BOOK OF ABSTRACTS

Social Networks and Inequalities in Health (Session 2)  
A network approach to integrate theories of cognition, society, and inequality  
Social networks of older people in the UK: are there positives as well as negatives?  
Body-mass index and social networks among adolescents: Evidence from four European countries  
Network, School and country variations in Adolescents’ Health Behaviour: A Multilevel and Multiple Classification Social Network Analysis of Binary Response Variables in six European cities.  

Socio-semantic networks: Political network and public opinion (Session 3; Part 1)  
Socio-semantic networks in the European vaping and fracking policy debates  
What can online discussions teach us about political polarization?  
Analyzing the Discourse on Asylum in Germany Before and After New Year’s Eve 2015/16  
Socio-semantic configuration of a Twitter territory  

Socio-semantic networks: Theoretical and methodological contribution to socio-semantic networks (Session 3; Part 2)  
Principles of the Social Construction of Reality – A Multilevel Network Approach  
Toward a typology of networks taking into account social and semantic relationships  
Social and symbolic relations in the Parliament of the Weimar Republic  

Socio-semantic networks: Exploring fields (Session 3; Part 3)  
Searching for the social structure of the happiness industry field  
Social ties and the academic self. A multilevel network study.  
Nonprofit mission framing: Evidence of variation across local United Way organizations  
Socio-semantic Aspects of Wikipedia Usage across Five Languages  

Networks in Archaeology and History (Session 4; Part 1)  
A formal network approach to ancient Mediterranean urbanisation process  
Agent Based Modeling and Archeological Networks - Refining the Material Based Approach  
Modeling innovation spread in archaeological networks  

Networks in Archaeology and History (Session 4; Part 2)  
The social dimension of credit relations: an application of SNA to an early modern merchant firm  
Mass genealogy: Top 1% of 19-th century Polish society as a single family network (PageRank-like analysis)  
Embeddedness of Periodicals in Illustrated Fashion Press in the Nineteenth Century  
The Network of zemstvo’ deputies in the Perm province in the second half of the 19th century: Dynamics and features of the formation  

Networks in Archaeology and History (Session 4; Part 3)  
"O Rus! Elite networks and gentry politics in pre-revolutionary Russia: The blacksoil nobles, 1861-1905"  
Hidden Archives and Lavish Libraries: Promises of Social Network Analysis for Research on Twentieth-Century China  
Building a Scientific Field in the Post-World War II Era: A Network Analysis of the Renaissance of General Relativity  
The elephant in the room of political parties: how patronage networks influenced leadership. A historical approach  

Social Networks and Intergroup Relations: New Questions and Challenges (Session 5; Part 1)
Be the Smart Guy: The Role of Gender and Ethnicity in Ability Attribution Processes in the Classroom

The interplay between ethnic composition and out-group attitudes as possible explanation for ethnic homophily in schoolchildren's friendship networks

The simultaneous development of ethnic segregation and health disparities among primary school children: a dynamic social network approach

Adolescents' Ethnic Self-Identification and the Formation of Interethnic Friendships

Social Networks and Intergroup Relations: New Questions and Challenges (Session 5; Part 2)

Intergroup Relations in Acquaintanceship Networks

Group violence, ethnic diversity and citizen participation: evidence from Indonesia

Assessing the structural conditions for ethnic boundary making: the role of ethnic segregation across school tracks

Varieties of Qualitative Perspectives in Social Network Analysis: Methodological issues (Session 6; Part 1)

Perceptions of Precarity - Facing methodological challenges in reconstructing dynamics of social network structures and social support

How to analyze deinstitutionalization and institutionalization of relational roles

Qualitative Typologization, networks and homophily. Tracing story-based interaction patterns

The duality of culture and social structure in the art field: a qualitative network analysis

Varieties of Qualitative Perspectives in Social Network Analysis: Methods (Session 6; Part 2)

The Truth Within – Re-interpreting the concept of social ties for social network research in the digital realm

Event-Based Diaries as a method for investigating the practical formation of networks

Using Graphical Bibliometric Reconstructions of Research Trails for Qualitative Investigations of Issue-Attention-Cycles in Science

Varieties of Qualitative Perspectives in Social Network Analysis: Stories (Session 6; Part 3)

Two sides of entrepreneurial support: Support ties emerging amidst mismatch between supporter and supported

Meaning, Content and Stories in eSNA. Personal Support Networks of Early Career Researchers in Educational Science.

Mapping Hiring Stories: an exploration of networks in international academic job securement

Varieties of Qualitative Perspectives in Social Network Analysis: Ego-centric networks (Session 6; Part 4)

Snapshot vs. Biography: Ego-Centered Social Networks in Biographic Perspective

Differences in the network structure of female professors from different scientific disciplines

Networks as identification resource – Evidence from narrative self-verifications of nascent entrepreneurs

Networks and the Labour Market (Session 7; Part 1)

Networks and status attainment: evidence from Spain

Occupational Mobility Networks

More than looking for a job, or: How refugees try to get a foothold in the German labour market

Networks and the Labour Market (Session 7; Part 2)

Teachers' labor market mobility in Sweden: Traces of the education reforms at the micro level
Gender, networks and career in Academia: Reevaluating evidence from Germany and Sweden

Climate change networks (Session 8; Part 1)
- Multi-level analysis of networks for sustainability transition in industrial areas
- Enter "KlimaNetze": Social networks and sustainable transformations in urban climate protection
- Social networks and the transformation of local electricity governance – cases from Germany

Climate change networks (Session 8; Part 2)
- Who cares about coastal carbon? Using social network analysis to map the structure of an emergent issue field (ID 1377)
- Divergent Neighbors: Corporatism and Climate Policy Networks in Finland and Sweden
- Participation within community-led energy projects: The role of social networks
- Online debate about climate change: Echo chambers and the structure of the climate news ecosystem

Psychological perspectives on social network analysis (Session 9)
- A psychological mixed-methods longitudinal study on personal network constitution and change: Concepts and first results of a student sample
- Understanding information search through an interactive networking game
- Personality and the Creation of Social Capital
- Overload and intention to leave: the negative effects of employees’ network embeddedness
- Leader centrality, satisfaction and team performance in workgroups: The analysis of instrumental and expressive networks

Networks for Learning: Network coevolution & social influence in Education & learning (Session 10; Part 1)
- Asymmetric social influence and the diffusion of high and low academic performance
- Social networks and favourite subjects: can friends explain gender differences in STEM preferences?
- Peer Effects in Online Mentoring – A Longitudinal Network Analysis
- Memory of ties: An educational network study over 10 years

Networks for Learning: Online social networks & Professional learning (Session 10; Part 2)
- What is going on? Assessing Network Positions within Online (Informal) Networks for Educational Practitioners
- The Effect of Organizational Structure and Cross-boundary Advice Seeking on Unit and Individual Learning
- The breadth and depth of knowledge exchanged in a Twitter community

Networks for Learning: SNA methods in Education (Session 10; Part 3)
- Mixed Methods Approaches to Social Network Analysis in Learning and Education
- Nash equilibrium with knowledge externality in students’ collaboration network
- Collecting Network Data of First-semester Students: A Photo Approach

Networks for Learning: Teachers’ social networks (Session 10; Part 4)
- Unravelling The Teacher Induction Period Using Social Network Analysis
- Understanding teacher collaboration for helping at risk-students to succeed against the odds: A social network perspective
- Teachers' Mental Models as Predictors of Advice Seeking: A Multilevel Social Network Analysis
- Teachers' Social Networks and Evidence Based Practice in German Schools

Networks for Learning: Theory in Education & Social Networks (Session 10; Part 5)
Towards a better understanding of the peer group context: The influence of close friends on the individual educational achievement and aspirations 103
Theoretical dimensions of interpersonal trust in an educational network 104
‘Collective embeddedness’ and social structure in schools: the case of a low-SES primary school going through a collective music-making intervention 105
Embedding Social Network Analysis into Educational Theory 106

Political Networks: Online networks (Session 11; Part 1) 108
Dynamic Networks of News Consumption: Online Traffic during the 2016 Brexit Campaign in the UK 108
#Pizzagate: Network dynamics of the alt-right ‘echo-system’ 109
Exploring the Facebook network of German anti-immigration groups 110
Twitter as the new coffee house? The mapping of European issue publics and the analysis of its internal structure 111

Political Networks: National and subnational political networks 1 (Session 11; Part 2) 112
Radical Right Media and Politicians within the Hungarian Media Network 112
Conflicts about Urban Infrastructure Projects: a Discourse Network Analysis 113
Negotiating conflict on e-cigarettes in policy debates 114
Strategic Action Field of the Polish Extreme Right, 1990-2013 115

Political Networks: Parliamentary networks (Session 11; Part 3) 117
Legislative co-sponsorship: Interest groups as hidden links? 117
Homophily, cosponsorship, and voting among legislators: New evidence from Ukraine 118
Information Networks of German Parliamentarians 119
Evolving affiliations amongst UK politicians 120

Political Networks: National and subnational political networks 2 (Session 11; Part 4) 121
Climate Change Policy Networks in the Czech Republic 121
Explaining intergovernmental cooperation in the water sector: The network of concordats among Swiss cantons 122
Explaining cooperation in “Save Cabo Pulmo” campaign: a multiplex perspective. 123
Driving changes or reserving stability? Transformation of political networks in Ukraine during 2002-2017 124

Political Networks: International and comparative networks (Session 11; Part 5) 125
Network governance in international organizations: Lessons from World Bank trust funds 125
Mapping the Community Structure of Far-Right Movements in the Czech Republic and Germany 126
Modelling multilevel network dynamics and the evolution of complex environmental governance 127

Political Networks: Conceptual / methodological innovations (Session 11; Part 6) 128
Governance Robustness & Resilience 128
Conflicts as Networks of Event Orderings 129
The duality of issues and organizations: A network approach to the exploration of collective agendas 130
The role of personal networks along institutional ventures. Insights from the Bolivian case. 131

Social Networks and Regional Economic Development: Regional Clusters, Knowledge and Collaboration (Session 12; Part 1) 132
Tie creation versus tie persistence in cluster knowledge networks 132
Knowledge dynamics in cross border collaborations. Spatial networks from co-authorships 133
Dyadic Analysis of Migration Flows across Italian Provinces 134
Innovation Networks Anchored into a Regional Scale: Looking for Smart Specialization Tendencies in the Portuguese Centro Region.

Social Networks and Regional Economic Development: Regional Development, Migration and Global Markets (Session 12; Part 2)
- Migrant enclaves and industrial districts: a complex interaction
- Re-Making social spaces: Networks of internally displaced persons (IDPs) and support organizations in Ukraine
- Upgrading in global markets through relational work
- A network-based approach to Food security and nutrition systems

Social Networks and Regional Economic Development: Cities and Networks (Session 12; Part 3)
- Polycentric urban systems: a multidimensional approach of networks
- A Tale of two Cities in the Greek Crises: Social Network-Based Resilience and Spatial Structures of Regional Cooperative Banks of Chania and Karditsa
- Comparing spatial and economic network analysis in Greater Manchester, UK

Negative Ties and Signed Graphs: Negative ties in schools and the workplace (Session 13; Part 1)
- Helping victims of bullying: The co-occurrence of defending, friendship, and dislike relationships
- Status Goals in School Bullying: The Co-evolution of Rejection and Bullying among Children
- Can collective experiences lead to negative ties? The case of a low-SES primary school going through a collective music-making intervention

Negative Ties and Signed Graphs: Methods in signed graph/negative ties research (Session 13; Part 2)
- Networks of Supreme Court Overturning Decisions
- “I ain’t got no quarrel with anyone” - How to measure negative ties? A comparison of qualitative and quantitative data collection.
- A Triadic View of Political Power in Signed Graphs: Exploring the Political Independence Index in the International Geopolitical Context

Negative Ties and Signed Graphs: Organisational and online signed graph/negative ties research (Session 13; Part 3)
- Negative experiences and negative ties: An analysis of the interdynamics of perceived exposure to workplace bullying and positive and negative social relations at work
- Bi-polar hierarchies: A study on the structure of coordination and control in Wikipedia
- Network antecedents of catch22-routines: Damned if you do, damned if you don’t
- The good and the bad - The Role of Balance, Status and Homophily in a Signed Tie Online Network in Germany

Sport and Networks (Session 14; Part 1)
- Tactical Insights from an Underdog Team: Network analysis of Iceland in the Euro 2016 against the teams of Portugal and England
- From the “Special One” to the “Sacked One”: the Effects of Manager Turnover on Passing Networks in Soccer Teams
- The connections of the connectors. Consultants of football players and their relationships

Sport and Networks (Session 14; Part 2)
- Social Network Analysis of Women’s College Basketball
- Social Networks and Retention of Members in Organized Sports
- Organized Sports, Gendered Networks?

Analysis of longitudinal personal and small social network analysis (Session 15)
Bargaining Power and Network Dynamics 163
New Kids on the Job - Analysing the emerging intra-organizational networks of newcomers and the social capital they provide. 164
Personal network dynamics in reference to physical activity behaviours 166
Theory and Methods of Multiplex Network Analysis I (Session 16; Part 1) 167
Field theory as a framework to tripartite analysis of agency 167
Optimization-based local simplification of multiplex networks 168
Multi-Graph Sampling Strategies for Conditional Uniform Graph Tests of Multiplexity 170
Clustering and network analysis of techno-economic segments characterizing emergent industries 171
Theory and Methods of Multiplex Network Analysis: II (Session 16; Part 2) 173
Information based approach for the detection of normative clusters. Analysis of post-disaster ordinances promulgation in Italy 173
Factorial methods to investigate multiplex network data 175
Community detection on multiplex social media data 176
Uncovering the network structures of corruption in Indonesia 178
Methodological Advances in the Study of Corporate Networks Fracturing and Concentration (Session 17; Part 1) 179
The Promise and Perils of Using Big Data in the Study of Corporate Networks: Problems, Diagnostics and Fixes 179
Multi-layer Motif Detection Algorithms for Understanding Corporate Networks 180
Pruning large corporate networks for core identification 181
Delineating the Corporate Elite: Inquiring the Boundaries and Composition of Interlocking Directorate Networks 182
Methodological Advances in the Study of Corporate Networks Fracturing and Concentration (Session 17; Part 2) 183
Uncovering Offshore Financial Centers: Conduits and Sinks in the Global Corporate Ownership Network 183
Pathways to the Power Elite - Career and network alignment in the study of elite concentration 184
Board appointments as a flow of events: Using relational event modelling for corporate networks 185
A country for old men: The inner circle in Danish corporate networks 1987-2016 186
Corporate Networks around the Globe: Power Structure Methods (Session 18; Part 1) 187
Limitations of Orbis relational data – the case of UK director interlocks 187
International networks of corporate power: What do interlocks matter? 188
Beyond Intercorporate Networks: the Policy Planning Network as the Center of the Corporate Power Structure 189
Corporate Networks around the Globe: Business-State Networks (Session 18; Part 2) 190
Leviathan and Business in Ukraine: Opening the black-box of the business-state symbiosis 190
Collaborative ties between private companies and countries in water sector 191
Assessing State Capitalism through cross-border ownership networks 192
Corporate Networks around the Globe: Networks Around the World (Session 18; Part 3) 193
Turkish firms and investors in the European Corporate Network 193
“The chemical brothers”: The evolution of the board interlock network in the German chemical industry, 1950-2015 194
China Goes West! Transnational networks of Chinese business elites and firms investing in Europe and the US 195
Corporate Networks around the Globe: Corporate Networks and Company Behavior (Session 18; Part 4)

- Network heterogeneity and the influential networks behind Germany’s largest listed companies
- The centrality of female directors: The law of gender quotas and interlocking directorates in Norway
- Social network, board interlocks and firms’ financial decisions: A case study of Italy

Multilevel Network Perspectives in and around Organizations: Multilevel large datasets: methodological issues and empirical cases (Session 19; Part 1)

- Multilevel blockmodeling for “larger” networks
- Multidimensional and Multilevel Analysis to Find and Describe Irregular Patterns in Political Communication on Twitter
- Dare to share? – How people share high-quality knowledge in online communities

Multilevel Network Perspectives in and around Organizations: Multilevel network studies in the public sector (Session 19; Part 2)

- A multilevel network study of sociability and governance of a common resource in Senegal
- Assessing the efficacy of self-organising project teams in a complex, research-intensive environment.

Multilevel Network Perspectives in and around Organizations: Multilevel networks in organizations (Session 19; Part 3)

- Cluster events: Arenas of informal networking and formal alliance formation? A multi-level network approach
- Recombinant capabilities for individual and organizational performance in the Biotech industry
- Conferences as a source of external knowledge: a multilevel level perspective.

Network Analysis of Political Power (Session 20)

- An approach to the study of power based on the concepts of duality and structural equivalence
- Normative Power in the Asia-Pacific Region: Network Analysis of Free Trade Agreements
- Centrality and Power: Network Analysis of Interstate Military Conflicts
- The BRIC phantom: ‘globalization’, mobility and structural change to the global power system, 1965 – 2005

Social Networks in Healthcare (Session 21; Part 1)

- Policy network in occupational safety and health in Slovenia
- Knowledge sharing in interdisciplinary networks of health care professionals
- Social network structure and healthcare coordination: an egocentric perspective

Social Networks in Healthcare (Session 21; Part 2)

- Exploring how multimorbidity care is managed and coordinated for an older Irish population within formal healthcare organisational structures and within informal networks: Preliminary results from an Irish study
- The Impact of Networking on Multi-Source Feedback Assessments for UK General Practitioners: A Social Network Analysis
- Physicians knowledge-sharing and Multidisciplinary Tumor Boards (MTB)
- Caregiving family networks and their impact on balancing caregiving for a home-dwelling relative with dementia and requirements of the family- and work-life: a planned mixed methods study
Social Networks in Healthcare (Session 21; Part 3)

Accessibility of Health Services for Young Latino MSM in Miami provided through Health Service Networks and Social Venue Networks

Interorganizational health care networks for outpatient care: Structural patterns and relevance for health care provision

Multiple chronic conditions in older people and their effects on health care utilization: a network analysis approach using SHARE data

Modeling Network Dynamics II: Time-stamped Network Data (Session 22; Part 1)

Multiple Imputation for Stochastic Actor Oriented Models

Standard errors in stochastic actor-oriented models

Tracking Local Communities in Dynamic Networks using Surface Tension

Analysis of temporary networks with time series modeling: an application to the Chinese contemporary art museum system

Modeling Network Dynamics II: Time-stamped Network Data (Session 22; Part 2)

Dynamic Network Actor Models (DyNAMs): An actor-oriented framework for studying time-stamped network data

Some days are better than others: Examining time-specific variation in the structuring of interorganizational networks

Predicting Relational Events

Collaboration between Software Developers and the Impact of Proximity

Modeling Network Dynamics III: Applications (Session 22; Part 3)

Exploring the dynamics of depressive symptoms and face-to-face interactions with DyNAM

Financial markets as evolving relational systems: Models and preliminary results from a study of European interbank market

Dynamicty as an innovation indicator in a longitudinal social network

The Serendipity of Friendship

Social Influence (Session 23; Part 1)

Adolescents’ socio-digital participation and school achievements: Selection and influence effects of peer friendship networks

Social and human capitals in academic performance. The complex coevolution of student health, social networks and academic performance

Peer Effects on Adolescent Delinquency and Substance Use: A Meta-Analysis of Stochastic Actor-Oriented Models

Social Influence in the Formation of Attitudes towards Homosexuality among Adolescent Friends: An Instrumental Variable Approach

Social Influence (Session 23; Part 2)

Collapse of an Online Social Network: The Blame on Social Capital

Mechanisms of social capital formation within non-commercial local exchange and trade system (LETS)

Smoking motivations differences according to peer groups’ gender composition. A social network study of 12 000 European adolescents.

The role of social networks to explain political behaviour and attitudes (Session 24; Part 1)

Facebook and revolutions: new evidence from Ukraine.

A Network Model of Selective News Consumption-Induced Fragmentation

Experimental Designs in Election Research: Are Online Political Stock Markets a New Option?

The role of social networks to explain political behaviour and attitudes (Session 24; Part 2)
It is not only who you are, it is also who you know and whether they know each other.

Exploring the effect of social networks on political participation in Belgium

Dissimilarity in political discussion networks and change of political orientations in Switzerland

Social Networks and Social Support (Session 25)

Big data and alternative facts: The changing face of information as power

Do we really discuss important things with unimportant others? On the tie strength of discussion networks and important tie networks - a comparison between The Netherlands and Slovenia

Pathways to Support: The Role of Entrepreneurs’ Indirect Relationships on Advice Flows

The relevance of space, distance and mobility for egocentric networks (Session 26; Part 1)

Does digitalization contribute to career advancement? Social networks of early career academics

The subject of innovative technology in humanities and social sciences: A methodological approach on analyzing academic egocentric networks

Personal networks and narratives about academic mobility: Visualizing the transnational mobile patterns of early stage researchers

The relevance of space, distance and mobility for egocentric networks (Session 26; Part 2)

Researching transnational networks in South Europe

Residential environments and personal networks in Germany

In Passing: The relational meaning of space for the occurrence of informal knowledge sharing in R&D

Social Networks and Spatial Embedding (Session 27; Part 1)

The Effect of Small Distances – Investigating Interaction Networks in a Workplace

Spatial diffusion and churning over the life-cycle of innovation

The Place of Interaction: Social Networks and Practices of Visual Artists in European Studios

Why some encounters encourage unplanned discussions on R&D-projects and others do not

Social Networks and Spatial Embedding (Session 27; Part 2)

The role of spatial and industrial proximity on the formation of inter-cluster linkages in Germany.

Spatial, Social and Professional Proximity in Hospital Wards

Social Network Analysis and its methodological potential to identify general features on Ebola Related Knowledge Producing Networks

Network Science & Law: Presentations: Social network & Law (Session 28)

Toward a Network Model of Soft Law: what gives Soft Law its Power?

Legal interpretation and network structures in mock trials shaping the European Unified Patent Court

The Economization of EU Competition Policy: Mapping the Network of EU Merger Control Decisions

Mapping the scholarship in International Courts: An exploration of scholar networks.
Social Networks and Inequalities in Health (Session 2)
Lea Ellwardt¹; Sylvia Keim²; Andreas Klämer³; Markus Gamper¹
¹University of Cologne; ²University of Rostock; ³Thünen Institute of Rural Studies

A network approach to integrate theories of cognition, society, and inequality
Mark McCann
University of Glasgow

This presentation applies four theoretical perspectives to the emergence of inequalities during the transition from adolescence to emerging adulthood, and will discuss how network analysis could provide opportunities to study the development of inequality.

Lin’s (1999) overview of the social capital model outlines how initial (e.g. parental) status provides access to individual resources such as education, and – via greater extensivity of ties – access to network resources. Secondly, mobilisation of social capital - mediated by the strength of ties and the status of alters - determines ego’s attained status.

Two elements of Tilly’s theory of durable inequalities are likely to operate through social network structures: opportunity hoarding, whereby groups of (often subordinate) individuals form an in-group that becomes overrepresented in relation to a resource or social position; and adaptation, formation of social structures and patterns which act to exclude subordinate groups. Operationalising these elements in a network analytic framework could help understand these processes.

Furlong et al’s theory of rationalised individualisation conceptualises successful youth transitions as part of a dynamic process, where an individual’s pattern of secured or frustrated outcomes iteratively determines how, at successive transitions, they rationalise actions towards or against behaviours which may influence outcomes.

A fourth perspective based on Galesic et al’s empirical social cognition research outlines how bias phenomena – e.g. self-enhancement, false consensus, ideological bias - can be explained by a social sampling model; the accurate estimation of alters’ traits, in the presence of homophily for that trait, leads to inaccurate estimations of the population distribution and one’s own position on the distribution.

These ideas allow us to conceptualise an adolescent developmental perspective on inequality. Initial status may confer differential academic orientation for young people based on whether education secured or frustrated their parents’ employment outcomes, health risk behaviours may be inherited from parents, and may also serve as a signal to their peers of school disengagement. Within schools, patterns of friendship may form around academic orientation: adaptation processes may act to exclude low-orientation individuals from the positive norms of high orientation cliques; while opportunity hoarding could lead low-orientation students to coalesce into groups and take up risk behaviour. Symmetric homophily would suggest both processes are at play, while differential formation of social ties at high versus low levels of orientation (asymmetric homophily) would suggest one process dominates the other. In the presence of homophily, social sampling may explain ‘biased’ rationalisations of the success or failure of high versus low academic orientation, amplifying such rationalisations and further embedding in-group norms over time.

Understanding the transition from relative equality of health in youth, to divergent risk behaviour in adolescence and inequality in life course outcomes is a key societal concern. This paper will explore how social network methods can be applied: firstly, to develop
hypotheses derived from integrated theories; second, to test these against network data; and ultimately, to develop robust, theory-informed interventions.
Social networks of older people in the UK: are there positives as well as negatives?

David Barron\(^1\); Elizabeth West\(^2\)

\(^1\)University of Oxford; \(^2\)University of Greenwich

There is clear evidence that social isolation among older people in the UK is a significant problem. It is problematic both because loneliness is an unpleasant and undesirable state to be in, and also because it is associated with increased risk of mortality and morbidity. However, recent research in the US has suggested that there are positive as well as negative impacts on social networks as people age. This is rooted in activity theory (Lemon, Bengtson and Peterson 1972) and continuity theory (Thoits 1992), which portray older people as resilient in the face of life events that might be thought to increase social isolation, such as retirement and bereavement.

Cornwell, Laumann and Schumm (2008) recently investigated the characteristics of people aged 57 to 85 in the United States. They found that age is indeed negatively related to network size and closeness to network members. On the other hand, they also found that age is positively associated with frequency of contact with neighbours and engagement with community activities such as volunteering. Using data from the English Longitudinal Study of Ageing, the British Household Panel Survey, and Understanding Society datasets, we build on Cornwell et al.’s work by investigating how a number of indicators of social networks vary with age in the UK. We also make use of the longitudinal nature of these three data sources to investigate how they are impacted by life events such as retirement and bereavement. We aim to show how changes in the social networks of older people can contribute to successful or positive ageing.
Body-mass index and social networks among adolescents: Evidence from four European countries

Thomas Grund; Travis Tatum

University College Dublin

Obesity is related with various illnesses and remains a major threat to public health. Previous research stresses the importance of social networks for health outcomes. We draw on network data (N = 18133) from the Children for Immigrants Longitudinal Study in four European Countries (CILS4EU) study for adolescents (mean age = 14.99, std = 0.81) and investigate the relationship between individuals’ body-mass index (BMI) and the BMI of their friends. Our study reveals strong evidence for BMI clustering in England, Germany, Netherlands and Sweden; adolescents tend to be friends with others who have a similar BMI. We also find evidence that BMI clustering is more pronounced for strong relationships and between adolescents of the same biological sex. We provide new insights into BMI clustering among adolescents in Europe and argue that targeted health interventions for weight loss among adolescents should take social networks into account.
Network, School and country variations in Adolescents’ Health Behaviour: A Multilevel and Multiple Classification Social Network Analysis of Binary Response Variables in six European cities.
Vincent Lorant¹; Prof. Mark Tranmer²
¹Université catholique de Louvain; ²University of Glasgow

Introduction
Adolescents’ health behaviours result from their social connections to peers having similar health behaviour. Better knowledge of this peer similarity of health behaviours in school-aged adolescents will be useful in terms of network interventions. Yet, it is unknown whether this similarity applies more to some behaviour and whether this similarity is vulnerable to compositional and situational factors. This paper describes the magnitude of health behaviour similarity and the role of compositional and situational factors on it.

Method
A social network survey (SILNE) was carried out in 50 schools from six medium-size comparable European cities (Namur-Belgium, Tampere-Finland, Hanover-Germany, Latina-Italy, Amersfoort-Netherlands, and Coimbra-Portugal). Adolescents in the 9th and 10th grades were recruited (n=11.015, participation rate = 79.4%). A method of estimating the extent of peer and school variations in health behaviour is described and applied, through the use of the Multiple Membership Multiple Classification (MMMC) Model. It is possible to assess the extent of similarity of a particular health behaviour within schools and within networks.

Result
Friendship network similarity was an important variance component for the three risky behaviours, smoking, drinking, and cannabis use; it was absent for the only positive behaviour, physical activity. The school bears very little on these behaviours, even before controlling for the school composition. Country is a key variance component for cannabis use but is not an important component for smoking. Network similarity was not very much affect by compositional or positional factors, with the exception of cannabis use. Cannabis friendship similarity relies heavily on popular individuals. Finally, we found that school are generally doing well or poorly in the same way for smoking, drinking and cannabis.

Conclusion
In conclusion, smoking and drinking are best addressed at the network level, cannabis consumption is better addressed both at the network and country-level whereas physical activity depends more on the country-level. Our approach provides an tool to identify vulnerable schools.
Socio-semantic networks: Political network and public opinion (Session 3; Part 1)
Chair: Nikita Basov
Co-chair(s): Iina Hellsten, Adina Nerghes, Camille Roth, Johanne Saint-Charles
1 St Petersburg State University, 2 University of Amsterdam, 3 Sciences Po, 4 Université du Québec à Montréal

Socio-semantic networks in the European vaping and fracking policy debates
Jacob Hasselbalch
Copenhagen Business School

This paper demonstrates the utility of a socio-semantic approach to network analysis for studying the evolution of public policy debates. I analyze two examples of recent European Union policy initiatives to address especially controversial and disruptive technologies: electronic cigarettes and hydraulic fracturing. Both of these debates involved highly polarized coalitions of interest groups (environmentalists versus oil and gas companies in the fracking case – vaping communities versus tobacco control groups in the vaping case) who clashed strongly over the necessity, definitions and extent of European regulation to mitigate the perceived risks that the technologies presented. These types of contentious and socio-technical policy debates are well-suited to investigating the links between the social structure of coalitions and the semantic structure of the discourses they organize around.

To map how interest groups pitched their arguments and framed their positions vis-à-vis other interest groups and institutional actors such as the Commission, I coded newspaper articles and press releases from the online database at EurActiv.com. I downloaded a total of 156 articles (104 concerning fracking and 52 concerning vaping) from 2010 to 2016 and identified a total of 946 statements where actors presented their position on the policy debates (fracking: 602 – vaping: 344). Informed by sociological studies of disruption and risk, statements were coded according to a six-fold typology of framing in which the risks and opportunities of vaping or fracking were either supported or rejected on normative, cognitive, or relational grounds. Using the Discourse Network Analyzer software, this list of coded statements was transformed into an affiliation network for each case study, that is, a directed, two-mode network in which statements represent the edges connecting actors to framings in either a negative or positive way. Drawing on these affiliation networks, one-mode networks of either actors or frames can be computed.

In the actor networks, similarity in frame usage can be understood as a form of social tie, whereby the social structure of the coalitions and the policy debate as such can be visualized. In the concept networks, groups of frames used in a similar fashion by multiple organizations can be understood as representing a discourse, whereby the semantic structure of the coalitions and the entire policy debate can be visualized. Comparing and contrasting the actor and concept networks over three different stages of the policy debate, each spanning about two years, I present a number of conclusions concerning how changes in the socio-semantic networks impact the strategy of coalitions and the space of policy solutions. Specifically, the network analysis implies two different varieties of venue-shopping, as actors seek to circumvent their opponents by either going over their heads or leveraging
popular sentiments rather than engage them head-on. This differs from other studies on policy networks that tend to view policy solutions as associated with the emergence of a consensus-seeking super coalition. In this study, instead, trust breaks down and coalitions harden.
What can online discussions teach us about political polarization?
Niclas Lovsjö, Martin Arvidsson, Marc Keuschnigg, Christian Steglich

Linköping University

We present first results from a proof-of-concept study in which we investigate the emergence of echo chambers in a large online discussion forum by means of textual machine learning methods and longitudinal social network analysis. We have web-scraped data from a Swedish discussion forum, consisting of over 1m members and ~50m individual posts since the year 2000. The forum is known on the one hand for the vast areas of everyday discussions, but on the other hand infamous for its openness to the free expression also of extreme political opinions. This results in a unique setting for e.g. following how people enter the forum for discussing everyday life-questions, and end up contributing to a thread in opposition of immigration.

By using techniques from natural language processing (such as semantic analysis and topic modelling) we classify beliefs and sentiments of people over time. These data constitute a dynamic two-mode (individuals by beliefs) network. We also extract dynamic one-mode (individual to individual) network data by assessing individuals’ exposure to others’ posts, and direct responses to others’ posts. Taken together, we arrive at a dynamic, socio-semantic network structure that we analyze with methods from longitudinal social network analysis. We examine in particular how individuals react when exposed to divergent beliefs of others. Are their own beliefs positively or negatively affected (social influence)? Do they reduce or increase their exposure and inclination to respond to these others (social selection)? The present study is meant to be a first phase of exploring tools, methods and online observational textual data that will later be used in a larger sociological study.
Analyzing the Discourse on Asylum in Germany Before and After New Year’s Eve 2015/16
Nora Sinner, Melanie Nagel
Universität Konstanz

Research on the combination of social structures and the role of beliefs and ideas increased in the last years. Scholars focus on the context and meaning of discourses of individuals, organizations or communities, and at the same time, they include structure and dynamic evolution of network relations into their analysis. The insight that similar arguments in a public discourse can be seen as a specific kind of structure, and groups of actors with related arguments can be seen as discourse coalitions, are indeed popular.

In our present research project, we focus on the public discourse on asylum in Germany before and after a critical turning point, which were sexual attacks on New Year’s Eve 2015/16 in Cologne, mainly by male refugees from the Maghreb states (ZEITmagazin No. 27/2016). Our research questions are: How can we explain the evolution and the sudden shock as change in the public discourse? Which actors were involved and which arguments made them adapt their previously different views?

Using the methodological tool discourse network analysis, we therefore entangle the relational nature of discourse in which actors influence each other mutually and differ or agree to certain degrees (Leifeld 2016: 3). Based on newspaper data, we analyze the public discourse two weeks before and after New Year’s Eve in a systematic and dynamic way.

Our findings show, that the events of New Year’s Eve as crisis suddenly changed the discourse on asylum and its structure. Research in this field can give important insight into discourse evolution, abrupt changes, polarization and depolarization. The combination of relational and content analysis is therefore outstanding for a multidimensional perspective of issues and actors.


Socio-semantic configuration of a Twitter territory

Camille Roth¹, Iina Hellsten²
¹Sciences Po, ²University of Amsterdam

Our paper focuses on the socio-semantic configuration of a digital Twitter territory, in particular around the publication of the Inter-governmental Panel on Climate Change (IPCC) panel Working Group 2 and 3 reports in March-April 2014. We show that this portion of the public space is characterized by specific sets of structural positions which, in turn, correspond to specific semantic positions, in terms of discourses and alignments in the underlying debate on climate change.

We distinguish an “IPCC heart”, actively discussing IPCC, from an “IPCC shadow”, which more anecdotally mentions IPCC and is likely to correspond to the remainder of a public space minimally interested in IPCC-related reports. More precisely, from the 35k distinct authors of about 90k English-speaking tweets mentioning “IPCC” during this period, we manually identified the top 2% having more than 15 tweets in the corpus. This yields a “heart” made of 629 authors who produced about 27% of the total amount of tweets (retweets were excluded to focus on utterances and links originally made by individuals rather than duplicated from others). We manually identify these heart users, according to their type and, most importantly, alignment in the climate change debate. We assume that users may have a specific alignment, depending on whether they are generally critical or supportive of anthropic climate change, or unaligned. User types simply correspond to the kind of entity behind the account, sorted into seven categories: corporate, research, governmental, individual, media, NGO-related accounts, or “other” (for uncategorized accounts, such as individuals whose category was not possible to identify from their Twitter account).

The goal of our analysis is to assess which positions are being occupied within this specialized digital public space, and by whom. We note the existence of four typical positions: stars (both heavily cited and active), famous users (cited without being very active), curious users (being rather active without receiving much attention), and silent users. In turn, these meta-positions are occupied by users whose type, alignment, and discourse very significantly diverges from a random baseline. Interesting observations relate to the position of critical users (who, albeit the minority, are both most visible and cited in this arena) among “star” accounts featuring under-represented and unaligned media and governmental agency accounts. Casual users, on the other hand, essentially remain supportive yet invisible, while relying on concepts – discussing mitigation, cost, adaptation issues – which are in phase with those evoked by more institutional accounts and in stark contrast with those of the critical stars, who focus on scientific concepts (hockey stick, AGW, data, models and predictions, even referring to scientists and science per se). For climate change debate, it is interesting to note that while critical users are in minority as compared to supportive and unaligned users, they typically occupy star positions, indicating a dominant (highly visible and highly cited) position in the Twitter debate. In a nutshell, our socio-semantic analysis sheds light on the intertwining of cognitive and structural position of a tightly delimited territory of the online/Twitter public space.
Socio-semantic networks: Theoretical and methodological contribution to socio-semantic networks (Session 3; Part 2)

Chair: Iina Hellsten
Co-chair(s): Nikita Basov¹, Adina Nerghes, Camille Roth³, Johanne Saint-Charles⁴
¹St Petersbourg State University, ²University of Amsterdam, ³Sciences Po, ⁴Université du Québec à Montréal

Principles of the Social Construction of Reality – A Multilevel Network Approach

Nikita Basov¹, Julia Brennecke², Peng Wang³
¹St Petersburg State University, ²University of Liverpool, ³Swinburne University of Technology

One of the corner stones of the contemporary sociological theory is the idea that individuals generate cultural structures through interaction to jointly make sense of the world, reinforce belonging to certain social groups and forge collective identity (e.g., Berger & Luckmann, 1966). Within this vein, studies on social networks and culture show that relations between persons affect their views, ideas, and perceptions (e.g., Carley, 1986; Lizardo, 2006; Pachucki & Breiger, 2010). However, until now, research has not identified the concrete principles of micro structuring that guide how interpersonal ties produce shared culture over the time of collective practice. In order to do this, a pragmatic approach, which takes into account the context of specific group practice when linking culture to social structure it is embedded in, is to be combined with a formal one, which detects fundamental mechanisms of socio-cultural micro structuring.

We develop a mixed method approach that applies statistical modelling to a combination of social and cultural network structures mapped using rich ethnographic data, such as interviews, dialogues and written texts, and regular sociometric survey data. First, utilizing word collocation technique we map cultural constructs specific for particular persons in their practical contexts based on multi-source textual corpora collected on each individual. Second, we use sociometric survey data triangulated with interviews and visual ethnographies to relate these cultural constructs to social ties between individuals. Finally, we jointly examine social and cultural structures in a fashion of quantitative socio-semantic network analysis (Roth & Cointet, 2010), treating them as multilevel structures that consist of meaning links connecting concepts at one level and social networks between individuals constructing these meanings at the other. Links between the two levels represent individuals’ usage of concepts. Multilevel exponential random graph models are applied to these structures in order to examine socio-semantic patterns and to capture the fundamental principles of how social network structure impacts groups’ cultural constructs over time.

We test the outlined approach using data on five artistic collectives located in different cities of Europe: St. Petersburg, London, Hamburg, Barcelona, and Madrid. We find the impact of interpersonal structure on concept sharing by individuals and on engagement of artists with the same meaning structures. This impact is different for two different types of interpersonal networks: emotional attachments and working relationships.
Toward a typology of networks taking into account social and semantic relationships
Johanne Saint-Charles, Pierre Mongeau
Université du Québec à Montréal

Networks studies taking into account both the social and the semantic have flourished in the last two decades. In their endeavours to decipher the manner in which social relationships and discourse/meaning are intertwined and influence one another, scholars have proposed theoretical and methodological pathways. A scan of the publications on this topic reveals that studies combine in various ways networks where nodes are agents, elements of discourse or objects and linked by ties taken from declarations, references, semantics or bipartite projections.

This leads to a puzzlement created by the use of the same names for different networks or different names for the same network.

In this paper we propose to construct a typology of networks taking into account social and semantic relationships along with the issues each type seeks to address. We conclude on potential new pathways for research based on types rarely used such as 3-mode networks.
Social and symbolic relations in the Parliament of the Weimar Republic
Jan Fuhse¹, John Levi Martin, Jan Riebling, Oscar Stuhler
¹Humboldt-Universität zu Berlin

We discuss the relation between social and symbolic ties. We distinguish three ways of constructing symbolic relations from automated analyses of textual data and illustrate each of them by way of analyses of the parliamentary proceedings of the Weimar Republic in Germany (1919-1933). First, we investigate general semantic connections (of co-occurrence of terms) as shared by the actors in parliament. This allows discerning a common symbolic universe, with tropes of political discourse. If possible, we offer snapshots of this political discourse as changing over time. Secondly, symbolic relations are reconstructed from political actors jointly using two terms. For example, one political party might connect the notion of “people” to “national community” and to the denigration of minorities, while a second links it to “citizens” and “democracy”, and a third thinks of “people” as workers, and tie this to ideas of welfare policies and elimination of private property. This leads to socio-symbolic constellations of actors distinguishing themselves from each other by way of symbolic practices, and of symbols marking particular ideological positions of political actors. Finally, we study the use of symbolic practices in ties between political actors. Members of one party typically react in particular ways (applause, boos, “hear, hear!”) to each other, marking the quality of the relations between political parties. Symbolic practices are here interpreted as part of the relationship culture between actors, rather than located in actors.
Socio-semantic networks: Exploring fields (Session 3; Part 3)
Chair: Camille Roth\textsuperscript{3}, Johanne Saint-Charles\textsuperscript{4}
Co-chair(s): Nikita Basov\textsuperscript{1}, Iina Hellsten\textsuperscript{2}, Adina Nerghes,
\textsuperscript{1}St Petersburg State University, \textsuperscript{2}University of Amsterdam, \textsuperscript{3}Sciences Po, \textsuperscript{4}Université du Québec à Montréal

Searching for the social structure of the happiness industry field
Jose A. Rodriguez Diaz
University of Barcelona

Happiness, in the process of becoming a new social goal of the XXI century, is materializing as a very large industry engulfing the interests, activities and dynamics of actors trying to define it; actors providing paths, products or services leading to it; those attempting to regulate it; and those pursuing it.

In this paper we attempt to map the social structure of the Happiness Industry field by way of interconnections and proximities between the components of the field: concepts, ideas, definitions (meanings) and actions, tasks (practices) and with the actors associated with them.

Surveying the web we obtain a wealth of information of types and organizational forms defining, providing, selling and buying happiness along with the meanings they give to their role and the activities taken or to be taken to attain happiness.

SNA approach and techniques are used to conceptualize the information in relational terms and to build relational matrixes to be used to analyze and visualize the social field of the happiness industry.
Social ties and the academic self. A multilevel network study.

Christian Steglich\textsuperscript{1}, Lysann Zander\textsuperscript{2}
\textsuperscript{1}Linköping University, \textsuperscript{2}Freie Universität Berlin

In educational settings, the self-concept of academic ability is of crucial importance for understanding academic motivation and academic achievement of students. Recognising that the self is relationally shaped in social interaction, we propose an integrated, dynamic social network approach to the study of academic self and academic outcomes.

Making use of a multilevel network model, we assume students are on the one hand connected to the beliefs they hold about themselves (their self-concept; nano-level) and on the other hand to the peers they interact with (friends, helpers, etc.; micro-level). This can be enriched with a connectionist (cognitive-semantic network) model of the self. This modelling framework allows the formulation of very detailed hypotheses about the social mechanisms governing the dynamic interplay between self-concept, selection and de-selection of specific interaction partners, and academic outcomes. Analyses are performed with the RSiena software. Data were obtained from more than 700 students in 36 school classes (years 6-9) in Germany. Initial results show that self-concepts are adopted from friends, but also that students selectively choose friends who hold similar self-concepts.

We will report results on more nuanced mechanisms, including a study of the so-called Big-Fish-Little-Pond effect, which states that students with otherwise equal academic abilities will develop more positive self-concepts of ability if they find themselves in a poorly performing environment, than if they find themselves in a high-achieving one.
Nonprofit mission framing: Evidence of variation across local United Way organizations
Megan LePere-Schloop
The Ohio State University

Nonprofit organizations function in a dynamic environment, to which they adapt in a number of ways. One adaptation strategy can be described as mission framing: when an organization reinterprets and/or emphasizes different dimensions of its purpose-based identity to better fit the context in which it operates. While organizational identity adaptation has been a central topic of generic management research (Gioia et al., 2013), it has received less attention from nonprofit scholars (Brilliant & Young, 2004). It is important to understand nonprofit identity-focused adaptation because such change shapes other strategic and programmatic choices, affecting the communities that depend on nonprofits for social service provision. This study examines nonprofit mission framing across an important field of organizations in the United States: the United Way (UW) system.

