple tutorials and insights on developmental science.

Profiles



Skills

Programming:

- R
- Python
- Matlab

Misc:

- Github
- Quarto
- Jupyter lab
- Photoshop
- Illustrator
- MsOffice

Work Experience

- 2023 – **Post-doctoral Researcher** Birkbeck, University of London
Leading research on the Leverhulme project, studying how multi-modal information affects children's action planning in tool-use tasks. Focuses on perceptual, cognitive, and motor processes in developmental planning.
- 2018 – 2023 **Ph.D. Researcher** Donders Center for Cognition, Netherlands
Contributed to the MOTION European project (MSCA), investigating how infants use statistical information to predict events. Applied EEG, fNIRS, and eye-tracking (pupillometry) to study neural correlates of action observation and infant predictive behavior.
- 2020 – 2022 **Lab Committee Member** Donders Center for Cognition
Represented the Baby & Child Research Center at DCC meetings. Managed lab operations, equipment, and research infrastructure.
- 2022 **Visiting PhD Researcher** Birkbeck, University of London
Developed fNIRS project design and data analysis during a 4-month visit. Initiated a collaborative study combining fNIRS with eye-tracking to study action planning in children.
- 2019 – 2022 **EEG Lab Support** Donders Center for Cognition
Trained researchers on EEG lab procedures and managed lab operations. Ensured availability of necessary equipment and materials for ongoing research projects.
- 2015 – 2018 **Research Intern** Affiliative Behavior and Physiology Lab
Participated in physiological (ECG, EMG, EDA) and behavioral research studies on social interactions and affiliative behaviors.
- 2016 – 2017 **Thesis Research (Erasmus+ Japan)** Nagasaki University, Japan
Conducted research on ethnicity's effect on emotional face recognition. Analyzed 64-channel EEG, ECG, and behavioral data to explore emotional processing.

Givens workshops

- 2024 **BTG Workshop** Max Planck Institute for Evolutionary Anthropology
Delivered the workshop "Gaze Tracking & Pupillometry" for the 2nd Bridging the Technological Gap Workshop.

Python
Eye-Tracking
Pre-processing
Psychopy
- 2024 **BCCCD Workshop** Budapest CEU Conference on Cognitive Development
Delivered the workshop "Python Fundamentals for Eye-Tracking Research" at the BCCCD.

Python
Eye-Tracking
Pre-processing
Paradigm creation

Outreach

- 2022 – **DevStart Website** Founder and Developer
Led the creation of **DevStart**, an online resource with tutorials for students and researchers in developmental psychology and cognitive neuroscience.
- 2021 **University Promotional Video** Donders Labs
Featured in the Donders Labs video series promoting the Baby & Child Research Center.
- 2021 **Scientific Podcast** Scientificast
Participated in Scientificast, discussing my research on infants' action prediction abilities. Listen to episode.
- 2018 **Blog Contributor** MOTION European Project (MSCA)
Contributed blog posts to the European MOTION project, sharing research insights.

Analysis

Frequentist ● ● ● ● ●

- Linear Models
- Generalized Linear Models
- Mixed Effects Models
- Generalized Additive Models

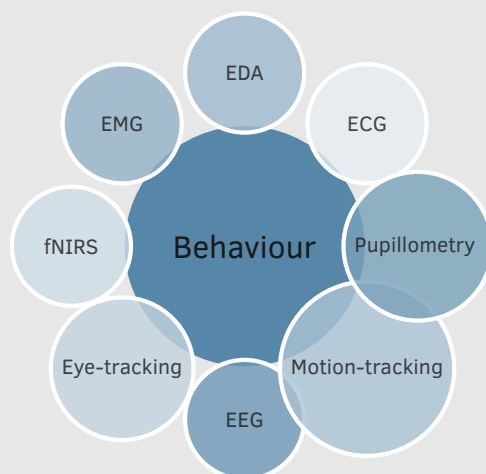
Bayesian ● ● ● ● ●

- Linear Models
- Generalized Linear Models
- Mixed Effects Models
- Generalized Additive Models
- Non-Linear Models

Machine Learning ● ● ● ● ●

- Random Forest
- Kmeans Clustering
- Dirichlet Clustering

Methods



Languages

Italian (Mother Tongue)

English (C1)

Dutch (A2)

Education

- 2016 – 2018 **M.Sc. Psychology-Neuroscience** Trento University, Italy
Title: Ethnicity and gender modulate the recognition of emotional facial expressions.
Grade: First Class Honours.
- 2013 – 2016 **B.Sc. Sciences and Techniques of Cognitive Psychology** Trento University, Italy

