

Interdisciplinary Workshop on Opinion Dynamics and Collective Decision 2017

July 5-7, 2017 @ Jacobs University Bremen, Germany

Program

All Speakers should reserve 5 to 10 minutes for discussion!

Wednesday, July 5, 2017

13:15 Registration opens, Coffee

14:00 – 14:20 **Jan Lorenz.** Opening and Introduction

Session 1 Chair: Jan Lorenz

14:20 – 15:00 **Rainer Hegselmann.** Modeling Radicalization (40 min.)

15:00 – 15:30 **Pawel Sobkowicz.** Opinion dynamics model based on cognitive biases (30 min.)

15:30 – 16:00 **Sven Banisch and Eckehard Olbrich.** Opinion Polarization by Learning from Social Feedback (30 min.)

16:00 – 16:15 Poster Spotlight 1

Floriana Gargiulo. Emergent dense suburbs in a Schelling metapopulation model: a simulation approach

Stephan Dochow. Discursive Foundations of Threat: Mass Media and Concerns about Immigration in Germany

Kyanoush Seyed Yahosseini. Walk to the best instead of copy the best: How social interactions can help groups to solve complex problems

Alan Novaes Tump. Variation in Individual-level Learning Promotes Collective Intelligence

Mariko Ito. Emergence of opinion leaders in reference networks

Fatma Farag. Role of Two Competing Groups of Informed Agents in Opinion Formation within a Society with Extremists

Maximilian Held. Sharing Is Growing – But We Don't See It

16:15 – 17:00 Poster Session 1 / Coffee Break

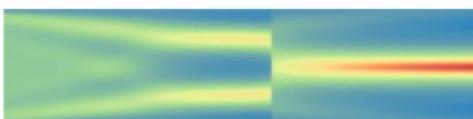
Session 2 Chair: Rainer Hegselmann

17:00 – 17:40 **Sascha Kurz.** Measuring voting power in continuous policy spaces (40 min.)

17:40 – 18:10 **Ulrich Krause.** On the dynamics of sharing (30 min.)

18:10 – 18:30 **Malte Sieveking.** On Confidence (20 min.)

Evening Program (optional). Visit to free open-air festival *Breminale*. Find details under Local Information.



Project LO 2024/2-1 (Jan Lorenz)
Opinion Dynamics and Collective Decisions:
Procedures, Behavior and Systems Dynamics



JACOBS
UNIVERSITY

Thursday, July 6, 2017

Session 3 Chair: Andreas Flache

08:30 – 09:10 **Adrián Carro.** The role of noise and initial conditions in opinion dynamics (40 min)

09:10 – 09:40 **Fariba Karimi.** Visibility of minorities in social networks (30 min.)

09:40 – 10:00 **Martin Neumann.** Theoretical foundations of models of attitude change (20 min.)

10:00 – 10:30 Coffee break

Session 4 Chair: Sascha Kurz

10:30 – 11:00 **Guillaume Deffuant.** Dynamics of opinions about oneself and others (30 min.)

11:00 – 11:30 **Christoph Merdes.** Strategic Disagreement (30 min.)

11:30 – 12:00 **David Hagmann.** Persuasion With Motivated Beliefs (30 min.)

12:00–13:30 Lunch in College III

Session 5 Chair: Guillaume Deffuant

14:00 – 14:40 **Marcus Pivato.** Epistemic democracy with correlated voters (40 min.)

14:40 – 15:10 **Marc Keuschnigg.** Social Influence Strengthens Crowd Wisdom Under Voting (30 min)

15:10 – 15:40 **Bertrand Jayles.** How social information can improve estimation accuracy in human groups (30 min.)

15:40 – 16:00 **Ines Lindner.** Wisdom of Crowds in Social Networks with Structural Variability (20 min.)

16:00 – 16:15 **Poster Spotlight 2**

Alexandru-Ionut Babeanu. Universal properties of culture

Masoud Jalayer. How to maximize a favorite opinion in social networks?

Laurence Droy. Can we use simulated experiments to identify important agent-based model design choices prior to empirical calibration? A case of modeling a harmful collective practice.

Matouš Pilnáček. Structure of online bi-polarized discussion with negative ties

Marwa Wasfy. Threat perception of “The New Terrorism” in U.S and Europe after the “Arab Spring”: Implications for the transatlantic cooperation on countering Extremism

Alex Filip. Contesting Europe – A Time-Series Analysis of Eurosceptic Influence over Mainstream Political Parties

Rocco Paolillo. Including attitude similarity in Schelling’s model of residential segregation

16:15 – 17:00 **Poster Session 2 / Coffee Break**

Session 6 Chair: Martin Neumann

17:00 – 17:40 **Sylvie Huet.** Involvement, extremism and polarisation in a rejection-attraction bounded confidence model (40 min.)

17:40 – 18:00 **Steffen Eger.** Opinion dynamics and wisdom under out-group discrimination (20 min.)

18:30 Walking Group leaves Campus for Social Dinner (3.5 km, 45 min.). Meet 18:25 at Research IV

19:15 **Social Dinner** at Restaurant “Zur Gläsernen Werft”, Schulkenstr. 2, in Bremen Vegesack. Find details under Local Information.

Friday, July 7, 2017

- Session 7** Chair: Sylvie Huet
08:30 – 09:10 **Floriana Gargiulo**. Opinion controversies between social and traditional media (40 min.)
09:10 – 09:40 **Marijn Keijzer**. Interaction in online social networks fosters cultural homogeneity rather than diversity (30 min.)
09:40 – 10:00 **Emanuel Deutschmann and Lara Minkus**. Swinging Leftwards: Public Opinion on Economic and Political Integration in Latin America, 1997-2010 (20 min.)
- 10:00 – 10:30 Coffee Break
- Session 8** Chair: Floriana Gargiulo
10:30 – 11:10 **Bruce Edmonds**. Drilling down below opinions: how co-evolving beliefs and social structure might result in collective opinion change (40 min.)
11:10 – 11:40 **Geeske Scholz**. An Agent-Based Model of Consensus Building (30 min.)
11:40 – 12:00 **František Kalvas**. How individualists, media and random change accelerate diffusion of avant-garde opinions (20 min.)
- 12:00–13:30 Lunch in College III**
- Session 9** Chair: Bruce Edmonds
14:00 – 14:40 **Fabian Winter**. Normative change and culture of hate: a randomized experiment in online communities (40 min.)
14:40 – 15:20 **Andreas Flache**. About renegades and outgroup-haters: Modelling the link between social influence and intergroup attitudes (40 min.)
15:20 – 15:40 Closing

Aims and Scope

Of democracy we expect that it enables us to utilize collective intelligence such that our collective decisions build and enhance social welfare, and such that we accept their distributive and normative consequences. Collective decisions are produced by voting procedures which aggregate individual preferences and judgments. Before and after, individual preferences and judgments change as their underlying attitudes, values, and opinions change through discussion and deliberation. In large groups, these dynamics naturally go beyond the scope of the individual and consequently might show unexpected self-driven macroscopic systems dynamics following “socio-physical” laws.

On the other hand, aggregated information and preferences through media, polls, political parties, or interest groups, also play a large role in the individual opinion formation process, and further on, actors are also capable of strategic opinion formation in the light of a pending referendum, election or other collective decision.

Opinion dynamics and collective decision is thus a political science topic which shall be tackled from social choice and game theory, political and social psychology, as well as from a systems dynamics and sociophysics perspectives.

Abstracts and Co-Authors

Session 1

Rainer Hegselmann

Title: Modeling Radicalization

Abstract: There seem to be some stylized facts about radical groups and processes of radicalisation. Among them we presumably find the following two: First, a radical group has – compared to ‘normal’ agents – a comparatively stable in-group consensus on an extreme opinion. Second, in a process of radicalisation people tend to get less and less open-minded. The two facts inspire an applied and modified version of the well known bounded confidence model as introduced in (Hegselmann/Krause 2002). The adapted version is still an extremely simple conceptual model. Under some assumptions the whole parameter space can be analysed. However, the model shows some surprising results and mechanism at work that inspire new possible explanations, new perspectives for empirical studies, new ideas for prevention policies, and a better understanding of the problems of such policies.

