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# Behavioural and Emotional Economics

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## Lecturers

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Chair in Macroeconomics

## Date

Deadline for turning in the thesis: Presumably at the beginning of December 2010

Seminar: Presumably at the beginning of January 2011

## Target Audience

The seminar is for Master and diploma students in economics or business administration.

## Registration

To register for the seminar, please send an e-mail to Michael Graber (Graber@uni-mainz.de). Besides your student ID number and field of study, you should enclose a list of two preferred topics. The registration deadline is 25/06/2010. A list of admitted students (including a waiting list) will be posted on our webpage by 02/07/2010. Participation will have to be confirmed by 09/07/2010. Students whose seminar participation has been confirmed, but who subsequently withdraw from seminar participation will fail the course.

## Contact

If you have further questions regarding the content and the organization of the seminar, please contact Michael Graber (Graber@uni-mainz.de).



## 1 Questions in Decision Theory

What is meant by the term rationality? What does the utility function measure, and specifically, does it have anything to do with notions such as well-being or even happiness? How do rules and analogies, two very fundamental reasoning techniques, feature into the beliefs that agents form? Answers to these and other questions are provided by Gilboa (2010). The student is expected to discuss them by providing an overview of the literature dealing with similar questions.

## 2 Objective Expected Utility Theory

Von Neumann and Morgenstern (vNM) developed the technology for describing preferences over objective uncertainty. By objective uncertainty we mean situations where all individuals will agree on the probabilities associated with each outcome. Since the vNM result is used in most economics models, it is useful to study the conditions under which preference relations can be described by the well known utility concept as well as its shortcomings. In particular, the Ellsberg paradox and the Allais paradox are considered as a violation of the expected utility concept. The student is therefore expected to present the standard theory of utility under objective uncertainty as presented in textbooks like Mas-Colell, Whinston, and Green (1995) or Kreps (1988) as well as the two mentioned paradoxes.

## 3 The Value of Useless Information

There may be situations where one does not want to observe the final outcome and instead prefers to remain in doubt. To illustrate the idea think of a simple example: Suppose you have the choice to take a test which tells you if you have a deadly disease. For understandable reasons, some individuals prefer to remain in doubt and never want to find out if they are going to die soon. More formally, individuals who take the test have a preference for an early resolution of uncertainty, while individuals who refuse to take the test have a preference for never observing the actual outcome. The standard vNM utility model is not able to take this aspect of human behaviour into account. The extension discussed above goes back to Alaoui (2009) and the student is expected to present a proof of a simplified version of the model.

## 4 Subjective Expected Utility Theory

There is not much doubt that the vNM representation, with objective probabilities only, is not suitable for all applications in economics of which we can think. Hence a natural extension is to focus on situations where an individual's assessment of the situation depends on subjective probabilities. Setups exist where all uncertainty is subjective, but this comes at a cost - obtaining the representation is quite a hard task. Therefore we focus on a simplification due to Anscombe-Aumann, which allows us to obtain both a state-dependent utility representation as well as a subjective utility representation. The former can be easily derived with the same axioms used in the vNM utility model, while for the latter we have to make use of another axiom. The student is expected to present the Anscombe-Aumann utility model, which can be found in Kreps (1988), chapter 7.

## 5 Choice under Ambiguity Aversion<sup>1</sup>

According to expected (objective/subjective) utility theory, an individual bases his decision on one objective/subjective probability distribution over outcomes. We now suppose that an individual comes equipped with a set of probability distributions. The idea is that  $p$  is one possible assessment of the situation and  $p'$  is another one and so on, and the individual is not able to attach relative likelihoods to these probability distributions. If the individual is pessimistic about nature, i.e. the individual might believe that nature chooses the probability distribution to make each choice as bad as possible, then the individual maximizes the minima of utilities. This idea is based on Gilboa and Schmeidler (1989) and the student is expected to present a simplified version of this result.

To illustrate the idea, think of the following example: Suppose a coin is being tossed and you assess that the probability of heads,  $p$ , is greater than 0.25 and the probability of tails,  $1-p$ , is greater than 0.4. You are offered 2 bets. Bet 1: \$3 if heads. Bet 2: \$2 if tails and your utility function is linear in money. Which bet would you prefer?<sup>2</sup> Another application is due to Dow and Werlang (1992), where they consider buyers and sellers of an asset and show that maxmin utility can lead to situations where both sellers and buyers do not want to engage in any trading activities on the market.

<sup>1</sup>This topic is meant for students with a strong background in mathematics.

<sup>2</sup>You would prefer Bet 2: Since  $\min_{0.25 \leq p \leq 0.6} 0p + 2(1-p) > \min_{0.25 \leq p \leq 0.6} 3p + 0(1-p)$ .

## 6 Temptation and Commitment

Choices can also be viewed as something being made over many stages. At some initial stage some alternatives are ruled out and at a later stage an option is chosen from the remaining alternatives. Of course if an individual is absolutely certain about what their preferences will be when they finally come to select an lottery, then there is no point ruling a few things out earlier. They may as well just select the thing they will like best at the initial stage and be done with it. However, if they are not certain what their preferences will be in the future they might prefer to wait and not rule everything out at the initial stage. That is they may have a preference for flexibility. On the other hand, there may be a benefit from ruling out certain tempting options at the initial choice stage, because individuals may give into temptations. This idea of commitment and temptation goes back to Gul and Pesendorfer (2001) and the student is expected to present their paper.

## 7 A Dual-Self Model of Impulse Control

Fudenberg and Levine (2006) develop a dual-self model which can explain several empirical regularities, e.g. time inconsistency<sup>3</sup>. In their model decisions are viewed as a game between a sequence of short-run impulsive selves and a long run patient self. In a standard consumption-savings setup for instance, the short-run selves want to consume all available wealth, while the long-run selves wants to smooth consumption over time by accumulating assets. The theoretical model and its implications for economic theory is to be worked out by the student.

