Henri Vandendriessche

Originally trained as an engineer in electronics and computer sciences, I dedicated 7 years to working at the Department d'Etudes Cognitives of the Ecole Normale Supérieure in Paris, overseeing the experimental platform. After several years devoted to collaborative projects, I decided to work on my own project. I commenced my Ph.D. in April 2021, with my research focus converging at the crossroads of affective value-based decision making, computational psychiatry and mental health.

I defended my Ph.D. entitled "Reinforcement Learning biases in general and clinical population" in June 2024 at the Laboratoire des Neurosciences Cognitives et Computationnelles (LNC2) as a part of the Human Reinforcement Learning lab under the supervision of Stefano Palminteri.

Currently, I'm a postdoctoral fellow in the Computational Group Dynamics Collaboration Unit (COGNAC) working with Wataru Toyokawa in the Center for Brain Science (CBS) in RIKEN (Tokyo, Japan). I'm using reinforcement learning models applied to humans to study individual or group decision-making and their biases, more specifically in the situation of consensus reaching.

Work Experience

01/2025 - Now **Postdoctoral fellow with Dr Wataru Toyokawa - Computational Group Dynamics Collaboration Unit (COGNAC), Center for Brain Science (CBS), RIKEN, Wako, Japan.**

- Using agent-based modelling, multi-agent RL simulations and human online experiment, my projects explore inter-individual differences and group dynamics in social contexts and more specifically in consensus decision-making.

07/2024 - 31/2024 **Postdoctoral fellow with Stefano Palminteri - Laboratoire de Neurosciences Cognitives et Computationnelles (LNC2), Ecole normale supérieure (ENS-PSL) Paris, France.**

- Building on my Ph.D. projects and their limitations, I laid the foundations for an ambitious project that should continue over the next few years. We are planning to recruit a larger sample of psychiatric populations to broader the scope of our investigation and assess the transnosographic potential of our behavioral and computational tool. Focusing on several pathologies (Depression, Bipolar disorder, Schizophrenia, Addiction, OCD), our sample would allow us a transnosographic approach that will help us overcome the difficulty of isolating specific psychiatric symptoms. The second goal of this study is methodological: it consists in testing how results obtained in clinical populations compare to those obtained in non-clinical population whose sub-pathological propensity to express psychiatric traits is assessed. This will allow us to assess whether patients and the online subjects group present similar relationship between behavioral and computational parameters (and if yes, along which symptomatological axis).

2021 - 2024 **Ph.D. in Cognitive Science: Reinforcement Learning biases in general and clinical population - supervisor: Stefano Palminteri - Laboratoire de Neurosciences Cognitives et Computationnelles (LNC2), Ecole normale supérieure (ENS-PSL) Paris, France.**

My Ph.D. focused in the study of cognitive biases at play in value based decision making in different tasks and populations.

- The first project was an investigation of the so-called negativity bias in patients suffering from major depressive disorder. The clinical population was compared to a matched control group in a reinforcement learning task. Both behavioral and computational results revealed a context dependence in the clinical population, showing a general tendency toward a negativity bias. This bias manifested with a stronger learning rate for punishments than for rewards (Vandendriessche & Demmou 2022).
- My second study focuses on designing and exploring a new multi-outcomes two-arm bandit task that involves a random reward selection process. This study aims to investigate how individuals process multiple outcomes for a single option and how they learn despite the random reward selection process. The study includes online and in-lab behavioral experiments, eye-tracking, and computational modeling.
- Another aspect of my Ph.D. involves a collaborative modelling investigation with Maëva L'Hôtellier (research engineer in the team) on an online follow-up of my first project. The main objective is to better characterize the task and the effect obtained in the Vandendriessche & Demmou 2022 paper. This approach allows us to implement a more robust modeling strategy with more complex models, thanks to a bigger and more naturalistic sample.

2019 - 2021 **Research engineer: Laboratoire de Neuropsychologie Interventionnelle (NPI), (ENS, Paris. AP-HP Henri Mondor Hospital, Créteil)**

- Designing and implementing IT solutions for various lab projects in close collaboration with the NPI project manager.
- Collaborating with NPI researchers, I contributed to the development of cognitive tests for clinical research on neurodegenerative conditions, including Parkinson's and Huntington's diseases.
- Providing technical support, conducting data analysis, managing data, and performing statistical analysis for clinical research projects at the French National Reference Center for Huntington's diseases.
- Managing and implementing cognitive tests in collaboration with external stakeholders of the lab.

2014 - 2019 **Engineer manager of a scientific platform: Département d'Études Cognitives (ENS, Paris)**

- Overseeing the management of the experimental platform for adult testing at the Département d'Études Cognitives.
- Conducting technical maintenance of the platform, which includes overseeing the upkeep of computers, software, Eyetrackers, EEG, and other associated equipment.
- Providing engineering support, which encompasses tasks such as data collection, experiment design, and analysis, particularly for strategic and innovative projects within the department.
- Organizing and facilitating meetings to coordinate the management of the experimental platform, bringing together researchers from each lab for fair and effective collaboration and communication.
- Developing and maintaining dedicated IT solutions aimed at optimizing the operational efficiency of the experimental platform.
- Supervision of an intern for the development of plug-and-play scripts, using pylink (EyeLink python library), to enable eye-tracking with experiments coded in python.