The UW system includes approximately 1800 local UW organizations around the globe, most of which are located in the United States. The UW system receives more in private donations than any other nonprofit in the U.S., and is the most significant private funder of human services in many local communities (Hall et al, 2013). Traditionally, a large portion of UW funding comes from workplace giving campaigns, employer-sponsored fundraising initiatives.

For at least twenty years, however, the workplace giving arena has been experiencing significant change. Since the late 1970’s, a number of alternative funds focused on issues such as minority rights, the environment, and medical research, have come to compete with the UW in workplace giving campaigns (Barman, 2006). As the UW Worldwide seeks to maintain its foothold in the workplace giving arena, it is attempting to re-frame its’ mission through the Community Impact initiative (Barman, 2006). Local UW organizations, however, have some discretion over implementation of the Community Impact initiative.

This study draws upon classic theories of organizational adaptation, and research on workplace giving, to examine organization-level variation in mission framing across a large sample of local UW organizations. Data on organizational purpose statements, philanthropic market consolidation, and peer influence are analyzed using machine learning, and social network analysis (SNA) techniques. Findings suggest that: 1) local UW organizations are both maintaining core dimensions of their identity while integrating new components; and 2) local field consolidation, and peer influence are associated with the mission framing choices of local UW organizations.

References


The goal of this communication is to make use of the openly available edit history of multiple language editions of Wikipedia in order to unravel patterns of behaviors and preferences regarding semantic aspects of the Wikipedia in five languages: English, Spanish, French, Portuguese, Italian.

Being aware that the English Wikipedia is a product of the worldwide population and, to a lesser extent, the same is true for the other language Wikipedias, our aim is to show that particular patterns can be found, regarding each language, as an important dimension between the high dimensionality in where the human being is embedded.

Taking advantage of the global covering character of the Wikipedia dataset, we address among others the following points: Rank activity and activity distribution according to the semantic involved in a page’s subjects in the several languages. Diversity in the semantics of subjects among the languages. In which semantic classifications are involved more wikipedians depending on the languages? Which subjects in Wikipedia pages are more open to the general population and, which are constrained to small number of wikipedians? Distribution and classification based on languages. Finally, we show the correlations between the communities of wikipedians and the semantics in the Wikipedia pages, defining connectivity between Wikipedians if they edit on the same page.

Why is the voluntary edition of Wikipedia suitable for this study? Because whatever the reasons behind someone’s decision to edit an article in Wikipedia and whatever his background and previous knowledge on an article’s subject, the voluntary process of Wikipedia edition provides an environment in which the outcome is clearly a collective product of interactions involving a large number of people, which are, in our case of study, also constrained to have a certain level of proficiency in the same language, being able to formally document subjects of interest and importance for them.

Our data sample for the Wikipedia editors consists of the five mentioned languages separated by Wikipedia dump, in the period of about ten years ending in January 2010. The accessible data contains the whole editing history record for both pages and editors.

Our purpose is not pretending to perform a complete sociological study regarding cultural aspects among the five languages, but to open a door into a rich source of knowledge regarding multiple semantic aspects that can suitably be studied by means of the human footprints resulting from the collective effort by millions of volunteers, which working in an apparently disorganized process of editing, acceptance and rejection, work, in fact, as an effective and robust peer review procedure, giving rise to the high quality of the Wikipedia encyclopedia.
A formal network approach to ancient Mediterranean urbanisation process

Lieve Donnellan
VU University Amsterdam

Recent approaches to formal network analysis in archaeology tend to be critical towards the importance paid to absolute space as analytical unit for studying past interaction. Even though space is an important factor in analysis, nodes in an archaeological network are too often equalled with a physical place. Thus, this paper proposes an alternative approach for studying interaction in past populations, based on funerary contexts. Ties between nodes (tombs) are based on similarities in materialities between individual funerary contexts. Similarities between the physical appearance of tombs used to be seen by scholars as expression of social class and social status, but the subtleties of interaction, as expressed through the use of material culture as proxy for interaction and ideology, could not be analysed. However, a systematic and quantitative approach is needed to gain a full understanding of the importance of network structure, clustering, the role of bridges etc.

By converting a funerary dataset into a two mode network model, a detailed understanding of the structure of the population as well as the role of individual objects and materialities can be made. This type of analysis revolutionizes the archaeological study of burial rites in the past.

The application of this model to a case study, Pontecagnano in Campania, Southern Italy, allows to gain a more subtle and complex understanding of the social make-up of this society, as expressed in burial. Traditionally, the society in Pontecagnano is seen as moving in a linearly fashion from simple to complex, in a process of state formation and urbanisation. In this process, different groups were gradually united into one larger early urban society. A formal network analysis allows to understand the trajectory of social change, the important actors, as well as their main strategies in the process.
Agent Based Modeling and Archeological Networks - Refining the Material Based Approach
Lennart Linde
Goethe-Universität Frankfurt am Main

Archaeological Networks constitute themselves from broken links and defunct nodes. Therefore they are not characterized as proper social networks but rather as material networks. Synthesized solely from the material remains of a distant past. But these material proxy's in itself are only a fragmentary sample of historic reality. They are bound to depict mainly the presence and absence of a chosen proxy at archaeological sites. While distribution patterns of artifacts emerge from past interactions between actors they hardly shine any light on the nature and directions of these interactions. A way to explore this very interactions are Agent Based Models (ABM). Virtual agents take the roles of actors and act accordingly to a given rule set. This ruleset mirrors our assumptions on the nature of interactions that lead to the observed network. These computational simulations allow us therefore to verify if the underlying hypotheses of how a network had constituted itself. The presentation will showcase an experimental ABM centered approach to generate archaeological networks. The network graphs and measures generated through the ABM will than be compared to the patterns synthesized from the material based approach. This puts ABMs in the place of a "computational laboratory", a virtual space to put those social rules and norms to test that we suppose to be the driving factors of network genesis. While the possibilities seem endless the talk will shed some light on what constitutes a good model and which boundaries are limiting to the current approach.
Modeling innovation spread in archaeological networks

Natasa Conrad
Zuse Institute Berlin

Real-world systems are often modeled as networks. Analysis of such networks has led to valuable insights about the underlying systems coming from many different areas: sociology, biology, technical sciences etc. In particular, archaeological network analysis has gained a lot of attention in recent years, as using graph structure enriches historical data with additional relational information. However, many of the existing approaches rely on directly applying established network perspectives, without adopting it specifically to archaeological data.

We develop new mathematical methods for archeological network analysis using not only relational data, but also incorporating spatio-temporal information, geophysical knowledge and existing material traces. We apply these methods for modeling innovation spread in large, time-evolving networks. In this talk, I will present our new method and demonstrate its applicability to studying how the use of wool-sheep has started and spread in Near East and Europe. We are interested in possible scenarios on where and when wool production first emerged and determining most probable paths of its spread. Our approach is based on dynamical exploration of network structure via a Markov process and using its spectral properties to reveal metastable regions, i.e. regions where innovation stays for a long period of time, before it quickly jumps and spreads in another metastable region. We focus on more detailed, mathematical understanding of this process. Such analysis could provide new perspectives for changes this innovation has made in particular regions and in textile production development in general.
The social dimension of credit relations: an application of SNA to an early modern merchant firm

Cinzia Lorandini; Francesca Odella
University of Trento

This paper uses historical network analysis to investigate the social dimension of credit in the early modern period. Drawing on insights from recent literature (Muldrew, 1998; Hoffman et al., 2000; Clemens and Reupke, 2009; Fontaine, 2014), we attempt to observe more deeply the role of reputation and trust in pre-modern credit markets, as well as the peculiar function of notaries in matching demand and supply of credit. The analysis was performed on an original dataset, reconstructed from the archives of a family business - the Salvadori firm of Trento - that was active in the eighteenth century. Specifically, we analyzed the local financial network of the family (2-mode matrix with credit positions by persons) extracted from loans granted between the 1720s and the 1760s, and on the basis of cross-information in business ledgers we were able to establish different types of links among the lenders (Salvadori family), the borrowers, and the other subjects involved (a sample of the civil society of the time). We then applied Social Network Analysis (Erickson, 1997; Brandes at al., 2012; Morrisey, 2015) not merely to visualize the Salvadoris’ credit network, but rather to make an attempt to test some hypotheses concerning the social dimension of credit, and the role of notaries. As for the social dimension of credit, we explored to which extent the credit transactions differed according to the borrower’s social position in the local milieu, and relationship with the Salvadori family. Secondly, we explored the intermediary role of notaries by analyzing their position within the family’s credit network. We aim to understand the reasons behind the recourse to different types of credit tools, namely notarial deeds vis-à-vis privately written obligations, particularly whether this choice was affected by the nature of the relationship with the borrower. Accordingly, we tested the hypothesis that reputational aspects were mostly relevant in the formation of the moneylending circuit (White, 1992) with selection mechanisms mainly based on the social class of the borrowers. Results confirm that the credit networks created by notarized and non-notarized loans is different in terms of composition and structure, an observation that supports the contention that notaries played a bridging role between actors of different social status, facilitating access to and circulation of credit.
Mass genealogy: Top 1% of 19-th century Polish society as a single family network (PageRank-like analysis)

Marek Jerzy Minakowski
Dr Minakowski Publikacje Elektroniczne

The recent developments paved a way for a new auxiliary science of history: mass genealogy, which lies between traditional genealogy and historical demography; which borrows from social network theory and software and in turn provides data for sociology. It is now possible to present whole societies (nations or their parts) as continuous family networks where everybody is connected through finite number of family ties – and analyse these networks.

Thanks to thousands volunteers indexing genealogical records, already about 20 million 19th-century birth/death/marriage records from Poland have been indexed in a machine-readable form. They were combined with data taken from printed genealogical and biographical lexicons and data from private archives of another thousands of people.

Now we have a densely interconnected network of the 19-th century intelligentsia - upper class (roughly top 1%) of former Polish-Lithuanian Commonwealth. The whole database (a single family network, published at http://Sejm-Wielki.pl and http://Wielcy.pl) has about 0.7 million people (nodes). While "The Polish Biographical Dictionary" (the most important source for biographies of most eminent figures from area of present Poland, Lithuania, Ukraine, Belarus and Latvia) covers 15,500 people born between 1750 and 1900 (27,500 in total), 60% of them is already in our network. While "Kurier Warszawski" (most popular newspaper) between 1821 and 1861 noticed about death of 18,000 people (the noticeable people for their readers), 50% of them is already in our network. We know who was important for historians, who was important for the contemporaries, and who was not. This made it possible to measure the social position of everybody in a way borrowed from the Google's PageRank algorithm.

The resulting measure ("family ties rank") seems to be closely related with combined P. Bourdieu's economic, social and cultural capital. For historical reason (wars, revolutions, border changes) the economic capital is less important for understanding Eastern European societies than especially cultural capital, which in turn is elusive and hard to measure. Our analysis makes it possible to understand why some people in some periods have "high marital market value" even if they were not wealthy at all. We can analyze trends and special cases.

Many interesting applications and many possibilities for further investigation appear. This dataset can be further analyzed in the graph theory paradigm or compared with other societies/populations.

There new science has also many methodological questions which should be addressed, especially how it differs from historical demography (which is also involved in reconstruction of families) and how to deal with the systemic problem of data incompleteness (some families are better known than others, some periods are better documented than others,
some archives were destroyed during wars and some were not: all this must be addressed \textit{by design}). One possible solution of the latter is to use the ideas developed for analysis of the Internet as a whole (i.e., PageRank etc.).
Embeddedness of Periodicals in Illustrated Fashion Press in the Nineteenth Century
Julie Birkholz; Marianne Van Remoortel
Ghent University

In the second half of the nineteenth century, a new type of women’s magazine emerged in Europe and the United States. Fashion – a staple of up-market women’s periodicals since the late eighteenth century – was no longer the prerogative of the elite press. Thanks to technological advances in printing, communication and transportation, it became the core ingredient of a growing number of affordable, lavishly illustrated magazines for women. A number of key players, seen as clever entrepreneurs who capitalized on the latest technological developments and joined forces on an international scale as they negotiated deals to exchange textual and visual materials among their respective magazines have gone down in history as the trailblazers of the illustrated fashion press. These success and rise of these periodicals has largely been explored through the lens of the periodicals themselves – level of the publishers, beyond their legal power to sign contracts and ability to wield the latest technologies, instead of looking and comparing the content itself. Illustrations were selected, imported and incorporated in different ways and under different conditions; texts were added, omitted, translated and adapted. This infers a much more complex series of transnational exchange practices which required specific skills, such as advanced language proficiencies, keen insight into the demands of the women’s magazine market at home and cultural affinity with the fashion press abroad. We show through a network approach that these so-called “editions” of fashion press in multiple markets were more than foreign-language duplicates of the original. Through the WeChangEd Linked Data set we mapped these periodicals through the lens of items – illustrations, patterns, columns, and so forth. We identify, projecting both one and two mode networks, relationships between the periodicals, contributors and items the embeddedness of both the periodicals and individual contributors, as well as identify influential nodes considering centrality and betweenness to explain the roles of these actors of the time. Findings show key fashion periodicals, for example Der Bazar and its foreign “Ausgaben” [editions] were interconnected in more complicated ways than the label suggests, and this was primarily due to the intellectual agency and cross-cultural vision of the women editors involved. Highly educated and often given considerable freedom by their publishers, these women forged their own networks and carved out their own spaces in the magazine market.
The Network of zemstvo' deputies in the Perm province in the second half of the 19th century: Dynamics and features of the formation

Nadezhda Povroznik; Sergey Kornienko; Andrey Smetanin
Perm State National Research University

Zemstvo self-government was introduced in the Russian Empire in the second half of the XIX century and became the representative body in Russia, a prototype of the parliament. Provincial Zemstvo Assemblies significantly influenced on the development of the socio-political, economic and social spheres of those provinces of the Russian Empire, where they were established. The decisions determining the directions of Zemstvo' activity were substantially limited by the framework of the legislation, but they were adopted in the Zemstvos provincial meetings and inevitably depended on the deputy corps, the patterns of behavior of Zemstvo deputies, their opinions, competences, personal experience and other factors. Deputies of provincial zemstvos and their interaction in meetings played an important role in the decision-making process determined the tendencies of the zemstvo self-government development.

Therefore, it is so important to build network structures of Zemstvo deputies and to identify the grounds for consolidation of deputies (such as interests in the Zemstvo and goals of activity, common views, social status, etc.) and the definition of mechanisms for interaction of deputies.

The cases of consolidated manifestation of Zemstvo deputies' opinions became the basis for building social networks. The obtained network models were verified by reliable empirical data. The model allowed identifying the role of individual social and professional characteristics (such as class, age, work experience) in the formation of stable links.

The journals of the meetings of the Perm Provincial Zemstvo Assembly became sources for the analysis and construction of social networks of the deputies. The journals contain brief transcripts of the meetings and information about voting, the positions of the deputies on the discussed issues, as well as special opinions, expressed personal positions on specific issues.

The network structures of the Zemstvo assembly and its dynamics will be presented on the basis of a comparison of network models at the beginning of the functioning of the Zemstvo in the Perm province in the first triennium (1870-1872) and in the three-year period of zemstvo activities a decade later (1882-1884). The second time period is characterized by an almost complete renewal of the zemstvo structure, including the replacement of the chairman of the meeting, which played an important role in the Zemstvo at the beginning of zemstvo activities.
Networks in Archaeology and History (Session 4; Part 3)
Chair: Marten Düring
Co-chair(s): Aline Deicke; Martin Stark
1Academy of Sciences and Literature; 2University of Luxembourg

: ‘O Rus! Elite networks and gentry politics in pre-revolutionary Russia: The blacksoil nobles, 1861-1905’
George Regkoukos
King’s College London

This paper explores the political relevance of the Russian gentry in the period leading up to the revolution of 1905 and discusses the reasons why this erstwhile ‘pillar of autocracy and the state’ and ‘backbone of Russian economy’ had, by that time, become a discountable non-entity in the country’s political scene. Although various interpretations have already been produced, this is the first time an explanation for this state of affairs is based on Social Network Analysis (SNA). The arguments made herein are based on the application of SNA on a sample of 1,600 nobles from the provinces of Tambov, Voronezh and Kursk, and represent the culmination of a five-year research project in Russian and Finnish repositories. The results are highly generalizable, so it is possible to argue that historiographical paradigms, which hold that the provincial gentry conform to the Chekhovian ideal type, are weak. In other words, it’s high time we revisited the dominant narrative, which sees provincials as a group of forlorn, nostalgic, helpless victims of change resigned to their fate. This change came in form of the Great Reforms, a period of societal engineering masterminded by the governments of Alexander II between c. 1860 and 1881. Traditionally, this has been considered as the turning point for Russia’s landed gentry and the high noon of ‘enlightened bureaucracy’. Longitudinal analysis of provincial networks reveals that this was not at all the case; specifically, we can observe the diffusion of political ideologies and trace the change in attitudes towards economic development. Pressed between grass roots movements ‘from below’ and the iron rule of bureaucracy ‘from above’, the landed gentry managed to adapt to, and even shape, political developments. The departure from the Chekhovian image is complete: These were not passive ‘recipients’ of policies, ‘victims’ of reform. Rather, they became important agents of change. What’s more, networks analysis has revealed important dichotomies within local communities, expressed in terms of powerful conservative and liberal currents, whereas previously historians assumed that blacksoil provincials had been predominantly conservative. It remains to say that due to the particularities of Russian political and social life in the nineteenth century and due to complications arising thereafter, these observations would not have been possible until network analysis had been applied to the provincial elites. We are therefore possibly looking at a ‘key’ interpretation, which may help unlock the reasons behind the nobility’s disintegration and, ultimately, its leaving open the road to the overthrow of Nicholas II.
Hidden Archives and Lavish Libraries: Promises of Social Network Analysis for Research on Twentieth-Century China

Henrike Rudolph

Mass movements and revolutions shaped the collective memory of several generations in China, but our understanding of these events is still lacking and many intricacies of social and political forces remain obscure. Chinese and foreign historians showing an interest in these topics struggle to obtain the necessary sources since the access to archives is restricted. Published Chinese-language sources and secondary literature on the other hand often exist in abundance and can be accessed in libraries or through online databases, yet they lack in analytical depth.

As I will argue in this paper, social network analysis can be used purposefully to identify new ways to make better use of the available source material and to turn quantitative and qualitative challenges into an advantage.

Two networks serve to illustrate this point: The first is a network of Chinese educators who were active in the movement for vocational schooling in the 1920s and 1930s. They published several hundred articles on the subject of vocational school systems in foreign countries. Because of this overwhelming amount of source material, the routes of textual exchange and educational borrowing were obscured, resulting in an oversimplified narrative blending out complexities in the dissemination and appropriation of foreign education models. To code and visualize this network of the educators national and international ties manifested in citations, translations, and co-authorships helps to uncover hidden structures. Thereby, social network analysis can help to break down the abundant sources and help to put existing narratives to the test.

The second is an elite network of scholars who founded one of China’s minor political parties in the late 1940s. The Jiusan Study Society was repeatedly subject to political purges but nonetheless continued to grow, now counting nearly 160,000 members. Archival sources on the early history of this group of scientists are difficult to obtain. Conversely, Chinese historians and the society itself published numerous official histories, biographies, and membership lists of its early period. All of these, however, lack a critical approach to questions related to the complicated relationship between the Communist Party and the Jiusan Study Society. For example, the question whether the Jiusan was initiated by the Communists to draw leading scientists to the left, or whether it was in fact founded by liberal scientists calling for political reforms, remains questionable. By using the available membership lists and recounts of modes of cooperation with Communist cadres to reconstruct their social network, we can further our understanding of the founding motives and the integration of this group into the Communist state.

In short, theories and methods of social network analysis, if applied with the necessary caution and methodological scrutiny, can enrich not only the scholarship of modern Chinese history but could also benefit scholars in other countries where historians face similar difficulties. With the help of social network analysis, the inaccessibility of archival material can be amended by making better use of the abundant published sources and identifying new methods to develop alternative routes to historical insight.
Building a Scientific Field in the Post-World War II Era: A Network Analysis of the Renaissance of General Relativity

Roberto Lalli; Dirk Wintergrü
Max Planck Institute for the History of Science

The development of general relativity presents intriguing challenges for historians of science. After an initial burst of excitement about its extraordinary implications, the theory underwent a thirty-year period of stagnation (between the mid-1920s to the mid-1950s) during which only a few specialists worked on it. In the aftermath of World War II general relativity gradually re-entered the mainstream of physics, attracting an increasing number of practitioners and becoming the basis for the current standard theory of gravitation and cosmology—a process coined by Clifford Will the “renaissance” of general relativity. While there is widespread agreement that this phenomenon occurred, scholars strongly disagree on its main characteristics, and there is no accepted definition of its periodization. As a consequence, many different factors have been proposed as the central cause of this process.

In a recent paper, Alexander Blum, Jürgen Renn and one of the authors (Lalli) have developed a historiographical framework in which we interpret this process as resulting from the interconnection of epistemic and social factors. Our claim is that in the post-WWII era Einstein’s theory of gravitation became a field of study in its own right, whereas earlier it served only as a theoretical framework related to different and dispersed research agendas.

In the talk, we employ the concepts and tools of network theory to deepen this approach, investigating both the social and epistemic aspects of the dynamical process that led to the establishment of a new research field in physics called “General Relativity and Gravitation” (GRG). By mapping the network of collaborations in the research fields related to general relativity from 1930 to the early 1970s, it is shown how the connectivity of this network changed dramatically in the post-WWII period. Other levels of analysis allow a) the identification of the of the most central actors in specific transitional periods; b) the study of the changing relations between different disciplinary domains, and c) the exploration of the changing relations between the different national communities. It is then argued that the topological transitions of the network of collaboration provide an unambiguous method to define the historical process under scrutiny as well as its periodization. Network analyses allows also to define some specific features of the process, which would not be otherwise understandable, such as the role of specific actors in the dynamics of knowledge production in general relativity in connecting different disciplines and research agendas. By comparing the social network analysis with the study of the co-citation network of papers published in the field between 1945 to 1973 we propose a new interpretative framework that connects the social dynamics with the evolution of the scientific field.

This project serves also as a case study of how to communicate the methods and outcomes of network theory to historians integrated in an interactive framework for digitally publishing research results in the field of history of science. We will briefly introduce this framework, which will be made available open source in Summer 2017.
The elephant in the room of political parties: how patronage networks influenced leadership. A historical approach

Isabelle Borucki
University of Trier

Much is known about the so called 'official story' of political parties forming their constitution, procedures and benefitting from state subsidies (Poguntke, Scarrow et al. 2016). Behind this legal side of parties, informal rules and patronage networks are of high interest helping to understand how and due to which relations leaders come into their positions (Keller 2016) and of what kind of resources they are supported - or not. This area of party research is underestimated since parties are reluctant against research from outside and thus often restrict access to their inner organisation. This is where this paper identifies recruiting patterns of party elites by using a historical documentary social network analysis.

Stating that elites recruit themselves and build on their inner structures, it is assumed that being a member of party’s central organs and other party affiliated organisations give individuals benefit considering their ascendency into leading positions. These affiliation and patronage networks build a central informal mechanism to explain parties’ survival and regeneration. The analysis of those inner party networks is achieved by case studies (the German parties CDU and SPD) with exploratory and structured approaches. Thus, classic documentary analysis is combined with SNA to lastly show who became a leader and why.

The materials to investigate enclose official protocols of party organs’ meetings, executive committees’ member lists, individual biographies, statements of account and documentations on the particular party’s history. To trace the genesis of assumed informal patronage networks and informal mechanisms of building leadership, a social network analysis (Wetherell 1998, Mahoney and Rueschemeyer 2003) models promotions and internal committee data for the mentioned cases in a longitudinal design from 1945 to 1972/73. This design allows to estimate the promotions between particular individuals based on their biographies and parties’ documenting of its inner life. The chosen period is historical because archives have then opened their shelves to researchers outside from parties. Thus this paper adds empirically to the body of knowledge of parties’ inner life by providing new evidence on the patronage networks within political parties regarding leadership resources and careers.

References
Social Networks and Intergroup Relations: New Questions and Challenges (Session 5; Part 1)
Lars Leszczensky, Hanno Kruse¹, Clemens Kroneberg¹
¹University of Cologne

Be the Smart Guy: The Role of Gender and Ethnicity in Ability Attribution Processes in the Classroom
Dorottya Kisfalusi¹, Béla Janky¹, Károly Takács²
¹Institute for Sociology Centre for Social Sciences, Hungarian Academy of Sciences, ²MTA TK ‘Lendület’ Research Center for Educational and Network Studies (RECENS)

In this study we examine ability attribution processes among male and female Roma and non-Roma primary school students. Girls and members of certain minority groups are often evaluated as less competent than boys and majority students even with the same level of performance. Double standards theory (Foschi, 2000) provides an explanation for why this might happen: people use different standards for making inferences about others’ competence based on social status. Because of status generalization processes low status individuals such as women and members of minorities might be judged by a stricter standard than high status individuals. Social identity processes, however, might also play a role in ability attributions. Social identity theory (Tajfel, 1982; Tajfel & Turner, 1979) suggests that social groups try to establish a positive distinctiveness from other groups, and therefore, people evaluate in-group members more positively, than out-group members. We posit that students’ ability attributions are interdependent, therefore, they need to be addressed by proper social network methods.

We analyse cross-sectional dyadic peer nomination data from 21 primary school classes in Hungary (392 students from 16 schools, mean age=13 years) using exponential random graph models (ERGMs). Our findings are mostly in line with the predictions of social identity theory: controlling for grades, students are more likely to nominate their in-group peers as clever compared to classmates from the out-group, in terms of both gender and ethnicity. One exception has been found: boys are similarly likely to nominate both boys and girls as clever. In line with double standards theory we have found that non-Roma students are less likely to consider those peers as competent whom they perceive as Roma compared to those whom they perceive as non-Roma. However, similar association has not been found with regard to gender. We have also found that Roma students are less likely to consider those peers as clever whom they perceive as Roma, but who identify themselves as non-Roma, than those Roma peers who also identify with the Roma group. This phenomenon might also be driven by social identity processes: Roma students try to distance themselves from those peers who are perceived as Roma but who declare themselves having different ethnic identification.
The interplay between ethnic composition and out-group attitudes as possible explanation for ethnic homophily in schoolchildren's friendship networks

Mark Wittek
University of Cologne

A growing strand of literature applies network analysis to investigate ethnic homophily in social networks. As one possible cause of ethnic homophily scholars studied the relationship between the ethnic composition of classrooms and ethnically homogenous network structures in schoolchildren's friendship networks. This paper tries to contribute to this literature by analyzing the interaction between out-group attitudes and compositional aspects of the school context that could lead to ethnically segregated friendship networks. I will analyze whether individual and parental outgroup attitudes on the micro level are associated with the emergence of ethnically segregated structures in friendship networks on the classroom level. Furthermore, I will investigate whether the ethnic composition of classrooms moderates this link between the individual potential for ethnic homophily and actual homophilous networking behavior. Building on intergroup conflict theory as well as insights from social psychology I will argue that ethnic classroom composition can amplify the association between outgroup attitudes and ethnically homophilous friendship selection.

The first wave of the CILS4EU project (18716 students; 11700 parents; 958 classes; 4 European countries) will be used to carry out the empirical analysis. My analytical strategy is inspired by previous work concerned with ethnic homophily in schoolchildren's friendship networks (Smith et al. 2016) and follows a three step approach:

1. Estimate exponential random graph models for each school class to measure ethnic homophily above the opportunity structure and network endogenous processes. The ethnic homophily parameter is estimated as change statistic, which is interpretable as the increase in the conditional log-odds of a network by adding one same-ethnic friendship nomination given all other local network structures included in the model specification (like the overall number of edges, reciprocated ties, etc.)

2. Aggregate the results using an univariate meta-analysis.

3. Use metaregressions (with ERGM coefficients for ethnic homophily as the dependent variable) to investigate between-context variation in ethnic homophily.

The first aim of the study is to test if inter-ethnic friendship nominations send by students with (parental or individual) negative out-group attitudes are observed systematically less often than inter-ethnic friendship nominations send by students with positive out-group attitudes. An ERGM specification will be proposed that allows to differentiate between these two types of nominations for native and immigrant students separately. I will also discuss how this approach can be extended to study conditional cross-group and multiple cross-group nominations within the ERGM framework more generally.

In a second step, a set of nested metaregressions will be applied to estimate how well variation in ethnic homophily on context level is explained by the classroom-specific mean
level of negative out-group attitudes, the ethnic composition of the classrooms and the interaction of these two factors.

The theory section will discuss the mechanisms that could be responsible for the association between outgroup attitudes, classroom composition and ethnic homophily on the network level. By testing these theoretical considerations empirically the analysis will help to evaluate whether the interplay of outgroup attitudes and ethnic classroom composition could provide a possible explanation for ethnic homophily in schoolchildren’s friendship networks.
The simultaneous development of ethnic segregation and health disparities among primary school children: a dynamic social network approach

Jochem Tolsma¹, Thabo Woudenberg, Kris Bevelander, Moniek Buijzen
¹Radboud University of Nijmegen

Ethnic health disparities are already observable among young children. Health-based selection of friends may therefore have as unintended by-effect ethnically segregated friendship networks. At the same time, friends may influence each other’s health behavior. Ethnic segregation in friendship networks may thus also reinforce ethnic health disparities over time. In the present contribution, we aim to investigate to what extent ethnically segregated friendship networks overlap with health segregated friendship networks in ethnically diverse Dutch primary school classes. We hypothesize that this overlap grows over time (age range 9-12) due to both selection and influence processes. Because ethnic identities will become more salient when children reach adolescence, the importance of health-based selection of friends (compared to ethnicity-based selection of friends) is expected to decline over time. Furthermore, we expect that influence process with respect to health behavior are stronger within ethnic groups than between ethnic groups. We will test our expectations based on data retrieved from the ERC funded ‘MyMovez’ project (4 waves; multiple ethnically diverse classes; for more information see: http://mymovez.socsci.ru.nl/). As our indicators of health and health behavior we will use BMI, physical activity (measured through a wearable lab) and eating habits. Friendships are measured by a nomination procedure.
Adolescents' Ethnic Self-Identification and the Formation of Interethnic Friendships
Lars Leszczensky, Sebastian Pink, Philipp Jugert

Adolescents in many Western countries attend multiethnic schools. This increased opportunity to engage in interethnic contact has long been recognized as being beneficial for the development of friendships between native- and immigrant-origin youth. Fostering interethnic friendships in turn is desirable because they can reduce prejudice and improve intergroup attitudes. However, the opportunity to engage in interethnic contact itself hardly guarantees the formation of interethnic friendships. In fact, even in ethnically mixed schools friendships tend to be more often formed between peers of the same ethnic group. A crucial limitation of most existing studies is that they capture ethnicity by “objective” demographic characteristics such as the country of birth of students or their parents. But a rising number of immigrant-origin youth was born and raised in the host country. For these students, it is questionable to what extend they identify themselves with the country of origin of their parents, with the host country, or with both of them. Against this background of contested ethnic identities, we ask how ethnic self-categorization affects friendship formation among native- and immigrant-origin peers. For immigrant-origin youth, we distinguish three ways in which they can categorize themselves: as members of the host country (host country identifiers), of their country of origin (heritage country identifiers), or of both countries (dual identifiers). In short, we suggest that these identifications affect both how immigrant-origin youth choose their friends and how they are perceived, and thus chosen as friends, by others. Based on various theoretical approaches, we derive respective hypotheses regarding youths' friendship preferences.

We empirically test our hypotheses using data from the project “Friendship and Identity in School” (FIS). FIS is a longitudinal German study of friendship networks of more than 2,000 students in schools with high shares of immigrant students. Our analysis relies on three waves of data, which are separated by nine months each. We use stochastic actor-oriented models (SAOM) for network dynamics, which can be regarded as agent-based simulation models that allow to examine how individual actor’s preferences interact to create the network dynamics we observe empirically while controlling for relational mechanisms and the opportunity structure.

We find that native German youth tend to befriend immigrant-origin peers with host country or dual rather than heritage country identification. Immigrant-origin youth with heritage country identification, however, were more likely to befriend native peers than immigrant-origin peers from other ethnic groups. Heritage country identification thus is disadvantageous in two ways, as it not only makes immigrant-origin youth less attractive as friends to native peers, but also reduces the preference for befriending immigrant-origin peers from other ethnic groups.

In sum, our findings speak against the pessimistic notion that native-origin adolescents may reject immigrant-origin adolescents as friends irrespective of their ethnic self-identification. Likewise, immigrant-origin adolescents do not always prefer immigrant-origin adolescents over native ones. Instead, our study provides evidence that how immigrant-origin youth identify themselves affects not only to what extent they seek intra- or intergroup friendships, but also how attractive they are as friends to both immigrant-origin and native peers.
Social Networks and Intergroup Relations: New Questions and Challenges (Session 5; Part 2)
Lars Leszczensky, Hanno Kruse\textsuperscript{1}, Clemens Kroneberg\textsuperscript{1}
\textsuperscript{1}University of Cologne

Intergroup Relations in Acquaintanceship Networks
Miranda J. Lubbers, José Luis Molina, Hugo Valenzuela-García
Universitat Autònoma de Barcelona

The economic crisis has hit some parts of the Spanish population harder than others. We assume that this inequality is amplified by social networks, in the sense that (a) the personal networks of some people are more affected than those of others, (b) the degree to which networks are affected covaries with individuals’ own socio-economic situation, and (c) how people react to the crisis and how they cope with it is not only determined by their own economic situation, but also by the situations of others in their broader social environment.

With the aim to test these assumptions, we designed a special module of the National Barometer in 2014-'15 in collaboration with the Centro de Investigaciones Sociológicas (CIS). Following among others DiPrete et al. (2011) and McCormick et al. (2010), we included the Network Scale Up Method to estimate the size of acquaintanceship networks. Also, we included questions about the number of people respondents knew in various subpopulations (e.g., people who had lost their jobs, who had been evicted or who had migrated). Other questions referred to respondents’ socio-economic attributes (assumption b), and their trust in public institutions, interpersonal trust, and the availability of social support (c). Interviews were performed by the CIS using CAPI with a nationally representative sample of approximately 2,500 inhabitants of Spain. We used the R package NSUM for the estimations of total network size and overdispersion of population sizes in networks (assumption a), and regression analysis to relate the residuals to individual attributes (b) and outcomes (c).

Results indicated that acquaintanceship networks were of similar size in Spain as reported for the US (DiPrete et al., 2011). Indeed, the number of people respondents knew from the different subpopulations showed variable degrees of overdispersion, indicating that some subpopulations were more unequally distributed over networks than others. The degree of over- or underrepresented was related to individual characteristics, mostly income, education and age. For example, the young and highly educated knew proportionally more people who had emigrated or who had found new jobs in the past three years, but they did not differ in the proportion of network members who lost their jobs. Last, trust in institutions and social support availability were not only related to individual characteristics but also by the clustering in networks, in line with our general expectation, but not in interpersonal trust.


Acknowledgements: The authors would like to thank the CIS, and in particular Félix Requena, Berta Álvarez, Carmen Lence and Araceli Mateos.
Group violence, ethnic diversity and citizen participation: evidence from Indonesia
Christophe Muller\textsuperscript{1}, Marc Vothknecht\textsuperscript{2}
\textsuperscript{1}Aix-Marseille University, \textsuperscript{2}European Commission

We study the impact of violent conflict on social capital, in connection with local ethnic diversity. Social capital is measured by citizen participation in four kinds of community groups: governance, social service, infrastructure development and risk-sharing. Combining household panel data from Indonesia with conflict event information, we find an overall decrease in participation in districts affected by group violence in the post-Suharto transition period. However, participation is found to be little affected by violence in communities with a high degree of ethnic polarization, and is even stimulated for local governance and risk-sharing activities. Moreover, individual engagement appears to depend on the involvement of other members from the same ethnic group, which points toward the emergence of intra-ethnic social networks in the presence of violence. Finally, we find large observed and unobserved individual heterogeneities of the effect of violence on participation. Once heterogeneity is controlled for, the ethnic and social configuration of society is revealed as a core factor in understanding citizen participation as a response to violence, perhaps because subjacent ethnic group strategies are at work.
Assessing the structural conditions for ethnic boundary making: the role of ethnic segregation across school tracks

Hanno Kruse, Clemens Kroneberg
University of Cologne

Identifying the structural conditions that give rise to particular configurations of ethnic boundaries (i.e., individuals' social affiliations and identities) constitutes a major task in contemporary integration research (Wimmer 2013). The underlying question involves identifying causal mechanisms behind the emergence of particular networks and identities (Hedström and Bearman 2009). Its substantive and theoretical importance notwithstanding, systematic large-N investigations of the structural conditions of ethnic boundaries are sparse. A main challenge has been the lack of adequate data that (a) includes information on the relevant analytical levels (i.e. individual, group, and institutional/structural) and (b) is detailed enough to allow application of methods that can account for the interdependent nature of the boundary making processes.

In this study, we aim to meet this challenge by combining data from the Children of Immigrants Longitudinal Survey in 4 European Countries (Kalter et al. 2013) with geospatial information on the location of (different types of) schools throughout Germany. Doing so allows us to apply a network-analytical approach (exponential random graph models) in a large sample of schools and to examine how their structural conditions render boundaries between ethnic groups more or less permeable. More specifically, we investigate how the regional extent of ethnic segregation across school tracks affects the making and unmaking of ethnic boundaries among students in German schools. Building on Blau’s concept of consolidation (Blau & Schwartz 1984), we argue that strong local over-/underrepresentation of minority and majority members in the upper tracks affect students’ understanding of what it means to be a minority/majority member. In particular, their ability to cross ethnic boundaries depends on the region that minority/majority members live in and the school track they attend. First preliminary results are in line with these theoretical expectations and help to illuminate the structural conditions for ethnic boundary making in an ethnically diverse Europe.
Varieties of Qualitative Perspectives in Social Network Analysis: Methodological issues (Session 6; Part 1)
Stefan Bernhard¹; Luisa Peters²; Inga Truschkat²; Andreas Herz³
¹Institute for Employment Research IAB; ²Universität Hildesheim; ³University of Marbug

Perceptions of Precarity - Facing methodological challenges in reconstructing dynamics of social network structures and social support
Stefan Brandt
University of Hamburg

Against the background of precarisation (Castel 2002) and neoliberalization (Bourdieu 1998) as central developments in the process of modernization, changes in wage labour and the restructuring of western welfare states have been much discussed in the past two decades. To describe the social consequences of changes in wage labour the assumption of an interrelation between 'integration through work' and 'integration through networks' (Castel 2002) is crucial. Although the importance of this interrelation is repeatedly emphasized theoretically, it is hardly been analyzed empirically.

In a subjective sense precarity is based on perceptions and interpretations of individuals. Since these perceptions are shaped in accordance with the immediate environment of individuals they can be seen as relational (Marquardsen 2015: 150). Therefore social support and social network structures affect perceptions of individuals twofold: positive and negative. Whereas stable networks and positive support can reduce negative perceptions of wage labour situations, 'not being able to keep up with one’s immediate environment' (Marquardsen 2015) as well as a lack of reciprocity due to material hardship (Gefken 2017) and disenchanted support expectancies (Laireiter/Lettner 1993) can reinforce perceptions of wage labour situations as being precarious.

Yet given that subjective perceptions of individuals are closely linked with specific practices in their respective lifeworlds, these perceptions are ‘not easily accessible to them by reflection’ (Bohnsack/Nentwig-Gesemann/Nohl, 2007: 11). As a consequence implicit and atheoretical knowledge on how wage labour situations are percepted only can be made accessible by reconstructing how these situations are elaborated on, and in which framework of orientation these situations are dealt with (Nohl 2010). Taking dynamics of social network structures and social support into consideration in this context serves as part of a complex comparative analysis that aims to disclose specific interrelations between ‘integration through work’ and ‘integration through networks’.

References


Social roles are defined as normative concepts regarding appropriate behavior. In organizations, social roles can be regarded as constituting elements which represents the intra-organizational division of labor. In symbolic interactionism, roles are understood as relational to their peers regarding their very meaning. Social roles are legitimized and delegitimized in relational processes of social construction of both the role actor and its peers. Established roles in organizations, as intertwined with working practices, are highly resistant to changes. Therefore, the introduction of new working practices challenges institutionalized roles and practices (Deephouse & Suchman 2008). The object of our research is to reveal dynamic processes of relational role change and role formation, when new practices are introduced to an organization.

To get a deeper understanding of these processes, we conduct a case study of a planning team in construction industry. Within the planning team a new digital planning method, called ‘Building Information Modeling (BIM)’ is introduced. Using a digital building model as central planning device implies changed working practices, new knowledge requirements and changed liabilities. As a consequence, new roles are added, existing roles are changed and a long established hierarchy of roles comes under question (Goodrick and Reay 2010).

For our data collection, we observed the regular meetings of the planning team for 30 month every other week and took interviews with all participants, further collecting secondary data as protocols and informal conversations.

For data analysis, we build up a database by qualitative coding (Padgett 2016). Every interaction is coded by dimensions of position (sender, receiver), kind of message (e.g. instruction, complaining) and quality of tie between the involved individuals (e.g. longtime colleague, supervisor). Further every event (e.g. team-meetings, project progress) is coded. Using network analyses for every observational point in time, we can map the evolving role structure with special regard to emerging events. In comparing the different networks in time, we can map the dynamic processes of deinstitutionalization and redefinitions of existing roles and the impact of new evolving roles on the existing role system.

Preliminary findings suggest dynamic processes of role definitions and redefinitions during time. The demand for using a new planning practice is translated and negotiated in its concrete meaning by the planners. Processes of role definition take place, in relying both on old and new practices to gain legitimization. We can observe the formation and the decay of informal groups and coalitions around similar role perceptions during time, reflected by ‘emotional’ relations and high level of non-confrontative communication. These processes of meaning construction result in new role expectations by relevant reference groups. The simultaneous existence of different role understandings is the source of persistent intra-organizational conflicts on proper role enactments and appropriate professional practice.

With this research, we contribute to two current discussions: (1) making use of role theory as analytical approach to reveal relational micro processes of institutionalization and (2) develop a new approach to analyze qualitative network data by using a combined strategy of qualitative coding and structural analysis of network dynamics.
some light on what constitutes a good model and which boundaries are limiting to the current approach.
Qualitative Typologization, networks and homophily. Tracing story-based interaction patterns

Susann Worschech
Europa-Universität Viadrina

Methodological triangulation is still rather an exception in social network analysis. But qualitative approaches do not only offer promising and innovative ways of collecting network data and the respective background information for interpreting the networks. Stories and identities are also parts of relational thinking at least since Harrison White proposed his ideas on 'netdoms', and others presented reflections on agency and culture in networks (Emirbayer 1997; Mische 2007; Mützel and Fuhse 2010; White 2008). Therefore, inherent stories, meaning patterns and interpretations of networks are included increasingly systematic in network research and theory.

An innovative approach to trace the evolution of stories within networks and construction of identities based on these stories can be regarded the homophily analysis, as proposed by McPherson and colleagues (McPherson, Smith-Lovin, and Cook 2001). Based on the ideas of stability and change in social and organizational fields, network analysis can help to understand how actors influence others, and how they converge or differentiate themselves related to the stories and identities that make up the field. Homophily based on unchangeable or changeable attributes can indicate whether dense interactions and the presumed stronger mutual influence is associated with shared characteristics or rather with shared beliefs, frames and interpretations.

In my paper, I will present and explain this approach using the example of the structuration of the field of civil society support agencies in post-communist societies. The methodological approach of qualitative typologization (Kluge 1999, 2000) provided the basis for the identification of distinct approaches and strategies how to support civil society. The network homophily analysis revealed that close cooperation of support agencies is related to similar approaches and strategies rather than to other characteristics, such as organizational form or national background of the respective agencies. Therefore, qualitative typologization, homophily analysis and the concept of stability and change in social and organizational fields, I argue, is a promising approach for analyzing how stories and meaning affect networks and generate the structuration of social fields.