## 8 The somatic marker hypothesis

Examining patients with cerebral lesions has shown that emotions are an integral part of decision making. Patients with dysfunctional regions of the brain normally in charge of emotional responses but otherwise standard brain functions (e.g. standard IQ) were repeatedly shown to be unable to make standard everyday decisions. The students are expected to work out the implications for economic decision theory.

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<sup>3</sup>Suppose you were offered 100\$ today or 105\$ tomorrow, you will probably choose to receive 100\$ today. However, when you are offered the same relative quantities a year from now and a year and a day from now, you will probably choose to get the greater quantity a year and a day from now.

## **8.1 Emotion, Decision Making and the orbitofrontal Cortex**

Bechara, Damasio, and Damasio (2000)

## **8.2 A neural theory of economic decision**

Bechara and Damasio (2005)

# **9 Brain activity and decisions**

The following topics deal with the neurotransmitter dopamine and its role for the decision making process. The students are expected to present the following works and to work out the implications for economic decision theory.

## **9.1 Dopamine, Reward Prediction Error, and Economics**

Caplin and Dean (2008a)

## **9.2 Economic Insights from “Neuroeconomic” Data**

Caplin and Dean (2008b)

## **9.3 Dopamine Enhances Expectation of Pleasure in Humans**

Sharot, Shiner, Brown, Fan, and Dolan (2009)

## **9.4 Two types of dopamine neuron distinctly convey positive and negative motivational signals**

Matsumoto and Hikosaka (2009)

# **10 Emotions and Experiments**

## **10.1 Emotions in Tournaments**

Krakerl (2008) introduce a concept of emotions that emerge when agents compare their own performance with the performances of other agents. Assuming heterogeneity among the agents the interplay of emotions and incentives is analyzed within the framework of

rank-order tournaments, which are frequently used in practice. Tournaments seem to be an appropriate starting point for this concept because a tournament induces incentives by making agents compare themselves with their opponents. Krakel (2008) identifies certain conditions under which the principal benefits from emotional agents. Furthermore, the concept of emotions is used to explain the puzzling findings on the oversupply of effort in experimental tournaments. The student is expected to present this paper and related literature.

## 10.2 Dynamic Choice, Independence and Emotions

From the viewpoint of the independence axiom of expected utility theory, an interesting empirical dynamic choice problem involves the presence of a "global risk," that is, a chance of losing everything whichever safe or risky option is chosen. In this experimental study of Hopfensitz and vanWindén (2008), participants have to allocate real money between a safe and a risky project. Treatment variable is the particular decision stage at which a global risk is resolved: (i) before the investment decision; (ii) after the investment decision, but before the resolution of the decision risk; (iii) after the resolution of the decision risk. The baseline treatment is without global risk. Our goal is to investigate the isolation effect and the principle of timing independence under the different timing options of the global risk. In addition, we examine the role played by anticipated and experienced emotions in the choice problem. Main findings are a violation of the isolation effect, and support for the principle of timing independence. Although behavior across the different global risk cases shows similarities, we observe clear differences in people's affective responses. This may be responsible for the conflicting results observed in earlier experiments. Dependent on the timing of the global risk different combinations of anticipated and experienced emotions influence decision making. The student is expected to present this paper and related literature.

## 10.3 Social Ties and Coordination on Negative Reciprocity: The Role of Affect

This is an experimental study of negative reciprocity in the case of multiple reciprocators. Reuben and vanWindén (2008) use a three-player power-to-take game where a proposer is matched with two responders. Reuben and vanWindén (2008) compare a treatment in which responders are anonymous to each other (strangers) with one in which responders know each other from outside the lab (friends). We focus on the responders' decisions, beliefs, and emotions. Our main findings are (1) friends punish the proposer more than strangers, (2) friends are more likely to coordinate their punishment (without commu-

nication), and (3) both punishment and coordination are explained by the responders emotional reactions. The student is expected to present this paper and related literature.

## 10.4 Fear and the Response to Terrorism

Becker and Rubinstein (2010) offer a rational model of fear and provides empirical evidence to support it. They use micro data taken from Israel during the "Al-Aqsa" Intifada to test the implications of our theory in the context of terror. The perceived extreme consequences of low probability events generate emotions of fear. These fears are endogenously determined by the economic benefits to overcome them. Using a unique micro data set constructed from the Israeli CBS Expenditure Surveys combined with daily terror incidents against Israeli targets we find that the overall impact of suicide attacks on the usage of services and goods that were subject to terror attacks is solely due to the reactions of moderate users, and has no effect on frequent users. A closer look at the underlying mechanism points to the importance of peoples' cognitive abilities and their exposure to mass media. Educated people are less likely to reduce their usage of bus services in response to terror strikes than their less educated counterparts. Using the natural variation in the exposure of the Israeli population to newspapers we find the impact of suicide attacks to be larger during regular media coverage days and negligible when followed by a holiday or weekend.

## 11 Theory of Addiction

Bernheim and Rangel (2004) propose a model of addiction based on three premises: (i) use among addicts is frequently a mistake; (ii) experience sensitizes an individual to environmental cues that trigger mistaken usage; (iii) addicts understand and manage their susceptibilities. We argue that these premises find support in evidence from psychology, neuroscience, and clinical practice. The model is tractable and generates a plausible mapping between behavior and the characteristics of the user, substance, and environment. It accounts for a number of important patterns associated with addiction, gives rise to a clear welfare standard, and has novel implications for policy. The student is expected to present this paper and related literature.

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