Teaching Experience

- 2021 – 2022 **Thesis Supervision** Donders Center for Cognition
Supervised 3 master's students in the preparation of their thesis.
- 2020 – 2021 **Brain & Cognition 1** Donders Center for Cognition
Teaching Assistant for Brain & Cognition course. Guided groups of students weekly through course material and supervised work-group activities, administering tests as part of the course on cognitive behaviors and brain function.
- 2020 – 2021 **Assistant for EEG Hands-on Session for Developmental Cognitive Neuroscience course** Donders Center for Cognition
Assisted during the EEG hands-on session of the course, providing practical training in EEG analysis of adult and infant signals.
- 2017 **Developmental Clinical Neuroscience** Trento University
Participated in organizing the course under the supervision of Professor Gianluca Esposito. The course introduced students to Social and Affective Neuroscience.
- 2016 **Social and Affective Neuroscience** Trento University
Participated in organizing the course under Professor Gianluca Esposito. Lecture given: "Processing Infant Direct Speech". The course focused on physiological mechanisms underlying social interactions.

Honours and Awards

- 2022 **Internationalization Travel Grant** Radboud University, Netherlands
Radboud internationalization grant for research collaboration.
- 2019 **Travel Award** Sackler Colloquium, USA
Awarded for attending "The Brain Produces Mind by Modelling" conference.
- 2018 **Merit Award** Trento University, Italy
Awarded for outstanding academic performance in the 2017 edition.

Publications

Journal Articles

- [1] Lauren KR Cherry, Minxin Cheng, Tommaso Ghilardi, and Ori Ossmy. “Automatic Real-Time Hand Tracking Enhances Adolescents’ Spatial Skills by Eliminating Haptic Feedback”. In: (2024), pp. 1–6.
- [2] Tommaso Ghilardi, Francesco Poli, Marlene Meyer, Olympia Colizoli, and Sabine Hunnius. “Early roots of information-seeking: Infants predict and generalize the value of information”. In: *eLife* 13 (2024).
- [3] H el ene Grandchamp des Raux, Tommaso Ghilardi, Christina Soderberg, and Ori Ossmy. “The role of action concepts in physical reasoning: insights from late childhood”. In: *Philosophical Transactions B* 379.1911 (2024), p. 20230154.
- [4] Francesco Poli, Tommaso Ghilardi, Roseriet Beijers, Carolina de Weerth, Max Hinne, Rogier B Mars, and Sabine Hunnius. “Individual differences in processing speed and curiosity explain infant habituation and dishabituation performance”. In: *Developmental Science* 27.3 (2024), e13460.
- [5] Francesco Poli, Tommaso Ghilardi, Jana HM Bersee, Rogier B Mars, and Sabine Hunnius. “Infants Track Environmental Volatility to Optimize Their Learning”. In: 46 (2024).
- [6] Joanna M Rutkowska, Tommaso Ghilardi, Stefania V Vacaru, Johanna E van Schaik, Marlene Meyer, Sabine Hunnius, and Robert Oostenveld. “Optimal processing of surface facial EMG to identify emotional expressions: A data-driven approach”. In: *Behavior Research Methods* (2024), pp. 1–14.
- [7] Tommaso Ghilardi, Marlene Meyer, and Sabine Hunnius. “Predictive motor activation: Modulated by expectancy or predictability?” In: *Cognition* 231 (2023), p. 105324.
- [8] Francesco Poli, Tommaso Ghilardi, Rogier B Mars, Max Hinne, and Sabine Hunnius. “Eight-month-old infants meta-learn by downweighting irrelevant evidence”. In: *Open Mind* 7 (2023), pp. 141–155.
- [9] Andrea Bonassi, Tommaso Ghilardi, Giulio Gabrieli, Anna Truzzi, Hirokazu Doi, Jessica L Borelli, Bruno Lepri, Kazuyuki Shinohara, and Gianluca Esposito. “The recognition of cross-cultural emotional faces is affected by intensity and ethnicity in a Japanese sample”. In: *Behavioral Sciences* 11.5 (2021), p. 59.
- [10] Andrea Bonassi, Tommaso Ghilardi, Anna Truzzi, Ilaria Cataldo, Atiqah Azhari, Peipei Setoh, Kazuyuki Shinohara, and Gianluca Esposito. “Dataset on genetic and physiological adults’ responses to social distress”. In: *Data in brief* 13 (2017), pp. 742–748.

Inproceedings

- [1] Tommaso Ghilardi and Ori Ossmy. “A Pupil-Dilation Technique to Test Developmental Differences in Visual Synchrony During Free Viewing”. In: OSF.
- [2] H el ene Grandchamp des Raux, Tommaso Ghilardi, and Ori Ossmy. “The Effects of Rewards on Trial-and-Error Learning in School-Aged Children”. In: OSF.
- [3] Tommaso Ghilardi, Marlene Meyer, Claire Monroy, Sarah Gerson, and Sabine Hunnius. “Statistics in motion: Does the infant motor system predict actions based on their transitional probability?” In: PsyArXiv, 2023.