

Bocconi

de Finetti Risk Seminars

Milano Lectures on the Mathematical Theory of Economics and Finance

Organized by

Department of Decision Sciences – Università Bocconi, Milano

and

F. Enriques Department of Mathematics – Università di Milano

March 27th, 2019

Time: 18.00 Room: 3-E4-SR03

Università Bocconi

A mathematical model of learning reward uncertainty in the brain

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To maximise their chances for survival, humans and animals need to base their decisions not only on the average consequences of chosen actions, but also on the variability of the rewards resulting from these actions. For example, when one's food reserves are depleted, one should prefer to forage in an area where food is guaranteed, rather than an area where the amount of food is higher on average but variable, thus avoiding the risk of starvation. To implement such policies, the brain needs to be able to learn about variability of rewards resulting from taking different actions. This talk will present a simple mathematical model describing how such learning may be implemented in the brain. The model suggests how the information about reward uncertainty is used by the brain to make decisions that not only maximize expected rewards but also take risks into account. The model is consistent with a wide range of experimental data from neuroscience. The talk will also include a discussion of the relationship between the model and the probability weighting functions from the prospect theory.

Light Reception at 17.30