Education

2021 - 2024 **PhD in Cognitive Science**: Ecole Normale Superieure (ENS), Paris Sciences et Lettres (PSL), (Paris, France)

- Thesis title: Reinforcement Learning biases in general and clinical population
- PhD scholarship from IRESP (National institute of public health research)

2014 - 2016 **Bachelor of Philosophy** (distant learning); Université de Reims Champagne-Ardenne.

2011 - 2013 **Master of Science: electronics and computer science engineering**; Institut Supérieur de l'Électronique et du Numérique ISEN, (Lille, France). Focus on digital technologies and applications (telecommunication, analogic and digital electronics). Second year of master achieved at TU Dortmund (Germany).

2007 - 2011 **Bachelor of Science: engineering science**; Institut Supérieur de l'Électronique et du Numérique ISEN France, Lille. Focus in mathematics, electronics, physics.

Teachings

2023 (March) **Co-organisation of a workshop**; Basic reinforcement learning modeling techniques at the international Symposium of "Biology of Behavior Change" (Kyoto, Japan).

2021 - 2023 **Teaching Assistant: PROG 101 Introduction to Programming for Cognitive scientists**; Cogmaster, Master of Cognitive Sciences, ENS-PSL & EHESS (40 hrs/year).

Teaching Python to master students with no prior experience in programming

2021 - 2023 **Student mentoring**; Supervision of two students for the bibliography and research teaching unit of the Paris-Est Creteil University's Biology and Health master's program. Based on three articles, selected by myself around a same topic, students had to write a research synthesis, where they discuss state of the art, scientific progess and limits of the different papers and of the scientific field in general.

2022 **Introduction to human reinforcement-learning**: Cogmaster, Master of Cognitive Sciences, ENS-PSL & EHESS (2 hrs)

Publications

- **Vandendriessche, H.**, Demmou, A., Bavard, S., Yadak, J., Lemogne, C., Mauras, T., & Palminteri, S. (2023). **Contextual influence of reinforcement learning performance of depression: Evidence for a negativity bias?** Psychological Medicine, 1-11. doi:10.1017/S0033291722001593
- Chambon, V., Théro, H., Vidal, M., **Vandendriessche, H.**, Haggard, P. & Palminteri S. **Information about action outcomes differentially affects learning from self-determined versus imposed choices.** Nat Hum Behav 4, 1067–1079 (2020). https://doi.org/10.1038/s41562-020-0919-5
- **Vandendriessche, H.**, Palminteri, S. **Neurocognitive biases from the lab to real life** Commun Biol 6, 158 (2023). https://doi.org/10.1038/s42003-023-04544-4
- Gharbi-Meliani, A., Husson, F., **Vandendriessche, H**. et al. **Identification of high likelihood of dementia in population-based surveys using unsupervised clustering: a longitudinal analysis.** Alz Res Therapy 15, 209 (2023). https://doi.org/10.1186/s13195-023-01357-9
- Marine Lunven, Karen Hernandez Dominguez, Katia Youssov, Jennifer Hamet Bagnou, Rafika Fliss, **Henri Vandendriessche**, Blanche Bapst, Graça Morgado, Philippe Remy, Robin Schubert, Ralf Reilmann, Monica Busse, David Craufurd, Renaud Massart, Anne Rosser, Anne-Catherine Bachoud-Lévi, **A new approach to digitized cognitive monitoring: validity of the SelfCog in Huntington's disease**, Brain Communications, Volume 5, Issue 2, 2023, fcad043, https://doi.org/10.1093/braincomms/fcad043
- Katia Youssov, Etienne Audureau, **Henri Vandendriessche**, Graca Morgado, Richard Layese, Cyril Goizet, Christophe Verny, Marie-Laure Bourhis, Anne-Catherine Bachoud-Lévi, **The burden of Huntington's disease: A prospective longitudinal study of patient/caregiver pairs**, Parkinsonism & Related Disorders, Volume 103, 2022, Pages 77-84, ISSN 1353-8020, https://doi.org/10.1016/j.parkreldis.2022.08.023.

Posters

2024 (October)	Society for Neuroeconomics (SNE), Cascais, Portugal.
2022 (July)	Forum of the Federation of European Neuroscience Societies (FENS), Paris, France.
2018 (June)	Symposium on Biology of Decision-Making (SBDM), Paris, France
2017 (March)	Cosyne, Salt lake city, USA

Skills

Codding	• Python, R, Javascript & PHP + html/css, Matlab • Linux (Debian, Ubuntu), bash, Database (MySQL,MariaDB)
Techniques	• Reinforcement Learning modelling, Eyetracking (Eyelink), Online experiment (Prolific), statistical modelling.
Languages	• **French**: Native speaker • **English**: Full professional proficiency • **German**: Professional working proficiency • **Spanish**: Elementary preficiency
Soft skills	• Coordinating the organization of bi-monthly lab meetings for the eight teams of the LNC2, which include both internal team members and external speakers.

Other Projects

2023	Consulting missions for Kwit, an app for quitting smoking. Data analysis strategy and literature review.
2023 (August)	Observation internship in the closed unit of the psychiatric university hospital departement at Saint-Anne Hospital (Paris).
2023 (July)	Attending the computational Summer school on Modeling Social and collective behavior COSMOS.
2021	Scientific mediation in schools with the association Declics, that promotes dialogue between researchers and high school students to create interest in the construction of knowledge.

Hobbies

Music:	Former member of the KKO Klaxophone Klezmer Orchestra (Clarinet)
Volunteering:	Former prison visitor, member of the ANVP (French association of prison visitors)
Video games:	I play a lot -_-