Pawel Sobkowicz

Title: Opinion dynamics model based on cognitive biases

Abstract: We present an introduction to a novel model of an individual and group opinion dynamics, taking into account different ways in which different sources of information are filtered due to cognitive biases. The agent based model, using Bayesian updating of the individual belief distribution, is based on the recent psychology work by Dan Kahan. Open nature of the model allows to study the effects of both static and time-dependent biases and information processing filters. In particular, the paper compares the effects of two important psychological mechanisms:

the confirmation bias and the politically motivated reasoning. Depending on the effectiveness of the information filtering (agent bias), the agents confronted with an objective information source may either reach a consensus based on the truth, or remain divided despite the evidence. In general, the model might provide an understanding into the increasingly polarized modern societies, especially as it allows mixing of different types of filters: psychological, social, and algorithmic.

Sven Banisch and Eckehard Olbrich

Title: Opinion Polarization by Learning from Social Feedback

Abstract: We further explore a mechanism based in reinforcement learning 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 and game-theoretic arguments to understand the role of network connectivity for the emergence of polarization. The paper on which our contribution is based has been submitted to the 2017 Social Simulation Conference (arxiv.org/abs/1704.02890).

Session 2

Sascha Kurz

Title: Measuring voting power in continuous policy spaces

Abstract: Classical power index analysis considers the individual's ability to influence the aggregated group decision by changing its own vote, where all decisions and votes are assumed to be binary. In many practical applications we have more options than either yes or no. In this talk we generalize power indices to continuous convex policy spaces. This allows the analysis of a collection of economic problems like e.g. tax rates or spending that otherwise would not be covered in binary models.

Ulrich Krause

Title: On the dynamics of sharing

Abstract: Consider a group of people sitting around some table. Each person possesses his own amount of money of which he retains a certain percentage but is willing to share the rest by giving it to his left hand neighbor. Can repeated sharing tend to an equal distribution of money among the people? Does the answer depend on how unequal the money was distributed among the people in the beginning? Which role does the percentage play? What do you think?

The talk addresses those questions and more general ones concerning the dynamics of sharing. For example, what happens if

- the structure of sharing is not a „ring structure“,
- the percentage of sharing changes with time as in case of shocks from the outside,
- sharing is nonlinear in that it depends on the preferences of people?

Some questions will be answered in the talk, some only partially and some will remain open.

The search for an equal distribution can be seen similar to the search for consensus in opinion dynamics/multiagent systems wherefore tools from the latter will be used in answering the above questions. Such tools can be found in U.Krause, Positive Dynamical Systems in Discrete Time. Theory, Models, and Applications. De Gruyter Studies in Mathematics 62, De Gruyter, Berlin 2015.

Malte Sieveking

Title: On Confidence

Abstract: A process where e.g. climate researchers gather to produce a single number: the estimated global warming for the next 10 years, measured in degrees celsius, is called opinion dynamics. A widely used device is to take the arithmetic mean of the estimates the individual researchers have come up with. I consider this a voting system with a single voting round. Hegselmann and Krause have designed a decentralized, multi-round voting system using a confidence horizon c : arithmetic means of the sets of votes which differ from x by at most c form the result of the first round. To which the same procedure is applied in the second round, e.t.c.

The final set of votes (after finitely many rounds, according to a main theorem) is stable, i.e. invariant with respect to another round: two votes of the final system differ by at least c . If (as intended) the final set of votes is a single vote, this is called consensus (aggregation), if there are two or more votes we have dissent (segregation). Surprisingly Hegselmann found (via simulations) that as c increases from zero there is frequent alternation: dissent - consent - dissent - consent - dissent - ... - consent. Surprising, since one would expect that more confidence produces less dissent. In my note I analyze the class of quadruples of initial votes w, x, y, z in three space, which produce: dissent - consent - dissent - consent. The argument is formal and tedious, but informally You might say: as every body increases his horizon and tries to get close to new friends necessarily some old friends get out of site.

Session 3

Adrián Carro

Title: The role of noise and initial conditions in opinion dynamics

Abstract: In order to reflect on the fundamental role played by noise and initial conditions on the dynamics of opinions, I will present two theoretical examples: on the one hand, a continuous-opinion, bounded confidence model (the Deffuant, Weisbuch et al. model) and, on the other hand, a model with discrete, binary opinions (the Voter model). The bounded confidence model is characterised by leading to whether a consensus or the split of the group in two or more segregated opinion groups depending on the value of the bound of confidence parameter. For this model, we show that, for a given bound of confidence, a consensus can be encouraged or prevented by certain initial conditions. Furthermore, when a noisy perturbation is added to the system with the purpose of modelling the free will of the agents, the importance of the initial condition is partially replaced by that of the statistical distribution of the noise. Nevertheless, we still find evidence of the influence of the initial state upon the final configuration for a short range of the bound of confidence parameter. The Voter model is characterised by the existence of two absorbing states, corresponding to symmetrical configurations of consensus. In the thermodynamic limit, the system will fall to the absorbing states or not depending on the dimension of the network of interactions: for $d \leq 2$ the system experiences a coarsening process leading to complete order, while for $d > 2$ the system never falls to the absorbing configurations. Any finite-size system ends up falling to one or the other absorbing state due to finite-size fluctuations. While rarely discussed, the initial condition has a decisive influence on the dynamics, in the sense of statistically determining the ordering of the system towards one or the other consensus. When a noise is added, the absorbing states become non-absorbing attractors, since the system can now escape from them with a probability proportional to the intensity of the noise. Due to the symmetry between these two attractors located at the extremes of the opinion space, the dynamics of the system becomes a series of transitions between being closer or more attracted towards one or the other. Thus, even for very small levels of noise, the influence of the initial condition is always lost in the long run, though the time to completely forget it goes as the inverse of the intensity of the noise. Finally, the same coarsening process as in the normal Voter model is observed in the noisy case, though only affecting the initial transient and thus being interrupted at a positive level of disorder proportional to the intensity of the noise.

Fariba Karimi

Title: Visibility of minorities in social networks

Abstract: Homophily can put minority groups at a disadvantage by restricting their ability to establish links with people from a majority group. This can limit the overall visibility of minorities in the network. Building on a Barabási-Albert model variation with groups and homophily, we show how the visibility of minority groups in social networks is a function of (i) their relative group size and (ii) the presence or absence of homophilic behavior. We provide an analytical solution for this problem and demonstrate the existence of asymmetric behavior. Finally, we study the visibility of minority groups in examples of real-world social networks: sexual contacts, scientific collaboration, and scientific citation. Our work presents a foundation for assessing the visibility of minority groups in social networks in which homophilic or heterophilic behaviour is present. We will also discuss the extension of this work on group perception biases.

Martin Neumann and Jan Lorenz

Title: Theoretical foundations of models of attitude change

Abstract: We present an agent-based model for studying the foundations of models of opinion dynamics in psychological theory. For this purpose we investigate the aggregated dynamics of various psychological theories of persuasive communication. The model allows for investigating the effects of

reinforcement theory, information processing theory and social judgment theory with and without a boomerang effect. Simulation shows that the theories generate different effects: Reinforcement generates radicalized consensus, whereas information processing and social judgment without a boomerang effect generates consensus in the middle of the opinion space. The boomerang effect entails a phase transition between attracting and repulsing forces. This is the only framework that includes the possibility of polarization and multiple opinion clusters.

Session 4

Guillaume Deffuant

Title: Dynamics of opinions about oneself and others

Abstract: We consider a model of N agents, each characterized by an opinion about itself and all the others, represented by a real number between -1 (very bad opinion) and $+1$ (very good opinion). The agents meet by randomly chosen pairs and influence each other's opinions through two processes: (i) vanity: agents increase their opinion of agents that value them highly and decrease their opinion of agents and undervalue them (ii) gossiping: agents propagate their opinions about other agents they know, in particular about themselves and about the agent they are talking with. The model includes two main additional hypotheses: (i) agents have a noisy access to the others opinions, with a uniform symmetric noise (ii) agents adopt more easily the opinions of the agents that they highly value. We study more particularly the case where the vanity process dominates over the opinion propagation. In this case, the opinions converge to a pattern in which each agent has a small set of friends (agents which are valued close $+1$) and a large number of enemies (agents which are valued close to -1). The network of friends tends to show the characteristics of a small world. Moreover, all the agents have a positive opinion of themselves. We unfold the interaction processes leading to this pattern, particularly the asymmetry between friends and enemies. We finally discuss rapidly a different pattern showing cycles where the agents lose all their friends and their positive self-opinion and then manage to make friends again and to restore their positive self-opinion.

