Curriculum Vitae

Francesco Poli

☏ +44 7387222505
francesco.poli@mrc-cbu.cam.ac.uk
15 Chaucer Rd
Cambridge CB2 7EF, UK

◆ Professional History and Education

2024-ongoing	**Postdoctoral Researcher**, *MRC Cognition and Brain Sciences Unit* University of Cambridge, Cambridge, UK Advisor: Prof. Duncan Astle
2023-2024	**Postdoctoral Researcher**, *Donders Institute* Radboud University, Nijmegen, the Netherlands Advisor: Prof. Sabine Hunnius
2018-2023	**Ph.D. Candidate**, *Donders Institute* Radboud University, Nijmegen, the Netherlands Thesis title: *Developing models for learning and exploration* Ph.D. Awarded *Cum Laude* on 22/02/2024 Advisors: Prof. Sabine Hunnius & Prof. Rogier B. Mars
2022	**Visiting Ph.D. Student**, *University of Oxford* Wellcome Centre for Integrative Neuroimaging Project: Modelling reward learning with time-varying hidden Markov models Advisor: Prof. Jill O'Reilly
2021	**Visiting Ph.D. Student**, *Max Planck Institute for Human Development* Berlin, Germany Project: Developing gaze-contingent eye-tracking paradigms for infant research Advisor: Prof. Azzurra Ruggeri
2016-2018	**Master's Degree**, *University of Padua* Cognitive Neuroscience and Clinical Neuropsychology Project: The development of implicit Theory of Mind (*University of St. Andrews*) Final Grade: 110/110 cum laude Thesis Advisors: Profs. C. Krupenye, M. Carpenter, J. Call, & F. Simion
2018	**Visiting Student**, *Max Planck Institute for Evolutionary Anthropology* Leipzig, Germany

	Project: Calibrating and testing great apes with eye-tracking techniques Advisor: Prof. Christopher Krupenye
2015-2018	**Research Assistant**, *University of Milano-Bicocca* Behavioural Insight Bicocca (BIB) Lab Projects: Communicative and logical abilities in problem-solving Advisor: Prof. Laura Macchi

2013-2016	**Bachelor's Degree**, *University of Milano-Bicocca* Psychological Sciences and Techniques Final Grade: 110/110 cum laude Thesis Advisor: Prof. Laura Macchi

◆ Publications

1. Li, Y. L., **Poli, F.**, & Ruggeri, A. (2025). Active control over exploration improves memory in toddlers. *Proceedings B*, *292*(2039), 20242555. https://doi.org/10.1098/rspb.2024.2555
2. Macchi, L., **Poli, F.**, & Caravona, L. (2025). Dissociable Effects of Verbalization on Solving Insight and Non-Insight Problems. *Journal of Intelligence*, *13*(3), 36. https://doi.org/10.3390/jintelligence13030036
3. **Poli, F.**, Meyer, M., Mars, R. B., & Hunnius, S. (2025). Exploration in 4-year-old children is guided by learning progress and novelty. *Child Development*, *96*(1), 192-202. https://doi.org/10.1111/cdev.14158
4. **Poli, F.,** Koolen, M., Velazquez-Vargas, C.A., Ramos-Sanchez, J., Meyer, M., Mars, R.B., Rommelse, N., Hunnius, S. (2024) Autistic traits foster effective curiosity-driven exploration. *PLoS Computational Biology*. 20(10): e1012453. https://doi.org/10.1371/journal.pcbi.1012453
5. **Poli, F.**, Li, Y. L., Naidu, P., Mars, R. B., Hunnius, S., & Ruggeri, A. (2024). Toddlers strategically adapt their information search. *nature communications*, *15*(1), 5780. https://doi.org/10.1038/s41467-024-48855-4
6. **Poli, F.**, Ghilardi, T., Bersee, J. H., Mars, R. B., & Hunnius, S. (2024). Infants Track Environmental Volatility to Optimize Their Learning. In *Proceedings of the Annual Meeting of the Cognitive Science Society* (Vol. 46). https://escholarship.org/uc/item/68r1k5gh
7. **Poli, F.**, O'Reilly, J. X., Mars, R. B., & Hunnius, S. (2024). Curiosity and the dynamics of optimal exploration. *Trends in Cognitive Sciences*. https://doi.org/10.1016/j.tics.2024.02.001
8. **Poli, F.**, Koolen, M., Vélazquez, C., Ramos-Sanchez, J., Meyer, M., Mars, R. B., Rommelse, N., Hunnius, S. (2023). Autistic traits foster effective curiosity-driven exploration. *PsyArXiv*. https://doi.org/10.31234/osf.io/jnfdw
9. Ghilardi, T., **Poli, F.**, Meyer, M., Colizoli, O., & Hunnius, S. (2023). Early roots of information-seeking: Infants predict and generalize the value of information. *Elife preprint*. https://doi.org/10.31234/osf.io/pevq9
10. **Poli, F.**, Ghilardi, T., Beijers, R., de Weerth, C., Hinne, M., Mars, R. B., & Hunnius, S. (2023). Individual differences in processing speed and curiosity explain infant habituation and dishabituation performance. *Developmental Science*, e13460. https://doi.org/10.31234/osf.io/thszj
11. **Poli, F.**, Ghilardi, T., Mars, R. B., Hinne, M., & Hunnius, S. (2023). Eight-Month-Old Infants Meta-Learn by Downweighting Irrelevant Evidence. *Open Mind*, 1-15.