References

The duality of culture and social structure in the art field: a qualitative network analysis
Željka Tonković
University of Zadar

The question of relationship between culture and social structure is one of the most important problems of social theory in general and “relational sociology” (White, 2008; Donati, 2011) in particular. Conceptualizing informal artist networks and collaborative practices as social spaces in which common aesthetic, political and social meanings are shared, this paper focuses on the networking practices in the 1990s Croatian art field. The primary aim of the research was to examine the structural properties of artist networks together with the perceptions and meanings of individuals involved in the networks. In order to trace both social and meaning structures, qualitative analysis was combined with the network analysis. Data was collected through qualitative semi-structured interviews with artists, art historians and curators who had actively participated in the national art scene in the 1990s. In addition to qualitative data from the interviews, the research also employed the comprehensive analysis of archival data. The results are interpreted in relation to the theoretical insights of network analysis and relational sociology. In the final part of paper, methodological implications of the research will be discussed.
Digitally mediated social interaction poses new challenges for the field of social network research: Online social networking platforms as a means to amplify the scope of social interaction, has given way to a more broadly defined approach to the nature of social ties. In social network research, social ties are a firmly established indicator to identify the strength of social relationships in structural network analysis. Thereby, strong ties and weak ties are the most commonly used labels to identify tie strength. Given the implications of digitally mediated social interaction, I argue that these dichotomous indicators become brittle, as they do not convincingly capture the actual affordances of digitally mediated social ties.

Recently, the notion of latent ties gained currency to signpost this development by way of describing a set of social ties that “exist technically but have not yet been activated” (Haythornthwaite, 2002). Whereas this definition points to the fact that digitally mediated social interaction bears a strong potential in building new social ties, a clear definition in terms of what these ties represent as part of an individuals’ social network is yet to be found.

My research showed that looking at digitally mediated social ties from an affordance perspective, i.e. what resources they provide access to, the established strong and weak tie dichotomy does not suffice. This is because properties of digital platforms allow individuals to build social ties in a more efficient manner.

Taking the formation of trust for example, the literature (e.g. Krackhardt, 1986) references strong ties as most efficient in creating trust, given the fact that long-standing social relationship which exhibit reiterated moments of social interaction are seen as conducive to forming trust.

This is different in the digital realm: Individuals form what they perceive as strong ties by creating social bonds by creating interaction around seemingly mundane hashtags. Such ephemeral social bonds would hardly qualify as strong ties, nonetheless they are perceived as being conducive to forming trusted bonds between individuals.

Obviously, this poses significant challenges for a structural analysis of digitally mediated social interaction with traditional SNA tools, such as the name generator.

My aim is to put forward ideas on how to find ways to convincingly indicate the strength of digitally mediated social ties in network maps. This raises a number of compelling questions:
How do we formulate accurate trigger questions for tracing digitally mediated social interaction with network diagrams? Is there a need to alter the rationale/framework of tools like the name generator? And do we have to move away from established conceptual assumptions in SNA that might be too rigid when researching social interaction in the digital realm?

Essentially, I argue that digitally mediated social ties be better conceptualised alongside a bandwidth of tie strength indicators: This resonates with the fact that digitally mediated social ties are more fluid when it comes to tie strength, expressing that they often take on strong tie and weak tie indicators at the very same time.
Event-Based Diaries as a method for investigating the practical formation of networks

Philip Roth
Fraunhofer Institute for Systems and Innovation Research ISI

Research has shown that informal advice networks are a key success factor for developers working on innovation projects in enterprises (Allen 1977). Following this, questions arise concerning the emergence of these networks and the corresponding milieu of interpersonal, spatial, and contextual interactions that facilitate their formation.

The research on these questions focuses particularly on the knowledge that actors have about others. This is grounded in the assumption that the occurrence of interactions results from a cognitive selection process. Contrasting research has demonstrated that unplanned encounters are essential to the emergence of informal advice networks (Backhouse & Dew 1992; cf. Feld 1981). I assume that encounters arise systematically and specific types of encounters systematically lead to specific forms of interaction. In understanding this system, there is therefore great potential for more comprehensive explanation of network dynamics.

Methods established in (qualitative) network research, however, are not suitable for investigating this systematic adequately. Especially two problems are crucial. On the one hand, observations are inappropriate because they require the decision when and where to observe. The research question, however, requires precisely this impartiality. On the other hand, interviews require recollections by the interviewees. It is expected that these are inaccurate and unstable, as peripheral dimensions of everyday practices are to be recalled.

Against this background, I suggest using event-based diaries to gather appropriate data (Roth 2015). In the lecture, I will outline how I applied the method in combination with focused interviews to collect data in the research & development departments of two companies. Based on the collected data, I will point out the advantages and weaknesses of the procedure.

Literature


Using Graphical Bibliometric Reconstructions of Research Trails for Qualitative Investigations of Issue-Attention-Cycles in Science
Andreas Gravert
TU Dortmund

We observe issue-attention-cycles (Luhmann 1970; Downs 1972) not only in the mass media and in politics, but also in science. Since the attention of the scientific community is limited, only few scientific problems can be on top of the scientific agenda. As a result certain scientific problems receive strong attention by the scientific community, but only in a limited period of time and only at the cost of other problems receiving less attention. The reasons for the ups and downs of issues in science are not yet fully explored.

This paper identifies issue-attention-cycles in the field of planning studies and analyses the attention towards the issues “climate change” and “shrinking cities” since 1995. Using a sociology of science perspective, a bibliometric analysis of both issues is being conducted. Issue-related networks of researchers are evaluated by using co-authorships and citations as relations. This quantitative data is then used to identify researchers matching a predefined relation-profile. The selected researchers are approached and interviewed. To prepare for the interview, the bibliometric information is used to create a graphical representation of the interviewees’ individual research trails. Using this network illustration in the interview, the choices of topics in the research career of the interviewee are discussed. Thus quantitative network data is complemented with qualitative information on the meaning of relations between researchers and between publications. With this mixed-methods approach, it is aimed to find out, how researchers choose their research problem(s). Building on that, explanations of issue attention-cycles in science are discussed.
Varieties of Qualitative Perspectives in Social Network Analysis: Stories (Session 6; Part 3)
Stefan Bernhard¹; Luisa Peters²; Inga Truschkat²; Andreas Herz³
¹Institute for Employment Research IAB; ²Universität Hildesheim; ³University of Marbug

Two sides of entrepreneurial support: Support ties emerging amidst mismatch between supporter and supported
Sean R White¹, Andrew Parker²
¹Grenoble Ecole de Management, ²University of Exeter Business School

In what ways do the experiences of supporting and the experience of being supported match up as a support tie to an entrepreneur? We investigate the features of relationships that provide entrepreneurs with accessible and valuable resources. Our theorization stems from the assumptions that entrepreneurship is fundamentally a social process (Downing, 2005) because entrepreneurs articulate resources controlled by people other than themselves (Stevensen & Jarillo, 1990; Venkatamaran, 1997) and relationships establish the value of the resources by determining how these are to be employed (Dyer & Singh, 1998; Kraaijenbrink et al., 2010; Wills-Johnson, 2008). Observing the social context of entrepreneurs implies observing the relationships in terms of their specific qualities, such as affect, reciprocity, type, (dis)similarity between connected actors, and so on (Granovetter, 1973, 1983). While much has been described regarding the general characteristics of these support networks and ties around the entrepreneur (e.g., Brüderl & Preisendörfer, 1998; Hanlon & Saunders, 2007; Hite and Hesterly, 2001; Jack, 2005; Kotha and George, 2012; Newbert & Tornikoski, 2012; Newbert et al., 2013; See Rawhauser et al. [forthcoming] for a review), further investigation is in order to understand the mechanisms that enable or hinder these networks and ties (Jack, 2010; see also Ibarra et al. 2005).

Repeated calls have been made to examine the experiences of the actors within these relationships to shed light on these relational mechanisms (Ibarra et al. 2005; Jack, 2010). In this paper, the focus is on the shared, emerging, experience between the actors who are connected through a tie. While research on support has shown that finding the right match between the entrepreneur and the supporter secures support (Rawhauser et al., forthcoming), a key feature of relationships highlighted in the literature is that they are founded upon mismatch between the actors, which the actors struggle to navigate around (Emirbayer, 1997; Fuhse, 2015). Mismatch arises from ambiguities within the relationship (White, 2008). An example of this within the present study is the amount of requests that can be made: commonly, entrepreneurs express gratitude and avoid asking for further support, while supporters complain that entrepreneurs do not request even more from them.

The present investigation employs phenomenological investigation through interviews with entrepreneurs and their supporters regarding the support relationships in which they are surrounded. Interviews were conducted with 10 entrepreneurs and 12 of their supporters. A narrative approach is taken in this investigation (Bamberg, 2006; Deppermann, 2013; Georgakopoulou, 2006; Downing, 1997, 2005), where the narrative used to describe the tie is observed within both actors’ accounts. These accounts are subsequently compared, using
situations and ties both actors have in common to anchor the comparison. A preliminary analysis of the data suggests that “matching” the supporter with the entrepreneur is about the experience of the connection between them – which is only partially shared by these two people and is shadowed by mismatch. How they handle the mismatch between them constitutes the routine of interaction that secures support.
Meaning, Content and Stories in eSNA. Personal Support Networks of Early Career Researchers in Educational Science.

Martina Kenk
Goethe Universität

The study investigates correlations between beneficial network aspects and academic careers of postdoctoral researchers in educational science. In 15 personal interviews, the social support, learning environment and supervision relationships were collected, using computer-based drawing of egocentric network maps. The interviewees explained their relationships and narrated events. These stories allow a deeper understanding of personal relationships and their construction of social reality. The meanings and contents of relations enable a differentiated typology of their learning environment: an individual supervision, a team or a ‘community of practice’. Their answers to questions of cooperation, expertise and professional career provide arguments for understanding the correlation between social support and career development. This focus on qualitative aspects of relations – the ‘meaning’ – is used for analyzing forms, contents and stories of support and networking. A new methodical procedure was tested by combining quantitative data of network maps and qualitatively categorized answers and stories – following up new approaches of qualitative SNA. Not only quantitative attributes on individual, relational and network level, but especially qualitative characterizations of network aspects are of interest here. Alteri roles, support functions of relationships, network elements like peer groups, cliques or components – these elements have an explanatory dimension in a qualitative perspective. This mixed-methods approach combines quantitative egocentric SNA with content-analysis of meaning and stories of relationships in support networks. This paper seizes critical statements that SNA research concentrated very strongly on formal structural analysis and more research on communicated meaning in relations is necessary.
Mapping Hiring Stories: an exploration of networks in international academic job securement
Julie Birkholz, Melissa Laufer
Ghent University

The impacts of networks on securing a job, from the perspective of a network researcher, is well established – the process is inherently relational and aspects of your personal network relate to your success in securing a job (Fernandez, Castilla, & Moore, 2000; Marsden & Gorman, 2001; Neckerman & Fernandez, 2003). Despite this knowledge, in many studies of academic careers, the topic of this study, the networks of actors are often overlooked in understanding job securement. In this study we sought to explore through an abductive research design, the factors that contribute to job success of international academics (academics entering a foreign higher education system).

Today, seeking academic positions abroad is more commonplace and manageable (Altbach, Reisberg, & Rumbley, 2009). For universities, internationalizing their staff can be both intellectually and financially beneficial. For academics, employment abroad can be an alternative to highly competitive and limited positions in their home countries (Marginson & Van der Wende, 2007). However, despite this supposed ‘win-win’ situation for both parties: in reality working abroad can present many new obstacles. We investigate the prominence of different contributing factors through semi-structured interviews of international academics in mid-level, tenured or tenure tracked positions in the Arts & Humanities. Through these hiring stories we combine content and network analysis to qualitatively compare the conditions under which these academics secured jobs.

In this presentation we seek to highlight the methodological steps we undertook to come to our findings. We draw upon theory on academic careers and consider a number of factors that contribute to job success including mentoring relationship with a more senior academic (Van Emmerik, 2004), collaborating with well-established researchers (Guimerà, Uzzi, Spiro, & Amaral, 2005) and the characteristics of an individual’s network (Hadani, Coombes, Das, & Jalalajs, 2012). We developed a set of questions that considered a wide range of variables that could be identified through a storytelling narrative. This resulted in a number of ego networks, including attributes of the individuals and the content of the hiring situation. Through an abductive qualitative approach, we sought to reconstruct the stories to identify patterns between the interviewees using a constant comparative method (Merriam 2009). Several ‘atypical’ stories emerged that did not follow the standard democratic hiring process i.e. a direct hire, closed posting. A combination of an applicant’s profile, background, experience and network played a role in their employment success. For example, an applicant’s possession of an ‘extra’ quality such as unique expertise in a narrow field, connection to a prestigious foreign university, an impressive teaching resume or a well-established career served to legitimize their potential to a hiring institution. This qualitative approach allowed us to identify a variety of potential factors in the international hiring process through a relatively small number of cases to contribute to our understanding of key concepts in the field of higher education hiring practices.
Varieties of Qualitative Perspectives in Social Network Analysis: Ego-centric networks (Session 6; Part 4)
Stefan Bernhard¹; Luisa Peters²; Inga Truschkat²; Andreas Herz³
¹Institute for Employment Research IAB; ²Universität Hildeshemi; ³University of Marburg

Snapshot vs. Biography: Ego-Centered Social Networks in Biographic Perspective
André Knabe¹, Andreas Klärner²
¹Universität Rostock, ²Thünen Institute of Rural Studies

Research on poverty often refers to social consequences of poverty (isolation, homogenization, stigmatization), but also to social determinants of coping with poverty (social support, social integration). So it is recommended to integrate social network analysis in qualitative poverty research to widen the perspective beyond the subjective narratives of the interviewees. But while biographic narratives refer to a certain temporality of events within the life course, egocentric network data usually is a snapshot of the current relationships of a person. Network data alone, does not report very much about the emergence and the development of ties. We can identify ties as supportive or burdening, but we are not able to say very much about the stories and histories behind different kinds of ties.

We want to present our mixed-methods-approach to combine biographic-narrative analysis with quantitative ego-centered network data. We want to show, how individual action is enabled and restricted by social ties and biographic experiences. Our analysis starts at the current living situation and it’s embeddedness in social network structures. In a second step we show which ties within the network are grown in which biographical context of life.

We analyze qualitative interviews with 55 women and men, who were asked about their everyday life and their coping with having very little money. We also collected social network data using the software Vennmaker, mainly asking for supporting but also for quarrelling people. This mixed-methods approach enabled us to analyze the social support network within the frame of the lifeworld of respondents.

Our results show, that snapshots of social Networks give a deep insight in the life-course of the interviewees. If we combine ego-centered network analysis with qualitative methods, we are able to understand the emergence of existing ties within biographical contexts. Existing supportive as well as negative ties, are not only a result of contemporary capacities to organize one’s network, but they are linked to events and involvement in social structures in the past.
Differences in the network structure of female professors from different scientific disciplines

Marina Hennig

JGU Mainz

While the network structures of male professors in the natural and social sciences only differ slightly, clear differences can be observed between female professors working in different disciplines. In this instance the network size and composition differ between feminized and masculinized scientific disciplines and have different effects on individual career development and on network strategies. The social sciences tend to be among the feminized scientific disciplines, which also have a much broader range of relationship types and present greater gender heterogeneity in the network composition than the natural sciences. The differences in the network structures of female professors, their causes, and their impacts on career paths are explained and discussed in this presentation. The database consists of a combination of problem-centered interviews and a quantitative network survey of ten professors (male and female) from different disciplines (social and natural sciences) working at different universities in Germany, which was carried out in 2015.
Networks as identification resource – Evidence from narrative self-verifications of nascent entrepreneurs

Stefan Bernhard¹, Nilgun Massih-Tehran

¹Institute for Employment Research IAB

The presentation draws on and develops qualitative methods in network research. It focuses on aspects of social networks that formal (quantitative) methods neglect, i.e. social networks as identification resources. While research on social capital has stressed the importance, varieties and challenges of networks as resources, their contribution to identification processes has attracted little attention. In light of the emphasis given to “identity” and “interaction” in recent network theorising, this is an astounding omission. We address this research lacunae by looking at processes of self-verification in the transition from unemployment to self-employment. To reinforce their identification with the new and challenging role of an entrepreneur, people use self-verification towards members of their personal networks. Drawing on narrative network interviews with nascent entrepreneurs I distinguish forms of self-verifications from networks and different usages of personal networks for identification projects. Our study shows that identifications resources are an important resource dimension of social networks that complements traditional forms of social capital.
Networks and the Labour Market (Session 7; Part 1)
Joan-Miguel Verd, Oriol Barranco, Universitat, Dafne Muntanyola-Saura
Universitat Autònoma de Barcelona

Networks and status attainment: evidence from Spain
Mattia Vacchiano, Joel Martí
Autonomous University of Barcelona (UAB)

A large body of sociological literature has been accumulated regarding the role of social capital as job search method and its results on job findings. On this topic, the «social resources theory» formulates the proposition that social capital (in terms of both accessed and mobilised resources in social networks) enhances the chances of obtaining better socioeconomic status. Although it is reasonable to claim that job seekers benefits by using contacts, inconclusive empirical evidence has put in doubt the importance of contacts on job outcomes, generating what is known, in the last decade, as the “Mouw-Lin debate”. Drawing on social capital theory, in this presentation we use social networks data from a study of young adults aged 20–34 in the Barcelona metropolitan area, in order to test the importance of contacts on occupational attainments. Controlling for socioeconomic variable such as sex, age and gender, we performed a multilevel analysis which predict the impact on job outcomes considering: (1) parental resources (occupational category), (2) personal resources (educational credentials), (3) accessed social capital (alters’ status and strength of ties) and (4) mobilized resources (alters’ status, strength and number of ties mobilized). Due to the specificity of our sample (which is composed only of young adults), we could not clarify the weight of occupational homophily on job outcomes (Mouw, 2003), considering this characteristic less dominant in young adults’ networks. However, our results show that SC has an impact on economic returns. Particularly, mobilising “few” and “better” contacts is associated with obtaining qualified jobs instead of no qualified; data also show that SC has no effect if we consider higher occupations (more qualified and prestigious jobs), underlying the importance of educational credentials for these specific attainments.

This research is part of a project financed by the Spanish Ministry of Economy and Innovation through grant CSO2012-36055 conducted by the Centre d’Estudis Sociològics sobre la Vida Quotidiana i el Treball - Universitat Autònoma de Barcelona. We also elaborate this research in the context of INCASI Network, a European project (Horizon 2020; Marie Skłodowska-Curie, 691004) coordinated by Dr. Pedro López-Roldán.
Occupational Mobility Networks
Per Block

Studies of intra-generational occupational mobility tend to view individuals’ transitions between occupations as events that are mostly independent of others’ moves in the labour market. The likelihood of occupational transitions is often discussed in terms of exogenous job characteristics that distinguish occupations, such as wage or skill levels. The theoretical focus on exogenous job characteristics is reflected in the methods employed in empirical analyses of mobility, as their fundamental assumption is the independence of observations. In this paper, an alternative method that can account for an interdependence of movement in the labour market is presented; by allowing and explicitly analysing dependence between occupational transitions provides new insight into the structure of occupational mobility. An intuitive way to analyse dependence in the labour market is to model occupational mobility as a network in which individuals’ transitions connect occupations. Dependence between occupational moves is analysed using statistical techniques for social networks, explicitly developed to model and account for mobility systems with interdependent observations. Using this method, it is shown that, even after controlling for many important job characteristics, the mobility network is strongly guided by endogenous forces. Analysing these forces allows conclusions about clustering and hierarchisation of the labour market. Whether the found endogenous factors are due to unobserved (unobservable) job characteristics or actual dependence between ties is discussed. Further, the method at hand is used to analyse gender segregation of occupations. By relating the patterns of how women and men move through the labour market, theories on men specifically leaving occupations with a high inflow of women can be tested. With the proposed approach, we can move towards understanding how far sex segregation of the labour market is due to job characteristics or due to individuals reacting to the moves of others through the labour market.
More than looking for a job, or: How refugees try to get a foothold in the German labour market

Stefan Bernhard

Over one million refugees migrated to Germany in 2015 and 2016. Many of them will stay in Germany for the medium or long-term. This raises the question of how refugees integrate into the labour market. I argue that job finding processes of refugees have to be seen in context of their biographical situation. For refugees, labour market integration is more and something else then finding a job. It’s about getting a foothold in a new country, acquiring knowledge about how things work there and redefining professional goals in a totally new social setting. How do refugees forge and use personal contacts in that situation? Building on early stage qualitative research on refugees in Germany, I present a research design that combines narrative data with data on personal communities as well as on job searching (weak) ties. I illustrate my approach using an empirical case study.
Labour trajectories and young people’s social capital: Is instability reducing useful contacts to get a job?
Joan-Miquel Verd, Lídia Yepes Cayuela
Universitat Autònoma de Barcelona

Traditionally, the experience in the labour market has been considered a source of social capital for young people useful for eventual job search and labour mobility -usually improving the initial labour conditions. However, the spread of unemployment and precarious employment during the Great Recession undermines this logic, especially because young people are the most affected by the lack of (stable) employment.

The paper will analyse to what extent labour trajectories are still a source of social capital in periods of economic turmoil, i.e. to what extent, in times of unemployment and labour instability, young people are able to obtain valuable contacts in the labour market or whether they have other sources of social capital. If this process of acquiring new valuable contacts along the labour trajectory is blocked, other kind of contacts, such as those in the family and in the educational and training activities, may take a more important role as sources of useful information to get a job.

These possible changes in the relation between trajectories and the composition of relational capital will be empirically tested by putting into relation the kind of labour trajectory developed by young individuals and the presence in their personal network of contacts acquired in different sociability spheres. This importance of different types of contacts will be evaluated also in terms of the use young people have done of these different contacts coming from different spheres to get a job (and the degree of success of theses uses).

Clearly, labour trajectories are linked to different sources of inequality in the labour market, such as educational level, gender or family background, among many others. Therefore these characteristics of individuals will be taken into account to control the results obtained in the analyses.
Teachers' labor market mobility in Sweden: Traces of the education reforms at the micro level
Selcan Mutgan, Christian Steglich
Institute for Analytical Sociology, Linköping University

The Swedish education system underwent several phases of de-regulation and liberalisation since the early 1990s. Starting out with almost exclusively state-run schools with geographically defined catchment areas, many independent (i.e., private and for-profit) yet 100% municipality-funded schools have opened, and parents’ school choice today is more constrained by resources (information bias, travel distance) than by governmental administrative regulations.

Working with yearly individual level population data from Statistics Sweden (“the register”) over the period 1990-2012 and taking a network approach, we plan to study the impact of liberalisation on the educational sector. One outcome to study will be the national labour market mobility of secondary school teachers after the introduction of publicly funded voucher schools. Another will be the birth and death of schools in the population.

Like other “big” data, the register is a treasure chest with a curse upon it. On the one hand, it is huge and complete: we will not have noteworthy missing data or power problems to deal with. On the other hand, it is not very deep: we have to work with those variables that are available, which all have been collected for other, in this case mainly administrative purposes. Administrative purpose and sociological inquiry are, luckily, often not too far apart.

Register data also allows us to follow life events of individuals over a long period of time, and, perhaps more importantly, we will have panel data on all teachers, students, and all schools which allows us to examine the dynamic feedback processes between labor market decisions of teachers and school compositions.

The nodal entities that can be involved in our analyses have a clear multilevel structure: students and their parents, teachers, schools, school boards, municipalities, workplaces, etcetera. The ties between them are of a straightforward affiliation nature only, as we typically do not have primary one-mode data on any node set. Each school belongs to a municipality, by its geographical location, and it receives its main funding from the municipalities that its student reside in (independent schools are also allowed to additionally accept private donations). Schools are not allowed to discriminate or require admission examinations, and we know for all students which school they went to. We know for all teachers which school they worked in, in addition to their personal educational histories. We also know who sat on the board of which school. Last but not least, we know workplaces and employers of the students’ parents. One-mode data will be obtained by projection of such affiliations, whenever this makes sense. For example, the sequence of yearly networks mapping teacher affiliations to schools can be used to construct a sequence of valued networks mapping the labour market moves between schools.
Gender, networks and career in Academia: Reevaluating evidence from Germany and Sweden

Irina Gewinner¹, Anett Schenk²
¹Leibniz University of Hanover, ²Lund University

Social change coupled with recent financial and economic crisis in Europe has altered careers not only in the commercial sector, but also in academia. Academia is undergoing significant changes, inspired by New Public Management reforming its structures towards flexibility, service orientation and excellence at the same time (Etzkowitz, 2003; Lynch, 2006). This goes along with growing modification of academic life courses: they increasingly shift towards discontinuity and de-standardization (Etzkowitz, 2003), whereas austerity of resources in academia leads to severe competition against the background of scarce job opportunities. This is especially true for German academia with its historically large proportion of junior staff in contrast to a dramatically small amount of senior scholars at tenure positions. In Sweden, increasing focus on excellence combined with management reforms and cut-backs in teaching begin to undermine the country’s previous reforms aiming at equal changes and levelling out hierarchies in academia – at the same time affecting academic identities, in particular for women (Berg, 2010).

Academic life courses are considered to still challenge women as being less suitable for them (e.g. Bagilhole, 2007; Baker, 2010; Fritsch, 2015; Foot & Garg 2015). Life course framework overcomes the limitations of the conceptual approach of the “leaky pipeline” (Berryman, 1983) and provides a more comprehensive understanding of the gendered pathways, since it recognises the cumulative effects of life events at particular stages on career outcomes. While men’s careers exhibit a relatively stable development, female academic life courses demonstrate higher individualization due to significant vertical and horizontal inequalities (Beaufays et al., 2012). These are characterised not only by social origin and field of study, but also increasingly by gender as well (Schultz, 1991; Vogel & Hinz, 2004).

The issue of gender and career advancement in academia has been raised in a number of European studies and publications. Although research has enhanced our understanding of inequalities faced by women who pursue academic careers, they have only to a very little extent highlighted the link between academic career advancement, social networks and their role in dynamics of inequalities for further career trajectories (Kenk, 2012; Gewinner, 2017). In contrast, the intensification of meritocracy related discussions shapes the current notion of academic performance and eclipses the meaning and importance of personal connections for career progression and scientific excellence.

This contribution aims at extending and systematising more thoroughly the relationship between social networks and females’ academic careers by reviewing the scope of pertinent literature on networks and academic labour market. Specifically, it seeks to identify the dominant patterns and intersections of gender, social networks and career progress in academia. By doing so, this contribution challenges the significance of the idea of excellence for career success, measured by obtaining a professorship or demonstrating academic achievement. Moreover, it emphasises the process of career advancement from early career stage to professorship and exemplifies evidence from Germany and Sweden. At this juncture, special attention is paid to interactions between networks effects and expectations towards social actors, family formation of academics and different fields of study.
Older industrial areas are often neglected in planning and research, especially when it comes to sustainability transition, although they encounter a considerable amount of conflicting issues which reduce their competitiveness: land sealing, soil contamination, heat islands, a lack of accessibility, and internal transport problems are reducing attractiveness and leading to unsustainable development which in turn leading to reduced biodiversity, ecosystem services, and health issues for employees. Climate protection or climate change adaptation are often not even regarded as a problem due to the perception of the nature of industrial areas as places of production. Hence, we experience a huge lack of climate and economic resilience in these areas.

In the federally funded project “Grey goes Green – Transforming Industrial Areas” we are aiming to establish a transformative process in three different industrial areas in the German cities of Frankfurt (Hesse), Remscheid, and Marl (both North-Rhine Westphalia).

In order to reverse the above mentioned negative trends, the question arises how a shift towards sustainable development can take place and how such a process is analysed best. To do so, a combination of structural network analysis (SNA) with elements of transition studies theory is used, e.g. multi-level perspective on transitions (MLP), strategic niche management and transition management.

We are looking at relational aspects by describing local actor networks across different levels and their dynamics during the project duration of three years: A multi-level quantitative SNA reaching across different groups of actors, e.g. companies in the study area, local administration, and political arena, is carried out. It will be complemented by in-depth qualitative interviews with key actors to look into their innovation biography and investigate their influence on other actors. Horizontal linkages within as well as vertical linkages between network domains shall be disclosed and used as an input for the ongoing transition process, in order to facilitate and accelerate the implementation of measures. While the project creates a protected space for niche development, the question which actors (and in which combination) are most relevant for a wider take up of transition is tackled. Are there certain characteristics of actors or certain interrelationships that are determining these processes? The local history of the transformative process is disclosed by text analysis and expert interviews, drawing from the theoretical framework of MLP. This also helps identify regional transition paths to sustainability, which draws on an evolutionary economic geography approach, elaborating how niche actors can use path plasticity in order to enact or facilitate change.

This in-depth empirical work is at the same time analysing three different geographical
locations and documenting undertaken measures and barriers among the different stakeholders, therefore making it possible to integrate the three different contexts within a comparative approach. This makes it possible to develop a geographically or place sensitive framework. As a consequence, we can explore mechanisms and foster theoretical understanding by integrating different aspects of spatiality, relational views, and governance aspects. Conclusively, this shall deepen the understanding of sustainability transition processes.
Enter "KlimaNetze": Social networks and sustainable transformations in urban climate protection
Martin Stark, Bettina Lelong, Britta Rösener, Marco Schmitt, Elena Kaip, Carolin Vorwerk, Johannes Vogelsang

The paper presents a multilevel network of actors and activities in climate protection as a first result of the ongoing transdisciplinary research project "KlimaNetze" on the role of social networks for creating social innovation and transformation in urban climate governance. To date, research in urban climate governance has focused on global cities, mostly ignoring smaller cities. At the same time, the main emphasis of innovation research was on the national and international level, neglecting the local or urban level. "KlimaNetze" responds to these research gaps by investigating the forms of cooperation of actors and their influence on innovative, local initiatives in urban climate protection in the German medium sized city of Bielefeld. The main questions here are: What inhibiting and promoting factors of cooperation/innovation can be identified and how can the cooperation of actors from different domains and with different and often opposing motivations be facilitated? For this purpose, "KlimaNetze" gathers expertise from sociology, human geography and urban planning. The aim of the project is to explore, enhance and if neccessary (re-)design governance processes in urban climate protection via a mixed methods approach. "KlimaNetze" proposes an integration of perspectives from urban climate governance, multi-level social network analysis, the multi-level perspective on socio-technical transitions, network domains and real-world laboratories, an increasingly popular research approach at the science-society interface.
Social networks and the transformation of local electricity governance – cases from Germany

Gerhard Fuchs
University of Stuttgart

In the transformation of the German electricity system the importance of local efforts looms large. At the local level actors which had before little influence in the field are building new types of coalitions motivated by climate protection as well as economic motives. The present paper will compare four local electricity networks both with respect to its structural features as well as with respects to their genesis. Theoretically the paper is based on recent developments in field theory (Fligstein/McAdam 2012) as well network theory (Padgett/Powell 2012). Although stressing the role of human agency in generating institutional change, this literature also highlights certain structural features that facilitate entrepreneurial efforts (Clemens/Cook 1999). Most important is the position of particular actors with respect to multiple social networks (Padgett/Ansell 1993). Because entrepreneurial action requires the construction of coalitions and innovative framing of issues, actors who straddle significant social networks are especially well situated to engage in skilled social action.
Who cares about coastal carbon? Using social network analysis to map the structure of an emergent issue field (ID 1377)

Jennifer Bansard
University of Potsdam

With respect to terrestrial ecosystems, the sustainable management of carbon sinks is unequivocally an established issue in international climate governance. Despite their significant carbon sequestration potential, coastal ecosystems on the other hand long remained absent from the debate. After decades in the shadow, “coastal carbon” is now establishing itself as an issue of scholarly interest. Along with the growth in the body of knowledge came the uptake of the topic beyond the academic realm. Indeed, more and more actors such as international organizations, NGOs, or the media are addressing the role of coastal ecosystems in mitigating climate change. This emergent issue field in turn materializes on the social media platform Twitter, where users brought to life hashtags such as #coastalcarbon or #bluecarbon. Against this background, this paper uses Twitter data to shed light on the landscape of individuals and organizations discussing the issue of coastal carbon. Special emphasis is devoted to analyzing the way scholars engage in these online discussions; i.a. examining how they relate to other types of actors in the network and what role they play in the dissemination of knowledge. Overall, the paper identifies pivotal figures in the coastal carbon field and reflects on the use of Twitter for bringing attention to research findings.
Divergent Neighbors: Corporatism and Climate Policy Networks in Finland and Sweden
Antti Gronow¹, Tuomas Ylä-Anttila, Marcus Carson, Christofer Edling
¹University of Helsinki

Previous research has argued that corporatist polities tend to enact more ambitious environmental policies than others. A similar systems research design is used to test the validity of this claim of two similar corporatist polities that diverge in their climate change policy: Swedish climate policy is more ambitious than Finland’s. It is argued that corporatism has three main characteristics: inclusiveness, consensualism, and strength of tripartite organizations. A hypothesis is postulated that the first two of these support and the last one hinders ambitious environmental policymaking. The hypothesis is tested with the help of a policy network survey of key organizations in climate policy in Finland and Sweden. The results show that the relationship of corporatism and environmental policy is not as straightforward as presumed previously: consensualism is slightly positively related to ambitious environmental policy, while the opposite is true of tripartite strength.
Participation within community-led energy projects: The role of social networks
Fleur Goedkoop, Andreas Flache, Jacob Dijkstra
University of Groningen

This paper looks at the role of social networks in facilitating or hindering participation in local renewable energy initiatives (LREI). These are bottom-up initiatives within communities to become more sustainable by energy saving campaigns or producing renewable energy via a local cooperative. Typically, in such projects a group of front-runners takes the lead shouldering the start-up costs. Hereafter, more members of the wider community may join. If too few inhabitants of the community participate though, the project might fail after all. Most existing studies investigating participation in community energy projects focus on individual characteristics of front runners and potential participants, disregarding social network characteristics. Studies that do include social networks often employ small samples or qualitative data. This work suggests that people are often recruited by familiar others who already joined the movement. Importantly, a strong connection to front-runners may provide individuals with trust, next to information and may provide a strong normative obligation to join.

However, not only direct but also indirect connections to front-runners in the broader network within the community might matter. Prospective participants engaged in other (local) organizations, may be more willing to join energy related community projects, since these other activities can bring them indirectly into contact with the ideas of the frontrunners. They might also be seen as a signal of general involvement within a community. By including the broader network in the community we gain more insight into how and when the team of front-runners is influential in attracting community members to engage in the project.

We use quantitative data in seven villages and neighborhoods in the Netherlands (N=465). We analyze the wider community network and individuals' indirect connections with frontrunners through affiliation networks. This way, we can proxy the social networks within these communities without collecting data on complete networks, something which is not feasible within communities of the size we study. From these networks we estimate effects of individual level network variables in an ordinal regression model of intention to participate. In addition, we compare the community network structure of these communities and link them to their progress.

Preliminary results show that in addition to prior investments in renewable energy and income, direct contact and, to a lesser extent, indirect contact via co-memberships seem to matter. However, these results differ between communities; in some communities indirect contact has a positive effect whereas in others it seems to have a negative effect, and in some there is no effect. When it comes to mechanisms, only social norms seem to play a role, indicating that people who know more front-runners feel a higher obligation to act pro-environmentally. Contact does not seem to be important for information sharing since almost all respondents knew about the project, independent of knowing the front-runners. In conclusion, it can cautiously be said that both direct and indirect contacts matter but to what extent and in what way they matter might turn out to be very context specific.
The future trajectory of the climate system will be determined by the aggregated decisions of the global human population, which will govern future greenhouse gas emissions and enactment of policies to mitigate, geoengineer and/or adapt to climate change. Personal beliefs and engagement with climate change influence climate-related decision-making at all social scales, including behaviours of individuals (e.g. lifestyles, consumer choices, political alignment), organisations (e.g. customer-focused business strategies, corporate social responsibility) and institutions (e.g. voter support for government policies and international treaties). Thus the social processes by which information is exchanged and beliefs are formed about climate change are central to understanding the coupled climate-society system and its evolution over time. Widespread use of social media and online social networks to communicate is affecting the ways in which individual opinions about climate are formed – and creating rich datasets which can be mined for insights into related social processes.

Here I first present findings from our recent paper (Williams et al, 2015) showing that discussion of climate change in social media is characterised by polarisation and echo chambers of like-minded users. Several forms of social network are constructed for Twitter users communicating about climate change. We classify user attitudes to climate change based on message content and find that social networks are characterised by strong attitude-based homophily and segregation into polarised “sceptic” and “activist” groups. Most users interact only with like-minded others, in communities dominated by a single view. However, we also find mixed-attitude communities in which sceptics and activists frequently interact. Messages between like-minded users typically carry positive sentiment, while messages between sceptics and activists carry negative sentiment. Users who express negative sentiment are themselves the target of negativity. Users in mixed-attitude communities are less likely to hold a strongly polarised view, but more likely to express negative sentiment towards other users with differing views. Overall, social media discussions of climate change often occur within polarising echo chambers, but also within ‘open forums’ that reduce polarisation and stimulate debate.

Next I will present new work that uses network analysis to consider the complex media ecosystem that surrounds the topic of climate change. By extracting the embedded hyperlinks from tweets shared by users discussing climate change, and identifying the online articles and web domains to which they refer, we create bipartite networks of user-article and user-domain relations that characterise the online climate debate. Bipartite community detection reveals distinct clusters of articles and domains shared by different user groups. Comparing the networks formed by sceptic and activist users, we find that different viewpoints in this divisive debate are supported by distinct sets of online information sources (domains) and that different topics of debate are prevalent in different user communities. Our findings characterise the online media debate about this important and divisive topic.

Psychological perspectives on social network analysis (Session 9)
Holger von der Lippe
MSB Medical School Berlin

A psychological mixed-methods longitudinal study on personal network constitution and change: Concepts and first results of a student sample
Holger von der Lippe
MSB, Medical School Berlin

During a visual network survey of important personal relationships more than 300 students reported on their core and surface personality traits as well as on the structure and the quality of their current relationships. Several years later, we caught up a sample of n = 45 students out of the initial survey and applied quantitative and qualitative methods to investigate the change of personality and networks.

This paper presents
• the theoretical framework that underlies this investigation;
• the analyses of the two cross-sections of this study; and
• first longitudinal findings from the qualitative and the qualitative analyses.

In the discussion we address the potentials of a cross-fertilization of genuine psychological research and social network analysis.
Understanding information search through an interactive networking game

Anne ter Wal¹, Valentina Tartari², Balint Dioszegi¹
¹Imperial College Business School, ²Copenhagen Business School

Despite the prominence of networking in modern society, we know surprisingly little about how individuals navigate social situations to access new information. While existing research has emphasized the structural aspects of networks, it has largely overlooked the behavioral aspects of networking. For example, little is known about why some individuals seem to choose the people to approach with deliberate intent, whilst others appear to be driven by more spontaneous, ad hoc decisions. To shed light on these different networking approaches and their implications for effective search, this study aims to assess the cognitive underpinnings of networking behavior. We do so by designing and implementing an interactive networking game, during which participants search for information by networking among themselves in a controlled setting. Using a battery of psychological measures as a backdrop, we aim to observe and understand how certain cognitive characteristics enable individuals to adopt behaviors that help them successfully navigate their networks in search of information.
Personality and the Creation of Social Capital

Marina Tulin1, Bram Lancee, Beate Volker
1University of Amsterdam

The aim of this paper is to explore the extent to which personality can explain differences in the creation of social capital. Social capital refers to resources that are embedded in people’s social networks, which can be used to improve one’s life chances. Previous research has put forward a set of three mechanisms that explain how social capital is created. First, social capital is dependent on opportunities for contact with others who are instrumental to one’s goals. Second, social capital depends on how attractive ego is to the alters, because those who have more to offer, receive more in return. Third, social capital depends on relationship qualities, such as trust and reciprocity. While these mechanisms have been used to explain how individuals create social capital, we know very little about why some individuals are better able to leverage these mechanisms in order to create social capital. In this paper, we argue that differences in personality might explain why some people are more successful at creating social capital, namely because their personality structure enables them to seek out more opportunities for contact, makes them more attractive social ties, and increases other people’s willingness to share resources with them. For instance, individuals whose personality is characterized by high extraversion tend to seek out new social contexts, and create larger social networks. Those who are high in agreeableness generously offer their help, which makes them attractive partners for social exchange. And individuals who score high on conscientiousness are considered reliable and trustworthy interaction partners. Based on social psychological research, we derived hypotheses for each of the Big Five personality dimensions. Specifically, we hypothesized that extraversion, openness to experience, agreeableness and conscientiousness are positively linked to social capital, while neuroticism is negatively linked to social capital. We tested these hypotheses using the Social Survey of the Networks of the Dutch (SSND; Volker, Schutjens, & Mollenhorst, 2014), which contains data of 1062 respondents on the Big Five personality measure and social capital as measured by the position generator. We ran multiple regressions with social capital (i.e., number of positions accessed; average, highest and range of accessed prestige) as dependent variable, and the Big Five personality dimensions as independent variables. In all analyses, we controlled for gender, age, education and ethnicity because these variables were previously shown to be related to social capital. The results support our hypotheses by showing that conscientiousness, openness to experience, extraversion, and agreeableness are positively related to social capital, while neuroticism is negatively related to social capital. We discuss the findings of the present study in light of existing structural explanations of differential creation of social capital.
Overload and intention to leave: the negative effects of employees’ network embeddedness

Natalie David, Olaf Rank
University of Freiburg

Research on employee social capital has mainly focused its attention on positive outcomes arising from employees’ access to valuable resources - such as knowledge - through their embeddedness in intraorganizational cooperative networks. In contrast, there has been little attention on resource consumption induced by employees’ network interactions. However, occupying a prominent position in the network of knowledge exchange within their organization not only confers advantages to employees, but also takes time and energy beyond their formal scope of work. We therefore explore the relationship between two exposed positions in the network, i.e., centrality and brokerage, and employees’ perceived role overload, as well as their subsequent performance evaluation and intention to leave. Specifically, we assume that employees’ knowledge providing activity and their bridging of structural holes increases their perceived role overload, while their knowledge seeking activity reduces their perceived overload. We further assume that role overload leads to a discrepancy in performance assessments between employees themselves and their supervisor, and to increased intention to leave. To test our hypotheses, we collected data from all employees within a medium-sized company in the southwest of Germany (n=153). The results of our study support our assumptions that employees who provide knowledge to numerous coworkers and those who act as knowledge brokers between unconnected others are likely to feel overloaded, leading them to overevaluate their performance and increasing their intention to leave the organization. Our study sheds light on possible negative outcomes associated with prominent network positions and provides important implications for organizational knowledge management.
Leader centrality, satisfaction and team performance in workgroups: The analysis of instrumental and expressive networks
Marta Alves¹, Paulo Lourenço²
¹Research Center in Business Sciences (NECE-UBI), Universidade da Beira Interior, ²University of Coimbra

Despite the fact that the hierarchical position within an organization structure determines who is and who is not a formal leader, in this paper we intend to emphasize the relational nature of leadership. The social network approach allows the conceptualization and the operationalization of leadership as “relational, situated in specific contexts, involving patterned processes, and both formal and/or informal influence” (Carter, DeChurch, Braun, & Contractor, 2015, p.599). The present study aims to test the following general hypotheses: (1) the level of centrality of the formal team leader positively predicts leadership and group outcomes; (2) the density of the network moderates the association between formal leader centrality and leadership/group outcome. A sample of 77 team leaders (81.6 % male) with an average age of 43.16 years (DP=8.44) participated in the research. The participants were formal leaders of organizational teams (i.e., commercial and marketing teams, project teams, human resources management teams, quality control teams, financial management teams and top management teams) from several organizations (industry, information and communication technology services, hospital institutions, commerce as well as transport and distribution). Team size ranged from three to ten members (M=5.23; DP=1.88). All the teams had no common members and were, to some extent, characterized by direct and regular interaction in the same organization. Leader centrality in communication (i.e., “to whom I provide information and materials necessary to carrying out the work”) and expressive (i.e., “with whom I have a close relationship”) group networks was calculated. Degree, closeness, betweenness and eigenvector centrality indicators were obtained for both social networks. Firstly, the relation between centrality variables and leader satisfaction with the team as well as leader’s evaluation of group performance were analyzed. Secondly, the moderating role of group network density in the relationship between leader centrality variables and both leader satisfaction and group performance was studied. Team size was controlled for all the analysis. Results are discussed in the context of contemporary leadership theories and leader’s social capital approach in the organizational team context.