Christoph Merdes

Title: Strategic Disagreement

Abstract: Processes of opinion formation and revision under social influence are a core topic of social epistemology. In particular, various procedures have been studied with respect to their ability to resolve disagreement between epistemic peers in a reasonable way. What is currently not yet as well understood is what happens once agents with strategic interests enter the disagreement scenario. Such a situation calls for a modeling framework more directly able to represent individual motivation beyond an interest in the truth, a suggestion for which constitutes the main contribution of this paper. The model is developed from a simple game of strategic opinion expression, which is then refined into a more expressive agent-based model by relaxing assumptions on common knowledge. Under the ABM paradigm, several behavioral patterns and scenarios are analyzed, in particular to shed light on the dynamical behavior of the model and to investigate first normative questions. In particular, the model is able to represent a tension between a desire for robustness in the face of opinion entrepreneurs and maximizing accuracy across the population.

David Hagmann and George Loewenstein

Title: Persuasion With Motivated Beliefs

Abstract: Considerable research finds that people derive utility not only from consumption, but also from their beliefs about themselves and the world. Rather than dispassionately updating their views in response to new information, such belief-based utility leads people to avoid information and use other strategies to protect their existing beliefs. We present a two-stage model of persuasion in the presence of belief-protecting strategies and test it in an incentive compatible persuasion experiment. Persuaders seek to shift receivers' numeric estimates related to emotionally charged topics, such as

abortion and racial discrimination. We manipulate whether the persuader first acknowledges her own lack of certainty and whether she first has an opportunity to build rapport with the receiver, which our theory predicts should enhance persuasiveness, but should be irrelevant or may even go in the opposite direction under the standard account.

Session 5

Marcus Pivato

Title: Epistemic democracy with correlated voters

Abstract: We develop a general theory of epistemic democracy in large societies, which subsumes the classical Condorcet Jury Theorem, the Wisdom of Crowds, and other similar results. We show that a suitably chosen voting rule will converge to the correct answer in the large-population limit, even if there is significant correlation amongst voters, as long as the average correlation between voters becomes small as the population becomes large. Finally, we show that these hypotheses are consistent with models where voters are correlated via a social network, or through the DeGroot model of deliberation.

Christian Ganser and Marc Keuschnigg

Title: Social Influence Strengthens Crowd Wisdom Under Voting

Abstract: Social scientists have long been interested in the advantages of groups over individuals in complex decision-making. Averaging over a collection of individual judgments proved a reliable strategy to aggregate information, particularly in diverse groups, where independent guesses fall on both sides of the truth and contradictory biases cancel. Social influence, it has been said, narrows the variation of individual judgments, and undermines this wisdom-of-crowd effect. Prior research, however, ignored that social influence is detrimental only under averaging. Our empirically-calibrated agent-based simulation shows that under voting---which constitutes the most widespread social decision rule---social influence instead contributes to information aggregation and can be advantageous for collective judgment. Our finding has important ramifications for the design of collective decision-making in both public administration and private firms.

Bertrand Jayles, Hye-Rin Kim, Ramón Escobedo, Stéphane Cezera, Adrien Blanchet, Clement Sire, Guy Theraulaz and Tatsuya Kameda

Title: How social information can improve estimation accuracy in human groups

Abstract: In a digital and connected world, the development of social networks, online shopping, and reputation systems raises the question of how individuals use social information, and how it affects their decisions. We report the results of experiments performed in France and Japan, in which subjects could update their estimates after having received information from other subjects. We measured and modeled the impact of this social information at individual and collective scales. We found that when individuals have little prior knowledge about a quantity (e.g large numbers in astronomy, physics, life or earth science...), the distribution of the logarithm of their estimates is close to a Cauchy distribution. We also found that social influence helped the groups improve their properly defined collective accuracy. When additional controlled and reliable information was provided, unbeknownst to the subjects, we quantified the improvement of the collective estimate. We show that subjects' sensitivity to social influence allows to define five robust personality traits, and increases with the difference between personal and group estimations. We then used our data to build and calibrate a model of collective estimation, to analyze the impact on the group performance of the information quantity and quality received by individuals. Our model quantitatively reproduces the distributions of estimates, as well as the improvement of collective performance and accuracy observed in our experiments. Our model also predicts that providing a moderate amount of incorrect information to individuals can counterbalance a human cognitive bias to systematically underestimate quantities, and thereby improve collective performance.

Ines Lindner, Bernd Heidergott and Jia-Ping Huang

Title: Wisdom of Crowds in Social Networks with Structural Variability

Abstract: Wisdom of crowds proposed by Golub and Jackson (2010) is a study on the convergence to the truth of individual beliefs. Agents receive independent noisy signals about the true value of a variable and update their beliefs by communication determined by a social network. It extends the classic model of DeGroot (1974) about reaching a consensus in which agents repeatedly update their beliefs by taking weighted averages of neighboring beliefs. Golub and Jackson's (2010) main finding is that the crowds is wise (all beliefs converge to the truth) if and only if individual influence vanishes as the network grows. This seems to support the idea that opinion formation in large social networks is eventually infallible.

We show that the appealing wisdom of crowds phenomenon heavily relies on the - unfortunately - unrealistic assumption that agents always update their belief in exactly the same way. This crude assumption reflects the usual way social network data is collected, where the strength or weight P_{ij} of a connection between two agents i and j is a combined frequency of interaction and influence. We refer to this approach as superposition, e.g. the weighted interaction matrix P is a (linear) combination of (different) matrices $P = aX + (1-a)Y$. For instance, consider data collected from online communication taken over one year in order to estimate the connections in a given group of users. Alternatively, consider splitting the period into two half years or four quarter years. Obviously, the estimated networks will be different while providing the same superpositioned aggregated data over one year. Consequently, there is aleatoric uncertainty about the actual pattern of belief updating. We show that wisdom of crowds is an illusive concept and it bares the danger of mistaken consensus for truth.

Session 6

Sylvie Huet

Title: Involvement, extremism and polarisation in a rejection-attraction bounded confidence model

Abstract: This talk shows the impact of a mixed population of self-involved and not self-involved agents which are designed from results of experiments presented in the literature in social psychology. These agents discussed simultaneously several issues: a main one and a secondary one. The self-involved agents are attracted on every issues if they are close onto the main issue but reject their peer's opinion if they are only close onto the secondary issue. The dynamics of non self-involved agents is a simple 2D bounded confidence model (Deffuant et al, 2001). From the analysis of simulations from a large experimental design, we observe the emergence of various types of "extreme minor clusters", as well as polarisation and depolarisation. The emerging extremists can lead the population to a polarisation on minor issues, but also on fundamental ones (as well as bipolarisation and multipolarisation). A very strong, and a very long transitory state, of ingroup polarisation on secondary issues can be also observed. Moreover, only few self-involved agents in the population are sufficient to obtain more cohesion (ie a smaller number of clusters) compared to a population of only non self-involved agents. Trajectories of agents will be presented to understand how these phenomenons emerge from the model.

Steffen Eger

Title: Opinion dynamics and wisdom under out-group discrimination

Abstract: We study a DeGroot-like opinion dynamics model in which agents may oppose other agents. As an underlying motivation, in our setup, agents want to adjust their opinions to match those of the agents of their 'in-group' and, in addition, they want to adjust their opinions to match the 'inverse' of those of the agents of their 'out-group'. Our paradigm can account for persistent disagreement in connected societies as well as bi- and multi-polarization. Outcomes depend upon network structure and the choice of deviation function modeling the mode of opposition between agents. For a particular choice of deviation function, which we call soft opposition, we derive

necessary and sufficient conditions for long-run polarization. We also consider social influence (who are the opinion leaders in the network?) as well as the question of wisdom in our naïve learning paradigm, finding that wisdom is difficult to attain when there exist sufficiently strong negative relations between agents.

Session 7

Floriana Gargiulo

Title: Opinion controversies between social and traditional media

Abstract: In social media we observe every day the emergence of strongly controversial debates. A typical example is the well-known debate about vaccines, a theme that has assumed a key role also in political debates even if a net position is usually adopted by the health institutions. How is it possible that a “minority” position is able to rise up a societal challenge? An intuitive answer could be that the topological structure of social media, together with the filtering algorithms applied by the platforms (whose behaviour is not accessible), creates strong echo chambers that allow the minority opinion to get reinforced. I will show, with a modelling approach, that this is not actually the case: the homophily that characterize the ties in social media, seems to have a positive impact on reducing, on the long term, the extremist behaviours.

