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Neuropharmacology of risk taking

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Abstract

Risk modulates the value of outcomes and choice options. In this lecture, I will review how accounts from economics, psychology and finance capture the relation between risk and value. These accounts differ in whether they explicitly define risk (e.g., as variance of outcomes) or infer risk attitude from the curvature of utility functions. However, the different models often make similar predictions about choices and it is therefore of potential interest to compare them at the neural level. I will also cover research on how risk affects the dopamine system, a major value processing system of the brain. I will focus on dopamine release in rodents, activity of single dopamine neurons in non-human primates, and BOLD activity of target regions of dopamine neurons in humans. Specifically, in keeping with its effects on value, risk enhances stimulus-related phasic dopamine activity and phasic dopamine release in risk seeking animals but reduces activity and release in risk averse animals. Moreover, risk increases tonic activity of dopamine neurons before the usual time of the outcome. The human striatum and lateral prefrontal cortex show similar phasic and tonic signals. Finally, I will present research showing that blocking dopamine D2/D3 receptor antagonists reduces risk aversion, reinforcing the notion that the dopamine system plays a central role for risk valuation.

Date: **5 December, 2018 (Wednesday)**
Time: **10:30~12:00**
Venue: **Faculty of Business Administration, E22-2011**

A Short Biography of Prof. Philippe TOBLER

Having studied experimental psychology (Bern) with a focus on the oculomotor system for PhD (Cambridge), Prof. TOBLER investigated reward processing by single dopamine neurons. His postdoctoral work (Cambridge, London, Oxford) employed functional magnetic resonance imaging in humans to shed light on how the brain processes economic reward parameters, such as risk, delay and probability. Currently (Zurich), he is interested in the neural basis of reward, learning, economic decision making and social behaviour. He studies both group effects and individual differences with a variety of methods. Examples of brain structures he is particularly interested in include the dopaminergic midbrain, the striatum and the prefrontal cortex.

ALL ARE WELCOME!