Networks for Learning: Network coevolution & social influence in Education & learning (Session 10; Part 1)
Marc Sarazin¹; Martin Rehm²; Dominik Froehlich³
¹University of Oxford; ²University Duisburg-Essen; ³University of Vienna

Asymmetric social influence and the diffusion of high and low academic performance
Francesca Pallotti¹, Andrew Parker², Alessandro Lomi³
¹University of Greenwich, ²University of Exeter Business School, ³University of Italian Switzerland

Social influence occurs when the behavior of an individual is affected by the observed or expected behavior of others. Traditionally considered as a prototypical example of individual level outcome, academic performance is increasingly recognized as the combined outcome of individual qualities and social influence - or peer-effects. Building on this view, recent studies of academic performance have tried to identify the specific network mechanisms through which social influence processes operate. This paper contributes to this line of research by examining the role of social networks in transmitting peer-effects in educational settings. We specify and estimate recently developed autologistic actor attribute model (ALAAM) that allows for network dependencies in the data to be taken explicitly into account.

We collected social network data on 139 students enrolled in a professional master program at a Swiss University. We asked each student to indicate who they sought advice from and who were their friends. We measured performance in terms of students’ overall grade in the class. The overall grade was based upon a mid-term exam and a final exam. We examine the effect of the advice network and the friendship network on high and low academic performance.

We find a positive and significant receiver effect in the advice networks - indicating that individuals who are central in the advice network are more likely to be high performers. We also find a positive and significant contagion effect suggesting that high performing students tend to form advice ties with each other. In contrast to high performance, we find no direct contagion effect at the level of low performance. However, we find a positive and marginally significant effect of reciprocal contagion, suggesting that having advice ties to low performers is not likely to affect an individual's performance, but reciprocated advice ties tend to diffuse low performance. This result is reinforced by the clearly detectable tendency of triadic closure mechanisms to produce asymmetric implications for the diffusion of high and low academic performance.
Social networks and favourite subjects: can friends explain gender differences in STEM preferences?

Isabel Raabe¹, Christoph Stadtfeld², Zsófia Boda²
¹University of Oxford, ²ETH Zurich

Considering the higher pay and prestige of jobs in Science, Technology, Engineering, and Maths (STEM), the under- or overrepresentation of sub-groups of the population contribute to social and economic inequality. Relevant demographic characteristics in this regard are both gender and ethnicity, with gender having received more academic attention. Despite that fact that the traditional gender gap in educational attainment has been reversed and boys and girls perform almost equally in Maths, women are still underrepresented in STEM occupations. A popular argument is the so-called “leaky pipeline” which proposes that girls, over their educational career, drop out of a STEM career trajectory. Indeed, many studies document different tendencies in aspirations (instead of actual performance) based on gender. Therefore, it is crucial to understand how these different patterns of aspirations come about.

Gender differences in aspirations can be explained by a variety of factors, of which peer effects in school are particularly important. However, studying peer effects has been methodologically problematic, especially in terms of separating between selection and influence effects. While social network models are appropriate for such analyses, their results often lack statistical power due to their classroom-level focus. In our study, we address and aim to rectify this by applying multilevel analysis of classroom-level social networks. For this, we analyse the co-evolution of friendship and two-mode favourite-subject networks applying the random-coefficient multilevel SAOM framework. We use a two-wave dataset of 251 Swedish classrooms collected as part of the Children of Immigrants Longitudinal Survey in Four European Countries (CILS4EU).
Peer Effects in Online Mentoring – A Longitudinal Network Analysis
Manuel Hopp¹, Albert Ziegler¹, Heidrun Stoeger²
¹Friedrich-Alexander University of Erlangen-Nuremberg, ²University of Regensburg

Longitudinal communication network and evaluation data was analyzed to get a better understanding of the interplay between peer influence and the outcome of online mentoring. These data contain detailed information about the communication networks and relevant outcome variables of mentees participating in the online mentoring program CyberMentor. To distinguish selection and influence processes a method (Simulation Investigation for Empirical Network Analyses, SIENA) was used in which network formation and changes in the outcome variables are simulated simultaneously within the context of other network processes.

The online mentoring program CyberMentor has the goal of effecting a lasting increase in the participation of girls in STEM (Science, technology, engineering and mathematics). In this program, more than 600 12- to 18-year-old girls are assigned a personal female mentor each year. The mentors are all STEM experts, either graduate students doing advanced degree work in STEM or university-educated professionals with careers in a STEM field. Mentors communicate with their respective mentees on a weekly basis for at least one year. Together, mentors and mentees discuss interesting STEM topics and work on joint projects. Communication takes place on a secure web-based community platform with internal email, chat, and forum systems. Several outcome variables (among others: interest in STEM, elective intentions, certainty about career goals, anxiety towards STEM) are assessed by online questionnaires in three points in time (beginning of mentoring, after 6 months, after 12 months).

We analyzed multiple subsets of mentees (N > 100), who communicated with each other by email. By conducting a dictionary based corpus linguistic analysis (LIWC) with the email data, we could create several different topic related communication networks, e.g. a STEM-related network and a leisure time related network, each in three points in time (beginning of mentoring, after 6 months, after 12 months). In the longitudinal network analysis we utilized several outcome variables for the coevolution of mentee network and behavior. First analyses with a subset of the data show promising results of peer influence on anxiety towards STEM in the STEM topic related communication network of mentees.
Memory of ties: An educational network study over 10 years
Vanina Torlo
University of Greenwich

This study is part of a wider project on the co-evolutionary dynamics of social networks and individual behaviour. We have extensively studied the educational setting where the effects of peer influence are viewed as consequences of interactions between students, and where the behavioural outcome of interest is the level of individual academic achievement. By studying a cohort of seventy-five MBA students, we have shown that students tend to assimilate the average performance of their friends and of their advisors. At the same time, students attaining similar levels of academic performance are more likely to develop friendship and advice ties. In other words, we have shown that – in a given timeframe of two years – processes of social influence and social selection are sub-components of a more general co-evolutionary process linking network structure and individual behaviour. This co-evolutionary process holds true even when considering the evolution of one-mode networks (such as friendship and advice) and two-mode networks (such as represented by the student’s employment preferences). In particular, we have found that advice ties between students lead to agreement with respect to employment preferences, a crucial aspect of their future career as managers.

But what happens after another ten-year time? Which emotional and professional relations are maintained and which get lost? And how do individuals' career paths affect these changes?

In order to answer these questions we have collected data on the same seventy-five MBA students 10 years after the end of the programme. We have collected information about their communication, friendship and advice ties, as well as information about their professional careers, such as the companies they work for and their roles. Preliminary results show some interesting patterns about the maintenance of different ties over a long period of time.
Networks for Learning: Online social networks & Professional learning (Session 10; Part 2)

Marc Sarazin¹; Martin Rehm²; Dominik Froehlich³
¹University of Oxford; ²University Duisburg-Essen; ³University of Vienna

What is going on? Assessing Network Positions within Online (Informal) Networks for Educational Practitioners

Martin Rehm, Frank Cornlissen, Alan Daly, Ad Notten
University Duisburg-Essen

A growing number of studies of professional development and educational reform have begun to illustrate the importance of online (informal) networks and social interactions among educational practitioners (e.g. teachers). However, despite a recent surge of social media use, there is little empirical evidence about the way educational practitioners interact in such (informal) networks online. Consequently, this study aims to contribute to filling this empirical gap and focuses on better understanding the social interactions among educational practitioners in these types of online (informal) networks.

In this context, educational scientists have increasingly acknowledged that the concept of social capital can contribute to our understanding of how (informal) learning networks develop over time. Moreover, social capital has already been used to better understand professional development. Nahapiet and Ghoshal (1998) distinguish between three dimensions of social capital, namely a structural, a cognitive and a relational dimension. Focusing on the structural and cognitive dimensions of social capital, we formulate two main research questions:

1. To what extent does participation in a online (informal) networks contribute to educational practitioners’ formation of:
   i. structural social capital?
   ii. cognitive social capital?

2. Depending on their network position, to what extent are individuals able to possibly influence the content of the online (informal) network?

In the context of this study, we focus on one particular online (informal) network, namely Twitter. We employ a multimethod approach, combining social network analyses (SNA) and bibliometric analyses. SNA has been widely acknowledged as a valuable tool to assess the structural dimension of social capital. However, in an online realm the distinctive features of commonly used metrics are getting blurred and the explanatory power might be diminished. Consequently, and building upon previous work on topics such as brokerage positions, we propose a new “social brokerage index” (SBI). In the context of our bibliometric analyses, to assess the cognitive dimension of social capital formation, we employ latent semantic analysis (LSA). Additionally, we use a term frequency and weighting algorithm (TF.IDF) to compute and visualize any potential similarity or dissimilarity between contributions. More
specifically, we collected data from six international (educational) Twitter hashtag conversations, namely #acps, #caedchat, #edchat, #ntchat, #nyedchat, and #satchat. Using the software tool NodeXL, the data was collected over a period of one year, from the 22nd of May 2014 through to the 21st of May, 2015. The collected data was then imported into R and Pajek to conduct the applicable SNA and bibliometric analyses. The results of our study suggest that our proposed metric (SBI), has added-value to the analysis of online (informal) network behavior also beyond the scope of Twitter. Moreover, by combining this index with additional bibliometric analyses, we are able to better assess network positions within online (informal) networks. Furthermore, this multimethod approach could possibly allow us to profile conversations in online (informal) networks and better understand what type of discussions draw what type of participants and how the dynamics might be influenced by this.
The Effect of Organizational Structure and Cross-boundary Advice Seeking on Unit and Individual Learning

Muge Ozman¹, Andrew Parker²
¹Telecom Ecole de Management, Institut Mines Télécom, ²University of Exeter Business School

Previous research on knowledge transfer within organizations suggests that having closed networks facilitates the flow of sticky knowledge (Hansen, 1999). In contrast, Burt (2004) shows the benefits of having structural holes, i.e., open networks, for access to good ideas. The research on boundary spanners is mixed with evidence that they can both inhibit and promote knowledge flow. Overall the research indicates that effective knowledge transfer depends on a mixture of strong ties/cohesion and range (Burt, 2005; Tortoriello et al., 2012).

In this paper, we investigate knowledge transfer processes taking into account the embeddedness of individuals in higher-level structures such as teams, departments and units. According to previous research such higher level structures tend to form thought worlds (Dougherty, 1992) or foci (Feld, 1981) where individuals develop common frames of thought, which may inhibit the extent of knowledge transfer between them. In addition, the way in which these higher-level foci are related with each other potentially influences the learning at the individual level as well. For these purposes, we carry out an agent based simulation and distinguish between two levels: individual advice networks and the higher-level foci they belong to.

In the agent-based simulation model, agents are members of different foci, and they learn from their alters through advice networks. We take into account different parameter spaces, according to (1) the structure of the advice network and (2) the similarity (relatedness) of foci. As for (1), the structure of the advice network is taken as a parameter in the simulations, which ranges between a perfectly closed (cohesive) structure where agents are connected only to others in the same focus, and a complete random structure where any agent is equally likely to be connected to any other. As for (2), we model the similarity between foci by drawing upon the knowledge-based theories of organisations. Specifically, we use a learning function in which, neither too much similarity nor too much dissimilarity is good for effective knowledge transfer, and that there exists an optimal cognitive distance (Nooteboom et al, 2007) for learning. In a parameter space defined by (1) and (2) above, we examine how the aggregate and foci knowledge evolves.

In addition, we seek to understand how the cohesiveness (and randomness) of advice networks influence learning under different foci network structures as well as in more complex structures where agents can be members of various foci at the same time. Some preliminary results reveal that, the effect of advice networks on learning depend on the similarity between foci. When similarity between foci is low, a cohesive structure benefits overall learning. When similarity between foci is high, a random network structure benefits overall learning.
For long the term lifelong learning has been part of policy discussion. Various initiatives aim to fulfil this goal of a life full of learning. Online communities form parts of the arsenal of tools organizations deploy to give employees the opportunity to constantly learn (Rehm & Notten, 2016). Online communities, such as twitter, can be set up as an informal learning network and provide a platform for knowledge exchange (Hofman and Dijkstra, 2010). At a public school in Virginia (US), a twitter community was created using the hashtag #acps to spread information to all involved staff and through this support their learning. The creation of a specific hashtag creates the potential for organizational learning to occur at the district level. Organizational learning is the implementation of new routines, procedures, or tools (Argote & Miron-Spektor, 2011). Hence, an important part for organizational learning is that new experiences and knowledge are integrated.

For Twitter to work as a tool for professional development and organizational learning, users need to be exposed to new information to enlarge their knowledge base (breath of knowledge) and to deepen their existing expertise (depth of knowledge). An issue with Twitter and other social media tools, is the mass of information that is available (Jones, 2009). Learning at the individual or organizational level can only occur if users are exposed to information. In this study we aim to analyze the potential of Twitter as a tool for organizational learning by analyzing the breath and depth of shared knowledge.

Our data consist of above 16,000 tweets using the hashtag #acps. We applied topic modeling to generate themes. For each individual, we computed the average topic across their tweets. This represents the expertise of the user. Subsequently we analyze the bipartite network "user – expertise" to calculate the breath and depth of information. The network had 849 unique users, and ten topics. Initial analysis on the bipartite network indicates that users tend to tweet about three specific topics (‘vulnerability’= 3.91, topic overlap = 0.15), indicating that users possess areas of specialization. On a network level, the Shannon Index of diversity (7. 42) indicates that expertise is evenly spread among users.

The current results indicate that Twitter could deliver on its potential for organizational learning thanks to diversity of topics shared. Further analysis will investigate the potential of being exposed to old and new topics.
Social network analysis and multiple and mixed method research are two important methodological trends in education and learning research (Hall & Preissle, 2015). The increased usage of combinations of both (e.g., Rienties & Hosein, 2015), what we call mixed methods approaches to social network analysis (MMSNA), has proliferated a plethora of approaches and designs. Since MMSNA are rather resource-intensive (Froehlich & Harwood, 2016), a guide for researchers is needed of how methods of social network analysis may be combined effectively and efficiently. Hence, we develop a map of methods used in MMSNA in the domain of education and learning based on published articles. This map informs future research about the potential of mixing and integrating multiple types of data and multiple types of methods of analysis. Furthermore, it is a tool that contributes to the objective of making the method more accessible also for researchers with more limited resources. This is done by moving away from typologies derived from theory that "have become almost too refined" (Bryman, 2006, p. 98) and staying close to research practice.

Data is generated through a systematic literature review across empirical education and learning journals published featuring MMSNA. For the selected articles, we code the methods used for data collection and analysis. The temporal order of the methods is then used to build a relational dataset. At the time of writing, the data collection and analysis is ongoing, the final dataset will be ready as of April 2017.

Quantitative social network analysis is used to analyze the relational dataset created. We analyze the network map that shows how different methods are linked with each other by extracting three centrality measures: indegree, outdegree, betweenness. Here, for instance, methods high in indegree may hint at a potential for preceding component preparation methods (Schoonenboom & Froehlich, 2016). Depicting a network graph and the network measures associated with it (e.g., measures of centrality) offer more versatile ways of finding and discussing patterns in previous research than typologies or mere counts of certain methods used (e.g., Bryman, 2006).

In conclusion, MMSNA is an important way of creating insight and moving the field of education and learning research forward. We provide a map of how MMSNA designs were implemented in previous empirical education and learning research. This can trigger an informed debate about what designs have proven to be useful, informs about the variety of potential designs, the ways of integrating qualitative and quantitative methods in social network research, and how to achieve the research goals given economic constraints. Furthermore, next to just reviewing what has been done and what not, the social network analysis used as a review tool allows the identification of new approaches to mixing quantitative and qualitative methods.
Nash equilibrium with knowledge externality in students’ collaboration network

Yuliya Skoblova, Vladimir Matveenko, Aleksey Korolev

National Research university Higher School of Economics

We study collaboration of students in one of the Russian universities. The aim of the paper is to verify theoretical results of model (Matveenko and Korolev, 2016) which analyses behavior in social network in framework of Nash equilibrium in a network game with production and knowledge externalities. In the model, each agent has initial stock of a good (it may be time) that can be consumed or invested into knowledge (partly or totally). Knowledge is used in production of goods for consumption in the second period. The volume of production depends both on personal investments of the agent and her ‘environment’. The environment is modeled as the sum of personal and neighbours’ investments into knowledge. The results of the theoretical model allow us to formulate hypotheses to be checked empirically.

We construct two types of networks for the same group of students: one represents friendship relationships and another one reflects interactions of students concerning only studying process (mutual help). Regression analysis is used to identify correlation between node’s position (in- and out-degree centrality) in two networks. ERGM-model that describes the process of ties formation is created. It includes network structure characteristics (density, clustering, reciprocity, etc.) and personal characteristics of students (homophily, popularity, activity).

Models help to identify students who produce and distribute knowledge externality in the network (those who has the most influence on their peers). We find that there is a case of “presence of productivity”, when the raise of received externality reduces personal investments of the agent (negative peer effect). Correspondingly, a free-rider problem takes place: low achievers get help from others and stop making efforts themselves. Analysis of the two networks together shows that there’s a cycle (Matthew effect). High achievers get popularity in both networks, and their own investments in knowledge grow, while low achievers (those who ask for help a lot) make efforts for developing friendship ties to widen their opportunities to ask for help. In result, their own investments into knowledge go down.

We assess accuracy of the theoretical model.
Collecting Network Data of First-semester Students: A Photo Approach

Till Krenz, Annika Rathmann, Knut Petzold
Otto-von-Guericke-Universität Magdeburg

The collection of network data usually requires surveying the participants, a process which can be very time consuming and discouraging for the participants, leading to high drop-out rates. In this talk we would like to present a method that reduces the burden on the participants, while protecting their data privacy. Over the course of a semester we took photos of the seatings of students in a lecture hall and generated network data from the positional information of 'who sits with whom'. The students were given paper sheets with alphanumeric codes, which they would hold up in front of their faces and therefore protect their privacy while, at the same time, giving them a unique ID. In addition to the first photo, a short questionnaire was handed out in order to collect basic personal information. The method offers a view of the development of network relations in the group of participating students through the semester and gives an idea of the attributes that constitute the facilitation of relations. Those attributes are gender, regional proximity, social status and the political standpoint. Finally, we would like to discuss the 'lessons learned' and venues for future research and teaching method applications.
Networks for Learning: Teachers’ social networks (Session 10; Part 4)
Marc Sarazin¹; Martin Rehm²; Dominik Froehlich³
¹University of Oxford; ²University Duisburg-Essen; ³University of Vienna

Unravelling The Teacher Induction Period Using Social Network Analysis
Laura Thomas¹, Melissa Tuytens, Geert Devos, Geert Kelchtermans, Ruben Vanderlinde
¹Ghent University

Research goal
Globally, early teacher attrition is an emergent issue (Ingersoll & Strong, 2011). In retaining beginning teachers, a growing body of literature recognizes the crucial role of relationships and support from colleagues (Mansfield, Beltman, & Price, 2014). Few empirical studies, however, investigate this relational aspect of teacher induction thoroughly from a network perspective. The main objective of this study is to explore the position of beginning teachers within the dynamic web of ties that make up their school team.

Methodology
In total, eight primary schools and their ten beginning teachers (two males, eight females) participated in the study. Data was collected using a follow-up mixed-method social network design. First, a questionnaire was distributed to the team members of all participating primary schools on three moments over one school-year. They were asked to report about their instrumental (“Whom do you go to for work-related issues?”) and expressive network (“Whom do you go to for personal matters?”). To deepen the quantitative results, every measurement was followed by semi-structured interviews with all beginning teachers. Hereby further information about their ties (e.g. support) with colleagues (ego network) and the school team in general was obtained.

Results
Currently, results of the first measurement (December 2016) are discussed.

The average response rate for the whole-school questionnaire was 96.5%. There is noticeable variation between schools; some are densely connected, while others are rather sparse. More specifically, for the instrumental networks, density ranged between .46 and .93. For the expressive networks, density ranged between .24 and .43. Moreover, for the instrumental and affective networks respectively, the normalized in-degree for beginning teachers varied between 1 and .47, and .53 and 0; the normalized out-degree between 1 and .31, and .71 and 0. These results reveal large differences among teachers’ power potential in the network. A high in-degree (receiving many ties) is an indicator of being popular or prominent. A high out-degree (initiating many ties) implies being an influential person. During interviews, differences between networks and positions of beginning teachers within
networks were substantiated. One teacher explained not to discuss personal matters with colleagues because during breaks she stays in her classroom due to high workload.

Scientific significance
A multitude of studies has already focused on the challenging teacher induction. However, studies regarding this period using a network perspective are scarce. By exploring the beginning teachers' school networks and the position of beginning teachers in these networks, this study broadens the theory building on teacher induction. When data-collection of all three measurements is completed, we will focus on beginning teachers' positional changes and/or absence of changes during one school-year and how this relates to factors affecting retention (e.g. job satisfaction).

References

Understanding teacher collaboration for helping at risk-students to succeed against the odds: A social network perspective

Lorena Ortega¹, Zsófia Boda², Ian Thompson³, Harry Daniels³

¹University of Tübingen, ²ETH Zürich, ³University of Oxford

Teachers’ relationships are often structured in subgroups within the overall pattern of teacher relationships in schools (Bidwell and Yasumoto 1999; Daly 2010; Penuel et al. 2009). Social network theory offers two mechanisms that may explain why teachers cluster together in subgroups—namely, structural balance and homophily (Davis 1963). Research in schools indeed suggests that the principle of homophily may shape teacher networks into relatively homogenous subgroups based on similarities among educators, such as gender, ethnicity, discipline, and orientations toward teaching (Frank 1995; Penuel et al. 2009).

This study explores teacher advice-seeking networks among teachers around the issue of supporting the learning and wellbeing of vulnerable students, and advances the field as there are very few studies that examine the social networks of teachers in the UK and none that explore teacher advice-seeking networks in relation to supporting vulnerable students.

Research question
- How do gender, teaching experience, formal roles and school climate perception interact to shape the network of teacher network of informal advice-seeking?

Data sets and methods
The data derives from a study conducted in England and consist of over 500 professionals working in six state secondary schools within an ethnically mixed city in the South East region of England with wide disparity between areas of wealth and poverty. An online questionnaire was administered that collected data from school staff on several topics such as background characteristics, teaching experience, working conditions, participation in collaboration activities and perceptions of school climate. Participants were also asked about their collaboration with their colleagues on supporting vulnerable learners in their learning and wellbeing, which provided social network data. A very satisfactory average response rate of 90%, with a range from 81 to 98%, was obtained.

The study applies exponential random graph models (ERGMs), a family of statistical models for analysing social network data. Analyses were run separately for each school and then systematised using meta-analysis. Data analysis was conducted using the specialised statistical package MPNet (Wang et al., 2014).

The study demonstrates the use social network analysis as a method to evaluate the specific nature of teacher relationships in schools and has important implications for leadership, policy and practice.

References
Teachers' Mental Models as Predictors of Advice Seeking: A Multilevel Social Network Analysis

Nienke Moolenaar, Yvette Baggen
Utrecht University

In research on teams, relational linkages among organizational members are increasingly acknowledged as an important source of organizational improvement and innovation (Balkundi & Harrison, 2006; Tsai 2001). While social network studies have been quick to discover potential benefits of relational linkages for organizational outcomes (e.g. Nahapiet & Ghoshal, 1998), attention to possible antecedents that shape social network structure is often limited to demographic characteristics, such as gender and formal position (e.g. McPherson, Smith-Lovin, & Cook, 2001). Recently, interest in more 'malleable' antecedents that may shape social network structure is receiving traction in educational research, such as teacher beliefs about reform or competition (e.g., Siciliano et al., in press). Of particular interest in this regard is the role of teachers' beliefs about teaching. On the one hand, at the dyadic level, similarity in mental models of teaching (in other words, having the same fundamental notions about teaching) may result in an increased likelihood for teachers to ask each other for advice. On the other hand, at the collective level, it may be dissimilarity in teams' mental models that is related to increased team-level advice-seeking (cf., Mohammed, 2001). In addition, we suggest that this relationship will be moderated by individual beliefs about help-seeking, but only at the individual level. In sum, this study aims to understand how teachers' (dis)similarity in beliefs about teaching affect advice seeking at the individual and collective level.

We collected social network data and data on beliefs about teaching among 689 educators of 21 school teams in Southern California. We asked respondents to assess their advice relationships on a 5-point frequency scale using a roster method. We analyzed the data with regression analysis and multilevel p2 analysis (Zijlstra, Van Duijn, Snijders, 2006). P2 analysis is designed to predict the likelihood of dyadic interactions based on individual, dyadic, and network level antecedents, taking into account the dependency of social network data. Teachers' individual mental models were assessed by asking teachers' beliefs about teaching and help-seeking, and shared team mental models were then constructed following previous research (cf. Butler, 2007; Fives & Buehl, 2008; Mohammed & Ringseis, 2001). Our findings seem to offer preliminary support to our multilevel differential hypotheses, and additional findings will be presented during the conference. We offer that this study will make a unique theoretical and methodological contribution as one of the few in the field to explore and conceptualize the role of individual and collective mental models about teaching and the likelihood of advice-seeking tie formation among teachers in a context of educational change.
Teachers' Social Networks and Evidence Based Practice in German Schools

Bastian Laier
Universität Mainz

Schools around the globe are under reform pressure. In this context, educational researchers, practitioners, and politicians alike have high hopes for social networks to help overcome the difficulties that arise when schools are in change. Teachers are to some extent the main group that has to implement changes. Despite the growing interest and the high hopes that are put into teachers social networks, studies on them are still rather scarce. The main goals of this study are 1) to empirically describe teachers social networks and 2) analyze the consequences of the observed structures. Data are drawn from five schools of the federal state Rhineland-Palatinate, Germany. The survey made use of a complete network approach. Respondents had to fill in a questionnaire on a total of seven different relations (based on a study by Moolenaar 2010). The relations can be categorized as instrumental or affective. Additionally, teachers were asked to indicate whether they made use of certain information sources. Teachers have access to a wide variety of information sources (own experience, student feedback, external evaluation, scientific journals, etc.) on which they can rely to teach their students. Furthermore, teachers can share and discuss these information sources with other teachers so that the information acquires the character of social capital. The different sources of information can be described as more or less evidence based. The link between teachers social networks and the usage of these sources will be the main part of the analysis. Accordingly, evidence based practice will be modeled as an outcome of network properties.
Towards a better understanding of the peer group context: The influence of close friends on the individual educational achievement and aspirations
Simon Christoph, Ilona Relikowski
Otto-Friedrich-Universität Bamberg

A number of recent studies analyzed reciprocal relationships in school classes and were able to show that such relationships - and moreover peer groups in general - can influence students’ educational achievement. However, peer groups are per definition a too broad frame of reference and thus characterized by a heterogenous nature. Therefore, relevant influences are over- and underestimated, confounded or even disregarded. Consequently, we will draw theoretically on the social capital theory and argue that educational research should pay more attention to the most important interaction partners of adolescents apart from their families, namely their close friends. Building on that, this article exposes the widespread but erroneous assumption that the majority of friends is in the same school class. Using CILS4EU data, we show that (1.) close friends have (an oftentimes underestimated) relevant impact on the individual educational achievement. (2.) A substantial proportion of individuals' close friends is not in the same school class as the students themselves, and (3.) this is important because it is beneficial for students if their friends are in the same school class while it is detrimental if this is not the case. Therefore, our findings illustrate that “classical classroom studies” often miss out relevant peer influences.
Theoretical dimensions of interpersonal trust in an educational network
Zola Kappauf, Nina Kolleck
Freie Universität Berlin

This contribution presents results of a qualitative study analyzing the social relations of an educational network. In particular, we examine interpersonal trust relations in order to generate an empirical grounded theory on dimensions of interpersonal trust in educational networks.

We assume that educational networks depend on their members’ capability to reduce complexity, form common goals and trust each other. As such, interpersonal trust creates a feeling of cohesiveness which is essential for an innovative and not mandatory cooperation relying on each actor’s engagement.

We focus our analysis on an exemplary educational network in the German Ruhr area. The network aims to reduce educational inequalities based on the social backgrounds of children and their families. For this purpose actors from different educational fields (e.g., state government, local government, universities, or local foundation) agreed upon common goals to jointly work for an educational system that promotes individual educational support, the academic success rate of students with non-academic social backgrounds, a continuous language education, and successful inter-organizational cooperation. Last but not least the network aims to adjust the success rate of students at universities from educationally deprived to those from well-educated family backgrounds.

Methodologically, we draw on ego-centric network maps combined with semi-structured interviews with 21 experts of the educational network. Our aim is to identify deep structures of trust and to determine the dimensions underlying their cooperation. With this in mind, the interviewees were asked to draw their network relations according to the importance given the contacts concerning the implementation of the educational network. In addition, interviewees were asked for their trust relationships and their motivation to take part in the educational network. Transcribed interviews were analyzed by means of Grounded Theory using the data analysis software MAXQDA.

Our analyses result in a theory of five dimensions of interpersonal trust in an educational network: (1) personality, (2) space and time, (3) profession and organizational affiliation, (4) power, and (5) multiplexity.

Personality is defined as a basic dimension, which is crucial for the development of trust. Space and time is comprehensive throughout all other dimensions since experiences that can be made together through time reduce all uncertainties that occur within other dimensions. The dimension of profession and organizational affiliation considers the inter-organizational collaboration as it is characteristic for an educational network. The dimension of Power for its part focuses the development of trust in different power relations. Finally, multiplexity refers to relationships that exist in different contexts and assume various forms.

This classification of trust relations into dimensions and their specifications allows a network analysis that works out a network’s developmental possibilities to improve its cooperation. Still a representative study is necessary to confirm the validity of the presented trust dimensions.
‘Collective embeddedness’ and social structure in schools: the case of a low-SES primary school going through a collective music-making intervention
Marc Sarazin
University of Oxford

Schools are complex and intensely social environments. Yet existing network studies do not always capture the complexity of students’ social lives in schools. They often focus on affective relational states, such as friendship, liking, or disliking, and often focus on student-student relations. But what role do other relational states and events play in students’ social experiences? And do members of school staff play an important role in students’ social experiences? In essence, what makes social structure in schools different from social structure elsewhere?

The present study does a mixed methods investigation of two French schools to illuminate these questions. It studies both schools as they are going through an intervention which aims to improve students’ social relations through the experience of making music collectively. It uses a combination of psychometric scales, social network measures, and ethnographic fieldwork to study the schools as they are going through this period of change. This study design makes it possible to look at school-specific processes which are brought out by the implementation of the intervention and which affect students’ social experiences.

The study’s findings reveal that students in the study were very often affected by individuals around them, such that they experienced a particular kind of embeddedness (in the sense of a dependency on their environment). This ‘collective embeddedness’ meant that social contagion was routine, could happen very quickly, and happened for a wider range of phenomena than is typically considered. It also meant that the distinction between ‘private’ and ‘public’ events and information was blurred, something which was at times considered a risk by adults and a problem by students. In addition, students were sometimes explicitly dependent on other students for achieving certain goals, thus reinforcing students’ embeddedness.

The study further finds that this embeddedness arose because of the way the schools and programme were organised. In both settings, students had little control over their whereabouts and, much of the time, who they spent their time with. Instead, staff members were largely in control of students’ social lives. More broadly, relations between students and adults were often non-reciprocal, whereas relations between students tended to be reciprocal. These features could lead to negotiations between students and adults and, in fine, a questioning of adult-student relations and trust.

To conclude, the paper argues that incorporating student-adult relations and the organisation of the school and programme in the analysis not only makes it possible to consider the generalisability of the above results to other schools and contexts. It also makes it possible to characterise schools from a relational perspective, and thus elucidate ways in which school social structure is “special” and different from social structure in other settings.
Embedding Social Network Analysis into Educational Theory

Stefanie Martin¹, Christoph Helm²
¹University of Bamberg, ²Johannes Kepler University Linz

In our talk we ask to which extent SNA represents an appropriate approach to analyse students’ scholastic learning. More specifically, we are aiming at identifying theoretical and empirical potentials of SNA that help to explain learning and instruction more clearly. It is a highly unsatisfying fact that so far instructional research traditionally focuses on analysing students’ attributes (e.g. intelligence) whereas relational aspects of scholastic learning (e.g. reciprocity of learning relationships) have been ignored (Carolan 2013). This desideratum is most likely due to the missing foundation of the social network analysis (SNA) approach in educational theory (Zander et al. 2014). Hence embedding SNA into educational theory constitutes the major goal of our study.

Particularly because scholastic instruction and learning is highly characterized by social relations as well as interactions and is embedded in social contexts (Wölfer & Cortina 2014) traditional research captures only an incomplete picture of how scholastic learning works. Thus, in accordance with others (Carolan 2013; Wölfer & Cortina 2014) we expect SNA to represent a fruitful approach for future educational research. For instance, SNA allows examining the assumption that cooperation leads to student learning only if cognitive conflicts are provoked and solved again. This assumption is central to social-cognitive learning theories (Piaget 1985; Vygotskij 1986). Hence this example shows that the use of SNA can be embedded in educational theory.

To identify SNA potentials for research on instruction and learning that are supported by learning theories we carried out a systematic literature review (SLR; Cooper 1984). Therefore, a total of six educational, psychological and sociological databases (PsycINFO, ERIC, SocINDEX, PSYNDEX, FIS-Bildung, psycARTICLES) were searched using a combination of terms such as “social network analysis” AND learn*. First, we extracted studies that use SNA to analyse teaching and learning processes. The only exclusion criterion was the language of the publication (no others than German and English papers were included). Based on these studies, we ask which educational theories are used to justify SNA. Second, we extracted studies that provide information on how specific SNA-metrics such as density, transitivity and centrality are applied in classroom-based educational research. Again, we ask which educational theories are justifying the use of SNA-metrics.

Until the date of submission we identified about 80 relevant studies in total. After this data gathering process the results are analysed, categorized and synthetized with regard to our research question concerning the SNA potentials for educational research.

Early results indicate that the majority of publications identified are related to topics like sex, drugs, social media, bullying, and crime or to organisational learning. If publications focus on schools they analyse teacher and school networks only. According to our findings, SNA of scholastic learning processes are niche products. However, some exceptions exist which mainly draw upon social learning theories from Lave and Wenger (1991), Vygotskij (1986), and Bandura (1976, 1979). With regard to SNA-metrics, centrality and transitivity are analysed mostly.
The findings of our SRL are discussed against the background of the limitations and the implications for further educational research.
Our paper uses UK clickstream data, the individual ‘clicks’ users make while browsing the web, to build a picture of the ‘map’ of news consumption in the lead up to UK’s 2016 referendum on EU membership (Brexit). In the first section we examine the prominence of different internet news providers in this network (where a link indicates that users went from one news service to another). We look at the relative prominence of different types of news sources as well as the extent to which the network is polarized. Additionally, four of the over 500 news sites are identified as sources of ‘fake’ news, and we look at their role and connections in the network. In the second part of the paper we extract the subsection of this network that corresponds to a sample we surveyed. We issued a longitudinal survey in January, April, and June 2016 to just over 1000 respondents. We asked them about their support for Brexit, whether they had seen news on certain specific facts important to the campaign, and whether they were convinced by these stories. We then compared the networks of respondents who supported ‘Leave’ consistently to those who supported ‘Remain’ to a third group that changed their opinion.
This paper aims at tracing and mapping the life-cycle of a rumour, turned into a conspiracy theory and ending with an episode of extremism, known as “Pizzagate”. More specifically, I will look at the online evolution of claims that the higher echelons of the U.S. Democratic Party were involved in a child trafficking and prostitution ring using a the pizzeria as their front end. At the same time, I expect to provide some clues for the investigation of the links between marginal speech acts (e.g. conspiracy theories) and mainstream politics. “Pizzagate” was a conspiracy theory with a clear political intent, eventually falsified by a believer in a violent event. In this sense, it can provide some clues about the connection between the networking dynamics of online activists the emergence of populism and extremism, particularly in Europe and the United States.

The internet became the centre stage for the advancement of conspiratorial modes of thought and there is an apparent lack of understanding about the way network effects contribute to the rise and fall of conspiracy theories, populism and extremism. Like small plot devices in a larger narrative, certain rumours or fringe conspiracy theories can be fundamental to understand the backdrop against which the current political scene unfolds. This is particularly acute in a media ecosystem where online social networking plays a central role in the way information flows and public opinion is formed.

Research on online communities has consistently stressed their polarised nature. On the one side, this is just an expression of an identified tendency for like-minded people to clump. The flip side of clustering is segregation. Political, religious or racial segregation is not only a defining characteristic of the online communities, but a general social trend. Social media networks reproduce this sect-like pattern (Guerra, Meira Jr, Cardie, & Kleinberg, 2013). Web platforms, like Facebook or Twitter, show a great deal of polarisation and clustering (Bakshy, Messing, & Adamic, 2015; Conover, 2011). This online entrenchment takes the shape of “echo-chambers” (Sunstein, 2009, p. 44), here reconceptualised as “echo-systems”, spaces marked by the internal reproduction of ideas and opinion reinforcement. Conspiracy theories are a typical by-product of echo-systems. Highly shared and minimally challenged ideas tend to thrive and resonate throughout a traditionally bounded space inhabited by like-minded individuals eager to sanction their worldviews. When challenged by outsiders, conspiracy pedlars tend to shut down from the world and entrench. However, in the last years, some echo-systems seem to have gained access to a wider audience and their signals are now being received beyond the limits of the self-secluded clusters. This seeming transition from entrenchment to encroachment is a new phenomenon in world politics.

The analysis of the #pizzagate conspiracy theory will show how echo-systems are resonating beyond their formerly bounded limits through network dynamics. At the same time, it will demonstrate that #pizzagate had prominent “conspiracy centrals” and a clear political intent. In this sense, it allows us to trace the connections between conspiracy theories, populism and extremism.
Exploring the Facebook network of German anti-immigration groups

Matthias Hoffmann, Mario Diani

Grounded in theories of social movements, collective action, and information and communication technologies, our paper will explore the online network of those German anti-immigration groups, that oppose shelters for refugees and asylum-seekers. Based on a relational perspective in sociology, techniques of Social Network Analysis are applied to analyze data about 189 Facebook pages. By retrieving roughly 1.5 million posts, reactions, and comments, we are able to construct a multiplex network dataset that includes five types of ties between actors: positive nomination among groups, mutual external allies, user overlap, content overlap, and co-mobilization for offline events. From this multiplex data, we identify configurations of resource exchange and social bonds among sets of actors that allow for a classification in the framework of Modes of Coordination of Collective Action. By learning about the organizational, subcultural/communitarian, coalitional, or social movement modes we hope to provide a genuinely relational perspective on collective action and empirically contribute to our understanding of the role social media plays for collective action formation.
Twitter as the new coffee house? The mapping of European issue publics and the analysis of its internal structure

Javier Ruiz-Soler

This paper is an explorative approach to Twitter networks of European topics, named as European Political Twittersphere. More specifically, in this paper I look into issue publics of European relevance through the Twitter hashtags. These issue publics involve transnational impact, (ii) they reach large mediated publics, and (iii) involve a political conflict. The hashtags selected are not only of European relevance, but also multilingual. Of European relevance because these issues are of European common concern for EU citizens. Issues that affect in one way or other all the citizens of the EU at the European level. Second, multilingual because they are used for conversations through different publics at the same time: used in different languages referring to the same topic of discussion.

The paper aims to respond what are the structural differences in each of the issues mapped ?. Since there is a lack of extensive empirical research in how these European networks are organized, either what qualities or characteristics they have, it is important as a first step, to explore and understand these networks for further analysis. The purpose of this article is to discern the main characteristics of these networks by using social network analysis.

To respond the research questions I apply network analysis. A network of 28 nodes -one for each member of the European Union- is created. In each node, Twitter data collected from each hashtag is embedded, forming six different weighted networks —each one for each hashtag— with the same number of nodes —the 28 members of the European Union. The networks contain replies, retweets or quotes of other tweets in the dataset (for which location data were available). In order to add the Twitter data to the different nodes representing each one of the countries of the European Union, the geolocation of the tweets have been collected. For this purpose I used geocoding strategies for Twitter place field of the users, making use of the Google Geocoding API.

With this procedure the main characteristics and patterns for each one of the hashtags is analyzed and compared, answering what are the structural differences in each of the issues mapped. In addition, a co-occurrence network of the six hashtags is created, showing overlapping in the different issue publics.

The outcomes of this paper are important to understand the development of the European public sphere. What is learn here about the structure and configuration of these networks, is important for the understanding in depth of new ways of communication and interaction of citizens, and its implications for the emergence of the European Public Sphere. This study, therefore, brings light not only into the structure of the communication flows, but also the common concern of EU citizens talking and interacting about these issues between them. In addition, this paper contributes to the literature on how, a platform with the characteristics of Twitter, affects political participation.
Radical Right Media and Politicians within the Hungarian Media Network
Attila Farkas
Corvinus University of Budapest

A lot of articles explaining radical right party through the elites, electoral successful, organization, ideology, or approaching certain parties via supply or demand theories. Although the alternative media network is also very important as the other features of success.

The aim of this article is to identify and analyse the radical right media network in a case of Hungary.

Since 2010 the radical right party in Hungary has become very popular. In the article I am providing an issue-centered approach to examine and locate the radical right media within the Hungarian media sphere. My question was, where are the radical right media in the Hungarian media network? How Jobbik's politicians are preforming in the Hungarian media compared to other politicians? In my article I have created a network. The nodes were the media (websites, newspapers, TV and radio stations) and the ties between the nodes were the citations between two media. The result is that the radical right media are staying out of the mainstream media flow except in few cases.
Conflicts about Urban Infrastructure Projects: a Discourse Network Analysis
Melanie Nagel¹, Keiichi Satoh
¹University of Konstanz

Protests against large-scale contentious projects in the last years occurred in Germany against the proposed infrastructural project Stuttgart 21. The intended modernisation and underground construction of the railway station in the heart of Europe were meant to be an expression of technical progress and environmental concerns, but protests, mostly performed by environmental activists, increased irresistibly and hit their peak with a violent escalation. However, the project had certain problems from the beginning, including ever-rising construction costs (Palmer, 2005) and non-transparent decision processes (Krull, 2009), but the question why this construction project became the subject of such hearted debate, remains. This question is strengthened when looking at the result of the referendum, conducted in the last phase, during which the majority of the people supported the construction. In this article, we will trace how the public discourse developed, using the technique of discourse network analysis. The strength of this chosen method is the analysis of the connection between issues and actors, the dynamical perspective and the possibility to fathom the bottom line by means of factor analysis.

The data for the analysis consists of all newspaper articles concerning the issue S21, published in four German newspapers from 2002 until 2011.

The results indicate that the evolution of the discourse is hallmarkked by the growth of project antagonists and especially The Green Party played an important role connecting the opponents. The analysis revealed the interrelation of central issues over time with their coherent actors, which for the S 21 adversaries, were the proposition of an alternative concept and the wish for more public participation.
Negotiating conflict on e-cigarettes in policy debates
Heide Weishaar\textsuperscript{1}, Theresa Ikegwuonu\textsuperscript{2}
\textsuperscript{1}Hertie School of Governance, \textsuperscript{2}University of Glasgow

Electronic cigarettes (e-cigarettes) have become the subject of highly contested public and political debates, including within public health communities. Proponents argue that e-cigarettes are effective aids to quit smoking and have the potential to alleviate the tobacco epidemic. Opponents, on the other hand, are concerned about their nicotine content, their attraction for young people and non-smokers, their potential to re-normalise smoking and the unknown long-term health impacts. The existence of this conflict is remarkable given the previously strong unity of public health advocates when arguing for tobacco control policies. In light of such contradicting stakeholder positions and inconclusive evidence on the harms and benefits of e-cigarettes, policymakers worldwide are faced with challenges regarding the regulation of e-cigarettes.

Taking the Scottish context as a case study of successful public health policymaking, the presentation will analyse a policy network in a debate on how to regulate e-cigarettes. The presentation will be based on the analysis of publicly available policy documents as well as semi-structured, in-depth interviews with key stakeholders. A mixed-method approach will be presented, combining the use of (i) social network analysis to systematically map and analyse the structure of the policy network, and (ii) thematic analysis to explore the content of the network.

