Clara Rastelli

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After earning a joint PhD in Cognitive Science (University of Trento) and Experimental Medicine (University of Tübingen), I have recently begun my postdoctoral research with Prof. Dr. Markus Siegel. My research covers topics from perceptual learning to complex decision-making, with a particular focus on semantic cognition. I am especially interested in how these cognitive processes develop and function across the lifespan in both healthy and clinical populations. In my work, I investigate how humans explore semantic spaces, using neuroimaging (fMRI), computational cognitive modeling and machine learning approaches, including Large Language Models (LLMs).

Research Interests

Semantic Cognition • Decision Science • Learning and Memory • Creative Problem-Solving • Large Language Models • Reinforcement Learning

Education

Joint Ph.D.	**Cognitive Science**, University of Trento *(Home Co-tutelle)* **Experimental Medicine**, University of Tubingen *(Host Co-tutelle)*	Oct 2019 – Apr 2025

- *Thesis:* Cognitive and brain mechanisms of semantic control in creative problem-solving

M.Sc.	**Applied Cognitive Psychology**, University of Bologna	2013 – 2016
B.Sc.	**Psychology**, University of Bologna	2009 – 2013

Research Experience

Post-Doctoral Fellow, *Dept. of Neural Dynamics and Magnetoencephalography* — University of Tübingen, DE — Apr 2025
- Siegel Lab; hosted by Markus Siegel, MEG Center, HIH, Tübingen

Pre-Doctoral Fellow, *Dept. of Psychology and Cognitive Science* — University of Trento, IT — Jan 2018 – 2019
- Hosted by Nicola De Pisapia, Rovereto.

Visiting Research Fellow, *ARC, Centre of Excellence in Cognition and its Disorder* — Macquarie University, AUS — Oct 2016 – Jun 2017
- Hosted by William Forde Thompson, Sydney.

Teaching Experience

Lecturer, Theories and Application of Pattern Recognition (ING-INF/05) — University of Trento, IT — 2019 – 2021
- Module: Neural Network's simulations

Teaching Assistant, Neurophysiology (M-PSI/02) — University of Urbino, IT — 2014 – 2016

Publications

Neural dynamic of semantic control underlying generative storytelling — 2025
Rastelli, C., Greco, A., Gabriele, P., Christoph, B., De Pisapia, N.
Communications Biology 8(1),513. ↗

Immersive exposure to simulated visual hallucinations modulates high-level human cognition — 2025
Greco, A.,, *Rastelli, C.*, Ubaldi, A., Riva, G.)
Consciousness and Cognition, 128, 103808. ↗

Statistical learning of incidental perceptual regularities induces sensory conditioned cortical responses

Greco, A., D'Alessandro, M., Gallitto, G.,, *Rastelli, C.*, Braun, C., Caria, A.

[Biology, 13(8), 576.](#) ↗

2024

A Supervised Machine Learning Approach to Classify Brain Morphology of Professional Visual Artists versus Non-Artists

Grecucci, A.,, *Rastelli, C.*, Bacci, F., Melcher, D., De Pisapia, N.

[Sensors, 23(9), 4199.](#) ↗

2023

Balancing novelty and appropriateness leads to creative associations in children

Rastelli, C., Greco, A., De Pisapia, N., Finocchiaro, C.

[PNAS nexus, 1(5), pgac273.](#) ↗

2022

Simulated visual hallucinations in virtual reality enhance cognitive flexibility

*Rastelli, C.**, Greco, A.*, Kenett, Y. N., Finocchiaro, C., De Pisapia, N.

[Scientific reports, 12(1), 4027.](#) ↗

2022

Creativity as an information-based process

De Pisapia, N., *Rastelli, C.*

Rivista internazionale di Filosofia e Psicologia, 13(1), 1-18. ↗

2022

Increased entropic brain dynamics during DeepDream-induced altered perceptual phenomenology

Greco, A., Gallitto, G., D'Alessandro, M., , *Rastelli, C.*

[Entropy, 23(7), 839.](#) ↗

2021

The Art of Happiness: an explorative study of a contemplative program for subjective well-being.

Rastelli, C., Calabrese, L., Miller, C., Raffone, A., De Pisapia, N.