On the contrary, I will show that a unilateral campaign through traditional media (promoting for example in the case of vaccines the health institution position), can strongly impact the online debate, reinforcing the counterpart position. For example, we observe in the Italian case that the introduction of the vaccine obligation, increased drastically the information request on the risks associated to vaccines. In general the combination of media pressure and network homophily patterns, allow the composition of a minority “front” (that otherwise would remain a broken up set of different opinions). We observe for example in the Italian case the rise of the common hashtag #noObbligo (no obligation) that joined previously disconnected issues.

Marijn Keijzer, Michael Mäs and Andreas Flache

Title: Interaction in online social networks fosters cultural homogeneity rather than diversity

Abstract: Online social networks revolutionized the way we share information with friends, colleagues, and family members; sparking public and scholarly debates about how these new platforms affect dynamics of cultural diversity and polarization. The question why cultural diversity seems to be so robust despite increasing opportunities for mutual social influence in an increasingly interconnected world has been on the agenda of theoretical modelers at least since Axelrod proposed his seminal agent-based model of cultural dissemination (1997). But although a large number of follow-up studies contributed to the theoretical understanding of how various factors affect cultural diversity, researchers only just started modelling opinion dynamics in online settings. A key roadblock is to develop a thorough understanding of how model results change if we assume the one-to-many communication regime typical for online social networks rather than traditional dyadic, face-to-face communication. Our paper contributes to this goal.

Unlike in models of face-to-face interaction based on Axelrod, where actors update their cultural traits after being influenced by one of their contacts, influence in online social networks is reversed, and multilateral, in that users emit messages directly to a large number of contacts. Building on earlier extensions of Axelrod that did include multilateral influence but not direct and active message emission by users (Flache & Macy, 2011), we implement this subtle difference in an agent-based model. Our model suggests that the communication structure of online social media can have profound implications for emergent dynamics of cultural dissemination. We show that while reversed multilateral influence fosters overall cultural homogeneity in the population, it also increases chances that individuals become culturally isolated from their network contacts. We also observed more “cultural fads” under reversed influence than under classical face-to-face interaction. It thus appears that in particular the mechanism of one-to-many message emission may critically change cultural dissemination dynamics.

Emanuel Deutschmann and Lara Minkus

Title: Swinging Leftwards: Public Opinion on Economic and Political Integration in Latin America, 1997-2010

Abstract: Coinciding with the shift to the left in Latin American politics, regional integration in Latin America accelerated during the last two decades. Yet, whereas support for European integration has been tracked systematically for decades, trend analyses of public opinion on Latin American integration are still missing. Combining data from eight Latinobarometer surveys on 106,590 respondents from 17 South and Central American countries, this article provides the first longitudinal analysis of Latin Americans' support for their continent's economic and political integration. Using multilevel mixed-effects logistic regression, inner- and inter-societal trends and cleavages are revealed. Our results show that support rates are generally declining from high initial levels. Furthermore, while gender and educational gaps in public opinion remained stable over time, considerable shifts occurred with regards to political orientation: starting from the lowest initial values, the left surpassed the right and — at least in the case of support for political integration — also the center to become the political wing most favorable of integration. This finding shows, contrary to prevailing ideas, that the political center is not necessarily the primary supporter of integration. When regionalism is increasingly driven by left-wing governments, public support for regional integration may also swing to the left.

Session 8

Bruce Edmonds

Title: Drilling down below opinions: how co-evolving beliefs and social structure might result in collective opinion change

Abstract: The talk looks at an alternative to "linear" models which deal with a euclidean space of opinions (usually a 1D space). This is a model of belief change, where both social influence and internal consistency of beliefs co-evolve with social structure. Thus this goes beyond most opinion dynamics models in a number of ways: (a) it deals with beliefs that may underlie measured opinions (b) the internal coherency among sets of beliefs is important as well as social influence (c) the social structure co-evolves with belief change and (d) the social structures are complex and continually dynamic. The internal consistency of beliefs is based on Thagard's theory of explanatory coherence, which has some empirical support. The model seems to display some of the tensions and processes that are observed in politics, for example: the tension between moderating views so as to connect with the public vs. reinforcing the in-group coherency. It displays a dynamic that can reflect a number of different courses including those that result turning points in opinions.

Geeske Scholz, Claudia Pahl-Wostl and Art Dewulf

Title: An Agent-Based Model of Consensus Building

Abstract: CollAct is built around the question how people gain a shared understanding and reach consensus in a group discussion. This is an important question which is rather difficult to analyze within case studies. We model agents in a cognitive way, including substantive and relational knowledge in mental models, which may change through learning. The agents in CollAct discuss with each other and produce a group model (consensus). Factors identified to have an important influence on the results of a group discussion include group size, the level of controversy within the discussion, cognitive diversity, social behavior in form of cognitive biases (Asch and halo effect), and, depending on group size, the existence of a leading role at the beginning. Furthermore, the integration of topics into the consensus follows a saturation curve, thus the ending time of discussions should be carefully chosen to avoid a loss of information.

František Kalvas and Dušan Janák

Title: How individualists, media and random change accelerate diffusion of avant-garde opinions

Abstract: We present three innovations of Latané's model of dynamic social impact (DSIT). In DSIT every agent compares overall support of its opinion with overall persuasion to change to another opinion. Every individual contributions to the overall support and persuasions are divided by the squared distance between the comparing and the respective agent. In case the persuasion is higher than support, the comparing agent changes to persuading opinion.

We introduce to this model three innovations: (1) individualists who could invent avant-garde opinions, defy DSIT by random change, and have high supporting power, (2) random change of common agents, and (3) the media who asymmetrically warp the social space. The media are persuaded as any other agent, but when media's listeners compare the support and the persuasion, these listeners see the media in very short distance (as to themselves or as to closest friends). Results show that every innovation improves propagation of avant-garde opinions. It seem that the most successful propagation tool are media, but they are strikingly successful according very special conditions. If the conditions are not fulfilled, the media are as successful as the other innovations.

Session 9

Fabian Winter

Title: Normative change and culture of hate: a randomized experiment in online communities

Abstract: We present a large-scale online randomized experiment in which we investigate the impact of perceived social norms on online hate speech. Our experimental setting allows us to compare community-driven (letting users speak against hate speech) and censoring (deleting hateful content) interventions to tackle online hate speech. Empirical results show broad differences between the two interventions. Participants were significantly less likely to engage in hate speech in the censored conditions compared to the control group. This work presents some of the first experimental evidence investigating the social determinants of hate speech in online communities. The results could advance the understanding of the micro- mechanisms that regulate hate speech. Also, such findings can guide future interventions in online communities that help prevent the spread of a hate culture.

Hans-Günther Döbereiner

Title: Mind of Mold and Man

Abstract: The slime mold *Physarum polycephalum* has been proposed as a non-neuronal model system for decision making. The foraging behavior of its multi-nucleated plasmodium has been described using the language of modern psychology. Slime molds form spatially extended networks of oscillating tubes which coordinate their phase to produce the overall geometrical and topological dynamics of the network. Genetic signals from individual nuclei or local protein interactions emerge into the collective behavior of the whole system. I will introduce this fascinating species and argue that one may consider *Physarum* as a model for opinion dynamics and collective decision making of individual agents. I discuss the topological dynamics of the network during foraging and present different modes of highly collective behavior given variant environmental conditions. Foraging under risk in two homogeneous adjacent half-spaces can be described as a binary decision of a stochastic system characterized by risk strength. *Physarum* has served as the focal point for a widely interdisciplinary series of lectures on universal properties of decision making given at Bremen University, see <http://decisions.uni-bremen.de/en/decisions>, over the past year and ongoing.