The primary focus of analysis will be on the reasons and underlying rationales for the identified conflict, i.e. between stakeholders who argue for stringent regulation (including the regulation of e-cigarette advertising and use in public places) and those arguing against such measures. In order to explore the division, the presentation will analyse proponents’ and opponents’ interests in, and position on, the benefits and harms of e-cigarettes, the ways in which interests and positions are presented, and their efforts to build coalitions in order to achieve specific policy outcomes. The presentation will also shed light on stakeholders’ use and framing of evidence and strategies of dealing with uncertainty.

The added value of the presentation will be that it presents a mixed-method approach to analysing networks in contemporary policy debates, increases understanding of a stakeholder network in a contentious and under-explored area of public health policy, and reflects on the use of social network analysis to investigate effective advocacy, coalition-building and political leadership.
Strategic Action Field of the Polish Extreme Right, 1990-2013

Daniel Platek
Polish Academy of Science

In Poland, an increasing intensity of extremist right-wing activities can be observed in the last two decades. These activities may be connected to institutionalized politics – the electoral success of right-wing political parties in parliamentary elections and their successful recruitment of new party members. This radical activism notwithstanding, in comparison with the extreme right activity in the Western Europe, in the 1970s ("the first wave") and 1990s ("the second wave"), is of more limited size and action capacity in most European countries. While the extreme right terrorism in Germany and Italy in the 1970s had produced thousands of casualties, the street extreme right actions in Poland in the 1990s had produced hundreds of victims. The “third wave” (from the year 2000 till today) of the extreme right mobilization in many European countries has still serious, but more limited consequences in terms of “body count”. This characteristic of the “third wave” might explain why so little social science attention has been devoted to the analysis of collective violence in the presence of the extreme right parties. My project investigates the potential impact of the extreme-right organizational structures on its violent actions. I have observed that in a favorable socio-political environment the extreme right movement is able to not only institutionalize its structures (create a political party on the parliamentary level), but also institutionalize its repertoire of contention (favor conventional forms of action and reduce the proportion of heavy violence against persons). I want to find how social movement in general and the Polish extreme right movement in particular, when having a chance to build a strong political party in the parliament, coordinates its actions in the field, defined by the network configuration, trying to distance itself not only from heavy violence as a form of repertoire, but also from specific targets and actors that could be regarded as most controversial.

By tracing the trajectory of extreme-right protest events (basing on information gleaned from national newspapers) I analyze how has the range of repertoires (violent vs. non-violent) of protest change during the last 14 years of the extreme-right movement activity in Poland. To analyze the relations between actors and repertoires I use statistical models of logistic regression. Second, trying to overcome problems with the aggregative approaches (reflection of findings in means and percentages), mainly used in the analysis of social movements, I employ social network analysis (SNA) to analyze structural relationships between targets, types of actors and repertoires of action of the extreme right movement in Poland. My project seeks to develop a more inclusive analytical framework for the investigations of collective mobilizations by exploring the concept of strategic action field (SAFs, proposed by McAdam and Fligstein). While much work in the social movements centers on the casual relation where an independent variable is responsible for violence, not recognizing who or what is attacked, I would like to make the conflation of targets problematic.

My goal is to identify the level of equivalence of the overall structures of the Polish extreme right movement strategic action field over time in relation to the level of violence and see what is changing in the period of time when the extreme right have a chance to build a strong political party in the parliament. I focus on a comparative network models of actors/repertoires participating in the events with the same targets, dividing time into periods in which political party has its representatives in the parliament and when they are absent. I am interested in setting a level of the similarity of all pairs of actors/repertoires (how many times were they co-present at the events with the same targets?) in particular periods of time (which periods of the movement activity are most similar to each other in terms of the configuration of actors/repertoires in relation to the targets and how does this relate to violence?).

Technically speaking, this study defines a tie as an event in which a given combination of
nodes – target, actor, and repertoire – occurred. This way I get three 1-mode, symmetric, weighted (dividing given number of ties by the maximum possible ties in the matrix), valued networks, each for every time period: 1) 1990 -2000, when the extreme right party was not in the parliament; 2) 2001-2007, when the party won the elections; 3) 2008 – 2013, when the extreme right party lost elections. Then I used blockmodel analysis to simplify the original (40 X 40) matrixes, but rather than picking a partition (the number of blocks) in an arbitrary manner, I compared the goodness-of-fit statistics of different partitions by using R2. At the third stage of the blockmodel analysis I implemented the procedure to decide whether I should assign zero or one to each cell of the partitioned matrix comparing different densities of reduced block matrixes. I searched for a best solution by comparing the different levels of cut-off. So, I fitted several image matrixes to the original matrixes for each period of time and computed the goodness-of-fit statistics. I obtained reduced matrixes for each period of time which served me to describe mechanisms in the strategic action field. I observed, for example, that in the second period (2001-2007), when the extreme right party won the elections, violence has been excluded from the field together with the ‘skinheads’ as the actors and ‘ethnic minorities’ targets.
Interacting with MPs is critical for interest groups in terms of agenda-setting and policy influence and, vice versa, MPs rely on interest groups for policy information and resources. This study focuses on a crucial aspect of this symbiotic relation between interest groups and MPs. It investigates whether MPs' affiliations to interest groups influence MPs agenda-setting behavior in parliament. It combines the literature on interest groups, parliamentary behavior, and legislative networks. A first theoretical expectation is that MPs with formal ties to interest groups, within a specific policy domain, are more likely to co-sponsor legislative proposals in this domain than MPs not affiliated to these interest groups. A second expectation is that MPs with similar profiles in terms of their interest groups ties co-sponsor their respective legislative proposals. These hypotheses will be tested empirically with data on MPs interest group ties and MPs behavior in terms of co-sponsoring legislative proposals in the Swiss Parliament.

Simple network measures such as degree centrality will capture the relations between groups and MPs. The information on which MPs have ties to which interest groups stems from the official register of the Swiss Parliament. Co-sponsorship activity of MPs as well as co-sponsorship ties between MPs are assessed in a network. The respective data stems from the official database of the Swiss Parliament. The analysis is based on a statistical model for network data (ERGM), and will control for additional explanatory variables of co-sponsorship behavior such as MPs' party membership, legislative committee assignments, electoral districts, seniority in Parliament, gender, etc.

Investigating the influence of interest groups on MPs agenda-setting activities is an important theoretical and normative topic, as it relates to the broader question of which interests MPs represent in parliament. If the hypothesized mechanisms are observed, this means that MPs promote the policy agenda of interest groups instead of representing the preferences of their electoral constituency. Such a discrepancy between electoral constituency and group preferences could be a concern for representative democracy. From a methodological point of view, it is also an interesting research design since ties between MPs and interest groups measure groups' access to the parliamentary venue, and the respective MPs' co-sponsorship of legislative proposals capture groups' influence on agenda-setting and policy-making.
Homophily, cosponsorship, and voting among legislators: New evidence from Ukraine
Tymofii Brik¹, Dmytro Östapchuk²
¹University of Carlos III, ²VoxUkraine

Keywords: cosponsorship; voting; collaboration; social network analysis; homophily; Ukraine.

The legislative process has triggered a vast array of research in political science. These studies, however, are not without limitations. (i) Most of the research is focused on the US; (ii) studies of co-voting surpass studies of cosponsorship; (iii) collaboration and homophily remain understudied. In order to address these limitations, we offer a new dataset on legislative collaboration (both co-sponsoring and co-voting) in Ukraine from November 2014 to August 2015. Our central research question is to what extent homophily is associated with legislative collaboration. On the one hand, those MPs who have similar ideology and experience could collaborate more. On the other hand, MPs are likely to gain advantage from their unique positions and, thus, collaborate on the basis of their interests and network positions regardless similarities with others. We put these contradictory expectations to the test by running a series of QAP correlation and regression models. Our data indicates that legislative collaboration in Ukraine varies greatly with respect to two dimensions: a type of collaboration (co-sponsoring or co-voting) and a type of mechanism (homophily or individual factors). In terms of homophily, our data suggest that this mechanism is important only for co-voting and does not affect cosponsorship. In terms of individual factors, our data suggest that group affiliations and resources are important for generating more co-sponsored laws with any other MP, whereas co-voting is more dependent merely on group affiliations.
The interest groups literature often assumes that parliamentarians lack in-depth knowledge on most policies and thus depend on information supplied by interest groups. On the other hand, literature on party politics often focuses exclusively on intra-parliamentary interactions or information exchange between parliament and administration. Both aspects are usually not combined within one study.

In our contribution we analyze information-seeking behavior of German members of the federal parliament (Bundestag). The data comes from a survey of a representative sample of about 15% of the members of the German Bundestag (MdBs). Our goal is, to identify information-seeking patterns among MdBs on EU-related decisions. This is done by clustering the bipartite information-seeking network between MdBs and their information sources using bipartite, recursively induced modules (BRIM) and Copula-based approaches. We then analyze whether similar information-seeking strategies can be explained by party affiliation, similar formal positions (e.g. committee chair, backbencher, …), experience or other factors.

Our research will hopefully contribute to a better theoretical and empirical understanding of parliamentary policy-making and explore to which degree bipartite clustering approaches can be used to understand behavioral patterns.
Evolving affiliations amongst UK politicians
Iain Weaver, Hywel Williams
University of Exeter

Elected politicians do not represent their constituencies in a social vacuum, but inevitably and necessarily form social connections with their colleagues. It is therefore important to describe the social networks of politicians, in order to understand how network structures and processes might affect the actions taken on behalf of the electorate.

This paper uses time-resolved interactions between UK politicians in social media to analyse their interactions during an eventful period spanning the 2015 General Election and the 2016 Referendum on membership of the EU (Brexit). We develop a novel ‘multiplex community affiliation clustering’ (MCAC) method to track the evolution of community structure amongst UK politicians (Members of Parliament, MPs, and British Members of the European Parliament, MEPs). To ensure sufficient data for creation of robust networks, we augment the direct first-order interactions (where one politician retweets another) with indirect second-order interactions (where a two-step retweet path connects two politicians via a non-politician intermediary). This extension captures the wider UK political landscape, including partisan and non-partisan media outlets, journalists, party members, and the politically engaged public. Social networks of politicians derived from interactions in social media show coherent communities with strong linkage within political parties. Comparison of networks formed from direct retweet interactions between politicians and the extended networks including two-step paths via a non-politician intermediary shows that both are qualitatively similar.

Despite the inherent dynamism of social media, network structure typically falls into one of four distinct network states, while the topics of discussion typically fall into one of six distinct content states. Both network states and content states are each strikingly persistent and recurrent over time, and reflect ongoing political events and debates. For example, the politically divisive referendum on the UK’s memberships of the EU produced a network state which dominated from announcement of the referendum date in mid-February to the end of June when the referendum took place. This period saw MEPs affiliated with the United Kingdom Independence Party, who largely championed the vote to withdraw from the EU, forming consistent communities with the majority of MPs from other parties who expressed support for Britain’s exit from the EU. Politicians campaigning to Remain were well-linked, including an unusual linkage between left-wing Labour MEPs and right-wing Conservative politicians.

The MCAC network clustering method alone recovered several key features of UK politics during the study period. Firstly, the temporal sequence of weekly network snapshots was recovered based on their cluster similarity, without any temporal information being provided to the clustering method. Secondly, the clustering of individual politicians was able to accurately identify the ideological position of MPs and MEPs regarding the EU referendum. This ability of social network analysis to predict the ideological positions of individual politicians suggests a route towards predictive political science.

Reference: Weaver, Williams (H), Cioroianu, Coan, Williams (M), Banducci (submitted) Evolving affiliations amongst UK politicians on social media. In review.
Political Networks: National and subnational political networks 2 (Session 11; Part 4)
Manuel Fischer; Dimitris Christopoulos

Climate Change Policy Networks in the Czech Republic
Petr Ocelík, Lukas Lehotsky
Masaryk University

Greenhouse gas emissions decreased rapidly in the Czech Republic over the two last decades. Nevertheless, this decline was achieved mainly due to economic restructuring which led to the withdrawal of energy intensive industries. Besides this, the Czech Republic remains to be a highly dependent on fossil fuels and its government recently lifted the ecological limits of brown coal mining. This situation hampers implementation of climate change policies (CCP) and reinforces ideological clashes among major actors. Policy network analysis is used to capture how diverse actors exchange resources, coordinate their actions as well as to map attribute factors such as actors’ policy core beliefs and organizational resources. Thus, the research explores Czech CCP networks (CCPN) including identification of key actors, their coalitions and patterns of their interaction. Data collection was conducted via survey of 122 organizations. First, standard descriptive and exploratory techniques were employed to reveal structural features of the CCPN. Second, exponential random graph modeling was used to disentangle which relational and/or attribute factors contribute to the formation of the cooperation network.
Explaining intergovernmental cooperation in the water sector: The network of concordats among Swiss cantons
Manuel Fischer, Nicolas Jager

Rivers and lakes often transcend established territorial borders, – such as those of nation states, regional entities, or municipalities –, and water resources might be affected by phenomena which originate across political borders, such as pollution, land use, or migration of species. Despite this crucial importance for the management of water bodies and resources, establishing cooperation across political borders remains a challenge. While a considerable body of research focuses on international cooperation, the factors and conditions that drive the cooperation on a sub-national level between federal states are underexplored.

Federalist and consensus-oriented Switzerland appears as a prime case for studying this phenomenon. While competences related to water are distributed over three levels of government, with the national level setting the general guiding principles, cantons are of prime importance in the management of Swiss water resources. They serve, as formal owners of their water bodies, as implementers of federal directives and benefit from large discretion and financial compensations for implementing their tasks. To fulfil these tasks, cantons have increasingly engaged in inter-cantonal cooperation by concluding formal concordats as a means for the management of cross-border water resources. Hence, this paper asks why do cantons cooperate in the water sector?

To answer this question, we will explore the role of a comprehensive set of factors, including water-relevant factors (e.g. joint water bodies such as lake and rivers, common problem settings), political factors (e.g. political orientation of government, same language, neighboring cantons), and network-related factors (number of cooperation treaties already in place, popularity, activity, etc.).

We rely on social network analysis and Exponential Random Graph Models to analyze cooperation among cantons: The intensity of cooperation, measured by the number of concordats between two cantons, defines the strength of a tie between both cantons in the network. Furthermore, we assess attributes of these ties determined by, e.g., the different aspects addressed such as the protection from water, the protection of water, and the use of water. Data stems from a systematic coding of inter-cantonal concordats in the water sector, based on an inventory of Swiss national and cantonal law (www.lexfind.ch). Based on this source we map the network of inter-cantonal cooperation and relate it to the social, political, and environmental factors that foster this cooperation.

This analysis will deliver important insights: First, from a political-democratic perspective, it is crucial to understand how cantons use their territorial competences and share these with other political entities to address pertinent water issues, and which factors influence whether they addressed or not. Second, from an environmental perspective, understanding the factors that influence cross-border cooperation is important, as it prequels the question of whether cross-border cooperation, and Integrated Water Resource Management more generally, have positive effects in terms of the quality of water resources, and related ecosystems.
Explaining cooperation in “Save Cabo Pulmo” campaign: a multiplex perspective.
Alfonso Langle¹, Petr Ocelík², Octavio Pérez-Maqueo³
¹Centre for Economic Research and Teaching (CIDE), ²Masaryk University, ³Instituto de Ecología A. C.

An environmental impact assessment’s policy process resembles a policy subsystem that involves a wide range of different types of actors from various levels who seek to influence policy outcomes of the land use change permits. A policy network approach then provides a comprehensive framework to disentangle and analyze such complex inter-organizational arrangements. In this context, we investigated factors that predict cooperation in a policy network of 29 organizations involved in conflict between a tourist resort development and Cabo Pulmo National Park (CPNP). The CPNP is an effective marine protected area located in the southern tip of the Baja California Peninsula, Mexico. When Mexican Environment Ministry authorized a construction of a large-scale development near the CPNP in 2008, a coalition of organizations launched a campaign named “Save Cabo Pulmo” that successfully transcended from local to global arenas. In result, president Calderón annulled the authorization to build the resort on June 2012. Data collection was conducted via organizational survey using snowball sampling, including information on 8 types of ties. We used exponential random graph modeling to identify factors contributing to formation of cooperation ties among the organizations. We found an evidence for homophily as well as multiplex embeddedness effects. In this sense, Cabo Pulmo’s case is an example of how multiplex network facilitated information exchange and cooperation among heterogenous organizations across broad spatial scales to influence environmental policy at a local scale.
Driving changes or reserving stability? Transformation of political networks in Ukraine during 2002-2017
Tetiana Kostiuchenko
National University of Kyiv-Mohyla Academy

Politicians affiliated with big business were and remain those who obtain legal opportunities to transform particular sector of economy through the draft laws. The legislation of Ukraine has been changing constantly over more than a decade – before and after the “Orange Revolution” in 2004, till the “Revolution of Dignity” in 2014 and after it. Both revolutions led to the changes of the main political institutions composition, including the Parliament, Administration of the President, and the Cabinet of Ministers; they both created and eliminated opportunities for the policy changes with regard to the economic development of Ukraine. Adoption of new laws occurred along with the circulation of political elites in the government, especially when political elites had business interests and aimed to create favourable legislative climate for the business activities of their allies. Legislative initiatives from the groups of coauthors among legislators and top-governmental executives can provide a hint on the cliques and subgroups within the political elites whose policy-making activities serve to forprofit business interests. The paper suggests the analysis of the joint legislative initiatives and the network structures formed by ‘businessmen politicians’ due to co-authorship in the draft laws. Similarly to the application of social network analysis (SNA) to the study of co-authorship networks in different spheres (i.e. in academic world, in engineering, or in literature) such approach enables the broader view on how the former businessmen overcame the obstacles when getting access to the decision making officially. Moreover, joint efforts in law-drafting demonstrate the mediated gate-keeping among political elite members who were not directly affiliated with big businesses, although their broker positions in legislative networks allow measuring of their level of influence and/or perceived sectoral expertise. Specifically, the analysis reveals stable broker position of some actors compared with changing (core vs. peripheral) position of the others with the passing time during 2002-2017.
Political Networks: International and comparative networks (Session 11; Part 5)
Manuel Fischer; Dimitris Christopoulos¹
¹MU-Vienna & Heriot-Watt Scotland

Network governance in international organizations: Lessons from World Bank trust funds
Bernhard Reinsberg¹, Simone Dietrich², Martin Steinwand³
¹University of Cambridge, ²University of Essex, ³Stony Brook University

International Relations scholars pay increasing attention to markets as a driver of international cooperation. For example, market principles have become an integral part of donor policies in the area of development policy, with Anglo-Saxon donors promoting market norms such as ‘value for money’. An important feature of this is that likeminded actors actively cooperate in the promotion of marked oriented development policies. In this article, we use network analysis to explore patterns of collaboration between donors through trust funds. These funds are ad-hoc policy venues and financing vehicles hosted by international organizations that allow like-minded donors to support joint priority areas. In a first step, we describe the network of donor cooperation that emerges through the use of joint trust funds and explore how this network varies with different types of funds. We expect that cooperative donor networks are particularly likely to emerge in sectors that allow for easy attribution of results (e.g. education, health, and emergencies) and that adopt private sector principles in their governance. Moreover, trust funds differentially drive international cooperation, depending on the political economy of donor countries. We then test market-based explanations for donor collaboration using ERGM analysis. Our project contributes to the study of international cooperation by mapping donor political economies to networks of donor cooperation. It contributes to the vibrant literature on foreign aid fragmentation and donor cooperation by systematically analyzing cooperation patterns from a network perspective, and offering a domestic policy based explanation for the formation of network ties. Our paper directly relates to the theme of the ‘Political Networks’ session, as it focuses on how states interact beyond codified international institutions and formal hierarchical political procedures. The network perspective provides an important innovation, as it provides an account of how cooperation can arise in a decentralized and spontaneous fashion, as well as accounting for higher-order interdependencies between donor states. It therefore uniquely contributes to our understanding of how states cooperate and how relational performance shapes foreign aid choices.
Mapping the Community Structure of Far-Right Movements in the Czech Republic and Germany

Ina Schmidt
Masaryk University

With the arrival of large numbers of refugees to Europe, far-right movements are confronted with an in their perception common enemy, which fosters, according to theories of social movement cooperation, the rise of cross-movement cooperation. The changing circumstances require a renewed mapping of the interactions between these movements, for which their internet presence and networking provide a valuable source as the internet is of central importance for the communication within and among these movements.

The contribution contains a social network analysis (SNA) of the online network of far-right movements in the Czech Republic and Germany, considering both their national and international cooperation. These two countries represent very different contexts, a high-income Western democracy and a post-communist, post-transitional regime, where different patterns of communication and networking might be expected. The analysis is based on the assumption that weak ties serve to connect various tightly linked communities that contain large numbers of stronger ties, which establishes the expectation of identifying dense national communities connected by weaker international ties. The SNA is based on a mixed methods research. Firstly, a weighted, oriented hyperlink network is extracted. Secondly, content analysis of the web pages is used to get a deeper understanding of the nature of the ties. Lastly, standard descriptive and exploratory measures, such as community detection, are used for mapping of structural properties of the network.
Modelling multilevel network dynamics and the evolution of complex environmental governance

James Hollway¹, Christoph Stadtfeld²
¹Graduate Institute Geneva, ²ETH Zurich

A key challenge in political networks is how to model the dynamics of complex governance systems such as that governing the environment. These systems consist of complex patterns of ties between and among actors and the institutions they establish to govern their relationship to the environment. These ties are interdependent in three ways: socially, temporally, and across levels. Dynamic Network Actor Models (DyNAMs) offer an actor-oriented statistical network model for studying the kind of time-stamped relational data that is becoming increasingly common in political science. In this paper, we argue that DyNAMs take an actor-oriented perspective that is straightforward to interpret and make full use of available temporal information to improve the precision of inference about network dependencies. We also propose an extension that enables the investigation of network dynamics across multiple levels. This enables new questions to be answered, such as when actors choose to reinforce existing ties instead of creating new ones or are influenced by historical ties. We demonstrate the value of this model using networks drawn from a novel dataset on interstate cooperation on global environmental issues that includes comprehensive information on cooperative agreements' start and end dates.
Relations between agents (i.e. networks) act as conduits to their political power. And power is channeled to the attainment of governance outcomes. Traditional social science makes the simplifying assumption that actor preferences (their perceived utility) can be employed to predict their behavior. By comparison an analysis of networks makes actor interdependence the point of departure to an understanding of their constraints and opportunities. In that respect actors can impact outcomes not only through their own discrete interventions, but also mediated by the pattern of interaction among others.

Governance as the product of political exchange is therefore affected by the quality of the interaction between political agents, what Jones et al. (1997) and Robins et al. (2011) have termed governance embeddedness. For instance, the degree to which political agents reciprocate relations equitably, whether there is transitivity, and whether relations are predominantly hierarchical. Governance as a process is affected by the pattern of exchange between political actors. For instance, the degree to which there is a strong core-periphery, the multiplicity of clusters, prevalence of brokers or the skewness in the distribution of ties can affect the way politics is exercised and policies are created.

I employ a range of case studies of policy making, policy implementation and cross-border policy in Europe, to demonstrate how governance process and governance outcomes are affected by the networks of political agents. This often happens in ways that can only be comprehended by analyzing the pattern of actor relations. I also use examples that draw from cases of environmental policy and the recent debates on sustainability to hypothesize on the nature of governance robustness & resilience. This analysis is coached within the literature of leadership, political entrepreneurship and brokerage or what has been termed, exceptional agency.
Conflicts as Networks of Event Orderings
Ronald Breiger, Julia Smith
University of Arizona

There has recently been increased interest in theorizing a greater diversity of networks, and in particular in using network analysis to exploit relations between events and the attributes, actions, and variables that can be used to characterize them. In this paper we advance this line of inquiry with respect to insurgencies, an important example of collective action within a political context. One productive way to analyze an insurgency is to view it as a network of sequenced variables across stages (periods) of the conflict. Reanalyzing data that has informed policy considerations from a RAND Corporation study of the thirty most recently completed insurgencies, we construct a network of insurgencies as a means of measuring the degree of overlap among their sequenced activities. The network among insurgencies is informative in identifying sequences of events that predict outcomes of interest, and aids in the identification and analysis of anomalous cases. We explore this formulation, point out some of its limitations, and present illustrative analysis demonstrating how new and useful insights can be obtaining by combining our formal approach with one grounded in the comparative analysis of case studies.
The duality of issues and organizations: A network approach to the exploration of collective agendas

Mario Diani
University of Trento

This paper proposes a 2-mode network approach to the study of the way in which issues addressed by interest organizations combine in broader collective agendas and guide collective action. It posits that the meaning of specific issues is best captured if they are explored in the light of their connections to other public issues, i.e., as part of broader agendas. The paper explores networks of issues created by the priorities of citizens organizations in three different urban contexts, Bristol and Glasgow (Diani 2015) and Cape Town (Diani, Ernstson, and Jasny 2015). Diani, Mario. 2015. The Cement of Civil Society: Studying Networks in Localities. Cambridge/New York: Cambridge University Press. Diani, Mario, Henrik Ernstson, and Lorien Jasny. 2015. “Modes of Coordination in Civic Fields: A Comparative Perspective on South Africa and UK.” Sunbelt Conference, Brighthon, UK.
The role of personal networks along institutional ventures. Insights from the Bolivian case.

Patricia Cabero Tapia  
Technische Universität Berlin

The notion of institutional entrepreneurship focuses attention on the manner in which interested actors work to influence their institutional contexts, through different strategies such as technical and market leadership or lobbying for regulatory change. By adopting different strategies, institutional entrepreneurs diffuse new practices using established networks and resources, and drawing effectively on existing institutional elements and models to craft new systems. While it is widely acknowledged that institutional change flows through personal and professional linkages, little is known about what kind of networks are associated with what kind of outcomes during the development of an institutional venture and how these networks evolve along an institutional project.

To shed light on these questions, the analysis of this study is built on ego network data from institutional entrepreneurs of two initiatives, which are fostering the diffusion of information technologies in Bolivia. The first case is about the SIM group, which promotes the development of world-class skills in computer sciences and programming for students in Bolivia, through the organization of yearly international programing contest since 2006. About 1500 students from 17 universities across Bolivia have participated in these contests in 2015. The other case is about the Software Libre (SL) groups. These groups have promoted the adoption of SL throughout the Bolivian state. As a result of the actions of the SL groups, the Bolivian Decree 1793 defines a time frame of seven years to complete the migration to SL of all governmental bodies. These groups constituted an ideal setting to study the dynamics around an institutional project, as they allowed for exploring: how ego networks of group members from the SIM and SL are affecting the diffusion patterns of information technologies in Bolivia.

In this paper, my approach is to advance our understanding of the role of personal networks of institutional entrepreneurs using the small group as the unit of analysis. Personal networks are analyzed in their composition, that is the distribution of actor attributes in the network, and their structure, that is the pattern of relationships within a network. The analysis is performed at individual and group level.
Tie creation versus tie persistence in cluster knowledge networks
Sandor Juhasz¹, Balazs Lengyel
¹University of Szeged

Knowledge networks are claimed to be important for cluster evolution but surprisingly little is known about how ties form, persist or vanish in these networks. We argue that network dynamics are driven by the search for non-redundant or new knowledge and the costs and uncertainties of creating and maintaining ties. Our empirical example is from a mature cluster in a medium-tech industry. Using stochastic actor-oriented models we show that triadic closure and geographical proximity increase the probability of tie creation but does not influence tie persistence. Cognitive proximity is positively correlated to tie persistence but firms only create ties to cognitively proximate firms if they do not share partners. Our findings suggest that the pursuit of finding new knowledge is an important source of balancing social closure in cluster knowledge networks.
Knowledge dynamics in cross border collaborations. Spatial networks from co-authorships

Sebastian Zimmer
Goethe Universität

The paper analyses co-authorship data from patents and publications in an embedded single case study, a cross-border cluster, to depict the spatial network development in regard to the territorial border that the cluster is bridging or rather supposed to bridge. Political borders and their territorial manifestation remain a crucial issue in the global economy. In order to name a few examples, certain developments of re-nationalisation in many European Union (EU) member states but also new developments in the United States of America recreate the presence of borders between nation states and hence re-amplify their impact on an economic but also on a social/mental level. With a focus on this regard, the EU has been an often-cited case of disappearing borders for goods, workers, capital and services, and the connected chances of growing cross-border collaborations. Yet, on a cognitive, individual level, territorial borders appear to remain as a mental border, turning them into a hindrance to knowledge flows, which are necessary for successful cross-border collaboration and innovation. This poses a challenge to entrepreneurs that would like to expand beyond the border. Recent research indicates that the closer to a territorial border a person lives, the more awareness is border receives, thus making it more present in the minds of people interacting in close proximity to borders. Hence, the focus of this paper is the effect of territorial borders on cross-border collaboration.

To measure the influence of cognitive border effects on cross-border knowledge dynamics, a combination of social network analysis and communication science is taken. The normative approach “communication constitutes organizations” allows for documents to be regarded as so called communication episodes, which provide a retrospective formalized end point to a communication exchange between involved agents. Under this assumption, co-authored documents provide a source for reconstructing knowledge flows and dynamics between agents and creates a network based on this data. In order to obtain a data basis of a formerly working case of cross-border collaboration, the Medicon Valley in the Öresund area is the case of primary analysis as it possesses an actually bridged border. It allows perceiving how individuals working in the high-output biotechnology industry in the border regions on the Danish and Swedish side interact with each other. By using a combination of co-patenting and co-publication data, paired with geographical information, a spatial network analysis of the formal, standardized communication inside Medicon Valley becomes possible. The results of this case are compared to the network existing in Stockholm and surroundings, where the biotechnological companies have a similarly strong economic impact. The difference however is that in case of Stockholm, there is no territorial border between nation states.
Dyadic Analysis of Migration Flows across Italian Provinces
Alessandra Michelangeli\textsuperscript{1}, Nicola Pontarollo\textsuperscript{2}, Paola Tubaro\textsuperscript{3}
\textsuperscript{1}University of Milan Bicocca, \textsuperscript{2}Joint Research Center, European Commission, \textsuperscript{3}CNRS

Migration can be seen both as a spatial phenomenon, entailing a change of place of residence, and a relational one, as change involves a place of origin and a place of destination. We leverage these properties by representing migration as a network, where the nodes are geographical areas and the ties are flows of people moving from one area to another.

We analyze migration within Italy, using administrative data from population registers. Italy is a particularly interesting case, historically characterized by the inter-twining dynamics of long distance flows from the poorer south to the richer north, and shorter distance relocation patterns between geographically close areas. Taking the country's 103 provinces as our units of analysis (nodes in the network), we observe spatial interdependencies at a high level of disaggregation, rarely attempted before in the literature on Italy.

We model the data as dyads, each unit of observation corresponding to a (potential) network tie between two provinces, and we estimate a modified gravity model, aiming to identify the factors affecting the magnitude of the mobility flow within each dyad. Innovating with respect to extant literature on migration, we take the network structure of the data explicitly into account, in that we use two nonparametric, sandwich-type robust variance estimators for linear regression, comparing them to each other, and to standard OLS/IV estimators. This approach has the advantage of controlling for dyadic clustering, so that it can correctly estimate standard errors and avoid misleading inference on results.

Beyond this methodological contribution, our paper also makes a substantive contribution, showing that two variables that were overlooked in prior research - accessibility and home ownership - do affect migration.
Innovation Networks Anchored into a Regional Scale: Looking for Smart Specialization Tendencies in the Portuguese Centro Region.
Paula Ribeiro, Teresa Sá Marques, Hélder Santos
CEGOT/FLUP (Centro de Estudos em Geografia e Ordenamento do Território / Faculdade de Letras da Universidade do Porto)

The aim is to explore the regional and sub-regional innovation ecosystems located at the Portuguese Centro Region (NUTS II e III), and their multi-dimension and multi-scale connections.

The innovation ecosystems are generated and sustained through knowledge networks connecting different actors, cutting across different geographical scales. They generate the framework for knowledge co-production and translation actions sustaining the innovation process. Through the time, it generates a process of co-specialization and complementarities interactions between different actors located inside and outside of the regional innovation system. In this interpretation, the regions are seen as dynamic entities, in permanent process of building innovation paths composed by a variety of knowledge trajectories that sometimes can be related, but others can be unrelated. These related and unrelated regional knowledge capabilities, built through the time, are the starting point for the smart specialization policy strategy. How can we reinforce the intertwining process of these regional trajectories and link them to other knowledge pools outside the region to increase the regional innovation performance is a smart specialization policy challenge.

To analyze the geographical dimension of the innovation process, we apply the social network analysis. By collecting the innovation projects developed through inter-organizational cooperation and supported by the last European founding for the period of 2007-2015, we have organized a database of all projects encompassing at least one organizational actor located at the Portuguese Centro Region. We explore different dimensions of proximity in our analysis:

• For the geographical proximity we use the location of each organization;
• For the organizational proximity we use the organizational relations intensity;
• For the knowledge proximity we use the relations between scientific areas and economic activity sector of knowledge application.

By these we aim to:

• Identify the key innovation actors inside the region and those outside connected with them;
• Explore the different inter-regional polarization levels of the actors and their cooperation relationships;
• Explore the regional and sub-regional specialization tendencies of the innovation process;
• Identify the technological areas leading the innovation process and the variety of economic activity sectors implicated;
• Identify the multi-scale nature of the organizational interactions in this innovations projects;
• Contribute to characterize the regional capabilities were the smart specialization strategies can be rooted.

We conclude by presenting a few policy implications for the smart specialization strategy.


This work was co-financed by the ERDF through the COMPETE 2020 - Operational Programme Competitiveness and Internationalization and national funds FCT under the POCI-01-0145-FEDER-006891 project (FCT Ref: UID / GEO 04084/2013)
Migrant enclaves and industrial districts: a complex interaction
José Luis Molina¹, Luis Martínez-Cháfer², Francesc Xavier Molina-Morales², Miranda J. Lubbers³
¹Universitat Autònoma de Barcelona, ²Universitat Jaume

The relationship among Industrial Districts (IDs) and migration enclaves have been studied so far mostly through examples of ethnic economies developed within the district, and/or the racists conflicts that achieved notoriety through the media. In this study we contend that there is a more general and complex interaction among the two phenomena (interconnected clusters of local industries and migration enclaves, i.e. high concentration of international migrants from a single nationality). This interaction is mediated by the local context, the national regulations, and the international market organization. Taking as example the Ceramic ID of Castelló (Spain), we show as this ID with a low index of job informality, combined with other job opportunities, and a unique “institutional completeness” created by the Romanian evangelical churches during the first stages of migration, set up the conditions for a non-conflictive Romanian migrant enclave that accounted almost for the 10% of the total population in 2008. After the financial crisis 2008-9, the ID exhibited better resilience than other sectors in a context where most migrants lost their jobs in construction and were forced to a national and international circular mobility but taking Castelló this time as the anchor point instead of the origin places in Romania. Finally, we suggest that this interaction should be analyzed under the general dynamics of the international organization of value, and the exigencies of flexibility and reduction of costs that frame both IDs and migration processes.
Re-Making social spaces: Networks of internally displaced persons (IDPs) and support organizations in Ukraine

Susann Worschech
Europa-Universität Viadrina

Dense social networks in everyday life are usually associated with local embeddedness. Neighborhoods, friendship circles, schoolmates and colleagues often form a specific social spatiality which provides socioeconomic support, solidarity, trust and identity frames for the networked individual. Space can be regarded one determining aspect of social network evolution, but social networks also make up spaces in the way how frames, identities or stories to 'characterize' spaces are constructed. Migration in its different dimensions changes perceptions of space as well as the network-space relation in general. Previous every-day networks break or are transformed into long-distance networks, network resources may vanish, new social embeddedness needs to be established. One question resulting from these reflections is how migration may alter socioeconomic patterns as well as social identities that are related to the construction of spaces through networks.

In my contribution, I will address this question on socioeconomic agency, networks, migration, and the making of space-related identity focusing the case of internally displaced persons (IDPs) in Ukraine. Before the annexation of Crimea and the war in Eastern Ukraine, in particular these two regions – Crimea and Donbas – deployed a strong regional identity. On a macro-level, this could be observed, inter alia, in the role of oligarchic networks from the Donbas region in Ukrainian politics and economics. On the micro level, however, much less data and information on local or regional identities and resources stemming from local networks is available. Consequently, little is know about the change of personal networks, socioeconomic activities and support and space-related identities of IDPs in Ukraine.

My empirical research tries to figure out the stability, transformation and reformation of everyday-life and support networks of IDPs in Ukraine, and their impact on the perception and construction of space. The case study focuses IDPs from the Donbas and Crimea in the Western Ukrainian city of Lviv, as well as Lviv based civil society and humanitarian organizations who support IDPs. First, based on egocentric network analysis, the structure of individual socio-economic support networks of the IDPs and the role of spatial proximity and distance within these networks will be traced. Are local integration of IDPs and their socioeconomic activities based on 'new' or 'old' networks of IDPs? Do 'IDP clusters' in the economic or civil society sphere evolve? Second, an analysis of IDP-related civil society cooperation networks will refer to the question if and how spacial perceptions of 'the Donbas', 'Crimea' and 'Western Ukraine' have changed among members of organizations due to the forced relocation.

In sum, the project tries to figure out the change in networks, the perception of space and the resulting social structure that may enable or hinder IDPs from re-building socioeconomic support networks in their new locations.
Upgrading in global markets through relational work
Johannes Glückler, Robert Panitz
Ruprecht-Karls-Universität Heidelberg

Digital technologies have enabled the geographical expansion of production and the distribution of creative goods and communication leading to global supply networks among firms. Simultaneously, the number of trade fairs and congresses has increased indicating an unbroken necessity for face-to-face contact. In this context, it is an unresolved question how physical encounter affects the evolution of global networks and what its consequences are for regions and countries? Drawing on the case of the stock photo trade, we use a unique survey of the global network of sales partnerships and interviews with picture agencies at international lead congresses to illustrate three essential findings about the dynamics of global market networks: First, we show how temporary proximity in congresses facilitates the rewiring of interfirm networks and long distance learning. Secondly, we use generalized blockmodeling to demonstrate how the global value network is constituted by a clear-cut social division of labor between firms that reflects specialized positions of countries in the global value network. Thirdly, we reconstruct how the relational work of making and dissolving relations leads to the economic upgrading of countries from peripheral to more central positions in the global network. This industry case study serves as an example of relational research designs which we propose to capture the consequences of technological change on the structure and geography of markets.
A network-based approach to Food security and nutrition systems
Laura Prota¹, Ivan Cucco¹, Vito Cistulli²
¹The American University of Rome, ²FAO

The evolving relation between global economic ties and local embeddedness is a key feature of contemporary globalization. The often tense relations between these levels are the focus of contemporary initiatives and visions for a deep transformation of food systems in the direction of greater equity, sustainability and democracy. To better understand these relations, we develop an innovative network-based methodology to compare territorial Food Security and Nutrition Systems (SNFS) across space and time. More specifically, the study proposes to use pre-specified blockmodelling and multi-level ERGMs to classify FSNS in alternative models of governance, innovation and institutional variety. The proposed approach can contribute new methodologies to prominent theories in the field of food system transitions.
Polycentric urban systems: a multidimensional approach of networks

Paula Ribeiro, Teresa Sá Marques, Miguel Saraiva, Catarina Maia, Diogo Ribeiro
1CEGOT/FLUP (Centro de Estudos em Geografia e Ordenamento do Território / Faculdade de Letras da Universidade do Porto), 2Faculdade de Letras da Universidade do Porto

The goal of this research is to uncover territorial patterns of urban centralities in Portugal and to understand how the organization and the interaction of the territories can promote their development. Using a multidimensional approach, through the analysis of social networks, the territory is problematized, not only from the perspective of the resources dimension, but also from the perspective of flows, networks, and community detection.

One of the current challenges at European level is the promotion of polycentric urban systems, more connected and collaborative. Attention is focused on the ability of territories to streamline their strategic resources and to explore complementarities between them, enhancing their growth and competitiveness. Thus, the analysis of urban systems is based on multifunctional and relational approaches that explore the power of attractiveness of territories and the development of networks of flows and cooperation.

From this theoretical framework and with the purpose of detecting centralities, this work was based on different types of relationships, capable of translating diverse types and levels of centrality. On the one hand, flows of people were used to analyze the power of attractiveness of the different territories and to identify the territorial communities: the commuting movements (home-work and home-school) and the mobility of students of higher education levels (national scale) and the Erasmus program (European scale). On the other hand, information from organizational networks (based on cooperation projects between organizations) was used, seeking to identify the centralities and territorial networks regarding leadership and the capacity to stimulate processes of economic innovation.

Using the NodeXL program, a detecting network communities method was applied to each of the networks, in order to perceive patterns of relationship between the municipalities and to identify the structuring and influencers nodes (municipalities) of the relational behavior (network). Then, using the Geographic Information Systems, the networks of flow, the centralities and the communities were mapped, in order to identify patterns of territorial organization of the urban system.

This work was co-financed by the European Regional Development Fund (ERDF) through the COMPETE 2020 - Operational Programe Competitiveness and Internationalization (POCI) and national funds by FCT under the POCI-01-0145-FEDER-006891 project (FCT Ref: UID / GEO 04084/2013).
A Tale of two Cities in the Greek Crises: Social Network-Based Resilience and Spatial Structures of Regional Cooperative Banks of Chania and Karditsa

Theodoros Katerinakis¹, Yiorgos Alexopoulos²

¹Drexel University, ²Agricultural University Of Athens

In the European Union case of Greece, sovereign debt crisis has evolved to main street economy dysfunction and challenges in civil society. After seven years in fiscal adjustment programs, cooperative banks, as non-systemic banks, are in the process of re-discovering their identity in the society they operate. Consequently, a broad rethinking about the tools of local policy and development strategies is an increasing necessity. This paper builds on the premise that development should be regarded as a cultural and an economic phenomenon, especially when regional spatial networks determine the network foundations of regional development.

Cooperative Bank of Chania (CBC) was founded from 60 local individuals, as a core network with strong ties of locality not related with common business ties in a chamber of commerce. Those ties expanded to 22,000 customers and members but bonding weakened to the sole commercial interest of banking transactions. In an era of capital control measures, the search for authentic identity becomes crucial: what are the resilient indicators of the CBC social network foundation? According to Borgatti’s classification, transmission, adaptation, binding and exclusion are categorical indicators of what a network is. How do these indicators connect with the three primary attributes of social economy enterprises that provide stability and boost growth for CBC: deep knowledge of the locals and their relations; hands-on engagement with the economic and social life; and referral trust and solidarity, crucial for self-employed individuals and small-medium-sized enterprises in Crete. A qualitative approach of structured interviews based on Glaser’s and Strauss’s grounded theory coding is used to measure the categorical network indicators.

Another case of reference is the up-and-coming cooperative Bank of Karditsa (CBoK), the first ethical bank in Greece, resilient in ECB stress test criteria, revealing another dimension in cooperative identity. The European Federation of Ethical and Alternative Banks (FEBEA) with 24 members across 11 European Union and 2 EFTA countries (and CBoK) guides the ethical banks with the objective of achieving a positive impact on the collection and use of capital. This institutional network reveals the importance of network density and network centrality for those collective members, not only for FEBEA network but also by propagating the same values among cooperative banks in Greece. CBoK promoted the initiative of SES-Net to formulate a common tool of social finance from the supply side, to evaluate the investment readiness of the demand side and to identify intermediaries to bridge the demand and supply offering business development services. In this case, UCINET mapping for the network connecting FEBEA and SES-Net partners is one of the most important analytical contributions in understanding the network effect, how the network is structured and how it operates. Is there an effect of the ethical network of CBoK to the network of members in CBC? What is the intersection? To what extent does SES-Net empower the cooperative network?

The authors argue that as cooperative banks are structured to build on, decide and act upon soft information, they provide more capital and facilitate significantly the development of SMEs, enhancing their output and employment effects in local economies via the network.
ties they are built on. The FEBEA and SES-Net network mapping, as well as the identification of authentic cooperative values in CBC core network is a process to forward the cooperative banking establishment that is part of non-systemic banks in Greece.

