

Seminar Speaker : Jun Seok Lee - Ecole Normale Supérieure, Paris

Seminar Date and Time: Monday 22nd of January at 11am

Location: CRNL, Neurocampus, Lecture Theatre

Title: (Mal-)adaptive tuning of learning and choice variability under unexpected uncertainty: links to compulsivity.

Abstract:

Human value-based decisions are notably variable under uncertainty. This variability is known to arise from two distinct sources: variable choices aimed at exploring available options and imprecise learning of option values due to limited cognitive resources. However, whether these two sources of decision variability are tuned to their specific costs and benefits remains unclear. To address this question, we compared the effects of expected and unexpected uncertainty on decision-making in the same reinforcement learning task. Across two large behavioral datasets, we found that humans choose more variably between options but simultaneously learn less imprecisely their values in response to unexpected uncertainty. Using simulations of learning agents, we demonstrate that these opposite adjustments reflect adaptive tuning of exploration and learning precision to the structure of uncertainty. Together, these findings indicate that humans regulate not only how much they explore uncertain options but also how precisely they learn the values of these options.

Furthermore, we found that compulsivity is associated with increased choice variability but no change in learning variability. This effect of compulsivity on the 'trait' component of choice variability is observed even in conditions where this source of behavioral variability yields no cognitive benefits. These findings indicate that while individuals are adaptive to uncertainty, compulsive individuals make maladaptive choices under uncertainty, but do not hold degraded representations of option values.