Andreas Flache

Title: About renegades and outgroup-haters: Modelling the link between social influence and intergroup attitudes

Abstract: Polarization between groups is a major topic of contemporary societal debate as well as of research into intergroup relations. Formal modellers of opinion dynamics try to explain how intergroup

polarization can arise from simple first principles of interactions within and between groups. Models have been proposed in which intergroup attitudes affect social influence in the form of homophily or xenophobia, elaborated as fixed tendencies of individuals to interact more with ingroup members, be more open to influence from ingroup members and perhaps even distance oneself from attitudes of outgroup members. While these models can generate polarization between groups, their underlying assumptions curiously neglect a central insight from research on social influence and intergroup attitudes. Intergroup attitudes are themselves also subject to social influence in interactions with both in- and outgroup members. I extend well-known existing models of social influence that include intergroup attitudes, by adding this feedback-effect. I show how this changes the predictions models make about the process and the conditions of intergroup polarization. In particular, I show how different models imply that intergroup polarization can become less likely if intergroup attitudes change under social influence. Moreover, models imply that a renegade minority (“outgroup-lovers”) can have a key role in avoiding intergroup polarization and even elicit “attitude reversal” resulting in a majority of individuals developing a negative attitude towards their ingroup and a positive one of the outgroup. Interpretations of these theoretical results and future research will be discussed.

Poster Session 1

Floriana Gargiulo, Yerali Gandica and Timoteo Carletti

Title: Emergent dense suburbs in a Schelling metapopulation model: a simulation approach

Abstract: The Schelling model describes the formation of spatially segregated clusters starting from individual preferences based on tolerance. To adapt this framework to an urban scenario, characterised by several individuals sharing very close physical spaces, we propose a metapopulation version of the Schelling model defined on the top of a regular lattice whose cells can be interpreted as a bunch of buildings or a district containing several agents. We assume the model to contain two kinds of agents relocating themselves if their individual utility is smaller than a tolerance threshold. While the results for large values of the tolerances respect the common sense, namely coexistence is the rule, for small values of the latter we obtain two non-trivial results: first we observe complete segregation inside the cells, second the population redistributes highly heterogeneously among the available places, despite the initial uniform distribution. The system thus converges toward a complex heterogeneous configuration after a long quasi-stationary transient period, during which the population remains in a well mixed phase. We identify three possible global spatial regimes according to the tolerance value: microscopic clusters with local coexistence of both kinds of agents, macroscopic clusters with local coexistence (hereafter called soft segregation) and macroscopic clusters with local segregation but homogeneous densities (hereafter called hard segregation).

Stephan Dochow and Christian Czymara

Title: Discursive Foundations of Threat: Mass Media and Concerns about Immigration in Germany

Abstract: Subjective perceptions of threat play a key role in debates on immigration in Western societies and mass media has long been discussed as an essential determinant of such perceptions. In this study, we investigate to what extent immigration related concerns in the German public fluctuate with the amount of media attention (salience) on this issue. We model media salience as a characteristic fluctuating on a daily basis combined with German representative panel data and covering a time span of over 14 years. Furthermore, we investigate which groups of individuals are especially affected by media salience and thus document the periodic occurrence of opinion polarization between these groups. We distinguish two sets of possible moderators: (i) contextual aspects, stressing the importance of the local opportunity structure for first-hand experiences with ethnic out-groups and (ii) personal characteristics, identifying which individuals are more prone to media induced threat perceptions. Our findings lend support to contact theory in a broader sense as well as to perceived - but not “realistic” - group threat theory. This casts doubt on the argument that threat perceptions stem primarily from the size of ethnic out-groups and points to the importance of

media as a source of information that potentially triggers threat and pays attention to varying susceptibility for such media induced threat perceptions.

Kyanoush Seyed Yahosseini and Mehdi Moussaïd

Title: Walk to the best instead of copy the best: How social interactions can help groups to solve complex problems

Abstract: One challenge for the use of collective intelligence in complex problems is that combining solutions is difficult. One way of combining the solutions of multiple individuals is to let the group members interact and influence one another during the task. This, however, requires a good balance between individuals exploring independently and imitating what others are doing.

In this project, we use agent based simulations to study how social interactions can help a group of individuals find a good solution when searching together in a multi-dimensional landscape of solutions. While varying the difficulty of the solution landscape.

The results of our simulation indicate two key findings: First, combining gradual changes with collective search generates better solutions than an independent search, but only for difficult solution landscapes. Second, diversity of initial solutions is beneficial and enhances the performances of collective strategies.

Alan Novaes Tump, Jens Krause and Ralf Kurvers

Title: Variation in Individual-level Learning Promotes Collective Intelligence

Abstract: Collective intelligence is the ability of groups to outperform individual decision makers in solving complex problems. Whereas numerous studies have demonstrated this effect, the mechanisms underlying collective intelligence are still poorly understood. Here we present evidence for a novel mechanism promoting collective intelligence which is based on the existence of individual-level learning differences. We performed an experiment in which human groups observed a sequence of cartoon characters, where each character had to be classified as either a cooperator or defector. Each character contained both informative and uninformative cues. After observing a character, individuals first made a personal decision, upon which they received social information consisting of the decision of their group members. Then all individuals made a second decision. Additionally, individuals reported their beliefs in the different cues. Our results show that individuals made better decisions after observing the decisions of others. Interestingly, individuals receiving exactly the same information developed very different cue beliefs, including many wrong beliefs. This diversity in beliefs, in turn, was a crucial predictor of collective performance: combining decisions of individuals with different beliefs promoted collective intelligence. This benefit of belief-diversity was present in informative cues (as it allowed the collective to integrate different relevant information) and uninformative cues (as different wrong beliefs largely canceled out at the collective level). Our results illustrate how variation in individual-level learning drives collective intelligence and how diverse collectives can protect against false individual beliefs, such as superstition.

Mariko Ito, Hisashi Ohtsuki and Akira Sasaki

Title: Emergence of opinion leaders in reference networks

Abstract: When one makes his/her decision, he/she is often influenced by other's opinions. We describe this situation by a network model with the nodes representing individuals and the edges representing references between them. In such networks, individuals who have a large number of reference links are greatly influential to others, so we call them opinion leaders. One of our questions is whether opinion leaders emerge from population where each person tries to make correct answers with referring to more accurate persons. When opinion leaders emerge, the opinions of people should be highly correlated. It is known that correlation between opinions can degrade the advantage of collective intelligence. Our second question is whether the reference structure with the opinion leaders leads to higher performance than that without them. To solve these questions, we constructed and analyzed an opinion dynamics model. We assumed in our model that, in each iteration, each

individual makes a decision on a given problem with the majority vote among his/her referents' opinions, and rewires the links according to the performance of the referents. Each individual is assumed to monitor his/her referent's performance and breaks the link if the performance becomes worse than a threshold. In our model individuals vary in their ability to solve problems by themselves. Our analysis showed the following results. 1) Opinion leaders emerged, i.e. we obtained exponential distribution of the number of followers, where a few agents collect many followers, after iterations of adaptive rewiring, and the emergence was earlier when the threshold for breaking links was low. 2) The mean number of followers per individual increased more than linearly with the ability of each individual, and this tendency became stronger for lower thresholds. 3) The population mean performance became higher but showed more temporal fluctuation than in a random network before rewiring.

Kamal Selim, Ahmed Okasha and Fatma Farag

Title: Role of Two Competing Groups of Informed Agents in Opinion Formation within a Society with Extremists

Abstract: To discover the impact of two competing polarized opinions in reducing or nourishing extremism in societies, an agent based bounded confidence model is developed. The model explores the impact of the presence of informed (strategic) agents on the process of shifting opinion formation towards a certain idea or decision within a society with extremists in opinion. Heterogeneous bounds of confidence -based on agents' opinions- is used instead of the commonly used homogeneous ones. We examine the effect of the presence of two competing groups of informed agents on the opinions of the society members.

This research concludes that highly sociable informed agents could accelerate opinion shifting. Moreover, the less informed agents stick to their declared opinions, the faster public opinion converges to the target one. It is found that the presence of competing informed agents drives the society to a moderate state, where cause the polarization and segregation in public opinion is not that extreme. Presence of competing informed agents in a society could radically shift most opinions to moderate ones and decrease the number of extremists in the society.

Maximilian Held and Jan Lorenz

Title: Sharing Is Growing - But We Don't See It

Abstract: In democratic societies, redistribution evolves as people form opinions in the public sphere, and vote on desired levels of taxation and transfers.

Citizens operationalized as boundedly-rational agents may act with threefold preferences to maximize their (a) individual outcome, (b) social criteria of the outcome distribution, or (iii) epistemically {objective} criteria to maximize welfare. One objective welfare-maximizing criteria is that redistribution through taxation can spur growth for all. The portfolio effect was discovered as an investment strategy, but is counter-intuitive and not widely known in macro-economics.

