

Evolving utility functions: can evolutionary biology explain why homo is not economicus?

General Information

Location: The workshop will take place in Balliol College (Broad Street, OX1 3BJ), in the Old Common Room (OCR). The OCR can be found in Balliol's Front Quad, please ask for directions at the lodge. Coffee and Tea will be served in the OCR during the conference (see programme), lunch will be had in the Dining Hall.

Conference Dinner: We will go for an informal conference dinner in Lebanese Restaurant Al-Shami (25 Walton Crescent, OX1 2JG) on the evening of the first night of the conference (May 29). Please contact Gijsbert Werner (gijsbert.werner@zoo.ox.ac.uk) if you want to join, and to indicate any dietary requirements by May 21 latest.

Accommodation: All speakers that have requested accommodation should have received information explaining where they will be housed. Please contact Gijsbert Werner for more information.

Programme: For the full programme, see the attached document. Full abstracts are listed below.

Speakers and Participants

Organisers:

- Gijsbert Werner (gijsbert.werner@zoo.ox.ac.uk), Department of Zoology
- Rick van der Ploeg, Department of Economics
- Stuart West, Department of Zoology
- Alex Teytelboym, Department of Economics
- Claire el Mouden, Blavatnik School of Government

Speakers

- [Max Burton-Chewell](#), Université de Lausanne
- [Balázs Szentes](#), London School of Economics
- [Melissa Bateson](#), University of Newcastle
- [Nichola Raihani](#), University College London
- [Tobias Kalenscher](#), Heinrich Heine University Düsseldorf
- [Cristophe Heintz](#), Central European University Budapest
- [Willemien Kets](#), University of Oxford
- [Jean-Baptiste Andre](#), CNRS Paris
- [Laura Fortunato](#), University of Oxford

Abstracts

Session 1

Gijsbert Werner, Department of Zoology, Oxford

Introduction: why might an evolutionary perspective be useful for (behavioural) economics?

Economists have classically assumed that in general people carefully calculate benefits and select the most profitable course action. However, scientists have uncovered many cases where people act inconsistently, irrationally or against their own interest. Yet, while we have an ever-increasing list of such economic biases, we seem to lack a general understanding of when and why they occur. What may seem an economic bias from a contemporary economics perspective, can however be rational in the light of evolution. In this introduction, I will briefly explore if evolutionary biology can help in providing such understanding. Could treating our preferences (utility) as a potentially evolving trait, help us better understand contemporary economic behaviour? What are challenges and obstacles? I will give a brief overview of potential directions of research to help drive an evolutionary understanding of economic decision making.

Max Burton-Chewell, Department of Economics, Lausanne

Title TB

Abstract TBC

Session 2

On the Biological Foundation of Risk Preferences

Balázs Szentes, Department of Economics, London School of Economics

This paper considers a continuous-time biological model in which the growth rate of a population is determined by the risk attitude of its individuals. We consider choices over lotteries which determine the number of offspring and involve both idiosyncratic and aggregate risks. We distinguish between two types of aggregate risk: environmental shocks and natural disasters. Environmental shocks influence the death and birth rates, while natural disasters result in instantaneous drops in population size. Our main result is a utility representation of the evolutionary optimal behavior. The utility is additively separable in the two types of aggregate risk. The term involving environmental shocks is a von Neumann-Morgenstern utility which induces the same attitude towards both idiosyncratic and aggregate risk. The term involving disasters cannot be interpreted as an expected utility maximization and induces less tolerance towards aggregate risk.

Why are there individual differences in risk preferences? Insights from behavioural ecology.

Melissa Bateson, Centre for Behaviour and Evolution and Institute of Neuroscience, Newcastle

A behavioural decision can be considered risky if it has higher associated outcome variance compared with an alternative decision. Animals often show preferences between two foraging options with the same mean reward but different degrees of risk (i.e. variability) in the reward. Such risk preferences vary both within and between individuals. In my talk I will briefly describe the kinds of models that behavioural ecologists have used to understand this variability in decision making. I will review the mixed attempts to test these models that have largely centred around manipulations of energy budget. Next, I will describe recent data that we have collected on individual differences in risk preferences in European starlings. We studied a cohort birds in which we had previously measured developmental erythrocyte telomere attrition, an established integrative biomarker of biological ageing. We measured the adult birds' preferences when choosing between a fixed amount of food and a variable amount with an equal mean. After controlling for change in body weight during the experiment (a proxy for energy budget), we found that birds that had undergone greater developmental telomere attrition were more risk averse as adults than were those whose telomeres had shortened less as nestlings. Developmental telomere attrition was a better predictor of adult risk preference than either juvenile telomere length or early-life food supply and begging effort. Our longitudinal study thus demonstrates that biological ageing, as measured via developmental telomere attrition, is an important source of lasting differences in adult risk preferences. I discuss whether, and if so how, these results can be understood using current optimality models of risk-sensitivity.

