Reinforcement Learning Models of Compulsivity, Depression and Anxiety

Attempts to link brain data, or behavioural assays thereof, to discrete psychiatric diagnostic categories have been met with limited success in small-scale, case-control studies. An alternative approach to understanding the neurobiological substrates of psychiatric ill-health is to set aside diagnostic categories and instead use biologically-relevant data (e.g. cognitive tasks) to determine which symptoms cluster together. In other words, to reverse engineer meaningful symptom classifications/dimensions. This talk will start by describing traditional case control designs that were used to identify a putative neurocognitive model of obsessive-compulsive disorder (OCD). Specifically, data suggesting that failures in ‘goal-directed control’ lead to overreliance on the brain’s habit system in OCD. Next, the limitations of these findings will be discussed in the context of diagnostic specificity, heterogeneity and comorbidity. I propose that large-datasets will be essential to address these fundamental issues in psychiatry research and web-based crowdsourcing of cognitive experiments is a viable methodology. To this end, I will present cognitive and clinical data from ~3000 subjects, across three experiments, which provide evidence that failures in goal-directed control are a trans-diagnostic psychiatric dimension.