The paradigms of the CBC and CBoK confirm the level of control that the two banks exercise in the SES-Net initiative and may determine centrality metrics for the leadership status in the current network of financial cooperatives in Greece.

The current crisis in the DNA of cooperative identity cultivates a "new normal" in the living cooperative reality in Greece. The social network foundation seems to glue all the pieces together, as immunization from the economic and social crisis.
Comparing spatial and economic network analysis in Greater Manchester, UK
Francesca Froy
Bartlett School of Architecture

Social and economic networks are always embedded in space. However, as Glückler et al (2017) point out, network studies have often either ignored space completely, or have treated it as a matter of linear physical distance. This is a missed opportunity, especially given that disciplines such as Space Syntax (see e.g. Hillier, 1996) have helped to bring greater precision to our understanding of space, and how spatial layouts impact on human movement and interaction. Space syntax analyses calculates proximity not ‘as the crow flies’, but in terms of the actual process of moving within street networks, and building layouts. It is based on a cognitive understanding of how people choose particular routes to their destination. Because it is itself based on graph analysis, making links across to social network analysis may be easier.

This paper explores whether a correlation can be made between a space syntax analysis of the city region of Greater Manchester in the UK, and an aspatial network analysis of industrial relatedness in the region. A quadratic assignment procedure has been carried out to ascertain whether there are statistically significant correlations between the two networks. The assessment of industrial relatedness draws on a methodology developed by Neffke et al (2009, 2013), which analyses labour flows between industries to suggest that certain industries are more likely to draw on common skills sets. Neffke et al see such ‘skills relatedness’ as an important component of the ‘related variety’ which Boschma et al (see e.g. Boschma and Iammarino, 2007) identify as shaping processes of regional economic diversification.

It is hoped that this research will identify whether any clustering visible within the industry relatedness data is also reflected in geographical or spatial clustering at the level of the city. Are industries that are close together in the skills-relatedness matrix also located closer together within the city street network? If so, can more be said about how industry relatedness is spatially arranged? If not, why not? Is it sufficient for industries to be collocated within the same functional urban area in order to draw on a common labour pool? Or does skills relatedness only in fact lead to spatial clustering at higher geographical scales (e.g. that of the region or the country)? While this research will only look at the location of industries within the Greater Manchester region, it is anticipated that future research may explore possible spatial clustering at other geographical scales.
Negative Ties and Signed Graphs: Negative ties in schools and the workplace (Session 13; Part 1)
Filip Agneessens¹; Alexandra Gerbasi²; Giuseppe Labianca³; Joshua Marineau; Károly Takács⁴; Patrick Doreian⁵
¹University of Surrey; ²University of Exeter Business School; ³University of Kentucky; ⁴Hungarian Academy of Sciences; ⁵University of Ljubljana & University of Pittsburgh, USA

Helping victims of bullying: The co-occurrence of defending, friendship, and dislike relationships
Beau Oldenburg; Marijtje van Duijn
University of Groningen

This study investigated defending behavior in seven grade 3 classrooms with 23 students. It was investigated to what extent defending relationships between bully victims and their classmates co-occurred with two common types of positive and negative relationships among elementary school students: friendship and dislike. It was hypothesized that defending was likely to occur between friends (hypothesis 1) and between friends of friends (hypothesis 2). In addition, we hypothesized that defending was unlikely to co-occur with dyadic dislike relationships (hypothesis 3). Finally, we hypothesized that defending relationships were likely to occur between students who were disliked by the same classmates (hypothesis 4) or between students who disliked the same classmates (hypothesis 5).

Bivariate Exponential Random Graph Models (ERGMs, using XPNet) were used to analyze the defending-friendship and defending-dislike networks in seven grade-three classrooms, where the model statistics were carefully selected to represent configurations in line with the hypotheses. In order to take into account that only victimized students could nominate defenders, non-victimized students were treated as structural zeros in the defending networks.

Although the study is quite small with only seven classrooms, a meta-analysis of the results per classroom showed support for the hypotheses.
Status Goals in School Bullying: The Co-evolution of Rejection and Bullying among Children

Dorottya Kisfalusi\textsuperscript{1}; Marianne Hooijisma\textsuperscript{2}; Gijs Huitsing\textsuperscript{2}; Jan Kornelis Dijkstra\textsuperscript{2}; Andreas Flach\textsuperscript{2}; René Veenstra\textsuperscript{2}

\textsuperscript{1}Institute for Sociology Centre for Social Sciences, Hungarian Academy of Sciences;  
\textsuperscript{2}University of Groningen

In this study we examine the co-evolution of rejection (“who dislikes whom?”) and bullying (“who is bullied by whom?”) relationships among Dutch elementary school children, and investigate the moderating role of gender on the relation between rejection and bullying. Several studies have found that bullies aim to gain status and affection in the group (Faris & Ennett, 2012; Faris & Felmlee, 2014; Sijtsema et al. 2009). Bullies thus often harass peers who are rejected by significant others (Veenstra et al. 2010). It has been shown that for children, significant others are likely to be same-gender peers (Dijkstra et al. 2007). Therefore, gender of the students involved (bullies, victims, and evaluators) can moderate the relationship between rejection and bullying (Veenstra et al., 2010). Following Veenstra et al. (2010) we hypothesize that students who bully same-gender peers are rejected by same-gender peers, and that students who bully other-gender peers are rejected by other-gender peers. Moreover, we hypothesize that bullies select victims who are rejected by same-gender peers.

Data from the first three waves of the Dutch implementation of the KiVa anti-bullying program are analysed using Stochastic Actor-Based Models (RSiena). Preliminary RSiena results from five schools (N=853, age 7-13) suggest that students are likely to bully peers whom they dislike. Moreover, rejected students are likely to be bullied over time. Bullying others, however, does not lead to be rejected by more classmates over time. In general, students are more likely to dislike and bully students from the same gender, same class, and with similar age.

In the continuation of this paper, we will conduct a meta-analysis based on data from more schools and investigate the moderating role of gender by developing new network effects in RSiena. Thus, we will be able to test our hypotheses by examining whether bullying same- or other-gender classmates leads to being rejected by same- or other-gender peers, and whether bullies choose victims who are rejected by same-gender peers.
Can collective experiences lead to negative ties? The case of a low-SES primary school going through a collective music-making intervention

Marc Sarazin
University of Oxford

The experience of doing activities in groups, particularly when these involve a common goal – such as making music in the aim of performing together – has often been seen as a way of building positive relations between individuals. As such, it underlies many educational programmes targeting children and young people. Yet, little research has looked at whether these collective experiences could lead to negative ties. On the other hand, existing social network research addressing negative ties, especially that concerning children and young people, tends to investigate affective relational states, such as dislike relations. It tends to neglect other relations, such as ones arising from these collective experiences, and how they can be associated with negative experiences and outcomes.

To address these gaps, the present paper presents a mixed-methods case study of the social networks, experiences and outcomes of children in two French primary schools. The study investigates both schools as they are going through the first year of an in-school intervention which aims to improve students’ social relations through collective music-making. It uses a combination of psychometric scales, social network measurements – including friendship and dislike relations – and ethnographic fieldwork to investigate students’ social networks, social experiences, and related outcomes. These features make it possible for the study to investigate whether collective experiences in the school and music programme can lead to a wide variety of negative ties, experiences and outcomes.

The study finds that the collective nature of students’ activities, whether in the school or music programme, led students to experience a form of ‘embeddedness’ – a dependence on their environment – which, at times, could create or promote negative ties and experiences. For instance, this ‘collective embeddedness’ meant that social contagion was routine, could happen very quickly, and happened for a wider range of negative phenomena than is typically considered. It also meant that the distinction between ‘private’ and ‘public’ events and information was blurred, and could lead to a form of invasiveness which fostered negative relations between students. In addition, the explicit dependence that sometimes tied students together could lead to negative relations between students when they felt they were being constrained by others. The study contrasts these findings with students’ positive and dislike networks over time, as well as their sense of community in school and related outcomes. It finally looks at the role of staff members in creating and mediating some aspects of ‘collective embeddedness’, and how this sometimes brought into question the quality of relations and trust between students and adults. The study therefore suggests that more attention may need to be paid to adults when investigating students’ negative ties in collective settings.

The paper concludes by considering the generalisability of the processes it identifies. It namely suggests that the negative aspects of ‘collective embeddedness’ cited above can be
present in other settings, namely when these are also intensely social and where participants exhibit little control over their social lives.
Negative Ties and Signed Graphs: Methods in signed graph/negative ties research (Session 13; Part 2)

Filip Agneessens\textsuperscript{1}; Alexandra Gerbasi\textsuperscript{2}; Giuseppe Labianca\textsuperscript{3}; Joshua Marineau; Károly Takács\textsuperscript{4}; Patrick Doreian\textsuperscript{5}

\textsuperscript{1}University of Surrey; \textsuperscript{2}University of Exeter Business School; \textsuperscript{3}University of Kentucky; \textsuperscript{4}Hungarian Academy of Sciences; \textsuperscript{5}University of Ljubljana & University of Pittsburgh, USA

Networks of Supreme Court Overturning Decisions

Patrick Doreian\textsuperscript{1}; Andrej Mrvar\textsuperscript{2}

\textsuperscript{1}University of Pittsburgh; \textsuperscript{2}University of Ljubljana

The network featuring the citation links linking the decisions of the US Supreme Court citing earlier decisions is usually treated as an unsigned network. However, when the Court overturns a prior decision, either completely or in part, this is a negative tie repudiating the earlier decision. A completely new dataset, constructed from multiple sources, was constructed to cover the period from the Court’s inception (1979) through 2005 that featured all instances of a prior decision being overturned. Most often, this has been studied as a pair of decisions in which one over turns the other. We treat this signed network in different ways. One was to build components made up linked decisions with only negative ties: overturning decisions are more than dyadic phenomena. Second, we embed these negative ties in a network featuring also positive ties between these decisions. Applying structural balance theory adapted in terms of consistency between decision reveals this network is no balanced. One surprising result is that there are decisions than have been overturned completely that are still cited as precedent. This calls into question the notion of stare decisis. Finally, we analyze the overturning network in terms of the Chief Justices of the Court. The issue here is whether the decision to overturn one or more prior decisions is judicial, political or motivated by establishing consistency. All three motivations are involved.
"I ain’t got no quarrel with anyone" - How to measure negative ties? A comparison of qualitative and quantitative data collection.

Philip Adebahr¹; Andreas Klärner²; Sylvia Keim³; André Knabe²
¹University of Technology Chemnitz; ²Thünen Institute of Rural Studies; ³University of Rostock

Objectives:
In our project ‘Aspects of Poverty in Mecklenburg-Western Pomerania’ (Germany) we collected qualitative and quantitative interview data on ego-centred networks. Analyzing our interviews we recognized huge differences between these two data collection methods regarding the nomination of negative ties, i.e. actors in the network with whom our respondents have a troublesome relationship. Often actors which are described as difficult, wearing, stressing etc. in the narrative part of our interviews are not mentioned in the standardized collection of information on the respondent’s network, where we asked with whom our respondents have quarrels or conflicts. Our mixed methods data enables us to analyse in-depth what our respondents define as negative ties themselves and what they do not consider as being negative ties. By answering the question ‘which negative ties have not been mentioned in quantitative research and why?’, we identify methodological challenges for the standardized collection of network data and stimulate the discussion on the measurement of negative ties. This is especially relevant regarding the diversity of measurement instruments of negative ties which are reaching from questions on bullying and dislike to questions on stressing and demanding people up to adversary and avoidance.

Method:
Between 2013 and 2015 we conducted problem-centred interviews with 55 people living below the poverty line on aspects of poverty, their everyday life and network aspects like their families, friends, social environment and social resources. Afterwards the respondents were requested to map their social networks within a quantitative questionnaire using the software Vennmaker. We used different name generators to collect data on strong and weak ties and we also asked ‘With whom do you occasionally have quarrels or conflicts?’ to collect negative ties. We choose the quarrel or conflict generator to collect not only negative ties (aggregated) but negative aspects of all kinds of ties. In our analysis we contrast the findings of our qualitative and the quantitative data.

Results:
We show that respondents are often unaware of negative ties being a relationship when we directly ask in a name generator approach because negative ties are experienced as emotionally distant and not as emotionally close. Furthermore, there is social desirability in a performance-orientated society not to have quarrels with anyone because it restricts the own performance capability. Moreover, negative experiences (e.g. quarrels) are to a certain extent psychologically suppressed and cannot be consciously remembered. We will also present further results on which negative ties are not mentioned when directly asking for quarrels or conflicts.
A Triadic View of Political Power in Signed Graphs: Exploring the Political Independence Index in the International Geopolitical Context

Giuseppe Labianca²; Filip Agneessens¹; Jesse Fagan²; Daniel Halgin²; Theresa Floyd³; Alexandra Gerbasi¹; Carlo Labianca

¹University of Surrey; ²University of Kentucky; ³University of Montana

Interest has grown in understanding which nodal positions in a network of positive and negative ties are in a favorable power position. One new measure of nodal power in signed graphs, the political independence index (Smith, et al., 2014) employs a dependence perspective to determine nodal power. However, it does not take into account whether alters are themselves connected by positive or negative ties. We introduce a new version of the political independence index which takes into account whether the alters are involved in closed triads of different types; this version does a better job of accounting for nations’ changes to their military in the post-World War II period than the original version of PII. We then extend the use of this new version in an interpersonal network within an organization.
Negative Ties and Signed Graphs: Organisational and online signed graph/negative ties research (Session 13; Part 3)
Filip Agneessens¹; Alexandra Gerbasi²; Giuseppe Labianca³; Joshua Marineau; Károly Takács⁴; Patrick Doreian⁵
¹University of Surrey; ²University of Exeter Business School; ³University of Kentucky; ⁴Hungarian Academy of Sciences; ⁵University of Ljubljana & University of Pittsburgh, USA

Negative experiences and negative ties: An analysis of the interdynamics of perceived exposure to workplace bullying and positive and negative social relations at work
Birgit Pauksztat¹; Denise Salin²; Christian Steglich³
¹University of Greenwich; ²Hanken School of Economics; ³Institute for Analytical Sociology, Linköping University

The aim of this study was to analyze how employees’ position in the social network affects their exposure to bullying behaviours, and how this exposure in turn affects their positive ties (“friendship”) and negative ties (“difficult” relations) at work. Thus, the study explores the interdynamics of perceptions of negative behaviours and negative and positive relationships. Longitudinal data on perceived exposure to bullying behaviours (NAQ – short version) and network data on relationship quality (friendship relations; difficult relations) were collected in eight small and medium-sized organizations in Finland. Hypotheses were tested based on two waves of data (n = 249) using stochastic actor-oriented modeling. Given the multilevel nature of the data (respondents nested in organizations), different approaches for analyzing the data were explored.

Contrary to expectations, initial analyses suggest that neither degree centrality in the network of difficult relations, nor degree centrality in the friendship network at T1 had any effect on perceived exposure to bullying behaviours (T2). However, respondents who experienced higher exposure to bullying behaviours at T1 reported both more friendships (endowment effect) and more difficult relations (creation effect) at T2. This suggests that at the group level, bullying might contribute to group polarization. Also, employees’ exposure to bullying behaviours was affected by the bullying behaviours experienced by their friends, perhaps pointing to social influence effects.
Bi-polar hierarchies: A study on the structure of coordination and control in Wikipedia
Juergen Lerner; Alessandro Lomi
1University of Konstanz

Peer-production of Wikipedia articles leads to emergent structures of coordination and control among contributing users. Besides discussion on talk pages, most coordination takes place through co-editing activities performed directly on the articles. Users can undo contributions of other users or can restore text that has been previously deleted. There are at least two competing explanations for the structure of these signed edit-networks: (1) the structural balance interpretation that users undoing each others’ edits belong to different factions having conflicting opinions and (2) the hierarchical interpretation that users with higher status or excellence dominate others. In this talk we present several ways how these alternative hypotheses can be tested against each other. We propose further hypotheses linking the structure of the group of contributing users with team performance and output quality and present initial empirical support.
Network antecedents of catch22-routines: Damned if you do, damned if you don’t
Christine Moser
VU University Amsterdam

Many organizations rely on the stability and continuity that organizational routines provide. Organizational routines are repetitive, recognizable patterns of interdependent actions, involving multiple actors and are key to organizational performance. Recent studies have emphasized the important role of organizational routines in both stability and change in organizations. Scholars distinguish between rules and procedures that have been formulated by management; and the actual work practice - e.g., how these rules are carried out on a day-to-day basis. The terms “ostensive” and “performative” indicate these two dimensions: ostensive refers to abstract patterns, and performative to specific actions.

However, routines that are unavoidable yet harmful for organizations – what I call “catch22-routines” – have not yet been researched. In this paper, I develop a novel understanding of organizational routines, specifically I focus on catch22-routines which are organizational routines that (a) fulfil the requirements of organizational routines (multiple actors carry out repetitive and recognizable interdependent actions); in addition (b) cannot be avoided and (c) are harmful for organizations, whichever course of action they choose: damned if they do, but equally damned if they don’t. In particular, I will conceptualize and define these routines, and develop theory on the antecedents on catch22-routines. To that end, I draw on network theory to explain the underlying theoretical mechanisms of catch22-routines. Given the ambiguous nature of these routines, the possible antecedents of catch22-routines must lie in positive as well as negative organizational relationships. In the paper, I will develop propositions that address the ambiguous nature of the routines in conjunction with positive and negative network antecedents. I conclude with implications for theory and practice.
The good and the bad - The Role of Balance, Status and Homophily in a Signed Tie Online Network in Germany

Alexander Polte; Markus Gampe

Most of signed ties research concentrates on the investigation of relationships between adolescents or children in schools (e.g. friendship and bully-victim relations). Those networks are often of moderate size so that it is quite feasible to analyze them using multivariate exponential random graph models (ERGMs). In contrast to that, networks from online-data may be very large and difficult to model within an acceptable amount of time. This might be a reason for the relative rarity of studies that model signed ties in online social networks.

The submitted paper aims to fill this research gap by cross-sectional modelling of 'positive' contacting relations and 'negative' ignoring relations of a regionally based online social network. More precisely we analyse the signed relations between subset of 3305 members from the former online social network "partyface.de", that are living in the town of Bitburg (Germany) and test the hypothesis regarding Homophily, Balance theory and Status theory.
Tactical Insights from an Underdog Team: Network analysis of Iceland in the Euro 2016 against the teams of Portugal and England

Pavlina Kröckel, Alexander Piazza
University of Erlangen-Nuremberg

The European Championship in 2016 was highlighted by the unexpected success of relatively unpopular teams like Iceland and Wales. In this paper, we focus on two games of the Iceland’s team. There are a couple of aspects that make this team interesting to analyze. First, this was the first appearance of Iceland in the 60 years of history of the European Championship. Second, Iceland does not have professional football clubs and its national team players are not playing at high professional level as the players of other more popular teams. Third, Iceland demonstrated that a tactic considered outdated by most modern managers, the 4-4-2, should not be overlooked. Iceland was eliminated at the quarter finals stage by France which is a strong competitor. Nevertheless, the team managed a draw against Portugal and a win against England. Therefore, we chose Iceland for our analysis.

In this paper, we derive the networks of the passing sequences of Iceland’s team against the teams of Portugal and England. The potential of social network analysis techniques on football data has been previously discussed in the literature (Clemente, Couceiro, Martins, & Mendes, 2015; Clemente, Lourenço, Kalamaras, Wong, & Mendes, 2015; Clemente, Martins, & Mendes, 2015; Cotta, Mora, Merelo, & Merelo-Molina, 2013; Loughead et al., 2016; Lusher, Robins, & Kremer, 2010; Yamamoto & Yokoyama, 2011). In our study, we use event data provided by Opta Sports, and analyze both games by using metrics at player, team and sub-group level of analysis. We first calculate and interpret well established network metrics such as density, betweenness and closeness centrality, clustering coefficient, PageRank, network diameter. This gives an overview of the static networks of each team for the whole game. In a second step, we integrate the time dimension by adding the timestamp attribute of each pass. We split the data in several time segments and analyze the metrics’ evolution over time. Finally, we interpret the metrics results in relation to the teams’ formation and the outcome of the match.
From the “Special One” to the “Sacked One”: the Effects of Manager Turnover on Passing Networks in Soccer Teams
Folkert Boer, Roger Leenders, Hans van Dijk

Manager turnover – replacing one manager for another - is considered a powerful and oft-used tool to change employee attitudes and behaviors, and is thought to be a helpful mechanism to increase faltering performance. Despite a recent surge of studies assessing the effects of managerial change on the performance of teams and organizations, findings have largely been inconclusive.

Many theories have been used to address the consequences of manager turnover, but most, if not all, take a “black-box approach”: the focus is on the correlation between manager turnover and performance, and the conditions under which the correlation is high or low. In our study we build on the Input-Process-Output (IPO; McGrath, 1964) perspective to build theory on the processes connecting manager turnover and team performance. In particular, we focus on how manager turnover affects the interaction and coordination in soccer teams, measured by their passing networks. We argue that manager turnover in the short term results in a loss of network structure, but over time is likely to pave the way for new network structures that may be more suitable for the environment. We also argue that the extent to which these passing networks change over time depends on the characteristics of the newly appointed manager.

We collected data on manager turnover in seven European soccer leagues from four consecutive seasons, containing all manager turnovers and relevant manager characteristics. We employ detailed match data containing all on-the-ball-actions in these matches, such as passes, interceptions, shots, et cetera. For this study, we extracted passing networks of all the matches in the data set and measure the change of network structure over time (short-term and long-term). Furthermore, we account for the change in managerial characteristics and their influence on the change of network structure. We identify two different types of passing network (one indicative of coordination, the other indicative of effort) and show how their changes relate to the change in manager for these soccer teams.
The connections of the connectors. Consultants of football players and their relationships

Raphael Heiberger, Tom Töpfer
University of Bremen

Consultants play an increasingly important role in the world of professional football. Due to the ongoing professionalization and commercialization in Europe’s big leagues, the influence of agents and consultants is growing, since top-level football players organize themselves more and more like enterprises with specialists in every field. Negotiating contracts and transfers are among the most important tasks for every athlete and nowadays managed by consultants with various backgrounds and qualifications. Although consultants have a rather bad reputation in the public opinion not just since “football leaks”, almost nothing is known about this part of the “beautiful game”. Our project aims to reveal the networks of consultants by utilizing a comprehensive dataset for the three biggest leagues in Germany, UK and Spain in the season 2015/16. The relationships are modelled as two-mode networks between consultant agencies and clubs, using players as “bridges”. On the basis of these networks and the analysis of the homophily of consultant agencies’ ego networks, we identify different types of agencies. In order to investigate consultants’ motivations and strategies in greater detail, we conducted additionally interviews with German consultants that occupy key roles. By interrelating network structures with attributes of agencies, we gain new insights to managing practices of football consultants and reveal certain clustering tendencies within leagues, but only a limited internationalization of the industry.
Sport and Networks (Session 14; Part 2)
Tom Töpfer; Raphael Heiberger
University of Bremen

Social Network Analysis of Women's College Basketball
Carol Xu, Renee Ha, James Ha
University of Washington

Using network analysis in sports can reveal patterns not readily available through traditional means of assessment, such as how different types of passing behavior or team network structures can affect success. We analyzed 30 games from the 2015 women’s NCAA basketball championships to determine if teams with higher in-, out-, and overall degree centralizations outperformed their rivals, and whether the ratio of in- to out-degree centralization predicts success as well. We also asked if the most central players on each team were also responsible for the most points, assists, and rebounds per game. Overall, we found a trend that higher degree centralization predicts success, particularly as the tournament progressed, and that winning teams also possessed higher in-/out-degree ratios. Winning teams also had higher instances of their most central player being distinct from the player making the most assists. Taken together, these data suggest that, at the college level at least, the better strategy is to have one or a few central "star" players on each team making the bulk of the passing decisions, perhaps due to the difference in skill levels between college teammates.
Social Networks and Retention of Members in Organized Sports
Ørnulf Seippel, Håvard Bergesen Dalen
Norwegian School of Sport Sciences

Social Networks and Retention of Members in Organized Sports

All organizations face the question of recruiting and retaining members. Sport clubs mostly recruit members at a young age, and the challenge becomes, by time, how to retain members and avoid a bigger than necessary drop out. To understand such processes of retention, the social networks among members in and around the organizations are probably of decisive importance.

In sport studies, recruitment/retention has mostly been studied either from a psychological perspective (motives etc) or in a more sociological styles looking quantitatively at individual attributes (age, gender, socio-economic status) or qualitative at contextual factors (family, friends). Para-doxically, several of these studies point toward the marginality of sports achievement as a motive (especially in grassroots sports) and instead emphasize the importance of social experiences – also as they play over into fun/enjoyment – for the experience of sport participation. Accordingly, in this study we ask how the social networks among participants/members within groups in sport clubs and their networks to actors within and outside sports matter for how they envision their future within organized sports.

To answer this question we combine measures of individual characteristic, how members in various groups in sport clubs describe their attachment to the group (do they feel that they belong etc) and social networks to other members of the group, both as they relate to each other within the sports context and outside sports. The purpose is primarily to study the importance of such social factors for how sport clubs members see their futures within sports: How do individual's attachments to the group or individual's actions and structural positions (degrees, centrality, ...) influence on their participation in sports? How do characteristics of the networks in the group (density, centralization, clustering, ...) matter for how individuals – alone or together – anticipate their future within organized sports? Next, we do also study how such characteristics might vary with type of sports, groups and individuals. Is it so that team sports provide a social climate that supports retention more than individual sports? Does sports on a higher level demand more of the athletes so that they stick together and then tend to stay on? Are there differences due to characteristics of the groups as size and "age". Are there difference due to age and gender? Do characteristics of the coach – age, gender, sports experience/education (often relative to the athletes) – matter for how members envision their futures within sports?

The study is based on a data set comprising surveys of 30 groups of athletes containing 350 individuals. Coaches of each group are also included in the study (with a distinct questionnaire). Groups are sampled according to sports, competitive level, geographical location, age and gender.
Organized Sports, Gendered Networks?
Håvard Bergesen Dalen
Norwegian School of Sport Sciences

Common stereotypes in contemporary culture often depict certain social behaviors as related to or a function of gender. Typically, males are presented as aggressive and outspoken, while women are emphatic with a great emotional presence. In this article, we study networks in boys’ and girls’ sport groups. The primary purpose is not to confirm or debunk popular gender-assertions, but to incorporate context and take into account the environment where boys and girls do sports. Today, more men and women are involved in sports than ever, and understanding the social networks in boys’ and girls’ sport groups are important both for sport politics and for the field of gender studies in the social sciences. Thus, the research question we ask in this article is what are the differences between boys’ and girls’ social networks in organized sports?

Studies of the differences between boys’ and girls’ sporting involvement has been dominated by qualitative approaches and psychological constructs (e.g. bullying, friendship, motives, well-being, cohesion). This process has taken place in conjunction with theoretical developments in the more general scene of gender studies in the social sciences. Conversely, we know little about structure and how previous relevant studies and popular notations about gender could be of importance to the socio-structural properties of girls’ and boys’ sport groups. Motives for participation reveal that competition and display of physical abilities are important for boys, while girls emphasize sociality. If boys are more competitive than girls, if girls are more concerned than boys about social unity, and if girls and boys express aggression in different forms, what does it mean to the social networks in sports groups?

To figure out if network-structures of relevance is gender-dependent, we ask how networks look like inside and outside boys and girls sport groups? To answer this question, we compare network metrics (group level: density, centralization, clustering. Individual level: centrality) in boys’ and girls’ sport groups. Do the assertion about the aggressive male athlete and the social female athlete still hold true when we compare boys’-, girls’ team density-, centrality, -and centralization scores? Next, we control and compare for age-effects for the purpose to examine if gender-variations in network metrics change over time. Are ‘the gendered network’ most visible in early or late adolescence? Third, we control for type of sports. Is network gender-differences related to whether or not athletes do “sex-appropriate sports”? Are girl teams in masculine sports more structurally similar to boys than girl teams in sports that is assumed to be more suitable for females?

The study is based on a data set comprising surveys of 30 groups of athletes containing 350 individuals. Coaches from each group are also included in the study (with a distinct questionnaire). Groups are sampled according to sports, competitive level, geographical location, age and gender.
Analysis of longitudinal personal and small social network analysis (Session 15)
Luisa Barthauer¹; Elena Stasewitsch¹; Lisa Handke; Matthew Sitch²
¹TU Braunschweig; ²University of Chichester

Bargaining Power and Network Dynamics
Felix Bader; Thomas Gautschi
University of Mannheim

The last decades have seen many theoretical and experimental contributions on bargaining power in exchange networks. The debate about the empirical fit of the proposed models to explain structural power is still ongoing. The Network Control Bargaining model by Norman Braun and Thomas Gautschi, based on non-cooperative game theory, is one promising candidate. It can be used to predict - for rational individuals - not only profit splits but also network breaks, i.e. frequent non-exchange in available bargaining ties. A network is said to be non-robust if an actor decides, comparing bargaining outcomes in his ties, about the non-usage of a certain tie. He will only break the network if this increases his profits using the remaining relations.

We tested this assumption experimentally by assigning each participant to a random position in a T-Shape, 4-Line, or a novel, more complex network we call V-Box-X-Box. As bargaining and exchange runs over 20 rounds participants have the opportunity to learn to use the power of their specific position. Our longitudinal data allows the analysis of network and behavioral dynamics: In which round, who uses which ties and gets how much of the profit? Timestamps in the data allow to look even further into details of network dynamics: Network members who have fulfilled their desired number of exchanges in one round are thus not available anymore for their remaining bargaining partners. Therefore, we can see the network gradually falling apart over the duration of one round. This changes the restrictions and externalities for the remaining participants for this specific round. Every time an exchange happens, the remaining structure that emerges needs to be reanalyzed.

According to our expectations, the T-Shape and V-Box-X-Box decay (i.e. permanent breaks occur) and the 4-Line turns out to be robust. Rare empirical occurrences of theoretically unexpected exchanges in the V-Box-X-Box can be explained by network dynamics.
New Kids on the Job - Analysing the emerging intra-organizational networks of newcomers and the social capital they provide.

Sabine Matejek
Radboud University

This paper analyses personal networks of organizational newcomers from the perspective of social capital theory. It strives to increase our understanding of the variance of network resources which newcomers (need to) draw from their emerging ties during organizational socialization. While extant research has focused primarily on factors influencing the degree to which newcomers are successfully socialized, this paper asks as its guiding question how a social capital perspective can help us to assess the quality of newcomer socialization.

In order to address this question, the paper’s structure follows three steps: First, the concept of organizational socialization is framed in terms of the challenges entailed for newcomers as they enter a new job environment. Faced with the need to acquire task mastery, social inclusion, and role clarity, newcomers often lack the resources to meet these needs on their own. Rather, they must find their place in resource exchange relations within the organization. This invites a connection to be made between the research literatures on socialization and social network analysis. Drawing on a viable framework of intra-organizational social capital, the paper identifies task-performance support, socio-emotional integration and initial career promotion as valuable resources helping newcomers to tackle the respective challenges they face as “new kids on the job”:

In its second step, the paper therefore reviews extant research on how the particular configuration of personal networks will affect the kinds of resources which newcomers will be able to draw from their emerging ties. Three propositions are derived, specifying which kinds of ties to which kinds of organizational insiders are considered particularly apt as conduits to provide newcomers with access to each type of relevant intra-organizational social capital.

As a third step towards answering its research question, the paper then illustrates how the configurations of individual newcomer networks as well as the network resources actually derived from them can be systematically mapped for research purposes by means of clustered graphs. This visualization approach not only facilitates the comparative analysis of small groups of personal networks with regard to the formulated propositions. It further enables researchers to track developments in the network configurations and derived social capital over time. To investigate in how far changes in either or both are related and how they evolve from a newcomer’s initial onboarding to the point when they achieve insider status is considered highly informative both from a socialization and social capital perspective.

For this paper, an initial data set comprising the first wave of data collected on the personal networks of a panel of 25 newcomers in 9 organizations is visualized as clustered graphs and analysed with regard to the formulated propositions. The paper concludes with an outlook on applying its approach to the remaining panel data, collected in two more consecutive waves covering three years in total. It is delineated how a longitudinal analysis is
to help refine the propositions for future research and how its initial findings can inform organizational onboarding practices and HR support during newcomer socialization.
Personal network dynamics in reference to physical activity behaviours
Matthew Sitch; Ruth Lowry
University of Chichester

Objectives:
To enhance understanding regarding social influence on Physical Activity (PA) by examining personal network structure over time.

Methods:
Participants (N = 20) were recruited from office based organisations. Personal network data was collected over three time points, one year apart, using a pen and paper method (Hogan, Carrasco and Wellman 2007) to create personal network diagrams. Multiple name generators were utilised and no limit was placed on network size. Personal network diagrams were used to explore network structure and analysed using social network software Visone (Brandes & Wagner, 2004). Numeric measures of network structure examined for change were network mass, size, homophily, weak components, brokerage, average degree, and effective size. A visual analysis was also conducted examining network change in relation to specific alters, such as those rated as “very close” or “very physically active”. Measures were examined case by case over time and then comparisons were drawn between participants to identify trends.

Results:
Five personal network types were identified which were characterised with certain network structures. Network homophily tended to change in line with Ego’s change in behaviour suggesting that the network operated to inhibit or promote physical activity. Visual analysis indicated that changes in particular social relationships were indicative of a change in ego’s behaviours.

Conclusions:
The ways in which personal networks structures changed were multiple sometimes dramatic. The finding that changes in the network were associated with changes in Ego’s behaviour is insightful in attempting understanding how personal networks operate. However, the method of analysis was relatively novel and exploratory, attempting to examine in-depth personal network data over time presented many challenges which are discussed.
Field theory as a framework to tripartite analysis of agency

Dimitris Christopoulos¹, Mario Diani, David Knoke
¹MU-Vienna & Heriot-Watt Scotland

We demonstrate how tripartite analysis can help us capture the multiplicity of entities and relational levels that collective constitute action fields. We first elaborate the tripartite logic by focusing on three type of entities: political actors, their respective advocacy organizations and the events in which actors and organizations have a high salience. We look at both a “restricted” and a “general” tripartite model. We reduce tripartite structures to all possible bimodal combinations and examine the ones where agency can be inferred. In principle this means looking at three levels, each of which yields important insights on the overall structure of political fields:

a) ties created between individuals by the fact of being active in organizations and/or events;
b) ties created between organizations by the fact of sharing core-members and events;
c) ties between events that are attended by the same individuals and/or organizations.

The paper presented is of interest for social scientists that work on network structure and political agency and for methodologists interested in a novel approach to the network analysis of exceptional political agents.
Optimization-based local simplification of multiplex networks

Roberto Interdonato, Davide Vega D'Aurelio, Matteo Magnani
Uppsala University

Multiplex social networks provide a more realistic representation of the different relations (also called layers) that characterize the social life of an individual if compared with simple graphs. Nevertheless, collecting a wide set of different relations among a large set of entities can easily result in a significant amount of noisy or redundant information. In this paper we will present a novel approach to multiplex network simplification, which aims at reducing noise and redundancy in the relation set by still preserving the original layer structure of the network. We formalize the simplification process as an optimization problem, maximizing a function expressing a trade-off between number of edges to remove and information loss.

All existing simplification methods for multilayer networks result in the removal of one or more relation types in their entirety. As an example, flattening produces a single-layer aggregate network containing the relations coming from all the different layers (possibly weighting relations' multiplicity) [1]. In order to limit the information loss that would derive from a complete flattening, layer aggregation techniques have been also proposed, based on the assumption that some layers may contain similar information (i.e., show a similar topology). De Domenico et al. [2] use an agglomerative hierarchical clustering method in order to aggregate layers, then choosing the final clustering solution as the one that minimizes an information-loss-based quality function. Even if the loss of information is explicitly taken into account in order to drive the simplification process, layer aggregation still leads to the loss of one or more of the original relation types.

Differently from the aforementioned approaches, our hypothesis is that each layer may contain both relevant and noisy information in different parts of its topology. Under this hypothesis, a more effective approach would remove noisy and redundant information by keeping the original layer structure of the network. We call this general approach local simplification [3].

In summary, we propose an unsupervised approach to the problem of local simplification of multiplex networks. More specifically, we formalize the simplification task as an optimization problem, in which the objective function to be maximized is proportional to the ratio of the information loss produced by the simplification process to the quantity of removed edges. Since the proposed simplification approach is devised to improve the quality of the information contained in the network, we measure its effectiveness in two different network analysis tasks, i.e., network visualization and community detection. More specifically, as regards the community detection task, we evaluate to what extent the same state-of-the-art community detection method obtains better results when applied to the simplified network.

Multi-Graph Sampling Strategies for Conditional Uniform Graph Tests of Multiplexity Statistics
Christopher Marcum, Laura Koehly
National Institutes of Health

Multiplexity, the extent to which multiple types of relations overlap among a set of actors in a network (say, friendship and co-authorship), is an increasingly important topic in social network analysis. The ability to test network hypotheses on multiplexity statistics using a conditional uniform graph approach rests thoroughly on the availability of methods to sample from some joint distribution of multiple graphs (multi-graphs) on which to calculate theoretical values of multiplexity statistics. However, generating samples of correlated binary variates from a joint distribution is an historically difficult problem. Several approaches, including autologistic models, logistic copula methods, and multivariate normal thresholding algorithms have all been developed to generate random correlated binary data. However, no exhaustive review of these methods has been done in the context of conditional uniform graph hypothesis testing of multiplexity statistics. Therefore, in this paper we evaluate the performance of each of these three methods using real multiplex network data collected from a large data set (n=1840) of cognitive networks we collected from a random sample of the US population for this purpose. In this framework, one may wish to evaluate whether an observed value of multiplexity was drawn from a joint distribution of multi-graphs evaluated uniformly on the space of all such joint distributions, conditional on at least one feature common among the graph set. In the classic univariate single graph framework conditioning the null distribution on size, density, edge counts, and dyad counts is fairly typical. As a first step in developing an approach for multi-graphs, however, we focus here on size, density, and correlation based conditioning. Our preliminary results suggest that the thresholding algorithms may be preferred over the other two approaches.
Clustering and network analysis of techno-economic segments characterizing emergent industries

Margherita Russo\(^1\), Annalisa Caloffi\(^2\), Francesco Pagliacci\(^3\), Pasquale Pavone, Federica Rossi, Riccardo Righi, Simone Righi\(^3\)

\(^1\)University of Modena and Reggio Emilia, \(^2\)University of Padua, \(^3\)University of Bologna

To analyse the structure of networks in techno-economic segments (TES) characterizing emerging industries (photonics, space industry, etc.), we propose a methodology combining (a) Infomap Multilayer analysis to detect communities; (b) semantic cluster analysis of technologies; (c) text analysis of co-occurrences of location of activities. Our focus is on overlapping communities of agents resulting from FP7 and H2020 programmes consortia, patent application development and ownership, publications.

The main questions to which the proposed methodology could allow to answer concern: (i) How can we single out techno-economic segments (TES) characterizing emerging industries (such as, photonics, space industry, etc.)?; (ii) How can we detect the topics characterizing TES; (iii) Who are the core players in those TES? i.e. types of agents (university, PRO, business company, …), their scientific/technical location, their spatial location (innovation ecosystems); (iv) What are the core activities enhancing the emergence of TES?; (v) How can we analyse the dynamics of formation and change of those networks?

The value added of the multilayer analysis is that it makes possible the analysis of community structure in each TES, and to single out the contribution of each agent (or groups of agents), of each layer and of the detected communities to the generation of the total Infomap flow. Clustering of semantic networks supports a categorization of new topics.

All these aspects can be investigated in their spatial (i.e. geographical) dimension. For instance, both agents centrality and multiple affiliation to communities could be affected by characteristics of the eco systems in which the agents are active. These characteristics, observed at city and regional level, are expected to drive spatial concentrations of specific typologies of agents, hence the spatial distribution of their relationships, thus adding a significant contribution to policy makers.

The paper presents some methodological results of the research activity explored in collaboration with the EC JRC Digital Economy Unit B6 Information Society Unit–in the EU project PREDICT (Prospective Insights on R&D in ICT)\(^1\).

\(^1\) The views expressed are those of the authors and may not in any circumstances be regarded as stating an official position of the European Commission. Neither the European Commission nor any person acting on behalf of the Commission is responsible for the use which might be made of this abstract.

Selected references

Balbi S. and Misuraca A. (2005), Pesi e Metriche nell'Analisi dei Dati Testuali, Quaderni di Statistica, vol. 7, pp. 55-68


Bolasco S. (1999), Analisi multidimensionale dei dati. Metodi, strategie e criteri d'interpretazione, Carocci, Roma
Bolasco S. (2013). L'analisi automatica dei testi. Fare ricerca con il text mining. Carocci, Roma
Fortunato S. and Hric D. (2016), Community detection in networks: A user guide, Physics Reports 659, 1-44,
Information based approach for the detection of normative clusters. Analysis of post-disaster ordinances promulgation in Italy
Pasquale Pavone, Riccardo Righi, Simone Righi1, Margherita Russo2
1University of Bologna, 2University of Modena and Reggio Emilia

In Italy, the recent post-disaster emergency and recovery interventions have been regulated by a great number of ad hoc ordinances: the goal of this paper is to identify the topics on which a national legislation is needed.

After having defined the network structure of citations of normative acts and ordinances issued after the earthquake occurred in Emilia-Romagna (Italy) in 2012 (Pavone et al. 2016), in this paper we present the detection of clusters of ordinances and normative acts promulgated to support the post disaster emergency and recovery interventions.

We explore two research strategies to detect clusters of nested ordinances and normative acts. In both strategies we adopt the Infomap algorithm based on information theory (Rosvall & Bergstrom, 2008; De Domenico et al, 2015). Since there was no reason to exclude overlapping clusters, the adoption of Infomap analysis was considered more appropriate than other methods that maximize modularity producing disjoint clusters.

In the first research strategy of the analysis, network data over 576 nodes (ordinances and normative acts) and cross citations are analysed by modelling them in a single network layer. The partition obtained reveals more than 100 overlapping clusters, with a positive Infomap flow, but without a meaningful structure with regard to the objective of our analysis, i.e. the identification of topics.

In the second research strategy, a factorial analysis combined with a cluster analysis of the content of the ordinances allowed us disentangling four main topics. By associating each ordinance to the corresponding topic, we developed a four layers network structure on which to implement a multilayer Infomap analysis. The partition obtained returned 68 clusters highlighting the structure of ad hoc ordinances promulgated to cover those relevant topics that should be more efficiently addressed by a national legislation.

References


Factorial methods to investigate multiplex network data

Maria Prosperina Vitale¹, Giuseppe Giordano¹, Giancarlo Ragozini²
¹University of Salerno, ²University of Naples Federico II

A multiplex network is a special case of a multilayer network that consists of a fixed set of nodes that interacts through different types of relationships. For this kind of data, the usual approaches consist of dealing with multiple relationships separately or of flattening the information embedded in all layers. This latter approach may lead to a loss of relevant information reducing the complexity of multiplex data. To cope with this issue, it could be useful to propose analytic tools that can be used to adapt multivariate methods to network data. In this regard, several factorial methods have been proposed in the social network analysis framework [3, 5], including attributes of nodes and events [4]. In the case of multiplex networks, canonical correlation analysis [2] was adopted to identify dimensions along which networks are related to each other, and an analytical procedure was recently introduced for dimension reduction using cluster analysis [7].

In this scenario, the present contribution aims at extending the use of factorial methods to visually explore the hidden structure of multiplex networks preserving the inherent complexity. More specifically, we focus on one-mode networks, analyzing the corresponding set of adjacency matrices using the DISTATIS technique [1], that is, an extension of the multidimensional scaling applied to a set of distance matrices derived on the same set of objects. This technique allows to represent the different kinds of relationships both in separate spaces and in a common space, called compromise. Therefore, it enhances the visual exploration of: i) the network structure in terms of nodes’ similarity in each single layer, ii) the common structure of all layers, iii) the nodes’ variation across layers, and iv) the similarity among the structure of layers.

In order to illustrate how the DISTATIS procedure works in practice for the treatment of multiplex networks, we consider a data set containing different kinds of relationships between 61 employees of the Computer Science Department at Aarhus University -AUCS data-[6]. The results of the illustrative example indicate the high explicative power of the method in capturing similarities among relationships.