The portfolio effect exists in risky environments where growth is stochastic and multiplicative. Modern economy can be seen as such whenever success is partly self-perpetuating but only imperfectly predictable. Without redistribution everyone will be wiped out in the long run by a sufficiently long streak of bad luck. The repeated redistribution of wealth from current winners to current losers prevents this and consequently spurs growth.

Aside from this theoretical observation, we want to understand how people and societies really decide in risky democratic environments? In particular we ask:

- (i) Do decisions differ under additive and multiplicative growth?
- (ii) What rationale do people use in voting about redistribution?

Poster Session 2

Alexandru-Ionut Babeanu, Leandros Talman and Diego Garlaschelli

Title: Universal properties of culture

Abstract: Understanding the formation of subjective human traits, such as preference and opinions, is an important, but poorly explored problem. An essential aspect is that traits collectively evolve under the repeated action of social influence interactions, which is the focus of many quantitative studies of cultural dynamics. In this paradigm, dynamical models require that all traits are fixed when specifying the “initial cultural state”. Typically, this initial state is randomly generated, from a uniform distribution over the set of possible combinations of traits. However, recent work has shown that the outcome of social influence dynamics strongly depends on the nature of the initial state: if this is sampled from empirical data instead of being generated in a uniformly random way, a higher level of cultural diversity is found after long-term dynamics, for the same level of propensity towards collective behavior in the short-term; moreover, if the initial state is obtained by shuffling the empirical traits among people, the level of long-term cultural diversity is in-between those obtained for the empirical and random counterparts. The current study repeats the analysis for multiple empirical data sets, showing that the results are remarkably similar, although the matrix of correlations between cultural variables clearly differs across data sets. This points towards robust structural properties inherent in empirical cultural states, likely due to universal laws governing the dynamics of culture in the real world. The analysis suggests, first, that this dynamics operates close to criticality and second, that it is driven by more than just social influence, implications which were not recognized previously.

Mehrdad Agha Mohammad Ali Kermani and Masoud Jalayer

Title: How to maximize a favorite opinion in social networks?

Abstract: In influence maximization problem, the social change agent is trying to maximize the number of infected nodes in the final step of information diffusion. But, in the real marketing application, the social change agents' objective is to maximize the sum of actors' beliefs to a favorite opinion. The question which should be studied is “how to maximize a favorite opinion in a social network?”. In this paper, a new mathematical programming model is developed to model this problem. Due to the complexity of the proposed model, to solve and find a good solution, a genetic algorithm (GA) is proposed too. For efficiency evaluation, the results of implementing the model and algorithm on four datasets have been compared with some of the well-known other greedy algorithm in influence maximization literature.

Laurence Droy

Title: Can we use simulated experiments to identify important agent-based model design choices prior to empirical calibration? A case of modeling a harmful collective practice.

Abstract: When developing an agent-based model of an empirical social phenomenon, calibration is crucial. Calibration means using information about an empirical target to constrain aspects of the design of a model. Calibration may involve choosing parameters, or rejecting certain assumptions in favor of others, based on empirical data. Calibration using data that is independent of the validation phase helps to prevent misleading models from erroneously matching patterns in empirical data. So, calibration helps to ensure that validated models are sufficiently similar to a target phenomena that insights from them will apply to that target. Yet, in practice, independent calibration is challenging. Modelers have limited time, resources and empirical data available to them. Also, questions regarding which details to include in a model, or what the costs of simplifications are for accuracy, are hard to assess independently. I discuss efforts to address these challenges in the context of building a model of an observed collective behavior. The target behavior is the harmful practice of female genital mutilation (FGM) in Africa. I discuss simulated experiments in which I varied the parameters, assumptions, and components of a preliminary model of FGM and measured their importance, prior to

calibration. I am interested in whether this can provide insights that can guide efforts at independent empirical calibration. The reasoning underlying the approach is that systematic permutation of a model specification may highlight which design choices matter most to its key behaviors. If a design choice has a strong impact (relative to others) on the key behaviors of a model, it seems reasonable to conclude that we should focus our limited resources on ensuring (e.g. through empirical investigation) that there is a strong analogy between this aspect of the model and the empirical target. Methodological and model-related insights gained from trialing this approach are discussed.

Matouš Pilnáček, Tomáš Diviák and Jaromír Mazák.

Title: Structure of online bi-polarized discussion with negative ties

Abstract: Current migration crisis has brought a bi-polarization into public opinion in Western states. The opinion bi-polarization is sometimes explored through formal multi-agent models using a few basic theoretical mechanisms such as persuasive arguments, opinion fault lines or bounded confidence models. One of these mechanisms is the negative influence model which can explain increasing polarization between groups. However, there is a lack of empirical research on negative influence in large groups on societal level. Our study strives to fill in the gap by exploring the differences between polarization structure based on negative and positive ties. We use data from the biggest Czech news server iDNES.cz. Specifically, we use automated data collection to download readers' comment below articles in the foreign issues section where topics of migration have been discussed. We focus on the year 2015 when the migration crisis culminated in Europe. The advantage of our data compared to data from frequently used social media, such as Twitter or Facebook, is that users can rate each other's comments with both positive and negative votes (likes and dislikes). We trace how different network communities develop through several time points based on both positive and negative ties and with subsequent content analysis of opinions within the groups, we identify polarized subgroups of pro-western and pro-Russia debaters in the issue of Ukrainian conflict and anti-immigrant versus pro-immigrant debaters in the issue of migrant crisis. Furthermore, we analyse internal characteristics of each group such as centralization, density or size. We would like to follow up on this research with a longitudinal exponential random graph model, where we model both positive and negative ties simultaneously to discover which network mechanisms brought about the polarized structure of the network.

Marwa Wasfy

Title: Threat perception of "The New Terrorism" in U.S and Europe after the "Arab Spring":

Implications for the transatlantic cooperation on countering Extremism

Abstract: The escalation of the conflict after what's called as "The Arab spring" has deepened the crisis of the transatlantic security. These revolutions that have turned into a partial or total collapse of the states such as that in Libya and Iraq, with instability shaking from time to time in Egypt and Tunisia, and more specifically with the escalation of the civil war in Syria, terrorist groups found a fruitful ground to flourish and to challenge the world security.

While terrorism is not a new threat, but after the Arab Uprisings and the rise of the Islamic state; terrorism is taking a different shape than Al-Qaeda group, this "New terrorism" is much more complicated with multi-facets and which uses the hybrid tactics in deepen its existence among public on the states where they exist and in recruiting foreign fighters from the West as well. Extremists then not only challenge the physical existence of the state institutions, but they also threaten the culture of the societies through "tools of radicalization". Indeed, "ISIS" or "ISIL" has proved the failure of both the Western approach for counter terrorism. Moreover, it has shifted the North Atlantic and NATO focus from the "out of area" formula of the post-cold war era to "in area" formula, where threats are taking part in inside the borders of the partners and have major impacts on their states.

The study argued that the dependable expectation of peaceful settlements of the conflicts is not enough for preserving the transatlantic security community, but a shared perception of the threat and

collective identity is needed; that shall be reflected not only on the state level but on the people level as well.

We model the impact of different calibrations of both rules (small versus large district magnitude and proportional versus equal distribution of subsidies) and gauge the impact on the emerging pattern of party competition.

Alex Filip

Title: Contesting Europe - A Time-Series Analysis of Eurosceptic Influence over Mainstream Political Parties

Abstract: While it is already taken for granted that the EU's traditional permissive consensus has been replaced by a „constraining dissensus“, it is still an open question how Europe's party systems will react to growing distrust towards the EU and the growing appeal of Eurosceptic parties. This research effort investigates whether and to what degree the electoral success of Eurosceptic Parties force other political parties in their countries to change their position on the issue of European Integration. Do Europe's mainstream parties maintain their standard discourse and policy positions unaltered, or are they forced to qualify their typical pro-integration stances when Eurosceptic challengers are successful at the ballot box? While tentative steps have been made in the past at theorizing the effects of populist parties from the Europeanization perspective, the topic has until very recently remained severely underdeveloped and understudied. This project brings together the specific literature on Europeanization and European Integration with more general theories of political party competition, Downsian proximity theory being the central one employed here. An information-via-elections model (similar to Budge's Past Election model) underlies the causal mechanism at the heart of this project, and using time-series cross-sectional regression, this research endeavor employs data from the Chapel Hill Expert Survey, the ParlGov Database (in addition to other sources) to analyze the dynamics of Eurosceptic influence. It is found that Eurosceptic Parties indeed manage to determine other parties to imitate or approximate their policy positions, if the former are successful enough at the ballot box.

