If you will join the class, **please send us an email as soon as possible:**
stefano.palminteri@gmail.com and mael.lebreton@googlemail.com
AND lhotelliermaeva@gmail.com
Please note that the class is going to start:
September the 17h *(Tuesdays - 2pm-4pm; Salle Théodule Ribot 29 Rue d'Ulm)*
Moodle code SC0M140 (moodle.u-paris.fr) (not updated yet)

Learning and decision-making

École Normale Supérieure, Département d'Etudes Cognitives
Instructors:
Stefano Palminteri (stefano.palminteri@ens.fr)
Maël Lebreton (mael.lebreton@googlemail.com)
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Level: M1, M2
Major(s): Psychology, Modelling, Social Sciences, Neuroscience
Semestre: S1, **ECTS :** 4
Number of hours: 24h (CM)
Prerequisites: none
Code: COGSCI 313

1a. Course description (English)

This course will provide an overview of the field of behavioural and neural economics, which studies the computational processes, involved in value-based decision-making as well as their neural implementation. We particularly focus on how decision variables, such as to the expected utility and its components (eg value, probability, risk and delay) are calculated and represented in the brain. The anchoring of decision-making into cognitive et computational processes allow correcting normative prespictions thanks to behavioural observations. The anchoring of decision-making processes to neural substrates, makes it possible to understand the deviations of rationality in the light of neurobiological constraints and to redefine the classic (descriptive) economic models in the form of neuro-computational (mechanistic) models.

1b. Description du cours (Français)

Ce cours donnera un aperçu du domaine de l'économie comportementale et neuronale, qui étudie les processus de calcul, impliqués dans la prise de décision en valua-base ainsi que leur mise en œuvre neuronale. Nous nous concentrons particulièrement sur la façon dont les variables de décision, telles que l'utilité

attendue et ses composantes (valeur, probabilité, risque et retard) sont calculées et représentées dans le cerveau. L'ancrage de la prise de décision dans les processus cognitifs et computationnels permet de corriger les présupposés normatifs grâce à des obervations comportementales. L'ancrage des processus décisionnels sur des substrats neuronaux, permet de comprendre les déviations de la rationalité à la lumière des contraintes neurobiologiques et de redéfinir les modèles économiques classiques (descriptifs) sous forme de modèles neuroinformatiques (mécanistes).

2. Learning objectives

On successful completion of this course, students will be able to critically read articles (understanding what kind of modeling approach and neuroscientific method is used), to perform efficient literature review and design experiments in the field of behavioural and neural economics.

- Understanding behavioural economics models and results
- Understanding neuro-economics models and results

3. Assessment

- weekly homework assignments (50%): I envision 1 assignment per class (except the first one), but this is subject to change depending on whether we need to adjust the schedule (see below);
- a group presentation (50%), whose subject will be proposed by the instructors

4. Textbook and readings

1. Neuroeconomics: Decision Making and the Brain. *Edited by:Paul W. Glimcher and Ernst Fehr*
2. Decision Neuroscience: An Integrative Perspective. *Edited by: Jean-Claude Dreher Leon Tremblay*
3. An Introduction to Behavioral Economics. *Nick Wilkinson , Matthias Klaes.*

5. Table of matters

Epistemological and methodological foundations

· The Epistemological Foundations of Decision-making research
· Experimental methods in Economics and Game Theory
· Experimental methods in Cognitive Neuroscience and Neurophysiology
· Designing and Testing Computational Models
· Computational Models of Decision Making in Psychology and Behavioral Economics

Neuro-computational models of simple economic choice

· The Computation of Stimulus Values in Simple Choice

- From Experienced Utility to Decision Utility
- Multistage Valuation Signals and Common Neural Currencies

Modulation of the utility function(s)

- Valuation for risky, uncertain and ambiguous options
- Prospect Theory and the Brain
- Valuation, Inter-temporal Choice, and Self-Control
- Integrating Benefits and Costs in Decision Making
- Context-Dependent Valuation and Choice

Perceptual decision-making

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Repeated choices and learning

- Value Learning through Reinforcement: Models
- Value Learning through Reinforcement: Brain
- Multiple Systems for Value Learning
- The Experience-Description Gap

Metacognition

-

Economic choices in social contexts

- Social Preferences and the Brain
- Strategic interactions, normative and cognitive bases

Class hours to teacher: SP: 12h; MLe: 12h: MLh: 20 minutes each class

6. Course policies

Attendance. Regular attendance of, and punctual arrival at lectures are crucial to succeed in this course, and they are mandatory for all students registered for credit. This is important both for your individual success in this course, and for every other students' success. Keep in mind in particular that, by arriving late, you are jeopardizing your own but also your classmates' education by disrupting the flow of lectures. Practically speaking, if you are registered for credit then your grade will suffer from poor attendance or recurrent late arrivals. If you are not registered for credit, the same policy applies, though with different consequences: poor attendance or recurrent late arrivals may force us to ask you to stop auditing the course.

Participation. You are strongly encouraged to participate in lectures. This means asking deep and challenging questions, but also asking simple questions, asking for clarification, saying “I’m just not getting this, please explain it in some new way” or “I’m lost, can you remind me why we’re talking about this?” You can ask questions in French at any time.

Contacting the instructor and TA via Schoology is the best way to contact us when you have brief questions.

Homework. All homework assignments are to be handed on time via Schoology. You can write up your answers in French or in English (NB you will not lose points for grammatical mistakes!).

Academic honesty policy Cheating will not be tolerated and may cost you your grade as well as have deeper repercussions in your academic career. The following is a non-exhaustive list of examples of what counts as cheating in this course: (i) signing on the attendance sheet without attending the class (e.g. signing and leaving, or signing for someone else); (ii) copying the homework write-up or the exam answers of another student, with or without that student’s knowledge; (iii) copying elements of your solutions of exercises from sources in the literature without giving them due credit; (iv) using the same homework to validate two courses.

Laptop/phone policy: no laptops except in some classes with in-class activities.
Participation. Strongly encouraged, in French or English.