References
Community detection on multiplex social media data
Luca Rossi¹, Obaida Hanteer¹, Matteo Magnani²
¹IT University of Copenhagen, ²Uppsala University

Community detection is a central area of research in network analysis. The growing level of interest in multiplex networks has been followed by a parallel growth of interest in multiplex applications of community detection methods that could be more precise when actors can interact through multiple relations at the same time. Despite these premises the diffusion of community detection methods for multiplex networks is still at its infancy with few papers addressing the issue [1,2].

We will present the results of the testing of several community detection algorithms applied to a multiplex network built from social media data. The multiplex network is a Twitter network of Danish candidates running in the 2015 Danish election with 3 types of relations (Following, ReTweet, Reply). The multiplex network counts 514 actors and 21642 edges in total. It should be noted that the three layers are largely different, with the Following relation being vastly denser than the two others (20958 edges) and different inter-layer correlations. Ground truth information about the political affiliation of the candidates at the time of the election is also available. Given the availability of ground truth (candidates affiliated to the 12 political parties participating the election), we will present a comparison of the different types of communities identified by the main available community detection methods.

Of particular interest are our preliminary results based on the clique-percolation method (CPM) [3]. For a given k, CPM builds up communities from k-cliques. Two k-cliques are said to be adjacent if they share k - 1 nodes. A k-clique community is defined as a maximal union of k-cliques that can be reached from each other through a series of adjacent k-cliques. This method is extremely interesting since it provides a simple, intuitive and deterministic definition of possibly overlapping communities and it has recently been extended for multiplex networks [4].

We have applied the multiplex CPM independently to every single relation type and to every combination of the three, and evaluated the results in terms of number of communities identified (the ground truth counting 12 political parties) and in terms of their Jaccard coefficient and number of actors assigned to the right community. The most interesting highlights are that CPM applied to multiplex data is more effective than applied to single relationship networks, but also that specific combinations of relationship (e.g. Following + ReTweets) seem to produce better results than others, which may require the development of new methods to explore the exponentially large space of combinations of relation types.

References:
Uncovering the network structures of corruption in Indonesia

Mala Sondang Silitonga¹, Rafael P. M. Wittek, Tom Snijders², Liesbet Heyse¹
¹ICS, University of Groningen, ²University of Groningen; University of Oxford

In this paper, we develop a typology and method to examine role structures in corruption networks in Indonesian local government. In its most basic form, corruption refers to a dyadic relationship which involves the exchange of some kind of profit (a bribe) for the return of some other profit (a favor). On the basis of relational model theory, we argue that in addition to this type of corruption (i.e. market pricing), profit exchange might also be embedded in friendship or kinship ties (communal sharing), work relations (equality matching) or authority relations (authority ranking). This multiplexity of dyadic relationships helps to solve the trust problem in corruption, and to avoid detection or betrayal. Furthermore, we expect that corruption is not solely dyadic in nature but may involve third and other parties that – through various types of relationships – facilitate corrupt transactions. In other words, networks of corruptions may be characterized by compound models of profit exchange, communal sharing, equality ranking, and authority ranking. By means of role analysis we explore the validity of the above ideas in a sample of 190 real corruption cases in Indonesian local governments from 2001-2013, with 2 to 100 actors per case. The dyadic relations obtained from newspaper reports were summarized in multiplex networks consisting of four relations: profit transfer (directed), authority relation (directed), horizontal work relation (non-direction), and informal embeddedness (non-directed). The analysis focused on the multiplex sets of the actors, considered at the level of the corruption case. The multiplex dyad census led to the basic but important conclusion that authority is always reciprocated by profit. The role analysis led to a reduction of the data to 30 role structures of which especially the combinations of authority and profit (or a compound version thereof) is dominant and strongly dependent on the dyadic embeddedness. We study the precise composition, nature and context of the cases that belong to the most dominant role structures in our sample and attempt to inductively generate theoretical ideas that can explain specific patterns in the data (for example, the dominance of specific sub categories of role structures in cases characterized by certain types of corruption).

Keywords
Corruption, relational models theory, role structure, multiplexity, dyadic relations.
Methodological Advances in the Study of Corporate Networks Fracturing and Concentration (Session 17; Part 1)
Eelke Heemskerk¹; Lasse Folke Henriksen²
¹University of Amsterdam; Copenhagen Business School²

The Promise and Perils of Using Big Data in the Study of Corporate Networks: Problems, Diagnostics and Fixes
Eelke Heemskerk¹, Kevin Young, Frank Takes, Bruce Cronin, Javier Garcia-Bernardo, Vladimir Popov, William Winecoff, Lasse Folke Henriksen, Audrey Laurin-Lamothe
¹University of Amsterdam

Network data on connections among corporate actors and entities – for instance through co-ownership ties or elite social networks – is increasingly available to researchers interested in probing many important questions related to the study of modern capitalism. We discuss the promise and perils of using Big Corporate Network Data (BCND) given the analytical challenges associated with the nature of the subject matter, variable data quality, and other problems associated with currently available data at this scale. We propose a standard process for how researchers can deal with BCND problems. While acknowledging that different research questions require different approaches to data quality, we offer a schematic platform that researchers can follow to make informed and intelligent decisions about BCND issues and address these issues through a specific work-flow procedure. Within each step in this procedure, we provide a set of best practices for how to identify, resolve, and minimize BCND problems that arise.
Corporate networks, in which firms are connected based on for example ownership, debt, trade and shared board members, have been shown to contain a wealth of information. The analysis of these types of networks has thus far focused on analyzing one type of relationship. In this work we go one step further and study multiple layers of interaction in the global corporate network. Furthermore, we will not merely look at how micro (organization) level interaction leads to behavior at the macro (system) level. Instead, we aim to detect higher order patterns at the meso level: distinct network motifs of groups of firms interacting within and between multiple layers of the network.

A network motif is a frequently occurring subpattern consisting of more than one node. The significance of a network motif can be established by comparing such a subpattern with the frequency of that pattern in a similar randomly generated network. To attain the above mentioned goal of multi-layer motif detection, we modify an existing algorithm by means of a novel layer encoding scheme. Furthermore, the null model against which significance is tested is adjusted such that the multi-layer aspect is properly captured. This process is nontrivial because there is a large degree of interlayer assortativity and because particular layers may contain bipartite relations.

The multi-layer motif detection algorithm is applied on a large corporate network dataset consisting of millions of ownership and board-interlock relations between firms across the globe. The motifs found this network show interesting patterns, revealing for example the presence of block holdings and joint ventures. More importantly, using metrics of motif complexity, we investigate the behavior of particular industry sectors and their involvement in complex motifs. This reveals not only how the financial sector is over-represented in more complex motifs, but also how certain industry sectors more frequently re-use particular corporate structures. These results not only pave the way for a better understanding of the organization of corporations, but also for automatically detecting patterns of financial risk and complexity at a global scale.
Pruning large corporate networks for core identification

Anton Grau Larsen, Lasse Folke Henriksen, Christoph Houman Ellersgaard
Copenhagen Business School

This paper describes challenges for constructing large, longitudinal and inclusive networks of corporate interlocks suitable for core detection analysis. We describe the three distinct steps in shaping register data to core analysis; 1) data selection, 2) data cleaning and 3) network pruning.

The goal of the core analysis is a group which has a profile that is compatible with the inner circle originally identified by Michael Useem. That is the most central agents that bridge between several major corporations and which is the dominant political voice of the corporate world. The core is identified with the K-core decomposition.

The available data lets us identify an inner circle within the Danish corporate network for each month in the period from 1987 to 2016. To not underestimate the degree of integration in the corporate network we increase the sample from the customary sample size of less than a thousand boards to more than 560,000 boards, 700,000 directors and 3,600,000 positions. This sample is substantial but far from the entire register. We discuss the problems with sampling from large registers, in particular problems with shell corporations and foundations. As a solution we propose sampling all boards that link between corporations with at least 10 employees.

We move on to discuss the problems of cleaning the time series networks for missing or unrealistic data and reducing the influence of “ultra-connectors”. As part of the solution we propose a spell graph – a graph made from spells of board memberships. In the empirical case the sample is reduced to 213,000 boards, 432,000 directors with 1,285,000 positions. Finally we discuss the problems of redundancy in networks and the problems it poses. Redundancy in affiliation networks is when a mother corporation has several subsidiary corporations with separate but almost completely overlapping boards. This poses a problem where it becomes difficult to determine whether a director actually bridges different corporations or just holds several board positions within a corporation. Redundancy poses problems both for the concept of the inner circle and for the core decomposition. As a solution to redundancy we propose a pruning technique dubbed betweenness decomposition. The procedure iteratively removes directors with a betweenness less than 1 in their 3rd neighborhood. The resulting network only contains directors that are essential for the connection of the network and it suitable for core identification. We apply the principle to the empirical case and identify a relatively stable core with a size of around 500 in each month in the period.

In the end we discuss the different types of affiliation network for which these problems exist and where variants of these solutions might apply and how it might be applied to weighted networks.
Delineating the Corporate Elite: Inquiring the Boundaries and Composition of Interlocking Directorate Networks

Jouke Huijzer

University of Amsterdam

Researchers of corporate elites typically study samples of directors and executives comprising, say 50, 100, 200 or 500 largest firms within a particular region. While these studies have revealed important patterns of corporate elite organization, the demarcating criteria of the group under study are rather arbitrary and poorly linked to the concepts that designate the group. This is problematic because decisions for demarcating the group under study likely affect empirical outcomes and thus impair a comprehensive understanding of the corporate elite, especially when they are compared over space and time (Mintz, 2002). In an effort to meaningfully determine a sample of organizations whose directors comprise the corporate elite, this study empirically compares various demarcations of the corporate elite using data from Canada. First, it is demonstrated that decisions for particular sampling criteria can significantly affect network properties and the conclusions drawn from it. Second, I explore alternative sampling strategies that align better with our theoretical understanding of the corporate elite and compare the new demarcations with conventional ones. I show that compared to conventional demarcations, our alternative strategy performs equally well at delineating a corporate elite that is connected and willing to promote its group interests. Finally replicate the landmark studies in Stokman, Ziegler & Scott (1985) and demonstrate how our understanding of networks of corporate power would have been different if alternative sampling criteria were applied. The findings enhance a more robust understanding of corporate elite organization and facilitate better comparisons of corporate elite networks over space and time.
Methodological Advances in the Study of Corporate Networks Fracturing and Concentration (Session 17; Part 2)

Eelke Heemskerk¹; Lasse Folke Henriksen²

¹University of Amsterdam; Copenhagen Business School²

Uncovering Offshore Financial Centers: Conduits and Sinks in the Global Corporate Ownership Network

Javier Garcia-Bernardo¹, Jan Fichtner, Eelke Heemskerk⁴, Frank Takes

¹University of Amsterdam

Multinational corporations use highly complex structures of parents and subsidiaries to organize their operations and ownership. For example, the Britain-based banking and financial services company HSBC has at least 828 legal corporate entities in 71 territories. Offshore Financial Centers (OFCs) facilitate these structures through low taxation and lenient regulation, but are increasingly under scrutiny, for at least three reasons: facilitating the avoidance of corporate accountability, the creation of opaque financial structures and facilitating corporate tax evasion. Therefore, identification of OFC jurisdictions has become a politicized and contested issue, and a number of either qualitative and possibly subjective or quantitative but not very fine-grained methods have been proposed.

We introduce a novel data-driven approach for identifying OFCs based on the global corporate ownership network, in which over 40 million firms (nodes) are connected through 71 million ownership relations.

This granular firm-level network data uniquely allows identifying both sink-OFCs and conduit-OFCs. Sink-OFCs attract and retain foreign capital while conduit-OFCs are attractive intermediate destinations in the routing of international investments and enable the transfer of capital without taxation.

We identify 24 sink-OFCs (the most important of them under British sovereignty). In addition, a small set of five countries -- the Netherlands, the United Kingdom, Ireland, Singapore and Switzerland -- canalize the majority of corporate offshore investment as conduit-OFCs. Each conduit jurisdiction is specialized in a geographical area and there is significant specialization based on industrial sectors.

Against the idea of OFCs as exotic small islands that cannot be regulated, we show that many sink and conduit-OFCs are highly developed countries. Targeting these conduit-OFCs could prove more effective than targeting sink-OFCs: new territories with low corporate taxes are continuously emerging, yet the conditions for conduit-OFCs (numerous tax treaties, strong legal systems, good reputation) can only be found in a few countries that are perhaps relatively easy to regulate.
Pathways to the Power Elite - Career and network alignment in the study of elite concentration

Christoph Houman Ellersgaard¹, Anton Grau Larsen, Lasse Folke Henriksen¹, Jacob Aagaard Lunding
Copenhagen Business School

Using sequence analysis, we analyze the career pathways of the Danish power elite, a tightly knit, cross-sectorial subgroup identified through an adapted K-core decomposition technique (Larsen & Ellersgaard forthcoming). We code the complete careers of this group and identify patterns in four distinct sequence dimensions - sectorial, occupational, organizational and geographical - enabling us to explore the relationship between career paths in different dimensions and network position among members of power elite. The four sequences are used to explore how elite cohesion and oppositions are created through four different mechanism: 1) inter-sectoral mobility 2) career slope 3) character formation through organizational adaption and 4) location in relation to the national and international power centers. We investigate the alignment between these multichannel sequences (Gauthier, Widmer, Bucher, & Notredame, 2010). Furthermore, we identify other social characteristics of the segments such as their gender, social background and educational profile. Finally, we explore the relationship between cohesion based on social ties and cohesion based on similarities in career trajectory through distances in sequence patterns and geodesics, respectively. These analyses serve to explore cohesion and fragmentation within the elite, adding historical depth and biographical complexity to the sometimes overly on dimensional lenses of cross-sectional network analysis. Combining network analysis and sequence analysis, we strive to advance methodologies for identifying patterns of concentration and fragmentation in corporate networks and beyond.
Board appointments as a flow of events: Using relational event modelling for corporate networks

Diliara Valeeva
University of Amsterdam

The long tradition of scholarly work that aims to understand the causes and consequences board interlock networks (where directors hold positions at the boards of at least two firms) has left us competing theoretical frameworks and only piecemeal understanding of interlock formation and dynamics. Board interlock formation is traditionally considered as a result of either firm or individual actions. What is missing is a theoretical and methodological approach that takes into account both the firm and the personal perspective as drivers for board interlock formation. From a network perspective, this means understanding interlock formation and dynamics at a bipartite level. While many authors agree that board interlocks should be studied at the bipartite level where both firms and persons make decisions, there have only been piecemeal steps forward. Also, the dynamic analysis of board interlock networks is usually restricted to the study of a limited number of discrete snapshots of board composition. Whereas a snapshot of board interlock network provides static insight in the structure of corporate elites, its dynamics uncover the evolution of the network aspects of corporate governance. As a result of this aggregation of events, it becomes difficult to distinguish a variety of fine-grained network mechanisms causing the network to evolve the way it does.

In this paper, we use recently developed method of relational event modelling for bipartite networks, considering daily data on board appointments at the largest Danish firms over 20 years. The method allows us to reveal fine-grained network driving forces that remain hidden when we use traditional network analysis methods treating dynamics as a series of discrete snapshots. This study reveals how a combination of network (e.g., assortativity and transitivity) and status-related (e.g., individual position in a network and past director experience) mechanisms drive the dynamics of board appointments.

Besides a methodological contribution to studies of board interlock networks, the paper also contributes to theoretical discussions about the causes of board formation and evolution. While interlocking is often analyzed as an action produced exclusively by firms, its dynamics cannot be revealed in details without taking into account individual-level mechanisms such as status-seeking or enhancing personal career paths. In this study, the fine-grained event-based analysis of board formation reveals how the two types of actors together drive the evolution of corporate control networks.
A country for old men: The inner circle in Danish corporate networks 1987-2016

Lasse Folke Henriksen¹, Anton Grau Larsen, Christoph Houman Ellersgaard¹
¹Copenhagen Business School

This paper investigates the evolution of the core group within the Danish corporate network from 1987-2016. Drawing on unique register data of all Danish corporate boards, combined with data from Danish personal registers, we show stability and change in the composition of the most central individuals during the last 30 years. Drawing on an analytical sample of a total different 39,181 corporate boards, having 350,735 positions held by 130,548 individuals, we identify the individuals in the core of the corporate network in very month from 1987 to 2016. The characteristics of these individuals – gender, education, residence, social origin, etc. - are then explored using personal register data, which also enables to compare the attributes of the core with that of the general population.

Unlike the fracturing of corporate networks show both in the US (Mizruchi 2013) and in small states such as The Netherlands (Heemskerk 2008) or Switzerland (Bühlmann, David & Mach 2013), we show that a stable inner circle (Useem 1984) have dominated the Danish corporate networks in the past 30 years. Both the size of the core group of the elite networks, and the individuals within the core, remain very stable, not least during the last 25 years of the period analysed.

While the inner circle has opened slightly towards women, it remains a very homogenous group when looking at age composition and geographical location. Although the educational characteristics for this core group changes slightly over the past 30 years – with engineers and trainees to some extent being supplanted by economist and business economists – the overall level of social reproduction remains the same. Thus, we show that this group in general has a quite exclusive social background, with markedly higher chances of access for the offspring of the most affluent classes; in particular those engaged in management themselves.

To underline the influence of this inner circle outside the corporate boardrooms, we also combine our analysis with databases containing 4,000 other key affiliations from Denmark in 2013 and 2016. The network integration in other sectors show that inner circle members – in particular those with the longest tenure in the inner circle – are also much more likely to hold key positions in governing bodies outside the business world and in the interest organisations of business and social networks of the rest of the Danish power elite. We argue that the particular ownerships structure of Danish corporations – with concentrated ownership in corporatist pension funds, foundations and family ownership still dominating business – has kept corporate control in the hands of this to a large extent self-recruiting elite group.
Corporate Networks around the Globe: Power Structure Methods (Session 18; Part 1)
Eelke Heemskerk1; Joshua Murray2
1University of Amsterdam; 2Vanderbilt University

Limitations of Orbis relational data – the case of UK director interlocks
Bruce Cronin1
1University of Greenwich

The BVD commercial database Orbis is widely used in the analysis of inter-corporate networks due to its extensive scale and international scope. Aggregating data of 60 million corporations from 156 countries it is an appealing database for those interested in analysing structures of corporate power within and between nations. Most prominently it has underpinned the claim that 147 corporations rule the world (Vitali et al, 2011).

This paper considers a variety of problems in the use of Orbis for the identification of intercorporate networks, a specific example of general problems in the use of Big Corporate Data identified by Heemskerk et al (2016). These include limitations in data quality; limitations in data source; variations in update frequency; Inconsistencies in timestamping; Biases in datasets; and Identity ambiguity, including entry duplication, identity matching and the impact of corporate hierarchies.

Using the case of UK corporate data, examples are provided of effects on network structure arising from differences in network boundaries, data source, identity matching technique and corporate hierarchy assumptions. The findings from the case support the argument of Heemskerk et al (2016) that the assumptions and methods used in inter-corporate network research need much greater specification and robustness checking.
International networks of corporate power: What do interlocks matter?
Reyes Herrero
Universidad Complutense de Madrid

The study here presented analyses the relations among 150 world major companies based on, first, interlocking directorates and, second, ownership. The analysis of interlocking directorates, a traditional topic for the study of corporate power and influence, confirms the findings of some recent works about the (mainly) national character of interlocks (see Windolf 2002, Pizarro & Commet 2011 or Cárdenas 2014). In other words, interlocks emerge as an expression of corporate policies at the national level, and their relevance depends mainly of a national delimitation of case studies. Far more interesting at an international level are ownership relations. The network of ownership relations shows strong connections among firms through common ownership, and a strongly cohesive group of investors connected by their common investment in the same group of firms. The analysis of subnetworks reveals a hierarchical structure with a group in the summit, which includes a small group of investors that share interests in many of the companies under study.
Beyond Intercorporate Networks: the Policy Planning Network as the Center of the Corporate Power Structure
Joshua Murray
Vanderbilt University

Donald Trump, who ran on the promise of "draining the swamp", has designated a collection of corporate CEOs and billionaires as his main advisors and potential cabinet appointees. What do we make of this? In the past, we could identify the position of these key advisors in the intercorporate network created by shared directors and infer interests and patterns of behavior from it. That is because the interlock network had key features that led to a strong association between centrality in the network and political cohesion and activism, allowing researchers to use it as a map of corporate power. The decline, over the last thirty years, of key aspects of the interlocking directorate network has created a situation where it is no longer a reliable map.

In this paper, I argue that the policy planning network (PPN) created by common participation in think tanks, private foundations, and policy discussion groups has similar features as the old interlock network and can serve as the new map of corporate power and interests. Using data on board membership for the Fortune 500 and 98 major think tanks, policy groups, and foundations in 2010-11, I demonstrate that centrality in the PPN is associated with political cohesion and activism. In addition, I use a few revelations learned from Wikileaks regarding corporate influence in the Obama administration to show that the corporations that were most heavily involved are found at the center of the PPN.
Ukrainian big business has preserved its influence in Ukraine’s politics despite the political turmoil of the democratic breakthroughs and reverse autocratic trends. Recent studies demonstrate that the core of Ukrainian oligarchs has remained stable and that their strategies to exert political influence have stayed largely unchanged (e.g., Pleines 2016). Still, it does not mean that the model of business-state relations remained static. We argue that in reaction to political turbulence and changes in the institutional setting of Ukraine’s political regime, Ukrainian big business continuously adjusted its ties to the main political actors within the repeatedly revised political and dynamic political processes. We suggest approaching business-state relations as a network of mutually beneficial symbiosis. By contrast, contemporary research approaches these relations in terms of power asymmetry. It is either state capture, when power asymmetry runs to the benefit of business elites at the expense of political elites, or state dominance, when business-state model is dominated by political elites. However and despite this rivalry, business and political elites also operate in a mutually beneficial symbiosis. Access to state institutions and political power enables business elites to secure their economic interests and make money, which they then use to broaden their political power. In turn, political elites profit from business funding of election campaigns and from ‘administrative rent’ and ‘kickbacks’ (otkaty). A symbiosis of politics and business often involves more than just a simple connection of patronage. Besides lobbying, and bribing to influence politics, business elites aim at assimilating the political elite, while political elites often start their own businesses. The assimilation of business elites in politics and vice versa is a common phenomenon. Moreover, the approach of power asymmetry has its methodological weakness. The concept of power asymmetry cannot operationalize the scope of (i.e. identify the extent to which the incumbent/big business is subject to ‘capture’ and threshold between state and business capture (i.e. identify a measurement threshold where business capture ends and state capture starts, or vice versa). Using the method of social network analysis, we demonstrate how the political – formal and informal – ties of Ukrainian big business to the different branches of state power evolved and what models of state-business relations developed from president to president. The analysis covers the period of 1998-2017 and contains the comparison of the relational structures of political and business elites in Ukraine during 4 presidencies and 5 parliament terms from the angles of actors’ common past (biographical ties) and common policy-making activities (co-authorship in draft-laws). We trace not only the visibility of various big business cliques within political institutions during last 20 years, but also track changes in business-state relations through influential persons, positions, groups and network structures. Therefore, we suggest the network explanation of the stability of business-state symbiosis in Ukraine as well as model its development for the future considering the internal and external factors.
The participation of private companies in providing water and sanitary services has varied throughout the years in different parts of the world. But, in all cases, such companies have formed collaborative ties with the local authorities while engaging in PPI (private participation in infrastructure) projects. Many studies in the literature have focused on case studies, investigating activities of a particular company in a specific region or country. However, the literature does not effectively provide a holistic view of the changing patterns of collaboration between private companies and various local authorities on a global level. This work attempts to investigate the factors affecting the formation of collaborative ties between private water companies and local authorities, and to provide a holistic picture of changes in the nature of such projects on a global level over the past 6 decades.

For the purpose of this study, the World Bank’s Private Participation in Infrastructure (PPI) Project Database has been used. This database includes information on PPI projects in the developing world (low and middle income countries), covering projects in the energy, telecommunications, transport, and water and sewerage sectors; this study has only made use of the data on the water and sewerage sector. Using this database, a panel dataset has been created with private companies and countries involved in each PPI projects as senders and receivers of ties, as well as a panel dataset including projects which have been carried out with more than two companies. Through the use of different models, this work attempts to explain the variance-covariance structure of a set of various variables describing the projects, as well as analysing how new alliances being formed between private companies and local authorities are dependent on the previous experience between the entities involved, the success of companies in fulfilling past projects, and similarities (economically and geographically) between companies’ countries of origin and the local authorities. Hence, the formations of new collaborative ties are investigated with regards to factors associated with embeddedness, centrality and homophily of entities in the network created from the data.
Assessing State Capitalism through cross-border ownership networks

Milan Babic
University of Amsterdam

The re-emergence of the concept of "State Capitalism" on a global scale represents one of the most controversially discussed features of the post-crisis global political economy. Although the concept suggests profound transformations of the global economy through the internationalization of state capital, the literature is mostly focused on case-studies of prominent examples or world regions (e.g. the BRICS or Southeast Asia). This obscures what role state capital occupies in the global economy. We argue that this represents a major shortcoming of existing research and contributes to the vagueness of the term "State Capitalism".

The approach used in this paper tackles this gap. We discuss the characteristics of “State Capitalism” in the global economy by investigating the internationalization of state capital. This consists of two main aspects: First, we define the internationalization of state capital in general as the flow of state-controlled value into the global economy. This re-focuses the question back to the implications for the global level. Second, we trace this process with network techniques by analyzing the mentioned value flow from an ownership perspective. With this method, we provide a complete empirical basis instead of anecdotal or regionally biased evidence.

The internationalization of state capital can proceed through various forms such as Sovereign Wealth Funds or Development Banks. For the purpose of this paper, we focus on rising cross-border state ownership of companies as a way of operationalizing this internationalization of state capital. This captures an essential part of the overall phenomenon. From a comprehensive database of over 100 Million firms worldwide, we identify roughly 150.000 state-owned enterprises worldwide, which are state-owned by 50 or more percent. From this dataset, we extract the cross-border owned companies and create a network of ownership-ties across the globe. The identified set of countries that dominate the network by sending out the most ownership ties (France, Germany, Arabic Emirates, China, Russia, Qatar and UK) are then investigated separately: What are the dominant sectors that are occupied by cross-border state ownership? In which regions do the dominant countries invest? Can we distinguish patterns regarding these questions and what could be explanatory factors? And, finally: How can these findings be related to ongoing discussions about the re-emergence of the state as an owner in the global economy? We see already in the analysis of the dominant countries that the rise of state capital exceeds the limited focus on regions or groups like the BRICs and we expect to find more data-driven insights.

In sum, our approach combines the discussions about the vague notion of the idea of a "comeback" of the state since the last global crisis and the (network) methods to investigate this idea. The paper thus contributes to the ongoing discussion about State Capitalism in general and lays the groundwork for empirically informed further research on this topic.
Corporate Networks around the Globe: Networks Around the World (Session 18; Part 3)
Eelke Heemskerk\(^1\); Joshua Murray\(^2\);
\(^1\)University of Amsterdam; \(^2\)Vanderbilt University

Turkish firms and investors in the European Corporate Network
Prof. Meindert Fennema\(^1\); Gürkan Çelik\(^2\); Eelke Heemskerk\(^1\)
\(^1\)University of Amsterdam; \(^2\)Inholland University of Applied Sciences

After a long period of rapprochement between the European Union and Turkey, currently it is widely assumed that the two are drifting apart, making it harder for both parties to influence each other positively. Despite the Syrian refugee deal between the two, the decline of Turkish democratic institutions, along with the backlash of the failed military coup of July 2016, impacts significantly on Turkey’s relations with the EU. At the same time, it seems that the EU is no longer the only potential suitor for Erdogan, which results in a situation that Turkey as Europe’s immediate continental neighbor rapidly moves away from the EU in geopolitical terms. Aside from geopolitics, Turkey is also important to the EU from an economic point of view. What binds the EU and Turkey still together in economic terms? To provide an answer this question we analyze how the two are economically connected and how this changes over time. We focus on three fundamental set of economic ties: trade flows; board interlocks, and ownership ties. A large scale network analysis sheds light on the changing orientation of the economic elite in Turkey.
“The chemical brothers”: The evolution of the board interlock network in the German chemical industry, 1950-2015
Hubert Buch-Hansen
Copenhagen Business School

In research on corporate networks it is frequently suggested that board interlocks connecting companies operating in the same market are likely to impact (mute) competition. Yet while some studies have identified such intra-industry board interlocks in various national industries in benchmark years (e.g., Windolf 2015), there have been few efforts to systematically map board interlocks within an industry, let alone to track the evolution over time of intra-industry interlock networks. The present paper seeks to contribute to remedy this gap. It utilises a novel dataset on the board composition of the 36 biggest German chemical producers over the entire 1950-2015 period. The dataset has been constructed based on archival research. It includes information on the duration (within the overall time frame) of the board membership of 2824 individuals. These individuals are divided into six different categories ("CEO", "employee representative" etc.).

The data allow for a fine-grained study of the evolution of the board interlock network in the German chemical industry. Over the six and a half decades covered by the data, a total of 426 interlocks of varying lengths are identified: the shortest were terminated within a year, the longest lasted for 29 years (average length: 5.8 years). The paper examines the structural changes in the network over time. The interlocks vary in strengths: some are stronger (connecting the managing board of Company A with the supervisory board of Company B), others are weaker (as when a bank manager or a trade unionist connects the supervisory boards of A and B. It is found that the density of the network decreases towards the end of the 1950-2015 period, which is consistent with findings of research on national interlock networks more generally (such as Heemskerk 2007) as well as with research noting the disintegration of the German company network (e.g., Höpner & Krempel 2004). In parallel with this process, the tendency was for ties to become weaker. Indeed, towards the end of the period covered here, trade unionists were among the biggest linkers in the German chemical industry.
China Goes West! Transnational networks of Chinese business elites and firms investing in Europe and the US

Nana De Graaff
VU University Amsterdam

Within the debate of China’s rise and its implications for the liberal order this research focuses on Chinese investments in Europe and the US, which have grown exponentially in the past decade. By focusing on Chinese business elites and firms at the forefront of China’s internationalisation trajectory that increasingly operate within - and cooperate with - the West, this study engages with the question to what extent China will adapt to the liberal rules of the game, confront or transform them? The paper will present novel data on Chinese global investments, with a focus on Europe and the US. Employing social network analysis and qualitative analysis on the basis of firm-data, biographical data and in-depth interviews, the study investigates how the changing networks of Chinese firms and business elites (2006-2016) are both linked to existing transnational business communities in the EU-US and, at the same time, are still linked to the domestic context, through ties with elite networks and state-business ties in China. The study therewith adds both to the debate within International Relations of how China’s growing influence will impact the liberal (US-dominated) order, and to the literature on modes, patterns and networks of transnational business elite formation.
Corporate Networks around the Globe: Corporate Networks and Company Behavior (Session 18; Part 4)
Eelke Heemskerk¹; Joshua Murray²;
¹University of Amsterdam; ²Vanderbilt University

Network heterogeneity and the influential networks behind Germany’s largest listed companies
Murat Uenal
SONEAN GmbH

This latest research into the social ties that connect Germany’s largest listed companies reveals interesting findings about the networks in which organizations and their leaders are embedded. We analyze over 4500 social ties that connect 395 executive managers and non-executive directors (not including employee representatives in the non-executive board). A special focus is dedicated to the role of network diversity, i.e. the unique ties that executive (managers) and non-executive directors bring to the company. We show that the diversity discussion, which is currently being led by policy makers, creditors, investors, and shareholders alike, needs to go well beyond traditional measures such as gender, age, and e.g. ethnicity. Diversity of social ties is crucial when it comes to innovativeness, governance as well as performance of the company. We rank DAX-30 companies based on the following network and diversity measures: 1) Number of unique connections that executive managers bring to their DAX-30 companies 2) Number of unique connections that non-executive directors bring to their DAX-30 companies 3) The institutions that connect DAX-30 executives 4) The non-DAX-30 institutions that connect DAX-30 executives 5) The institutions that connect DAX-30 non-executive directors 6) The non-DAX-30 institutions that connect DAX-30 non-executive directors. Women only hold 10.71 % of the executive jobs, and more striking is that none of the women has a CEO or CFO position (by the end of October 2016). Furthermore, the majority of their positions are in human resources (41 %). Overall, if you disregard employee representatives on the non-executive board, women hold 28.14% of non-executive positions and 20.79 % of all positions (including management and non-executive board jobs). We also analyzed the past end existing connections of the women in the DAX-30 companies and identified that at least 62% of the executive and non-executive positions are occupied by women who have prior and existing multiple ties that connect them to the male board members. This gives us the impression that most women are extensions of male networks and that the selection process is not necessarily an objective one but very much dependent on the level of connectivity of the women in management and on boards.
The centrality of female directors: The law of gender quotas and interlocking directorates in Norway

Trond Loyning
University College of Southeast Norway

Since 2008, the gender composition of boards of directors in all public limited companies (PLC) in Norway has been regulated by law. The consequence was a sharp increase in the proportion of female directors reaching 40% in 2008, thus meeting the minimum requirement. In this paper the effects of the law on the interlocking network of directors is analysed, using data from the period 2008-2016.

From a network perspective, the concept of old-boys network highlight not only the gender imbalance in leaderships positions in business, but also the restricted pool of candidates from which leaders and directors are recruited (the men with connections), as well as the recruitment mechanism (informal and network-based). Furthermore, the concept of social homophily is relevant. It has been shown that networks are an important recruitment mechanism to leadership positions, and specifically that the presence of female directors increase the likelihood of recruiting female directors. Thus, although not directly regulated by the law, there are strong reasons to analyse the effects of the law on this network.

Earlier studies show that the law had a large effect on the network of interlocking directorates. Female directors became central in the network, completely reversing the earlier situation. There is, however, reasons to believe that this could be a temporary effect. When the law was implemented, there were a large number of positions to be filled by women in combination with relatively few women with relevant experience. This has changed: there are fewer corporations regulated, and more female directors gain relevant experience.

Thus, in this paper, effects of the regulation on networks of interlocking directorates over time are analysed. The first main question explored is whether women keep their central positions attained immediately after the full implementation of the law during the period until 2016. Analysing the two-mode networks directly, using several measures of centrality, the main finding is in the affirmative – women keep their central positions.

The issue of gender imbalance in business is general in nature, while the law is narrow in the sense of targeting only one legal form of corporation, public limited companies. Possible effects beyond this form of corporation is important to consider, particularly since the number of public limited companies decrease during this period. Thus, the second main question is on possible effects of the law on corporations not directly regulated by the law, specifically private limited companies (Ltd). Here, the main finding is that there seem to be few discernible effects. In addition, there are few ties between this type of corporations and PLCs. Furthermore, when analysing the overall network, most of the network ties are among PLCs. From a network perspective, it can be argued that regulating PLC is effective when aiming to improve the gender balance among corporate directors in business, but that the effects beyond this legal type of corporations are small.
Social network, board interlocks and firms' financial decisions: A case study of Italy
Srinidhi Vasudevan¹; Riccardo De Vita²
¹University of Greenwich; ²University of Greenwich

In corporate finance, capital structure and firm performance have been studied from several perspectives. There is an ongoing debate about the optimal capital structure and how firms choose capital structure. The idea that the actions of economic agents are crucially dependent on the social network within which they are embedded has been broadly accepted by sociologists and organisational theorists and this has been recently extended to include corporate financial decisions and outcomes. Extant literature shows that the role of board of directors and composition of the board have been found to impact capital structure decisions and the firm’s choice to fund its operations through different funding sources. Corporate interlocks enable firms to co-opt resources in uncertain environments given that networks act as conduits of information and help reduce information asymmetry. This might enable the firms to obtain resources that might otherwise not be available to the firms.

This research uses a social network approach to understand the role of corporate interlocks in shaping a firm’s decision to fund its operations through debt or equity. Longitudinal data from 2010 – 2015 is collected from two different databases: BoardEx and Orbis. Network measures are integrated with financial information and measures. Preliminary results show that the leverage of the firms is associated with the position of the firms in the network.
Multilevel Network Perspectives in and around Organizations: Multilevel large datasets: methodological issues and empirical cases (Session 19; Part 1)
Francesca Pallotti¹, Paola Zappa², Spyros Angelopoulos³
¹University of Greenwich, ²Maynooth University, ³Tilburg University

Multilevel blockmodeling for “larger” networks
Aleš Žiberna
University of Ljubljana

The problem that this talk will address is how blockmodeling of multilevel network data can be applied to “larger” networks (e.g., more than 200 units). Multilevel network data consist of networks that are measured on at least two levels (e.g. between organizations and people) and information on ties between these levels (e.g. information on which people are members of which organizations). Several approaches are possible: a) separate analysis of the levels; b) transforming all networks to one level and blockmodeling on this level using information from both/all levels; c) truly multilevel approach, where both/all levels and ties between them are modeled at the same time. Here we will focus on the last approach.

The approach was initially developed within generalized blockmodeling. However, for larger networks (several hundred units), this approach is not appropriate. Therefore, algorithms for multilevel blockmodeling based on two-mode k-means and/or stochastic blockmodeling will be presented. Advantages and disadvantages of these approaches will also be discussed.
Multidimensional and Multilevel Analysis to Find and Describe Irregular Patterns in Political Communication on Twitter

Audrey Wilmet¹, Robin Lamarche-Perrin²

¹Laboratoire d'informatique de Paris 6, ²Institut des systèmes complexes de Paris Île-de-France

Twitter is now an integral part of means of communication used by political leaders to disseminate information to the public. A politician may use it sporadically to merely broadcast to his followers or on the contrary employ it regularly and tweet at strategic moments. Likewise, their followers may be occasional spreaders or real online activists retweeting primarily a particular political figure. The complex processes formed by interactions between users through a retweet may result in a media event whose influence goes beyond Twitter framework. We propose a multidimensional and multilevel analysis method to describe structural and temporal relational patterns in this retweet network as well as to find unexpected behaviors related to this political strategy of communication.

The retweet temporal network we use has been obtained from observing the Twitter accounts of nearly 3,500 political actors such as individuals, organizations and institutions. In this network, two users are connected at time t if one of the two – the spreader – has retweeted a tweet of the other – the author – at time t. Our method consists firstly in evaluating the quantity of interactions between an author and a spreader during a given time period. After this step, we have access to local information: the finest scale at which we can observe interactions. One then uses data aggregation to obtain the total quantity of interactions of an entity such as an author, a spreader, an hour or a couple obtained by combining those three dimensions (marginal values). This step gives us access to global information that can be used to provide more context to local data.

Afterwards, in order to detect irregularities in users and temporal behaviors we compare the previously obtained quantities of interactions between them. Here again, we propose to decompose comparison in multiple levels. For instance, one can look at the quantities of interactions by hours, comparing them all at global scale and find an hour with unexpected activity level compared to all the others. Then, one can look at the couples (author, hour), comparing them at local scale after having fixed the hour previously found abnormal, i.e. comparing authors'activities on this hour, and finally find an author with unexpected activity level. Hence, while global comparison consists in comparing the quantity of interactions of an entity to the quantities of interactions obtained by all other entities of the same type, local comparison consists of fixing a variable in an entity and comparing its value to all others obtained by varying the remaining variable(s).

Our method enable us to explore all the different levels of interactions and to find outliers according to the normality that we define by choosing the context to which we compare the quantities of interactions. We show that, by varying information and comparison granularities, one can build interesting insights regarding the political organization on Twitter. Indeed, first results bring out political leaders and online activists among Twitter users, political meetings, relationships between a spreader and a group of authors, and so on.
Dare to share? – How people share high-quality knowledge in online communities
Enrico Rotundo, Marit Blank, Christine Moser, Henrik Leopold
VU Amsterdam

The Internet has fundamentally changed how work gets done in the 21st century. For example, people increasingly spend time on the Internet where they share and develop knowledge in online communities. Yet, little is known about how high-quality knowledge comes about in these communities. This is surprising, because stakeholders such as organizations, policy makers, or activist groups can profit from high-quality knowledge shared and produced in online communities.

In this study, our goal is to test how social network structures influence the quality of knowledge developed in online communities. Our project will contribute to the literature on online communities and knowledge management, because we will conceptually develop and empirically test which social network structures are conducive for sharing and producing high-quality knowledge. As opposed to prior studies in this area, we will leverage automated techniques for our analysis. In particular, we will develop Natural Language Processing based techniques to recognize the substantial core and value of social media contributions. Besides the scientific contribution, our project will also deliver valuable insights for practitioners, which can aid in better managing online communities that are geared toward sharing and producing knowledge.

We will use large data sets of three online communities to provide a ‘big data picture’. Our analysis will be based on a theory-based conceptualization of social network structures and knowledge quality. As a result of the automated analysis using the algorithms developed in the context of this project, we can automatically recognize high-quality knowledge based on a number of variables that are partly based on theory and partly developed using human coders. What is more, we can automatically extract the social network structures in the data. Based on these results, we will then test which social network structures are conducive for sharing and producing high-quality knowledge across the three data sets.
Multilevel Network Perspectives in and around Organizations: Multilevel network studies in the public sector (Session 19; Part 2)
Francesca Pallotti¹, Paola Zappa², Spyros Angelopoulos³
¹University of Greenwich, ²Maynooth University, ³Tilburg University

A multilevel network study of sociability and governance of a common resource in Senegal
Tom Snijders¹, Malick Faye², Julien Brailly³
¹University of Groningen; University of Oxford, ²Rhine-Waal University of Applied Sciences; SciencesPo, Paris, ³Swinburne University of Technology, Melbourne; SciencesPo, Paris

This study considers a group of seven villages in rural North-Western Senegal. The villages have a common water supply which is governed by the villagers themselves by means of a managing board. The inhabitants of the villages are from two ethnic groups, a distinction corresponding – although incompletely – to the difference between sedentary crop farmers and nomadic cattle breeders. Ethnicity and the associated different interests of crop farmers and cattle breeders constitute an important underlying division for the governance of the water supply. The combined sociological research questions for this presentation are about how ethnicity and the crop farming – cattle breeding contrast is related to sociability and social support; how these social configurations (sociability, ethnicity, type of agriculture) are associated with the selection of board members; and how these social configurations influence the patterns of advice between the board members.

The network structure of this data set has, next to being multivariate (sociability and advice), two kinds of complexity. First, the actor set has a nested structure, with individual inhabitants in houses in villages; there are a total of 7 villages. Second, the board members are a subset of the inhabitants, chosen by the inhabitants and therefore endogenous; the sociability relation is observed between all inhabitants, and the board-related advice relation is observed between board members. This is summarized only inadequately by the heading of ‘multilevel network analysis’. The methodological research question for this presentation is how to specify this network data structure for a longitudinal analysis using a stochastic actor-oriented model implemented in RSiena.

The structure chosen for the Siena analysis is a multivariate dependent network, with separate within-village sociability, between-village sociability, and board advice relations; and with board membership as a dependent actor variable. The structure is further specified by blocks of structural zeros to distinguish the within-village and between village networks, and by special effects restricting the board advice relation to the set of board members. A first set of specific questions are concerned with homophily (concerning relevant individual attributes) of the sociability relation, and how this homophily differs between within-village and between-village ties, and between cattle farmers (Fulani) and crop farmers (Wolof). A second set of questions are about the ways in which the power basis of the board members, as reflected in the membership itself and in the board advice relation, depends on their attributes and on their social capital.

Marcelo Marques
University of Luxembourg

Keywords: European Educational Research; Framework Programme; Organizational forms

European research policies have become increasingly visible since the 1980s. Its genesis can be traced back to the launch of the European Union Framework Programme (EUFPs) in 1984 and it got further momentum with the establishment of the so-called European Research Area (ERA) in 2000. The EUFPs have been the privileged instrument of the ERA to boost European research collaboration (Ackers, 2008; Heilbron, 2014) and to find common solutions for common problems or – in the context of evidence-based policy-making – to identify ‘what works’ (Biesta, 2007). By defining targets and research priorities for Member-States, the European Commission, as a supranational regulatory body, plays an important role in the development of a pluri-scalar governance of research (Dale 2007; Lingard & Rawolle, 2011). Educational research, among other social sciences disciplines, has been funded since 1994, although the structure of this constellation of knowledge producers is still unclear. The aim of this contribution is to analyze the geographies of knowledge production of European Educational Research through a social network analysis of the research organizations that participated in transnational research projects from 1994 to 2013 (FP4 to FP7). Through CORDIS databases, I collected educational research projects and identify the organizations that participated and collaborate in the EUFPs (857 organizations in 94 research projects).