Rocco Paolillo and Jan Lorenz

Title: Including attitude similarity in Schelling's model of residential segregation

Abstract: Schelling's model (1969) addresses the emergence of segregated societies from individual homophily of people according to ethnic membership. Used to understand residential segregation, the original model does not include mechanisms of integration which are relevant in migration context (Hatna & Benenson, 2015). Promotion of tolerance as acceptance of ethnic diversity might be a critical issue in these terms, facilitating the integration between out-groups but stressing out the diversity between in-groups with opposite attitudes (Verkuyten, 2010). With our agent-based model, we aim at investigating what consequences the inclusion of similarity based on the attitude of tolerance might have on the patterns of residential segregation as in Schelling. We therefore extended the original model introducing the dimension of tolerance for both a local and migrant population, defined as the percentage of liberal and conservative agents in that population. As in Schelling, conservative agents consider similar only members of their ethnicity regardless of their attitude, vice versa liberals consider similar those agents with the same liberal attitude regardless of their ethnicity. We run first observations manipulating the percentage of tolerance distribution in local and migrant populations, decreasing the preference of similar in neighborhoods initially for liberals, and comparing with conditions of low/high density of society and conditions of local majority/equal representation of populations. The introduction of similarity based on ethnicity and attitude causes four patterns between integration and segregation. Ethnic segregation, as in the original model, occurs between conservatives of diverse populations, or between liberals and conservatives of diverse population, whereas ethnic integration occurs between liberal agents of diverse ethnicity. Internal segregation occurs between conservatives and liberals of the same ethnicity, whereas internal integration occurs

within conservatives or liberals of the same ethnicity. The combinations between these patterns are compared with the original model across conditions.

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The Workshop is part of the project

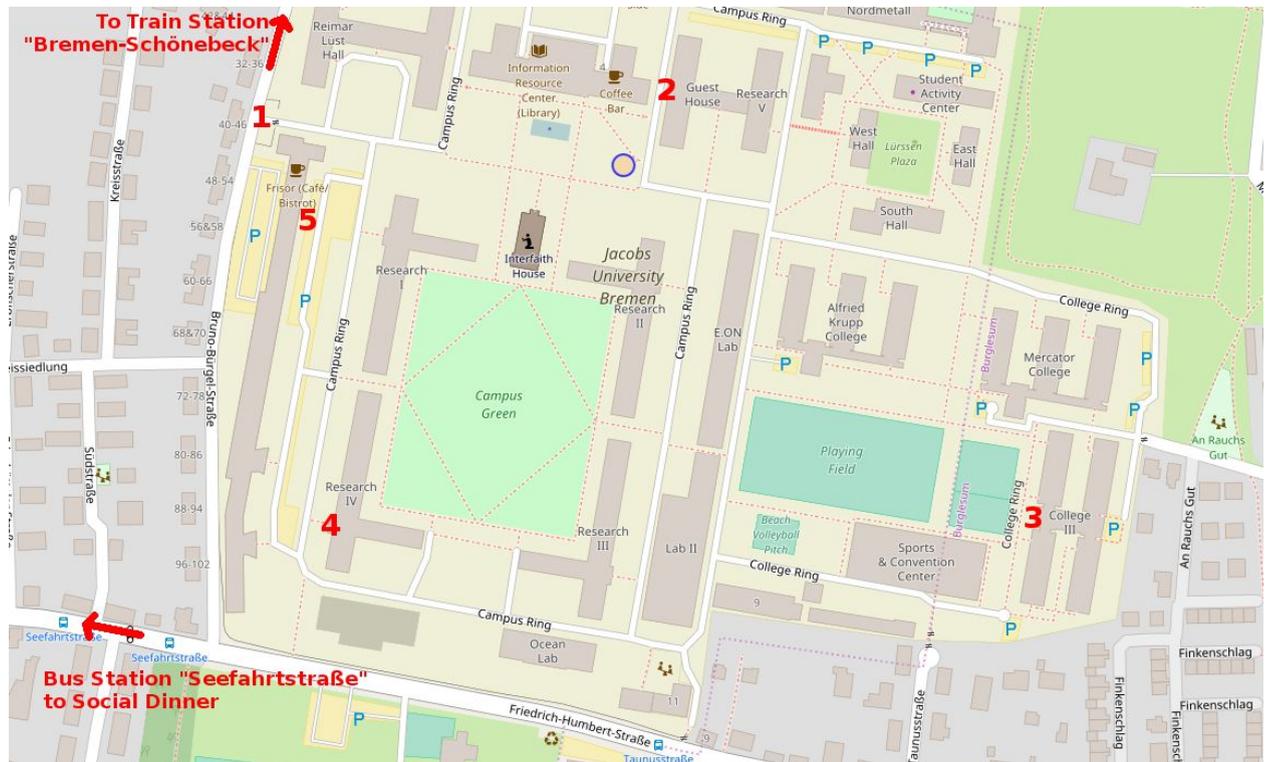
Opinion Dynamics and Collective Decision: Procedures, Behavior and Systems Dynamics

(Jan Lorenz) funded by the German Research Foundation (DFG) under grant number LO 2024 2-1.

<http://gepris.dfg.de/gepris/projekt/265108307>

Local Information

Campus Map



1 Front Gate You enter Campus here. Get your room keys. Get Guest CampusCards here. Load money on cards only here. Some porter is always here +49 421 200 4820.

2 Guest House Accommodation

3 College III Accommodation

Breakfast 08:00 - 09:30 (pay with CampusCard only! No Cash!) (Saturday 8:30 - 10:00)

Lunch 12:00 - 13:30 (covered by Workshop Fee, show your Badge)

Dinner 18:00 - 19:00 (pay with CampusCard only! No cash!)

