

# Introduction to Neuroeconomics: How the Brain Makes Decisions

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**Contents**

**1 About this course** **3**

**2 Resources** **4**

**3 Introduction to Neuroeconomics** **5**

    3.1 Origin of Neuroeconomics . . . . . 5

    3.2 Neuroeconomics and Decision-making Theory . . . . . 5

# **1 About this course**

The intersection of economics, psychology, and neuroscience, form the unified discipline of Neuroeconomics, with the ultimate goal of creating a single, general theory of human decision making.

Neuroeconomics provides a framework to deeply understand how, and why we make decisions; neurobiological mechanisms of decision making, decisions under risk, trust, and cooperation.

## 2 Resources

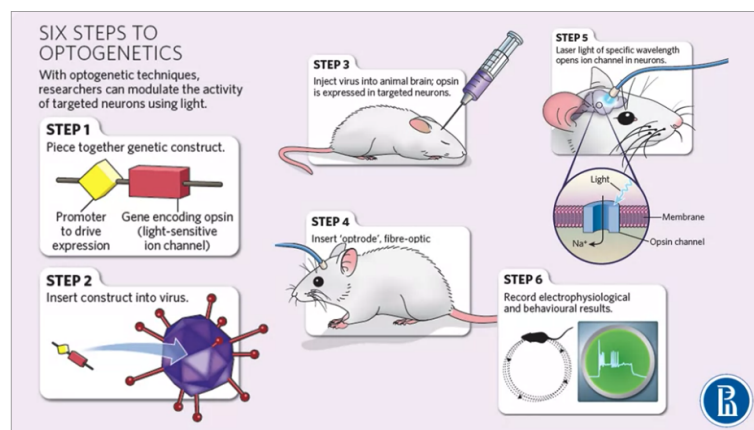
- **Coursera: Intro to Neuroeconomics How the Brain Makes Decisions** taught by professor, and Head of psychology department Vasily Klucharev, at HSE University (<https://www.coursera.org/learn/neuroeconomics>)

## 3 Introduction to Neuroeconomics

### 3.1 Origin of Neuroeconomics

In 2002, Princeton University psychologist Daniel Kahneman PhD, was awarded the Nobel Memorial Prize for his work in applying psychological insights to economic theory, particularly in areas of judgment, and decision making under uncertainty. Vernon L. Smith was also a winner of the award, and also the creator of the field of experimental economics. Smith established lab experiments as a tool in empirical economic analysis, especially in the study of alternative market mechanisms.

- **Paul Glimcher**, the god father of Neuroeconomics.
- **Core Neuroeconomics** or the **neuroscience of decision making** that studies processes connecting sensation and action, by revealing the neurobiological mechanisms by which decisions are made.
- **Extended Neuroeconomics** is a multi-disciplinary field that studies decision making by integrating evolutionary, neurobiological, and social science approaches.
- **Optogenetics**: Researchers can modulate activity of targeted neurons using light.



### 3.2 Neuroeconomics and Decision-making Theory

Decision theory is the theory about making decisions... duh. Examples:

- Do I see a red, or green traffic light (sensory system)
- Shall I bring the umbrella (depends on knowledge)

- A committee must make a decision, but its members have different opinions (How to overcome disagreements)

These **decisions are based on certain assumptions**. The three main assumptions of decision theory.

1. There are options to choose from.
2. We choose in a non-random way
3. Our choices are goal-directed activities/behaviour

**Ultimately, decision theory is concerned with goal-directed behaviour in the presence of options.**

Two types of Decision making theory:

- **Normative decision-making theory:** theory about how decisions **should** be made
- **Descriptive decision-making theory:** theory about how decision are **actually** made; tries to model our actual behaviour.