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An important and significant trend in the field of complex systems, which is currently unfolding: the quest for a quantitative and predictive understanding of socio-economic phenomena, offering a rich and, to a certain extent, alternative path to traditional social sciences and economics. These efforts in understanding collective phenomena are carried out through novel ways in data analysis, numerical simulations, model building and statistical testing. This topical issue of ACS is devoted to reflect these trends. The themes covered in this issue range from the analysis of social interactions, agent based models, evolutionary mechanisms in societies, opinion formation, and econophysics. Some of the papers in this topical issue of ACS have been presented at the *European Conference on Complex Systems* (*ECCS*), held on September 12–16, 2011 in Vienna, and at the *Cultural and Opinion Dynamics*: *Modeling*, *Experiments and Challenges for the Future* (*CODYM*) workshop. Prior to publication in this issue, they have undergone considerable extensions and revisions.

With their variety of topics, concepts, and ideas, they underscore the important direction in applying complex systems theory to the social sciences.

The contribution *Social Dynamics in a Large-Scale Online Game* studies new ways of analysing social interactions and socio-dynamics in online game data. This data contains complete information about communication patterns, friendships and enemy relations, economic relations and aggressive behaviour of hundreds of thousands of players. The study explores ways to extract knowledge about human behaviour with the availability of a new generation of data, known as *multiplex networks*. These are data structures that contain information on various social networks linking the same set of nodes. Results on human mobility, social self-organization, and multiplex networks are presented.

The paper *Cognitive Network Structure*: *An Experimental Study* follows a similar line of research but uses software tools, specifically designed for experiments on small groups of people, who exchange private and public messages within a virtual community. In these experiments the subjects were asked to estimate their affinity with others under various conditions. The results indicate that public and private networks differ substantially.

The author of *A Connectionist ABM of Social Categorization Processes* introduces a new model to understand social complex phenomena, such as the self-categorization process or the formation of shared social categories. The dynamical model is based on two levels, an individual and a group level. The individual-level model represents a single agent and consists of a recurrent neural network able to store information. Whenever two agents meet, the 'listener agent' compares the information received from the 'speaker agent' with the stored one and potentially modifies his network. Inter-agent weights are updated as a function of the distance between internal beliefs of the listener and speaker. In this way agents form an adaptive, socially distributed network in which information and knowledge are distributed, and propagated according to the social ties. The model is tested in laboratory experiments.

In *The Dynamics and Evolutionary Stability of Cultures of Corruption*: *Theoretical and Empirical Analyses*, the author proposes a simple attempt to describe and analyse the culture of corruption within modern societies. A model inspired by evolutionary dynamics is presented where corrupted and non-corrupted individuals interact and compete for available social monetary resources. Among other results, it is shown that pervasive corruption is conditionally evolutionary stable and thus is empirically rare. Organized bureaucratic corruption in most cases is a quasi-stable equilibrium, representing the coexistence of corrupt and non-corrupt agents. Some results are partially confirmed on empirical corruption data from 89 countries.

In *Modeling Belief Change in a Population Using Explanatory Coherence*, the author proposes an original model inspired by Thagard's theory of 'explanatory coherence'. The model assumes that a population of agents interacts through a social network. In interaction events, agents suggest to their neighbours to adopt new beliefs. An agent has a higher chance of adopting a new belief if the new set of

beliefs improves a "coherence function". Agents can also drop beliefs. An opinion is defined as a function of the belief set, which evolves with the adoption and dropping of beliefs. The author investigates the model for various coherence functions, and measures the evolution of the degree of consensus in the population.

In *Properties of Social Network in an Internet Political Discussion Forum*, the authors study a two year time-span of a Polish political discussion forum on the internet. Entries in this forum were classified for their content, political inclinations of their authors and their emotional content. The authors study user activity and find Tsallis distributions for the number of posts. Further, they find a remarkable persistence of political sympathies in the contributors to the forum over time, and study the lead-lag relations of contributors and readers. In terms of distribution of political sympathy levels, they find that those of contributors and readers are similar. The study is complemented with an agent based model to better understand the statistics observed in the forum.

The paper *Fractal Markets Hypothesis and the Global Financial Crisis* is a work on econophysics, i.e. applications of methods used in physics on financial problems. The author argues that in situations where heterogeneous agents with a wide spread of investment horizons, the efficient market hypothesis loses its validity and should be complemented with additional instruments such as liquidity. In the analysis, persistence measures such as the Hurst exponent are used, and investors' behaviour is indeed found to change during a crisis.

Finally, *Modularity, Dependence and Change* studies the global structures of software packages and other technological artefacts, and their composition from basic modular blocks, lines of code, or small devices. Theoretical and empirical analysis of the dependence between modules suggests that higher interdependence is associated with higher possibility to evolve and that changes can be more efficiently incorporated into subsequent modifications of the artefact.

We would like to thank Professor Frank Schweitzer for his active engagement in making this present topical issue possible.