4 Research IV Workshop Venue Find on the Ground Floor

Conference Room 52: **Talks**

Seminar Room 49: **Coffee Break**

Multi-Purpose Office Room 48: Use if needed

Room 50 Miriam Trefas: **Registration**

Foyer: **Poster Sessions**

5 Frisör (Small Bistro) Open 6:30 - 16:00

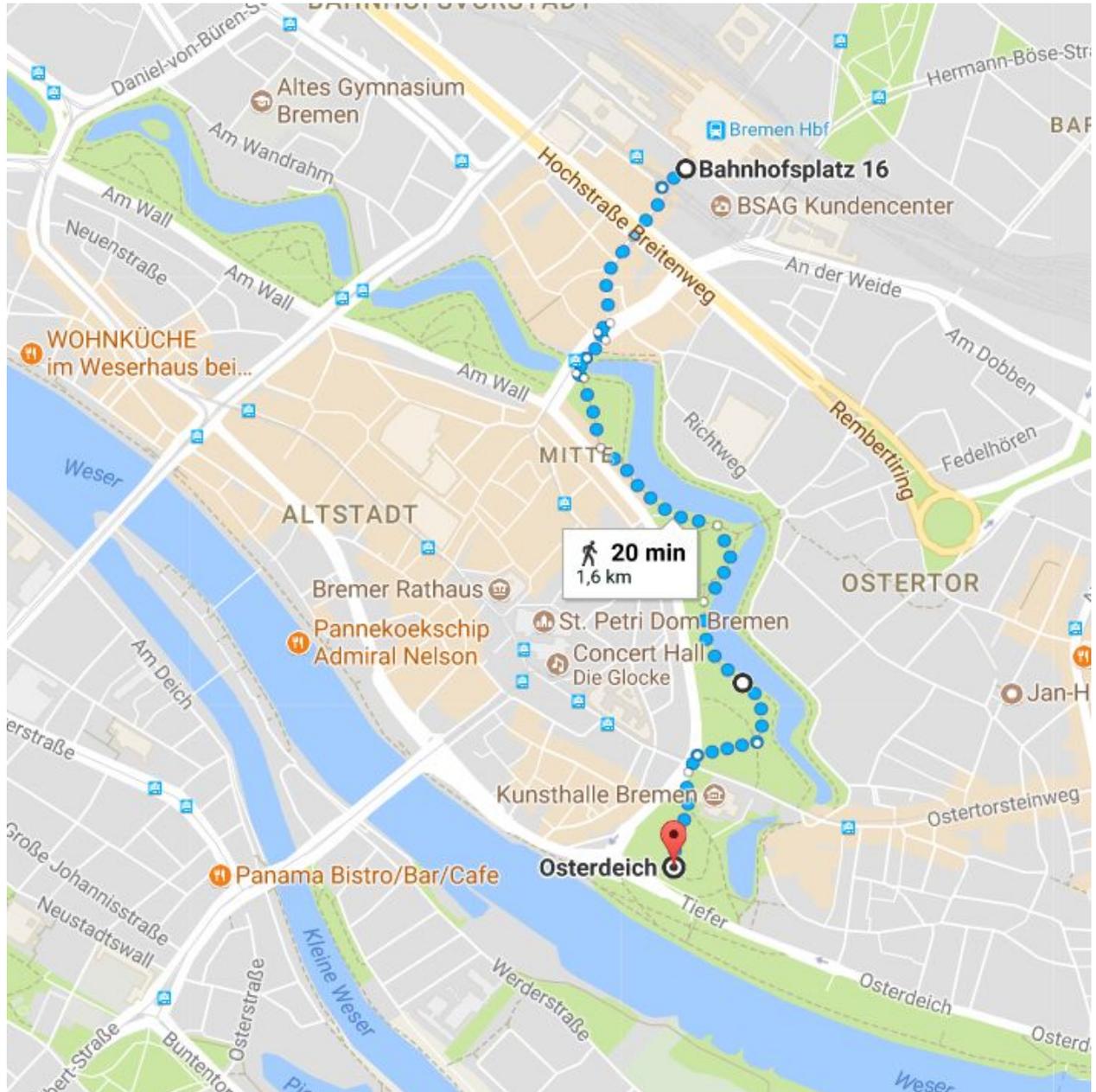
Note: There is a fence around campus. You can only enter at the Front Gate. Once you have the transponder for your room you can use it to open side doors.

Wifi

We provide a **wifi-account** for all participants. Details are on your badge. Further on, eduroam runs on Jacobs Campus.

Optional evening program Wednesday: Breminale

The Breminale is a very popular free open-air festival at the weser riverside in downtown Bremen with music, art, shows, and street food. You can reach it from the Central Railway Station (“Bremen Hbf”) by foot (approx 1.5 km) or with a short tram trip.



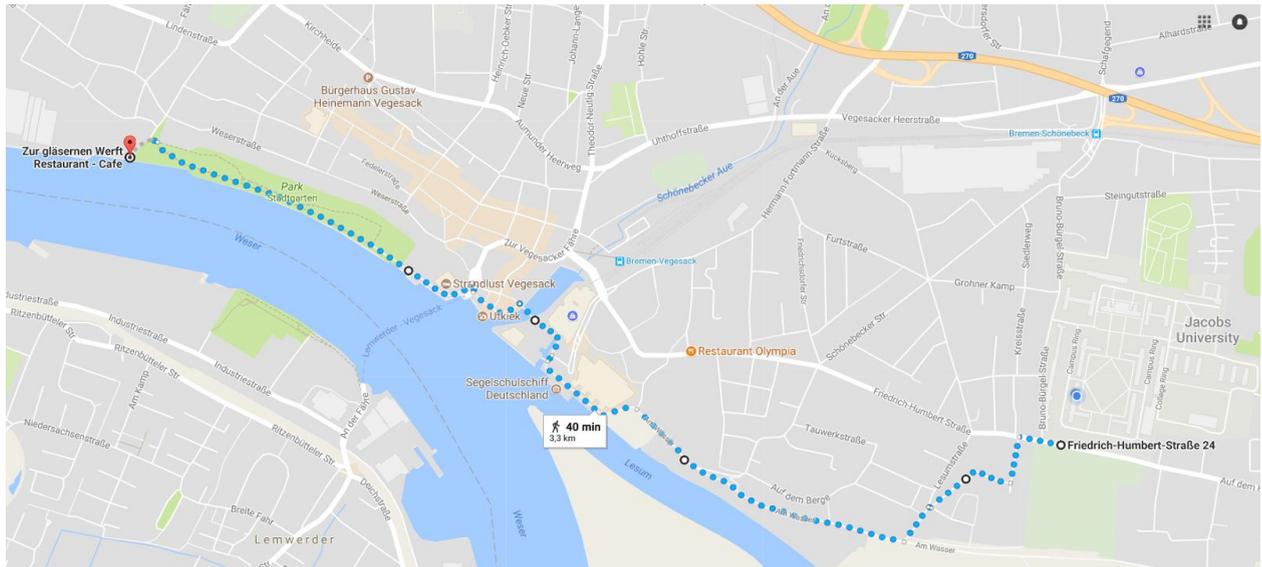
Trains leave “Bremen-Schönebeck” at 18:52, 19:07, 19:22, 19:37, 20:07, 20:37, ...

Trains leave “Bremen Hbf” (back to “Bremen-Schönefeld”) at 22:04, 22:34, 23:06, 23:34, 00:06 (later only Night Bus Service, which takes very long)

Way to the Social Dinner

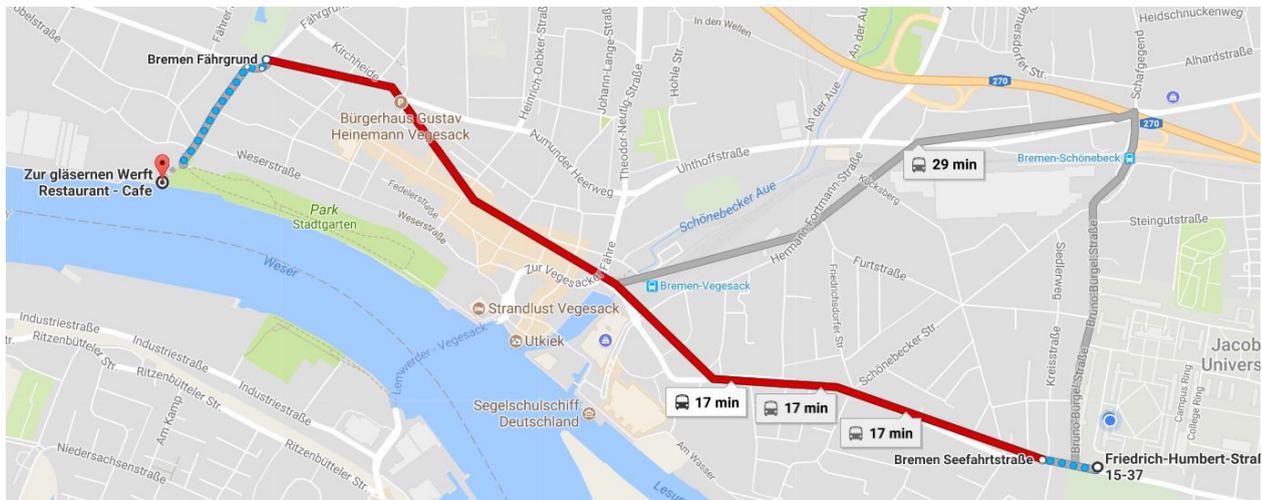
The Social Dinner starts Thursday, July 6 19:15 at **Restaurant “Zur Gläsernen Werft”**

A **walking group** will start 18:30 and take this nice route along the rivers Lesum and Weser, passing a big sailing vessel (Schulschiff Deutschland), the Historic harbour Bremen-Vegesack, a bronze statue of a whale’s jaws, and the nice riverside park “Stadtgarten Vegesack”. The walk is 3.3 kilometers.



Public transport

Bus 94 from “Seefahrtstraße” (Direction “Schwanewede”) leaves 18:40, 18:55, 19:10 take six stops (11 min.) and get off at “Fährgrund”. You can also get off at Bremen-Vegesack (central public transport hub in the North of Bremen) and walk half way. One trip is 2.75 €.



Way Back

If you do not want to walk or take or share a taxi. Take the Bus 94 from “Fährgrund” (Direction “Bf. Burg” or “Gröpelingen”). Leaves at 21:48, 22:18, 22:48, 23:18 (last).