Session 3

Behavioural and neural basis of inequity aversion in rats

Tobias Kalenscher, Institute of Experimental Psychology, Heinrich Heine University Düsseldorf

Inequity aversion is a behavioral, motivational and/or emotional response to an unfair reward distribution, given equal efforts to obtain rewards. Disadvantageous inequity aversion can be caused by a reward distribution that leaves the decision-maker worse off than a partner, advantageous inequity aversion can result from a reward distribution in which the decision-maker is better off than a partner. Both types of inequity aversion have been shown in humans and non-human primates, but it remains elusive if they evolved earlier in the phylogenetic history. In my talk, I will provide evidence that rats show disadvantageous and advantageous inequity aversion. I will argue that the rats' social preferences are most likely the consequence of social reinforcement learning in which social signals emitted by the conspecifics shape the rats' preferences for equal reward outcomes. I will furthermore present data suggesting that the integrity of basolateral amygdala is necessary for developing mutual reward preferences – the presumed motive underlying advantageous inequity aversion.

Homo-economicus is dead, long live homo-economicus

Christophe Heintz, Department of Cognitive Science, Central European University, Hungary

While behavioural economics has been presenting its results as refutations of the validity of the homo-economicus model, the very same model is used in evolutionary approaches to understanding human as well as non-human behaviour. We can reconcile these two trends of research by interpreting the results of the former as providing information about the proximal mechanisms of behaviour; and the latter as providing information about ultimate functions. But in doing this a difficulty arises: Departures from the prediction of a homo-economicus model can be interpreted in two different ways, with no unambiguous way to choose between them. On the one hand,

departures from the homo-economicus model can be interpreted as a cognitive bias and theorised as the signature of a heuristic; but they can also, on the other hand, be interpreted as evidence of some further constraints that were not taken into account so far (e.g. consequences of a choice on long-term payoff, error management, minimization of cognitive cost, etc). The choice between these explanatory strategies eventually depends on whether the notion of utility refers to inclusive fitness, to whatever is being maximized by a behaviour, or to the psychological motivations that lead to the formation of intentions. I would illustrate how it is possible to navigate between these interpretations to better describe the (ultimate) function of choice and behaviour, and the (proximate) cognitive mechanisms. I would take the study of prosociality as a case study.

Session 4

The biological contract theory of human cooperation

Jean-Baptiste André, Evolution and Social Cognition, Ecole Normale Supérieure, France

I will argue (i) that human cooperation is sustained by an evolved ability to enter into contracts with others, enforced by the need to maintain a good reputation, (ii) that the existence of contracts constitutes the key difference between genuine reciprocal cooperation and other forms of cooperation, and (iii) that the adaptive function of our sense of fairness is to calculate, and respect these contracts. I will then show that this view of cooperation (i) explains the most important properties of our sense of fairness such as our intuition that people should be rewarded in function of their efforts and talent, (ii) resolves apparent moral paradoxes such as the fact that fairness often consists in refusing the consequences of power-struggle, and (iii) can account for the variability of human cooperation across societies.

The effects of group identity, competition, and inter-group relationship on human cooperation: initial results from a case study in a historic Italian city

Laura Fortunato, School of Anthropology, University of Oxford

Adam Kenny, University of Oxford

Does competition increase in-group cooperation, or decrease out-group cooperation? Does the level of cooperation differ when individuals are faced with members of a rival vs. neutral out-group? The contradasystem in the town of Siena, Italy, provides a real-world setting to address these and related questions. The system has been in existence since the medieval period. Members of the 17 contrade participate in year-round activities and rituals, identifying strongly with their in-group. The contrade compete in two horse races held in the summer months, called palio, characterised by intense competition. Inter-group relationships vary: some pairs of contrade are neutral competitors, whereas other pairs are designated allies or rivals. Using lab-in-the-field measures, we assessed the effects of group identity, competition, and inter-group relationship on cooperation. The results reveal a limited effect of competition, with stronger effects of group identity and inter-group relationship. These findings will be discussed in the context of the literature on the evolution of cooperation, and against the ethnographic background for Siena and its contrada system.

Session 5

Paranoia: when and why might people have biased utility functions?

Nichola Raihani, Experimental Psychology, UCL

Humans are arguably unique in the animal kingdom in being able to understand that other individuals have intentions and also to some extent, to predict what these might be. Nevertheless, because inferences about the beliefs and goals of others are often made in highly ambiguous scenarios, there is much scope for variation and error in intention attribution. One way in which variation in intention attribution might manifest is as paranoid thinking. Paranoia is the most common presenting symptom of psychosis but is also distributed throughout the general population to varying degrees of intensity, including among people without any clear psychiatric or neurological difficulties. Paranoia can be defined as an exaggerated tendency to believe that others intend to cause the person harm. Implicit in this definition is the idea that paranoia results in biased estimations of other people's utility functions in social interactions. We argue here that paranoid thinking might be understood as the adaptive output of a psychological system geared towards detecting coalitional threat. I outline our conceptual framework for thinking about paranoia in evolutionary terms, as well as selected experiments that show that paranoid attributions about the intentions of others are labile and increase in response to experimentally-induced social threat. As well as affecting how we perceive others, I will show that paranoia also affects our social preferences (utility functions) towards them, biasing towards reduced cooperation and increased punishment in social interactions. Evolved responses to social threat therefore have the ability to affect both our own utility functions – and how we infer the utility functions of other people.

Title to follow

Willemien Kets, Department of Economics, Oxford

Abstract to follow