12. Meyer, M., van Schaik, J. E., **Poli, F.**, & Hunnius, S. (2023). How infant-directed actions enhance infants' attention, learning, and exploration: Evidence from EEG and computational modeling. *Developmental Science*, 26(1), e13259.
13. **Poli, F.**, Meyer, M., Mars, R. B., & Hunnius, S. (2022). Contributions of expected learning progress and perceptual novelty to curiosity-driven exploration. *Cognition*, *225*, 105119.
14. **Poli, F.**, Serino, G., Mars, R.B., & Hunnius, S. (2020). Infants tailor their attention to maximize learning. *Science Advances*, 6(39).
15. Bagassi, M., Salerni, N., Castoldi, V., Sala, V., Caravona, L., **Poli, F.**, & Macchi, L. (2020). Improving Children's Logical and Mathematical Performance via a Pragmatic Approach. *Frontiers in Education,* 5(54).
16. Macchi, L., Caravona, L., **Poli, F.**, Bagassi, M., & Franchella, M. A. (2020). Speak your mind and I will make it right: the case of "selection task". *Journal of Cognitive Psychology*, 1-15.
17. Caravona, L., Macchi, L., **Poli, F.**, Vezzoli, M., Franchella, M. A., & Bagassi, M. (2019). How to Get Rid of the Belief Bias: Boosting Analytical Thinking via Pragmatics. *Europe's Journal of Psychology*, 15(3), 595.

◆ In Preparation

1. **Poli, F.,** Oldham, S., Bullmore, E., Vertes, P., Akarca, D., Astle, D. (in prep.) Right time, right place: Heterochronicity shapes brain network formation.
2. **Poli, F.** (under review) How infants learn and explore: from behavior to computations.
3. **Poli, F.**, Ghilardi, T., Bersee, J., Mars, R. B., Hunnius, S. (under review) Volatility-driven learning in human infants.
4. **Poli, F.**, Popescu, S. T., Marusic, J., Khoury, J. A. M., Hoffmann, M. (in prep.) Infants systematically explore their own body through self-touch.
5. **Poli, F.**, Liu, Y., Mellet, J., Mars, R. B., Hunnius, S., Rushworth, M., O'Reilly, J. (in prep.) Reward rates alter the balance between narrow and broad exploration in monkeys and humans.
6. Scatolin, S., **Poli, F.**, Mars, R. B., Hunnius, S., De Weerth, C., Beijers, R. (in prep.) Revisiting associations between infant cognitive functioning and maternal caregiving quality using eye-tracking and Bayesian cognitive modelling.
7. de Boer, E. R., **Poli, F.**, Meyer, M., Mars, R. B., & Hunnius, S. (2024). Infants' curiosity impacts cognitive capacity in early childhood. *OSF Preprint.* https://doi.org/10.31219/osf.io/r6m2u

◆ Preregistrations

1. van den Bosch, S., Meyer, M., Hunnius, S., & **Poli, F.** (2024, April 9). Is information gain rewarding for infants?. https://doi.org/10.17605/osf.io/a9mvd
2. Donkers, I., **Poli, F.**, Oosterman, J., Hunnius, S., Meyer, M., & Wiegand, I. (2024, February 1). Curiosity-driven exploration and learning in aging. https://doi.org/10.17605/osf.io/g2hfr
3. Krol, M., Ramos-Sanchez, J., Praat, A., Moiseenko, O., Fico, K., de Kloe, Y., … **Poli, F.** (2024, January 19). Changes in cognitive effort across infancy and early childhood. https://doi.org/10.17605/osf.io/vgqjt

◆ Grants and Scholarships

221'374 €	**NWO Rubicon Postdoctoral Fellowship 2024** To: **F. Poli** Unifying brain and cognitive development through network models
789'791 €	**NWO SSH Open Competition L 2023** Morality as a hyperparameter in social decision making: A new approach to studying an age-old problem To: R.B. Mars (Main applicant), I. Brazil, **F. Poli**, R. J. Blair
5'892 €	**Erasmus+ Staff mobility for teaching and training 2022** To: **F. Poli**
6'000 €	**INPS excellence scholarship 2015-2018** To: **F. Poli**

◆ Awards

10'000 $	**Glushko Dissertation Prize (Cognitive Science Society)** To: **F. Poli**

◆ Conference Talks and Symposia

Poli, F., Lewis, L.S. (2025) Comparing curiosity: Changes in information-seeking across development and evolution. **Symposium** at *Budapest CEU Conference on Cognitive Development 2025*: Budapest, Hungary.

Poli, F., Ghilardi, T., Bersee, J., Mars, R.B., Hunnius, S. (2024) Infants track environmental volatility to optimize their learning. **Oral presentation** at *CogSci 2024*, Rotterdam, the Netherlands.

