

Neural signals in human Foraging and dynamic Choice

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February 9 (Tuesday), 2016,

13:30-14:30

1st Floor Seminar Room, BSI East Building

Abstract

During the past three decades we have learnt much about how the brain integrates evidence for perceptual and simple reward-based decisions. Furthermore, there are increasingly sophisticated biophysical models of reward based choice, i.e. of how, neurally, comparisons are made between two or more valuable concrete options. We know however, surprisingly little about how other kinds of ecologically relevant decisions are made, despite their great relevance to allow appropriate behavioural flexibility. Whereas a lot of decision neuroscience has focused on using simple economic models in order to understand evaluation between options, a large and rich literature exists in ecology research, trying to understand how animals optimize their behaviour within different environments. For this they have to track a variety of environmental parameters such as average reward rates or risk pressure. In my talk I will discuss some of my recent studies trying to understand different kinds of decision processes, inspired by distinctions seen to be essential for ecological behaviours such as patch-leaving and risk sensitive foraging.

Neurally, I will highlight novel insights that can be gleaned from such an approach about the potential functions of several prefrontal brain regions, particularly focused on dorsal and perigenual anterior cingulate cortex, but also ventromedial and frontal polar cortex. Overall, mine and other studies suggests a ubiquity of comparison processes in cortex, with key differences in what is compared in an a particular region and how the comparison is implemented.

I will furthermore discuss more broadly, how environmental changes can shape evaluative contexts and lead to network changes that allow for multiple evaluative frameworks to co-exist and interact with each other to enable flexible and adaptive behaviours in many different environments

Host: Hiro. Nakahara Lab for Integrated Theoretical Neuroscience