

Cognition, Decision-making and Social function

October 7 (Tuesday), 2014

13:30 – 16:40

1F Seminar Room, BSI Central Building

13:30-13:40 Opening

13:40-14:30

**Micro-modules based on resting-state functional connectivity
to reconstruct brain networks**

Prof. Seiki Konishi

Juntendo University

14:30-15:20

Implicit Behavioral/Social Contagion

Prof. Katsumi Watanabe

The University of Tokyo

15:20-15:50 Break

15:50-16:40

**Neural Basis of Intrinsic Motivation, Self-Determination, and
Opportunity Equality**

Prof. Kenji Matsumoto

Tamagawa University Brain Science Institute

Host:

Hiro. Nakahara Lab for Integrated Theoretical Neuroscience

Micro-modules based on resting-state functional connectivity to reconstruct brain networks

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Recent advancement of resting-state functional connectivity magnetic resonance imaging (MRI) has provided a method for drawing boundaries of brain areas. However, it remains to be elucidated how the parcellated areas in the association cortex relate to the spatial extent of the brain activation which ought to reflect a functional unit in the neural network supporting that particular function. To address this issue, we first mapped boundaries and 2 adjacent activations in the human inferior frontal cortex, and then examined the spatial relationship between the boundaries and the 2 activations. The boundaries mapped with high-resolution functional magnetic resonance imaging revealed a collection of micromodules, the size of which was approximately only 12 mm on average, much smaller than the Brodmann areas. Each of the 2 activations associated with 2 functions, response inhibition and feedback processing, was smaller in size than the micromodules. By comparing the spatial patterns between the boundaries and the 2 activations, it was revealed that the brain activations were less likely to be located on the boundaries. These results suggest the functional relevance of the areas in the association cortex delineated by the boundary mapping method based on resting-state functional connectivity MRI.

Host:

Hiro. Nakahara Lab for Integrated Theoretical Neuroscience

Implicit Behavioral/Social Contagion

Prof. Katsumi Watanabe

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People tend to implicitly assimilate each other. In this talk, I present a set of studies on implicit behavioral contagion. The first sets of experiments concern speed contagion, where people tended to modify their movement timing according to others' movements even when the observed and the to-be-executed movements are unrelated. The results suggest that behavioral tempo may be contagious; the speed of others' movements may automatically influence the timing of movement execution by the observer. In the second sets of experiments, we examined how the presence of another person and the history of interaction with the person would influence body movements by measuring involuntary body movements while people tried to keep their posture still. The results suggest that body movements tended to be mirrored implicitly and the short-term history of interpersonal interaction may affect this tendency. Possible implications are also to be discussed.

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Hiro. Nakahara Lab for Integrated Theoretical Neuroscience

Neural Basis of Intrinsic Motivation, Self-Determination, and Opportunity Equality

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Valuation of goals underlies motivation. When intrinsically motivated to do a task, the goal is simply engaging in the task itself, and is not an external reward based on task performance. Redirection of intrinsic motivation towards an extrinsic reward undermines the original intrinsic motivation, making simple task engagement less rewarding. This psychological phenomenon is called the “undermining effect.” I will introduce our fMRI study designed to uncover the neural basis of this effect. Self-determination theory, a leading explanation for intrinsic motivation, states that the undermining effect occurs when one’s sense of self-determination for a given task is lost. I will also introduce our fMRI study that addresses the neural mechanism that facilitates performance and motivation through self-determined choices. The sense of self-determination may depend on the number of options, as theoretical economists have proposed that freedom to choose is characterized quantitatively as the sheer number of available options. Indeed, the number of available choices has been reported to be correlated with activity in a reward-related brain region. Finally, I will introduce our recent fMRI study that addresses the effect comparing one’s number of available options with that of others has on motivation.

Host:

Hiro. Nakahara Lab for Integrated Theoretical Neuroscience