Poli, F. (2024) Infant attention as precision-weighting of prediction errors. **Oral presentation** at *ICIS 2024:* Glasgow, Scotland.

Poli, F. Ghilardi, T., Bersee, J., Mars, R.B., Hunnius, S. (2024) Learning in uncertain worlds: The dynamics of infant brain and behaviour in response to change. **Symposium** at *ICIS 2024:* Glasgow, Scotland.

Poli, F., Ghilardi, T., Mars, R.B., Hunnius, S. (2023) Pupil dilation as a window onto infants' learning processes. **Oral presentation** at the *52nd annual meeting of the Jean Piaget Society*: Madrid, Spain.

Poli, F., Ghilardi, T. (2023) Learning how to explore: The developmental mechanisms of information-seeking. **Symposium** at *Budapest CEU Conference on Cognitive Development 2023*: Budapest, Hungary.

Poli, F., Li, Y., Naidu, P., Mars, R.B., Hunnius, S., Ruggeri, A. (2022) Infants are active and adaptive ecological learners: Evidence from a novel gaze-contingent search task**. Oral presentation** at *ICIS 2022:* Ottawa, Canada.

Poli, F., Mars, R.B., Hunnius, S. (2020) Infants track learning progress and allocate their attention based on it: an eye-tracking study. **Oral presentation** at the *Budapest CEU Conference on Cognitive Development 2020*: Budapest, Hungary.

◆ Invited Talks and Workshops

Department of Psychology, University of Gottingen (Germany). **Invited workshop**, host: Prof. Nivedita Mani (2024).

Max Plank Institute for Evolutionary Anthropology (Germany). **Invited workshop**, host: Prof. Hanna Dr. Pierre-Etienne Martin, Dr. Laura Lewis, and Prof. Hanna Schleihauf (2024)

Department of Psychology, New York University Abu Dhabi (United Arab Emirates). **Invited talk**, host: Dr. Stefania Vacaru (2024).

Department of Psychology, University of Milano-Bicocca (Italy). **Invited seminar**, host: Prof. Laura Macchi (2023).

Learning Adaptive Behaviour Lab, University of Ghent (Belgium). **Invited talk**, host: Prof. Tom Verguts (2023).

BabyDevLab, University of East London (United Kingdom). **Invited talk**, host: Prof. Sam Wass (2022).

◆ Teaching

04/2025	Eye-Tracking Workshop for Developmental Scientists DevStart **Workshop**, *Birkbeck University of London*
01/2025	Analyzing pupillometric data in R: A hands-on tutorial BCCCD pre-conference **Workshop**, *Central European University*
09/2024	Modelling Theories of Curiosity RTG Kick-Off **Workshop**, *University of Gottingen*
08/2024	Hands-On: Eye-Tracking with Python Bridging the Technological Gap **Workshop**, *Max Planck Institute*
01/2024	Python fundamentals for eye-tracking research BCCCD pre-conference **Workshop**, *Central European University*
2020-2021	Perception and Development **Frontal lectures and hands-on classes** (BSc), *Radboud University*
2019-2020	Brain and Cognition **Grading** (BSc), *Radboud University*
2019-2020	Introduction to Brain and Behaviour **Hands-on classes** (BSc), *Radboud University*
2019-2020	Action and Development **Frontal lectures and hands-on classes** (BSc), *Radboud University*

◆ Supervision

Ph.D. students

2024-2025	William Mills, implementing a python toolbox for generative network models
2022-2024	Jessica Ramos-Sanchez, investigating information-seeking with EEG
	Eline De Boer, investigating free play in toddlers

Master's students

2023	Jana Bersee, *University of Amsterdam* Infants' learning in stable and volatile environments: A pupillometry study
2022	Pravallika Naidu, *Max Planck Institute for Human Development* Investigating active learning in infants using a gaze-contingent paradigm
2022	Sofia Weidle Scatolin, *Radboud University* The effects of early environmental factors on infants' cognitive functioning
2022	Maran Koolen, *Radboud University* Curiosity-driven learning in the autism spectrum disorder
2019	Giulia Serino, *Radboud University* The cognitive mechanisms underlying statistical learning in infants and adults

◆ Programming Skills

I developed the following models and tools:

- **Hierarchical Bayesian models** to measure individual differences in infants' cognitive functioning (https://osf.io/zux9v/) [Python].
- **Reinforcement learning models** to measure learning, exploration, and sampling decisions (https://osf.io/h2prm/) [JAGS/R].
- **Information-theoretic models** to measure various forms of uncertainty (https://osf.io/a93qr/) [Python].
- **Generative network models** to simulate the development of the brain connectome across time (https://generative-network-models-toolbox.readthedocs.io/) [Python].
- **Gaze-contingent "Torchlight"** to allow infants to actively explore the screen controlling a torchlight with their eyes (https://osf.io/5y4tw) [Python].
- **DevStart** is an online guidebook to introduce students to cognitive science research methods and programming (https://tinyurl.com/devstarthome)

◆ Journal Peer Reviews

Nature Communications, Elife, Child Development, Developmental Science, Psychological Review, Topics In Cognitive Science, Open Mind.