[Frontiers in Psychology, 12, 96.](#) ↗

2021

Revealing the role of divergent thinking and fluid intelligence in children's semantic memory organization

Rastelli, C., Greco, A., Finocchiaro, C.

[Journal of Intelligence, 8(4), 43.](#) ↗

2021

Looking for the Kennformen of the Italian verb paradigm. An experimental study

Bertinetto, P. M., Finocchiaro, C., , *Rastelli, C.*

Acta Linguistica Academica, 67(2), 219-246 ↗

2020

Conference Poster

Rastelli, C., Greco A., Finocchiaro, C., De Pisapia N., Christoph Braun. Cognitive and neural mechanism underlying creative story generation. Poster presentation at the *Systems Neuroscience Symposium 2023.* Tübingen. Sep, 14-15 2023.

2023

Greco A., *Rastelli, C.*, De Pisapia N. Finocchiaro, C. Children efficiently regulate semantic exploration to generate creative word associations. Oral presentation at the *Complexity and Cognition, CompCog23* Rovereto. Feb 1 2023.

2023

Rastelli, C., Greco, A., De Pisapia N. Finocchiaro, C. Exploring semantic search strategies underlying creative word association in children. Oral presentation at the *18th Annual Conference of the Italian Association of Cognitive Sciences, AISC*. Rovereto. Dec 17 2022.

2022

Rastelli, C., Greco, A., Kenett, Y.N., Finocchiaro, C. De Pisapia N. Deepdream Altered Perceptual Phenomenology in VR facilitates Cognitive Flexibility. Society for the Neuroscience of Creativity, SfNC. May 12 2022.

2022

Rastelli, C., Greco, N., Braun, C., Finocchiaro, C., De Pisapia, N. MEG alpha power decodes creative vs non-creative stories. Poster presented at the *25th annual meeting of the Organization for Human Brain Mapping (OHBM).* June 24 2021. 2021

Rastelli, C., Greco A., Finocchiaro C., De Pisapia N. Computational assessments of creativity in short stories. *International Conference on Computational Creativity, ICCC'20.* Doctoral consortium section. Virtual Conference. Sep 11 2020. 2020

Rastelli, C., Finocchiaro C. Semantic networks predict differences in fluid intelligence and divergent thinking among children. Oral presentation at the *European Collaborative Creativity Conference (EC3).* Marconi Institute for Creativity, University of Bologna, June 20-22 2019. 2019

Greco, A., Gallitto, G., **Rastelli, C.**. Brain dynamics during induced altered perceptual phenomenology revealed by multiscale permutation entropy and functional connectivity networks. Conference presented at the *1st annual meeting of the Conference on Complex Systems (CCS).* Trento, Italy. 2019

Rastelli, C., Greco, A., Finocchiaro, C. Small-world properties of creative semantic networks in low and high fluid intelligence children. Conference presented at the *1st annual meeting of the Conference on Complex Systems (CCS).* Trento, Italy. 2019

Greco, A., **Rastelli, C.** On Naturalized Creativity: a complex hypothesis on the neural correlates of creative process. Conference presented at the *44th annual meeting of Australasian Society for Experimental Psychology.* Newcastle, NSW, Australia. 2017

Rastelli, C., Greco, A. Clinical implication of reversing maladaptive plasticity. Conference presented at the *44th annual meeting of Australasian Society for Experimental Psychology.* Newcastle, NSW, Australia. 2017

Language and Computational Skills

Natural Languages:

- Italian (Native)
- English (C1)
- German (A1)

Programming Languages:

- R
- Python
- Matlab
- LaTeX

ML and NLP software:

- SciKit-Learn
- PyTorch
- HuggingFace
- Spacy

Neuroimaging lab-experience:

- fMRI
- EEG
- MEG

Neuroimaging software:

- Fieldtrip
- SPM
- FSL
- FreeSurfer

Stimuli presentation software:

- OpenSesame
- Psychopy
- Psychotoolbox

Funding

University of Trento, Department of Psychology and Cognitive Science
Financed by the Italian Government

Doctorate Scolarship
2019/2022
50, 000€

University of Tubingen, MEG Center
Financed by Erasmus trainee mobility program

Erasmus+ Research
2020/2021
12, 000€

University of Trento, Dep. of Psychology and Cognitive Science
Founded by the "CollegaMENTI" project

Research Scholarship
2018
5, 000€