MASTER 2 Fundamental and Clinical Neurosciences

Internship proposal 2022-2023

(internship from January to June 2023)

Host laboratory: Lyon Neuroscience Research Centre, Centre Hospitalier Le Vinatier, 95 Boulevard Pinel, 69500 Bron

**Host team : PsyR2 https://www.crnl.fr/en/equipe/psyr2 , Centre Hospitalier Le Vinatier, 95 Boulevard Pinel, 69500 Bron**

Internship supervisors : Jacqueline Scholl, CRCN INSERM, Jacquie.scholl@gmail.com

Project title : Susceptibility to peer feedback and its relationship to emotional resilience

Project Description: Young people worry about what their friends think about them. This makes teenagers and young adults especially vulnerable to episodes of teasing and bullying. These experiences are powerful and can lead to the development of depression, a common disorder with debilitating consequences for the teenager. However, not everyone experiencing teasing or bullying more widely develops depression. Many are able to ignore negative comments from peers and "bounce back" from these experiences. This ability called resilience is an intriguing yet under-studied area of research. This study proposes to investigate the cognitive basis of susceptibility to peer feedback and its association with emotional resilience in young people using computational modelling. Specifically, we plan to develop a novel task to be administered online, which mimics real-life experiences of positive, ambiguous and malicious social feedback and fit a cognitive model which tests what factors are associated with resilience. We propose that the ability to accurately judge and learn from social feedback is key. In other words, being able to accurately make judgments about what peers say (e.g., judge if a comment is too "mean") and be able to ignore these biaseswhilst judging one's abilities and competency – is associated with increased self-esteem emotional resilience following experiences of bullying. To test this hypothesis, we will develop and then administer a **social learning task online** to a large sample of young people (16-21 years). We will measure participants' real life individual differences self-esteem, bullying experiences, depression and resilience using questionnaires. We will then link computational measures of task behaviour and real-life individual differences using a computational psychiatry approach. These findings would have important implications for our understanding of the mechanisms by which differences in susceptibility to peer feedback are associated with increased emotional resilience vs. vulnerability to depression following experiences of bullying.

Role of the student and skills learnt

Please send your proposal to marion.richard@univ-lyon1.fr for publication on the Master of Neuroscience website.
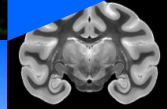
The student will design and pilot the social learning task online, building on previous work and early piloting data in the lab. To validate the task design and analyse individual differences in task behaviour, the student will learn to build cognitive computational models (in R and Stan). These models will include reinforcement learning models and Bayesian learning models. *Prior experience with coding is not essential, but interest in learning to code is crucial.*

Data collection will follow a 'discovery sample' and 'replication sample' approach. This has the advantage that it combines data driven hypothesis generation with great statistical rigour. The student will collect an initial 'discovery sample' (n=400) online. Task behaviour and self-reported real-life individual differences will be linked through regression models that the student will develop. The student will then write up the results of this discovery sample and use it to deposit a pre-registration (on osf.io). Time permitting, the student will finally collect a 'replication sample' (n=400) and analyse and write-up the results.

3-5 recent publications :

Scholl J., Trier H.A., Rushworth MFS, Kolling N (in press) Should I stick with it or move on? The effect of apathy and compulsivity on planning and stopping in sequential decision making. PLoS Biology

Scholl, J., Kolling, N., Nelissen, N., Browning, M., Rushworth, M. F., & Harmer, C. J. (2017). Beyond negative valence: 2-week administration of a serotonergic antidepressant enhances both reward and effort learning signals. PLoS biology, 15(2), e2000756

Scholl, J., Kolling, N., Nelissen, N., Wittmann, M. K., Harmer, C. J., & Rushworth, M. F. (2015). The good, the bad, and the irrelevant: neural mechanisms of learning real and hypothetical rewards and effort. Journal of Neuroscience, 35(32), 11233-11251

Scholl, J., & Klein-Flügge, M. (2017). Understanding psychiatric disease by capturing ecologically relevant features of learning and decision-making. Behavioural brain research.

Trudel, N., Scholl, J., Klein-Flügge, M. C., Fouragnan, E., Tankelevitch, L., Wittmann, M. K., & Rushworth, M. F. (2021). Polarity of uncertainty representation during exploration and exploitation in ventromedial prefrontal cortex. Nature human behaviour, 5(1), 83-98.

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