Henri Vandendriessche

I am currently pursuing a Ph.D. at the Laboratoire des Neurosciences Cognitives et Computationnelles (LNC2) as a part of the Human Reinforcement Learning lab under the supervision of Stefano Palminteri. Originally trained as an engineer in electronics and computer sciences, I dedicated 7 years to working as an engineer at the Department d'Etudes Cognitives of the Ecole Normale Supérieure in Paris, overseeing the experimental platform.

After several years devoted to collaborative projects, where I was involved in helping setting up complex experiments and implementing technical solutions and data analysis, I decided it was time to work on my own project. I commenced my Ph.D. studies in April 2021, with my research focus converging at the crossroads of affective value-based decision making, computational psychiatry and mental health as well as behavioral economics.

Work Experience

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

2021 - 2024 **PhD 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 PhD 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.
- My last project - that is beyond the reasonnable scope my PhD - is probably the most ambitious and the more important to me. The first project of my PhD left some limitations that are hard to overcome with traditionnal computational psychiatric experiment settings. The population of patients (undergoing major depressive disorder) presented several comorbidities and were taking very different medications, making it hard to discriminate which different clinical traits contribute to our behavioral and computational specificities. Furthermore, with only one clinical population, we could not assess the specificity of the effect and whether or not similar biases are found on other pathologies. For this project, 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. To do so, our experimental tool, will be also deployed in a large online sample, which will fill up the same

questionnaires as our psychiatric patients. 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).

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

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 among high school students with the associationDeclics. An associaton that promotes dialogue between researchers and high school students to create interest in the construction of knowledge.

Hobbies

Music: Member of the KKO Klaxophone Klezmer Orchestra (Clarinet)

Volunteering: Prison visitor, member of the ANVP (French association of prison visitors)

Video games: I play a lot -_-