

SOE 2: Social Systems I

Time: Monday 10:00–11:15

Location: GÖR 226

SOE 2.1 Mon 10:00 GÖR 226

How smoking became uncool: clustered marginalization of minorities during social transitions — ●JONATHAN F. DONGES^{1,2}, CARL-FRIEDRICH SCHLEUSSNER^{1,3}, DENIS A. ENGEMANN⁴, and ANDERS LEVERMANN¹ — ¹Potsdam Institute for Climate Impact Research, Potsdam, Germany — ²Stockholm Resilience Centre, Stockholm, Sweden — ³Climate Analytics, Berlin, Germany — ⁴Cognitive Neuroimaging Unit, CEA DRF/I2BM, INSERM, Université Paris-Sud, Université Paris-Saclay, NeuroSpin center, Gif/Yvette, France

Large-scale transitions in societies are associated with both individual behavioural change and restructuring of the social network. These two factors have often been considered independently, yet recent advances in social network research challenge this view. Here we show that empirically observed societal marginalization and clustering of minorities emerge naturally during social transitions in a co-evolutionary adaptive network model. This is achieved by explicitly considering the interplay between individual interaction and a dynamic network structure in behavioural selection. We exemplify this mechanism by simulating how smoking behaviour and the network structure are re-configured by changing social norms. Our results are consistent with empirical findings: The prevalence of smoking was reduced, remaining smokers were preferentially connected among each other and formed increasingly marginalized clusters. We show that self-amplifying feedbacks between individual behaviour and dynamic restructuring of the network are the main drivers of the transition.

SOE 2.2 Mon 10:15 GÖR 226

Opinion Dynamics by Learning from Social Feedback — ●SVEN BANISCH and ECKEHARD OLBRICH — Max Planck Institute for Mathematics in the Sciences, Inselstrasse 22, D-04103 Leipzig, Germany

We explore a new mechanism to explain polarization phenomena in opinion dynamics. The model is based on the idea that agents evaluate alternative views on the basis of the social feedback obtained on expressing them. A high support of the favored and therefore expressed opinion in the social environment is treated as a positive social feedback which reinforces the value associated to this opinion. In this paper we concentrate on the model with dyadic communication and encounter probabilities defined by an unweighted, time-homogeneous network. The model captures polarization dynamics more plausibly compared to bounded confidence opinion models and avoids extensive opinion flipping usually present in binary opinion dynamics. We perform systematic simulation experiments to understand the role of network connectivity for the emergence of polarization. We show that the likeliness that an agent adopts an extreme opinion is correlated with its position in the network, which may provide a possibility to assess the validity of the model by comparison with data from real world social network data.

SOE 2.3 Mon 10:30 GÖR 226

Influences of Norm Change and Bounded Rational Decision Making on Sustainability Transitions in a Two Sector Eco-

nomic Growth Model — ●JAKOB KOLB^{1,2} and JOBST HEITZIG¹ — ¹Potsdam Institut für Klimafolgenforschung, Potsdam — ²Humboldt Universität, Berlin

The Anthropocene is thought of as the age of the humans, where in the context of modeling, man-made processes and environmental dynamics can not be treated separately anymore. It is at the core of human agency, to keep the trajectory of this coupled system within the boundaries of a safe and just operating space, to ensure prosperity for future generations. In all the common business-as-usual scenarios of future economic development and GHG emissions, this is not likely to happen. Therefore, we aim at investigating sustainability transitions towards independence from fossil resources. The German Energiewende has proven that besides economic realities, social dynamics such as opinion spreading can play a significant role in the choice of energy sources and thereby resource dependence of a society. Consequently, we study the co-dependence and co-evolution of social, economic and resource dynamic processes. Since we are interested in qualitative behavior of this complex system such as transient behavior and phase transitions rather than quantitative predictions, we use a conceptual model for our studies. This model combines a resource-dependent two-sector economic growth model with heterogeneous households with Fast and Frugal heuristics for household decision making, as well as an adaptive network approach to norm change amongst households.

SOE 2.4 Mon 10:45 GÖR 226

XXIst century governance as a complex system — ●SARA ENCARNÇÃO^{1,2,6}, FERNANDO P. SANTOS^{2,6}, FRANCISCO C. SANTOS^{2,6}, VERED BLASS³, JUVAL PORTUGALI⁴, and JORGE M. PACHECO^{5,6} — ¹Interdisciplinary Centre of Social Sciences, CICS.NOVA, FCSH/UNL, Lisboa, Portugal — ²INESC-ID & IST, Universidade de Lisboa, Portugal — ³Faculty of Management, Tel Aviv University, Israel — ⁴ESLab, Tel Aviv University, Israel — ⁵Centro de Biologia Molecular e Ambiental and Departamento de Matemática e Aplicações, Universidade do Minho, Braga, Portugal — ⁶ATP-group, Lisboa, Portugal

The interaction between individuals within a society, organized in different sectors and with growing emphasis on civil institutions, is inherently complex and difficult to analyze. Here we employ tools from stochastic population dynamics and ecology to comprehend those interrelations, and to assess the impact of new policies on cross-sectorial dynamics and desirable societal changes. Our results evince the potential key-role that the civil sector has in enabling a paradigm shift in modern societies, especially if supported by the public sector. Interestingly, a later civil-private coordination may exempt that support. This dynamical perspective on inter-sectorial coordination can constitute a key asset for political actors concerned with the complex ecology of decisions that accrue to multi-level governance [Encarnação et al., R. Soc. Open Sci., in press].

15 min. break