Studies in Sociology of Science to the EUFPs often tend to focus either in micro or in macro analysis. At the micro level studies using bibliometric indicators show the influence of EUFPs on the reputation, career development and citation scores (Peters et al, 2010). Studies focusing on the macro level, often using social network analysis, have shown a correlation between the size of the national research systems with the participation and coordination in EUFPs (Kastrinos, 2010; Peter et al, 2010; Watson et al, 2010). Following the same argument presented by Lazega et al (2008) and Belloti (2012) I assume the need to focus my analysis on the meso-level – organisational level - in order to avoid deterministic explanations of the results. Preliminary results through the application of degree centrality measures using geographical attributes (country=research system size and European region) show that while there is correlation between the size of the research system and the number and weight of participation of organisations (UK, Germany and France), organisations from small or medium size research countries (Belgium, Netherlands and Greece) appear as more central in the network. These results pose new research questions on organisational studies to understand the role of the departments and universities as centres of internationalization despite the size of the research system (macro determinism), confirms previous studies on assuming that the position of an organization is still more important than the position of the individuals (Lazega et al, 2008) (micro determinism), and shows the potential of SNA to open new avenues for research.
Assessing the efficacy of self-organising project teams in a complex, research-intensive environment.

Fabian Held
The University of Sydney

Background: Complex societal problems often have no clear and obvious answer and their solution requires the joint collaborative efforts of experts form diverse disciplines and backgrounds. Traditional organisation of University research in Faculties and Disciplines can be an obstacle to such collaborative efforts. This presentation presents the case of an interdisciplinary research institute at the University of Sydney that has been created to “ease the burden of chronic diseases, especially obesity, diabetes and cardiovascular disease”. This sets a single overarching mission, but does not constrain the paths to this end. The centre brings together more than 1100 researchers from all Faculties of the University, supporting new collaborations through several mechanisms including: 1) Co-location of more than 850 researchers a dedicated building with nearly 50,000 m2 of wet laboratories, dry laboratory areas, teaching spaces, core facilities as well as a clinic. 2) Internal projects as easy and attractive ways for individual researchers to engage. 3) Easy access to compatible expertise. 4) Allowing projects and collaborations to seek resources, grow, morph and die organically. We use social network analysis to assess the efficacy of two of these mechanisms, co-location and internal project opportunities, to create new collaborations.

Methods: Exponential-Family Random Graph models quantify and test the interacting effects of processes that are consistent with the structure of collaboration as evidenced by the joint authorship of peer-reviewed publications. Controlling for seniority, and Faculty affiliation, this analysis addresses the interacting effects of several forms mechanisms of engagement: Membership in research groups, participation in self-organised internal research projects, as well as physical co-location.

Results: To date there are 67 internal projects connecting more than 400 researchers. Preliminary analysis indicates that the collaboration network is established through a complex interplay of factors, and that there is substantial variation in the strength and significance of effects even within the same class of associations. There are significant activity effects for select faculties and research groups, as well as homophily effects for co-location, affiliation, and research group membership. Participation in internal research projects is found to have varying effects on the observed network of collaboration.

Conclusion: This investigation into the multilevel nature of collaboration in a research intensive organisation contributes to explaining the complex interactions of individuals and their various memberships in groups, projects, their affiliations and location. By controlling for various other relational effects, this analysis serves as a means to assess the efficacy of self-organised research projects and other mechanisms of engagement regarding their contribution to the overall network of collaboration. In the network under investigation multiple types of affiliations jointly shape collaborative research, thus determining the self-organising of organisational outcomes.
Multilevel Network Perspectives in and around Organizations: Multilevel networks in organizations (Session 19; Part 3)
Francesca Pallotti¹, Paola Zappa², Spyros Angelopoulos³
¹University of Greenwich, ²Maynooth University, ³Tilburg University

Cluster events: Arenas of informal networking and formal alliance formation? A multi-level network approach
Michael Wältermann, Georg Wolff, Olaf Rank
University of Freiburg

Over the past two decades, the concept of clusters has experienced a real boom as a policy guideline for the promotion of innovativeness and industrial competitiveness. Despite the growing interest of social network scholars in the cooperative network structures within clusters, little is known about its antecedents. In particular, it is unclear to what extent cluster events serve as platforms to connect the cluster members.

Scholars widely agree on the importance of industry events, such as conferences and trade fairs, in helping participants from different regions to meet, exchange information and establish relationships. Furthermore, previous research suggests that inter-personal relationships built during such events set the stage for formal cooperations at organizational level. However, there is no evidence with regard to events organized by the cluster management specifically for its members. On the one hand, these events – compared to industry events – tend to be smaller and more informal and, thus, provide an environment particularly suitable for networking. One the other hand, one may argue that, due to the local nature of clusters, there are already enough occasions for the cluster members to interact face-to-face, without the need for specific cluster events.

We aim to fill this research gap by applying multi-level exponential random graph models (MERGMs) on social network and event participation data collected in a German biotech cluster. To the best of our knowledge, it is the first application of MERGMs that models a multi-level network of inter-personal and inter-organizational relations as a function of event co-participation. Specifically, we investigate how different types of cluster events as well as the count and temporality of actors’ co-participations relate to the existence and interdependence of ties at both levels.

All in all, this study makes three major contributions. First, we add to the emerging field of multi-level social network analysis. Second, we contribute to the research on cooperative networks in the context of high-tech clusters. Third, our results enhance the understanding of cluster events’ effectiveness in stimulating knowledge exchange and cooperation among cluster members, with concrete practical implications for cluster management organizations.
Recombinant capabilities for individual and organizational performance in the Biotech industry
Alvaro Pina Stranger, Emmanuel Lazega, Yuval Kalish, Amalya Oliver

Any venture is the result of the combination of many different resources and assets. An innovative venture is the result of the encounter of resources such as financial, cognitive (or human), social, scientific, organizational, technological, etc. Success is keeping those resources stuck together, failure is tearing them apart. However, the sort of organizations and the sort of entrepreneurs are not always the same. While the failure rate of venture capital funded startups is high compared with more conservative ventures, literature has shown that the key to success is not only based on the scientific or technical hypotheses supporting a new venture. Depending on their specific characteristics, a similar set of resources can lead to different outcomes.

The aim of this article is to explore the conditions of success by looking at the aggregation or disaggregation of assets in the evolution of Biotech startups. To understand how this complex process evolves, we differentiate between organizational and individual performances.

Inspired by the multilevel social network analysis, this paper explores how the recombination of different kinds of assets is linked to organizational sustainability and to individual staying capacity. As the multilevel social network analyses have shown, the fate of the organization and the fate of the individuals working in those organizations is not always the same. The mechanisms through which organizations capture the benefits of an individual's work, or the mechanisms through which that individual privatizes organizational goods depends on their specific experiences and networks of relationship. Moreover, we claim that, together with the straightforward correlation between organizational and individual performance, the same multilevel configuration can, for instance, lead to organizational sustainability while favoring a weak staying capacity for individuals.

To explore this generic hypothesis, we use a longitudinal social network survey of the Biotech industry in France. Two waves of observations (from 2008 and 2013) allow us to collect information about the venture capital funded Biotech startups and the executives working in them. Using this unique data-set, we define organization performance in terms of organizational sustainability, and we differentiate 5 types, going from remarkable success to failure: going into a public market (IPO), improving the business model, keeping a valuable business model (with high growth potential), lowering the impact of the business model and failure. We conceptualize individual performance in terms of staying capacity and we differentiate 4 different tracks for entrepreneurs: those who maintain their position in the biotech sector but work in another startup, those who keep working in the same Biotech startup, those who stop being an entrepreneur but stay in the Biotech sector, and those who go out of the Biotech sector.

Using these two typologies as dependent variables, we explore, through multinomial regression models, the financial, cognitive (or human) and social conditions of success while differentiating organizational and individual performance. Our research provides an empirical application of the overall theoretical frame of the multilevel social network analysis that aims to disentangle the different levels of agency that drive collective action.
Conferences as a source of external knowledge: a multilevel level perspective.
Stanislav Vlasov
Tilburg University

Events like conferences are the oldest form of interpersonal and inter-organizational interaction (Lomnitz, 1983). Today in the US alone we have million events every year and in total the attendees spend more than 280 billion dollars annually (PricewaterhouseCoopers LLP, 2014). But are there benefits of participating? Yes, recent studies show that participation at events like conferences and trade-fairs help firms identify and access valuable external knowledge, build new ties and ultimately facilitate firm innovation (e.g. Maskell et. al., 2006; Stam, 2014; Vlasov et al, 2017).

However, firm participation at industry events is rarely considered from individual perspective and the mechanisms of how the knowledge gained from such events is assimilated by the firm remain a blackbox. This study addresses this gap by focusing on the following question: Does conference participation pay off only for individual engineers who actually went to a conference (e.g. by providing more ideas for inventions) or can the knowledge obtained at the conferences spillover within the firm and facilitate firm's knowledge creation as a whole?

To answer such question we zoom in on individual engineers that represent their firms at conferences and on their position in firm’s internal network of inventors. More specifically, we investigate how the structure of internal network (e.g., density, cohesion) and the position of gate-keepers (e.g., betweenness centrality) who connect the firm to external knowledge can explain how firms learn from conferences. We test our hypotheses using longitudinal archival data. The data on firm- and individual-level conference participation comes from manually coded conference programs from which we extract such information as lists of presentation titles, names of contributors and their affiliation for a certain session at a conference. Organizational and individual names from conference programs are then matched with patent data which we parsed from official USPTO publications. We use difference-in-difference approach to estimate the extent to which conference participation influences subsequent individual and firm knowledge creation which we measure using data on patents.

This study contributes to the growing literature on event participation as external source of knowledge (e.g. Maskell et. al., 2006; Vlasov et al, 2017; Stam, 2014). It also adds to the ongoing debate on how external knowledge gets in and is assimilated by the firm (e.g., Tortoriello, 2015; Ghosh & Rosenkopf, 2014; Funk, 2014). Finally, this study contributes to the recent calls for multi-level perspectives on networks (e.g., Lazega & Snijders, 2016).

References (shortened):
Funk (2014). Making the Most of Where You Are... AMJ.

Lomnitz (1983). The Scientific Meeting... 4S Review.

Maskell et al. (2006). Building global knowledge pipelines... EPS.


Stam (2010). Industry event participation and network brokerage among entrepreneurial ventures. JMS

Tortoriello (2015). The social underpinnings of absorptive capacity... SMJ.

Network Analysis of Political Power (Session 20)
Alina Vladimirova¹
¹Institute of Oriental Studies of the Russian Academy of Sciences

An approach to the study of power based on the concepts of duality and structural equivalence
Reyes Herrero
Universidad Complutense de Madrid

The empirical study of power has been a longstanding issue for political science, being the agency vs. structure dilemma the main pitfall where different empirical approaches have failed. Social Network Analysis have burst into the debate with an alternative framework where the agency-structure dichotomy can be resolved and power can be properly described and measured in empirical terms. Measures of power have mainly developed as measures of centrality, and these measures of centrality provide on the other hand the means for the definition of particular features of networks as possibilities for control, influence, power... The aim of this study is to discuss how different strategies of analysis other than centrality can help to shed a different light in the conceptualization of power. In particular, duality and structural equivalence can be used to define power as a particular kind of structure rather than a particular kind of relation.
Normative Power in the Asia-Pacific Region: Network Analysis of Free Trade Agreements

Alina Vladimirova
Institute of Oriental Studies of the Russian Academy of Sciences

As new power centers are rising in the Asia-Pacific region, more policymakers, academics, and journalists are engaged in heated discussions on who and how is able to rewrite rules of international relations. Attention to these questions is growing especially after USA withdrew from the Trans-Pacific Partnership in January 2017. Is there a country that can promote values and norms effectively at least in the context of regional economic integration? If China aims to become as successful as the “normative power Europe”, does it possess of such abilities? Is “ASEAN centrality” a mere theoretical concept or this organization members have enough influence in the region? In this paper we suggest to use data on 228 Free Trade Agreements that took place in 1975-2016 for a network model to study emerging structures and test hypothesizes on normative power.
Centrality and Power: Network Analysis of Interstate Military Conflicts

Fuad Aleskerov; Maria Kurapova; Sergey Shvydun

Contemporary international relations are a complex system with a large number of political actors interacting in a single environment. The analysis of political processes at the global level requires considering the diverse influences of all of these actors. Network analysis is a method that allows us to identify the most powerful actors in different networks by finding the most influential nodes (centrality measure). Classic indicators of centrality have several disadvantages for networks where the actors are the States. They do not allow considering features of actors and indirect interactions between them. The solution to this problem is a pressing issue in network analysis and its development as a research method in political science. In this work we use two classical centrality indices (Eigenvector and Page Rank) and new indices of centrality (Short-Range Interaction Centrality and Long-Range Interaction Centrality) which consider country characteristics and indirect interactions between countries. Classic and new indices are applied to the empirical data about interstate conflicts. We model interstate conflicts as a network, where nodes are countries and edges are a fact of conflict. The intensity of interaction in a network is intensity of the conflict (by battle-related deaths). The network of interstate conflicts covers a wide period of time and considers conflicts in different regions of the world. We reveal the most powerful countries for a certain periods by application of centrality indices.

Keywords: interstate military conflicts, network analysis, influence.
The BRIC phantom: ‘globalization’, mobility and structural change to the global power system, 1965 – 2005

Lindsay Marie Jacobs

The dominant perception in scholarly communities and popular opinion is that a number of formerly less powerful countries including the BRICS, have enhanced their global power to the extent that it now rivals that of the traditionally core powers. Serious doubts can be raised, however, to what countries are genuinely ‘rising to power’, as well as to the extent of this rise. Our work draws social network analysis (SNA) to propose a method for the measurement of countries’ level of ‘prominence’ in the global power system. These measures are then used to analyze the rise of the BRICS within the structural evolution of this system between 1965 – 2005. A large focus here is on the role played by mobility and ‘globalization’.
Policy network in occupational safety and health in Slovenia

Helena Kovačič; Andrej Rus; Hajdeja Iglič
University of Ljubljana, Faculty of Social Sciences

The safety and health of the worker is of vital importance to the well-being of people and the whole society. Slovene workers have traditionally enjoyed a high level of protection in their work, both from accidents and ill health. However, according to the Labour inspectorate, the number of reports on violations of safety and health at work in Slovenia is increasing. The marketization of this area provided possibilities for the entrance of private providers and diversified the supply of services. With more than 300 organizations, licensed for the provision of professional services in the field of safety and health at work, the field has become a social network of numerous stakeholders. There are more than 150 occupational medicine specialists, providing services either in public or private sphere. Regulation of safety and health at work falls within the competence of two ministries: The Ministry of Labour, Family, Social Affairs and Equal Opportunities and the Ministry of Health. Control over the implementation of regulations in this area is under the competence of the Slovenian Labour Inspectorate. The two government institutions are dependent upon the co-operation and joint resource mobilisation of policy actors outside their control.

The aim of the paper is to analyse policy network between the relatively stable sets of public and private players in occupational safety and health. We will identify how occupational safety and health policy-making outcomes are influenced by the structure of the network and the interactions that occur within the network, including the inclusion and exclusion of certain interests (or individuals/groups) in the network. We will examine the structure and processes through which joint policy-making is organized (frequency of interaction, degree of integration, network size, distribution of resources in the network). Based on the policy network data we will be able to provide a more comprehensive picture of the state of the art in this field.
Knowledge sharing in interdisciplinary networks of health care professionals

Nienke Moolenaar¹; Linda Busstra - van den Broek²; Esther de Groot³
¹Utrecht University; ²University of Applied Sciences Utrecht; ³UMC Utrecht

Large-scale changes in the organization of health care in the Netherlands urge health care professionals to learn to collaborate in increasingly interdisciplinary teams. Health care professionals (e.g., general practitioners, pharmacists, physical therapists, psychologists) are expected to operate more at the boundaries of disciplines, take stock of each others' work and collaboratively implement health care innovations in local interdisciplinary teams (Fay, Borrill, Amir, Haward & West, 2006; Länsisalmi, Kivimäki, Aalto & Ruoranen, 2006). However, as professional autonomy is the norm and working in such interdisciplinary teams is new to many health care professionals, the question arises how interdisciplinary knowledge sharing in such teams occurs, and how it may support or hinder efforts at innovation implementation. Moreover, it may be that the extent to which health care professionals are aware of other professionals' skills, knowledge and roles (a concept we labeled interdisciplinary awareness) mediates the relationship between interdisciplinary knowledge sharing and support for innovation.

To examine these questions, we explored knowledge exchange in the social network of a single local interdisciplinary health care group in the Netherlands. We collected network and survey data among health care professionals (N = 100) in eight different health care disciplines. We calculated several (new) network measures to reflect the diversity and frequency of interaction in these interdisciplinary health care teams and further analyzed the data using multiple regression/mediation analysis (Zhao, Lynch, & Chen, 2010). Our findings suggest that the more health care professionals exchange work-related knowledge with professionals from other disciplines, the higher the perceived support for implementing innovations (both in terms of frequency and diversity of network interaction). In addition, we found that interdisciplinary awareness did not significantly explain this relationship. As interdisciplinary work among health care professionals, and the medical complexity in their fields, is increasing rapidly, this research suggests that investments in knowledge sharing and network building in interdisciplinary health care teams is vital for innovative local health care efforts.
Social network structure and healthcare coordination: an egocentric perspective

Ivana Durcinoska1; Kon Shing Kenneth Chung1; Jane M Young2; Michael Solomon2
1The University of Sydney; 2Sydney Local Health District

Aim: Providing coordinated care is a key priority for health service improvement. Given the interpersonal nature of health care provision, social networks have emerged as an innovative approach to improving health care. However, little is known about how social network ties and structure affect patient care coordination and navigation through the health system. We sought to i) describe the personal networks of patients receiving treatment for colorectal cancer and ii) explore the role of personal network attributes in the patient experience of cancer care coordination.

Method: The study utilised a mixed-method egocentric network analysis approach. Eligible patients with colorectal cancer were identified from a representative state-wide study the NSW Bowel Cancer Care Survey. Participants initially completed a self-report questionnaire at baseline assessing care coordination experiences 6-8 months following diagnosis. Network data was subsequently collected in semi-structured telephone-based interviews. Four name generator questions were utilised to identify key alters involved in their decision making, information provision, emotional and practical support, and negative relationships. Participants were also asked to report on the frequency of contact, closeness of relationships, time known, and demographic characteristics of all alters named. We used descriptive social network measures (density, degree centrality, tie strength, efficiency, constraint, functional diversity) to characterise the networks in NETDRAW, and multivariate regression models to examine the association between network properties and experience of care coordination.

Results: A total of 126 patients participated, in which 875 alters were identified. Respondents had mean age of 67 years, 57% male, 24% living alone, and care coordination scores (mean 75.9, 10.11 SD, range 20-100) were normally distributed. Mean participant network size was 6.9 (SD 2.9) ranging from 2 – 18 alters. Participant network composition was approximately evenly distributed among family, friends and healthcare professionals. However, family members were more likely than other individuals to be identified as a close network and the vast majority of the negative ties identified (n=46) were health professionals. Multivariate analyses showed that higher care coordination scores were associated with higher density (β 5.5, p=0.001) and degree centrality (β 1.9, p<0.001).

Conclusion: This study offers a novel approach to exploring patient care experiences and navigation through the health system. More specifically it provides insight into care coordination processes and how relational networks influence this dimension of care. These results can inform evidence-based interventions aimed at improving coordination of patient care.
Exploring how multimorbidity care is managed and coordinated for an older Irish population within formal healthcare organisational structures and within informal networks: Preliminary results from an Irish study

Orla Caffrey; Mandy Lee; Charles Normand
Trinity College Dublin

Introduction
Multimorbidity is the presence of two or more chronic conditions within one individual. Continuity of care, effective communication and collaboration between different healthcare professionals are important factors in providing timely and appropriate care to patients with multimorbidity. Current evidence shows these patients can experience disorganised, inappropriate and/or delayed care as a consequence of a fragmented health system organised to deliver episodic care for single conditions (“disease silos”) that can result in adverse outcomes and preventable healthcare costs for this patient group. Additionally, self-management of chronic conditions is increasingly advocated for this patient cohort. Yet research to date tends to focus on formal healthcare organisational structures. This study aims to address the gap in evidence of how multimorbidity care is shaped not just by formal healthcare organisational interactions but also by informal intra-organisational networks. This is achieved by adopting a SNA study design that utilises a socio-centric analytical approach.

Methods:
A socio-centric SNA is performed on a sample of hospital clinicians and support staff involved in managing patients with rheumatoid arthritis, COPD and a third condition that is identified by the respondent. The survey instrument compared professional interactions that were expected for these patient cohorts against what actually occurred in clinical practice. The expected interactions were derived from recommended care pathways for each included condition found in the literature. Professional support network captures the type and frequency of professional interactions with one another through a self-administered survey. Key services involved in coordinating care for these cohorts. Gaps that impinge on integrated care are revealed for both cohorts. The SNA instrument used for the professional socio-centric analysis took many iterations to overcome software issues, boundary issues, multiplicity of health services and professionals involved and time restrictions due to the busy participants targeted to complete the survey instrument.

Results:
Recommended care will be compared to interactions that occur in practice for the patient cohort of interest. Visualisations and interpretations of metrics for the clinical networks captured will be presented as preliminary results from the above study.

Conclusions:
This study adds to our knowledge about the intra-organisational networks involved in managing complex multimorbid patients who are aged 50 or over living in the community. The second phase of this study will gather information from patients aged 50 or over with at least three chronic conditions that included rheumatoid arthritis and COPD using an egocentric approach to explore how multimorbidity care is managed from a patient’s perspective through their family, community & clinical support networks. To understand what enablers and barriers exist in accessing care for multimorbid patients, factors influencing their healthcare access care will also be explored through the egocentric analysis. There is scope to extend this research by investigating inter-organisational networks or applying the methods used here to other geographic areas or to another multimorbidity cohorts in order to inform future strategies to improve how multimorbidity care is organised and coordinated.

KW: Multimorbidity; Hospital Networks; MDTs; Integrated Care; Ageing Population;
The Impact of Networking on Multi-Source Feedback Assessments for UK General Practitioners: A Social Network Analysis

Sebastian Stevens\textsuperscript{1}; Julian Archer\textsuperscript{1}; Arunangsu Chatterjee\textsuperscript{1}; John Scott\textsuperscript{2}

\textsuperscript{1}Plymouth University; \textsuperscript{2}University of Exeter

Background

Multisource feedback (MSF) is a method of workplace-based assessment in which ratees are evaluated by their colleagues on key performance behaviours. MSF has been widely adopted within medicine to assess and quality-assure clinical practice worldwide. In the United Kingdom (UK), MSF forms a core component of the medical re-certification process, created to increase patient safety and ensure that all doctors ‘up-to-date and fit-to-practise’ and known formally as medical revalidation. Throughout the medical education literature, MSF is widely reported as being a feasible, reliable and valid method of assessing medical performance. However, a number of threats to the validity of the assessment process have been highlighted, rater selection being one highlighted area of concern.

Currently, the majority of MSF assessments for medical revalidation in the UK require the doctor (ratee) to nominate colleagues (raters) in order to provide feedback; however, research exploring the selection of raters in MSF assessments has demonstrated significant differences in the feedback results of ratee vs. third party nominated raters. After controlling for factors previously believed to affect differences in feedback provided by colleagues, Archer and McAvoy (2010: 891) highlight that the ‘practice of choosing one’s own raters is likely to lead to more favourable results’. No evidence currently exists however to understand why this phenomena occurs. Addressing barriers to the validity of MSF assessments within medical revalidation is critical in terms of the safety and quality of patient care. Using General Practitioners (GP) as a sample group, the study looks to explore whether friendship networks within primary healthcare teams may be a factor influencing the rater selection choices made by doctors in MSF assessments for medical revalidation.

Methodology

A cross sectional, mixed methods design is adopted to explore the research problem. Friendship networks are measured with an online survey using name generators, distributed within recruited GP practices in the South West region of the UK. Rater selection choices are measured with archival MSF data provided on behalf of the GP by CFEP UK Surveys, a private company providing administrative support for appraisal. Together, this data is combined to explore the degree to which friendship networks within a healthcare team impact the rater selection choices made by GP’s, and the likelihood of replying to feedback requests by nominated colleagues. Descriptive network measures including density, centrality, betweenness, and in/out degree will be analysed, with ERGM’s employed to explore the patterns underlying possible relationships between social closeness and rater selection.

Results and Conclusion
This paper will disseminate the results of regional network study in the South West UK to demonstrate the extent to which friendship networks may influence the rater selection process, and how this problem may translate into the quality and safety of patient care.
Physicians knowledge-sharing and Multidisciplinary Tumor Boards (MTB)
Natalia Zlotnik; Olaf Rank
Albert-Ludwigs-Universität Freiburg

According to WHO cancer is the leading cause of death worldwide. In Germany, a National Cancer Plan was introduced aiming to establish a cross-sectoral, integrated oncological health care. One accomplishment was the foundation of a network of Comprehensive Care Centres (CCC). The mission of these CCC is to provide diagnostic and therapy for patients based on latest medical insights and to bundle the expertise and knowledge of all professionals across Germany. The compulsory requirement for the CCCs according to DKG (German Cancer Society) are multidisciplinary tumor boards (MTB) or multidisciplinary tumor conferences. MTBs are crucial instruments for treatment recommendations and decisions unifying heterogeneous expertise and allowing to learn from the experience of others.

As state-of-the-art cancer treatment can only be accomplished by knowledge sharing of experts interacting on multiple organizational levels, the aim of this study is to draw the structural patterns of interpersonal and intraorganizational knowledge sharing mechanisms in a CCC. We focus on tie formation between physicians engaged in cancer treatment, their affiliation to multidisciplinary tumor boards as membership ties and knowledge flow across tumor boards by uncovering formal and informal relationships. The effects of experts’ formal embeddedness in tumor boards and their informal knowledge-sharing behavior lead to implications for knowledge management in health care.

Data was collected on interpersonal knowledge exchange. Applying exponential random graph models for multilevel networks, we illustrate the interrelationship of physicians’ informal ties and their formal membership in multidisciplinary tumor boards.

We hypothesize a tendency toward reciprocity in knowledge-sharing networks among physicians who share membership in tumor boards and a tendency in physicians’ popularity as experts with increasing tumor board membership. Our results are meaningful to the extent that insights could serve to identify key knowledge-actors in order to transfer expertise across CCC network’s members.

Keywords: Tumor Boards, exponential random graph models, health care networks, knowledge sharing, multilevel networks
Caregiving family networks and their impact on balancing caregiving for a home-dwelling relative with dementia and requirements of the family- and work-life: a planned mixed methods study

Lydia Neubert; Hans-Helmut König; Christian Brettschneider
University Medical Center Hamburg-Eppendorf

Ample theoretical work on social networks is explicitly or implicitly concerned with the role of interpersonal interaction. However, empirical studies to date mostly focus on the analysis of stable relations. This talk introduces Dynamic Network Actor Models (DyNAMs) for the study of interpersonal interaction through time.

The presented model addresses three important aspects of interpersonal interaction. First, interactions unfold in a larger social context and depend on complex structures in social systems. Second, interactions emanate from individuals and are based on personal preferences, restricted by the available interaction opportunities. Third, sequences of interactions develop dynamically, where timing of interactions relative to one another contains useful information.

It is further discussed how DyNAMs can be applied to study coordination networks through time. It is taken into account that the creation of coordination ties between two actors is typically the outcome a two-sided agreement process in which both actors’ opportunities and preferences are aligned.

The DyNAM framework is conceptually and empirically compared to the relational event model, a widely used statistical method for the study of social interaction data.

Literature:


Accessibility of Health Services for Young Latino MSM in Miami provided through Health Service Networks and Social Venue Networks

Mariano Kanamori¹; Kayo Fujimoto²; Mark Williams³; Sheyla Santana¹; John Schneider⁴; Mario De La Rosa¹
¹Florida International University; ²Center for Health Promotion and Preventive Research, The University of Texas; ³The Robert Stempel College of Public Health & Social Work, Florida International University; ⁴Chicago Center for HIV Elimination, University of Chicago

Introduction. In Miami-Dade County (MDC), Florida 65% of residents are Latino. Latinos account for more than half of the HIV cases. Most HIV-infected Latinos are men who have sex with men. This is a study of a Miami Health Service Network in which HIV prevention, HIV testing, and HIV care are provided to young Latino men who have sex with men (YLMSM) (e.g., HIV clinics, community-based organizations). We also incorporated a Social Venue Network where YLMSM congregate because social venues can provide and promote health offered services by Health Service Networks. YLMSM’s access to health services provided by both types of networks in MDC is unknown. The research aims for this study were to: (I) Describe collaborative efforts within and between venue networks; (II) Locate geographic clusters of health services provided by these networks; and (III) Determine if health services provided in these geographic clusters are accessible by YLMSM.

Methods: The study uses cross-sectional data collected in 2016 by the Young Men’s Affiliation Project (YMAP). Investigators, staff members and community consultants developed a list of 59 Social and Health Venues serving YLMSM in Miami. Forty venues from this list were randomly selected. For each venue, an owner, manager or front-line person reported services provided by his/her venue from a list of 18 health services, and collaborations with other venues in the networks. The collaboration relationship was defined as: (1) worked together on an activity, project, or event; and/or (2) had a referral agreement; and/or (3) had sponsorship collaborations. We performed network visualization analyses including symmetric data; a thematic map with the number of services provided by each venue; a base map with the number of Latino male adolescents and young adults living in each sub-area; and, walkability maps using Kernel density estimations with parameters’ weights including the number of services provided by each venue and a two-kilometer walking distance radius. Analyses were performed using UCINET6, NetDraw2.160, and ARCGIS.

Results: The mean number of services provided was seven for Health Venues and one for Social Venues. The most popular services provided in both networks were free condoms and HIV education materials. HIV testing or treatment was also a popular service provided in the Health Service Network. We found collaborations both within and between the Health Service and the Social Venue Networks. In the northern part of the county, a network cluster of health services was located where few YLMSM live. In Downtown Miami and the western part of the county, network clusters of health services were located where many YLMSM live. In Miami, where many YLMSM socialize but few live, a cluster of health services was offered. Overall, many YLMSM lived beyond walking distance of areas where health service network clusters were located and HIV testing was provided.
Conclusion: Even though collaboration between and within Health Service Networks and Social Venue Networks can expand access to HIV prevention and treatment services, geographic accessibility is a potential structural barrier for accessing these services.
Interorganizational health care networks for outpatient care: Structural patterns and relevance for health care provision
Eva Kesternich; Olaf Rank
University of Freiburg

We represent financial markets as evolving relational systems. Using data that we collected on one major European regional interbank market, we examine how market structure emerges from sequences of relational events connecting quoters and aggressors – the two main roles that banks assume in financial transactions. We frame the interbank lending market as the institutional interface that regulates exchange across these roles and that allows sellers and buyers of money to coordinate. We show how individual acts of exchange produce and, at the same time, are produced by structured time-ordered sequences of transaction events connecting buyers and sellers. Building on current theoretical understanding of the dynamics of interorganizational relations, and on available empirical evidence we focus our analysis on relational micro-mechanisms that regulate tendencies toward: (i) repeated transactions – or inertia; (ii) reciprocity – or symmetry; (iii) popularity – or centralization of selling; (iv) activity – or centralization of buying activities, and (v) path-shortening – or closure. The study identifies the mechanisms by which dyadic coordination between buyers and suppliers of money is actually achieved, and clarifies how market structure and individual exchange activities are related.
Multiple chronic conditions in older people and their effects on health care utilization: a network analysis approach using SHARE data

Andrej Srakar; Valentina Prevolnik Rupel

The presence of multiple coexisting chronic diseases in individuals and the expected rise in chronic diseases over the coming years are increasingly being recognized as major public health and health care challenges of modern societies (Marengoni et al., 2011; WHO, 2009; Vogeli et al., 2007; Glynn et al., 2011; Smith and O'Dowd, 2007; Barnett et al., 2012). Individuals with multiple conditions are presumed to have greater health needs, more risk of complications, and more difficulty to manage treatment regimens. At present, the main health care model is disease-focused rather than person-focused and, therefore, involvement of several different health care providers in managing multiple disorders is inevitable and often results in competing treatments, sub-optimal coordination and communication between care providers, and/or unnecessary replication of diagnostic tests or treatments (Vogeli et al., 2007; Clarfield et al., 2001; Greß et al., 2009). As a consequence, the common belief is that persons with multiple diseases have high rates of health care utilization and this is confirmed by some international studies (Glynn et al., 2011; Starfield, 2006; Fortin et al., 2007; Laux et al., 2008; Salisbury et al., 2011; van den Bussche et al., 2011; Lehnert et al., 2011).

In our article we use SHARE dataset of Wave 5 (covering year 2013), including data on 14 European countries and Israel. We model the presence of multiple coexisting chronic diseases as a two-mode network analysis problem. This has special scientific relevance as, to our knowledge, network analysis has not been used so far to study this problem, and, also, very seldom before in the analysis using SHARE data. In our case, therefore, the diseases are vertices/nodes and individuals having them the edges. Controlling for the frequency of network relationships, we calculate different network parameters (e.g. centrality parameters) and use them in econometric modelling. To appropriately model the presence of multiple chronic diseases we also use tools from multivariate analysis (mainly factor and principal components analysis and cluster analysis) and blockmodelling.

Finally, to verify the effects of multiple diseases on the rates of health care utilization we construct four different health care utilization variables: frequency of medical visits, number of taken medications, frequency of hospitalizations and probability of hospitalization. Main research questions of the analysis are: 1) What are the most frequent combinations of chronic diseases? 2) Which are the most common groupings of diseases which can be characterized from the data for the older people in Europe? 3) What are the effects of multiple coexisting chronic diseases on health care utilization of the older people when controlling for different groupings of diseases? 4) Are there different effects on health care utilization for different groupings of diseases? We model the effects of different combinations of most commonly connected diseases on the health care utilization using econometric models from causal inference (controlling for endogeneity). Finally, in conclusions, we provide reflection of the findings for future work and policy relevance of the study.
Missing data on network ties are a fundamental problem for network analyses. The biases induced by missing edge data, even when missing completely at random (MCAR), are widely acknowledged. In this paper we present a new method to handle missing data due to actor non-response in the framework of stochastic actor oriented models (SAOMs). We compare the standard procedure of handling missing data within SAOMs with multiple stochastic imputation in a simulated setting. The proposed method imputes missing tie variables in the first wave using Bayesian exponential random graph models (BERGMs) and imputes missing tie variables in later waves utilizing a SAOM. Because the underlying data was completely observed and missing data was simulated, we are able to estimate the biases of both methods. The results have relevant implications for the analysis of network dynamics as the proposed method allows for more reliable estimation of SAOMs on networks with actor non-response.
Standard errors in stochastic actor-oriented models

Nynke Niezink
University of Groningen

Stochastic actor-oriented models can be used for statistical inference on the mechanisms that drive social network dynamics, and the interdependent dynamics of networks and actor behavior. To test hypotheses about social mechanisms in this framework, we usually use t-type tests. We divide parameters – expressing the strength of the social mechanisms – by their standard errors. For correct inference, both parameters and standard errors need to be estimated accurately.

In converged stochastic actor-oriented models, parameter estimates have been obtained for which simulated data resembles the observed data on the features that are included in the model. However, the usual convergence criteria for parameter estimates do not guarantee the accurate estimation of standard errors. Standard errors in converged models with a complex model specification can be highly inflated in some cases, especially when the model includes some parameters that are hard to estimate for the data set under study. These very high standard errors will occur seemingly at random. Rerunning a complex model several times may then result in a wide range of standard errors: some small, some very large. This behavior of the estimation procedure increases the risk of type II errors. In the presentation, I will address the origin of this problem and how we can diagnose and quantify it. I will also provide practical guidelines for reliably estimating standard errors in such cases, and for assessing their accuracy.
Tracking Local Communities in Dynamic Networks using Surface Tension
M. Amin Rigi; Irene Moser
Swinburne University of Technology

Community detection in networks has met with renewed interest due to its relevance in the interpretation of influence in social networks. Social networks are typically very large and the communities in constant flux. Global community detection methods cannot be applied to reasonably large networks due to the increase in computational complexity. Therefore, local community detection methods are becoming very popular. However, tracking local dynamic communities, despite of its importance, is one of the most neglected areas in the field of community detection. In this work, we introduce a competitive new local community tracking method based on the chemistry-related concept of surface tension.

We aim to understand and explain communities and their evolution using surface tension, a natural phenomenon which has been comprehensively investigated in chemistry. We know from chemistry that the binding forces between the molecules of a liquid draw the molecules of the substance into a shape that has the least surface area. Putting it differently, a community of similar liquid molecules tend to shape themselves in a way that surface tension is minimised. In an analogous manner, binding forces between nodes of a community inside a network lead to particular patterns for a the community. A pattern or shape in which the surface tension of community is minimal.

We modeled surface tension of communities in networks and showed our model can be used for tracking local communities in networks. We use surface tension as an objective for local communities. To show the surface tension of a community is an acceptable representative of the community's quality, we compared the surface tension of several communities against the conductance. Due to high correlation between conductance of a community and its surface tension, surface tension can be regarded as a quality measure. Surface tension provides a unique ability for tracking local communities in dynamic networks in which new nodes are added over time. In other words, when a node is a candidate of inclusion in a local community, it will be included only if the surface tension of the community is reduced or remains unchanged.

Our method clearly outperforms the existing local tracking method and shows good tracking accuracy across a number of problems with stronger and weaker communities. The correlation with the global measure of quality of communities explains why the method is so successful.
Analysis of temporary networks with time series modeling: an application to the Chinese contemporary art museum system
Andrej Srakar; Marilena Vecco; Simeng Chang

Temporal networks are a subject of intense study in the network analysis theory and applications (Barabasi, 2005; Tang et al., 2009; Hill & Braha, 2010; Hanneke, Fu & Xing, 2010; Vespignani, 2011; Zhao et al., 2011; Pan & Saramäki, 2011; Perra et al., 2012; Starnini et al., 2012). Except for some preliminary attempts (Scherrer et al., 2008; Hempel et al., 2011; Sikdara, Ganguly & Mukherjee, 2016), temporal networks have not been studied in detail so far with time series econometric models. In this paper, first, we provide an overview of time series statistical estimators to study temporal networks (in particular as related to large networks) and study some of their statistical properties. Second, we apply this framework to the network data on artists and their exhibitions in Mainland China, collected from Artlinkart, a Chinese exhibit platform, covering the period of 1989-2015. A two-mode network analysis framework is developed over time. This allows us to outline the dynamic of the topography of contemporary art emerged after 1989. In this topography the period of 2006-2015 represents a relevant decade for shaping the contemporary art system as the main (private and public) museums of contemporary art have been established. Moreover, this analysis provides information on the position of the different museums as art gatekeepers in selecting and presenting young talented artists. In this regard, we are able to follow the impact of these museums choices over time. According to the signaling theory (Podolny, 2010), our assumption is that the museum choice of selecting an artist at time t, may be adopted by other museums in the following years. The purpose is to identify the key figures (»selectors«) in discovering new talented contemporary artists, whose choices have been confirmed and disseminated by other museums belonging to the same network (»disseminators«). In a young and immature market - as the Mainland China's one - characterised by high uncertainty (Burt, 1992; Podolny, 2001), when two actors initiated a relationship, the tie between them serves as a signal for other market members (Benjamin and Podolny, 1999; Podolny, 2001), which will revise their strategies. In this frame, the capacity to predict the link between actors and the properties of the future network instances using time series as a proxy, may have several market implications. Therefore, we propose a forecast model of time series to predict the properties of the temporal network in Mainland China contemporary art at a later time instance, extending the analysis in Sikdara, Ganguly & Mukherjee (2016) to the low frequency setting. This analysis represents one of the first attempts to map and study the Chinese contemporary art system using network analysis. It also provides important insights into the possibilities to use time series econometric tools to study the dynamics of temporal networks in future.
Modeling Network Dynamics II: Time-stamped Network Data (Session 22; Part 2)

Chair: Tom Snijders

Co-Chair: Christoph Stadtfeld; James Hollway

1ETH Zurich; 2University of Groningen; University of Oxford; 3Graduate Institute Geneva

Dynamic Network Actor Models (DyNAMs): An actor-oriented framework for studying time-stamped network data

Christoph Stadtfeld; James Hollway; Per Block

1ETH Zurich; 2Graduate Institute Geneva

Ample theoretical work on social networks is explicitly or implicitly concerned with the role of interpersonal interaction. However, empirical studies to date mostly focus on the analysis of stable relations. This talk introduces Dynamic Network Actor Models (DyNAMs) for the study of interpersonal interaction through time.

The presented model addresses three important aspects of interpersonal interaction. First, interactions unfold in a larger social context and depend on complex structures in social systems. Second, interactions emanate from individuals and are based on personal preferences, restricted by the available interaction opportunities. Third, sequences of interactions develop dynamically, where timing of interactions relative to one another contains useful information.

It is further discussed how DyNAMs can be applied to study coordination networks through time. It is taken into account that the creation of coordination ties between two actors is typically the outcome a two-sided agreement process in which both actors’ opportunities and preferences are aligned.

The DyNAM framework is conceptually and empirically compared to the relational event model, a widely used statistical method for the study of social interaction data.

Literature:


Some days are better than others: Examining time-specific variation in the structuring of interorganizational networks

Viviana Amati\textsuperscript{1}; Alessandro Lomi\textsuperscript{2}; Daniele Mascia\textsuperscript{3}

\textsuperscript{1}University of Konstanz; \textsuperscript{2}Università della Svizzera italiana; \textsuperscript{3}University of Bologna

Using longitudinal data we have collected on a set of more than 8,000 relational events connecting the members of a small community of health care organizations, we explore patterns of time variation in the effect of network mechanisms on the dynamics of interorganizational relations. Data are analysed by using an event-oriented model based on the assumption that the observed sequence of relational events is the outcome of a marked temporal point process. The analysis supports conclusions that are generally consistent with prior research showing that interorganizational relations are patterned consistently and systematically by tendencies toward reciprocity, assortativity, closure, and by inertial forces that tend to stabilize interorganizational collaboration. However, the analysis also reveals that the effects of local network mechanisms on relational events connecting organizations display significant time variation, and tend to operate differently at different points in time. We discuss the implications of this finding for our theoretical understanding of interorganizational networks as emergent from the interaction of time-invariant relational mechanisms and time-specific local contingencies.
Predicting Relational Events
Laurence Brandenberger
University of Bern & Eawag

Models for dynamic network analysis are becoming increasingly popular. Among such temporal network models are relational event models, where sequences of relational events are examined across time. Each of these events represents an edge (or tie) forming in a network at a distinct point in time. This flexible and dynamic form of network inference can be used to examine how actors behave in changing network settings. Examples of event networks include states co-signing agreements, parliamentarians bargaining over new regulations, or individuals interacting online. The additional information regarding the timing of events allow for a more precise estimation of popular network effects, such as popularity, triadic closure or homophily effects. Inference on how networks evolve over time can be gained from combining network effects with statistical models from survival analysis, such as conditional logistic regressions or Cox models.

However, estimated parameters may suffer from a form of omitted variable bias if the temporal dependencies are not specified correctly and/or sufficiently, resulting in a misspecification of the joint likelihood of the model.

This paper presents a simple approach to predicting relational events as well as goodness-of-fit measures to evaluate the simulated sequences and to determine which temporal dependencies are crucial to the data-generating process of event sequences.
Collaboration between Software Developers and the Impact of Proximity
Dawn Foster; Guido Conaldi; Riccardo De Vita
University of Greenwich

This study investigates collaboration in an open source software community using proximity theory as the theoretical lens with social network analysis and modeling of activities over time to predict collaboration.

Actors in this study are part of the Linux kernel community where they collaborate on one or more sub-projects using mailing lists as the primary method of collaboration. Collaboration occurs in real-time between actors that contribute to multiple sub-projects, work for firms that pay them to contribute to the Linux kernel, and are working virtually from locations across the globe. This complex setting can be better understood by using several dimensions of proximity: organizational, cognitive, institutional, social, and geographical. Collaboration is analysed using data from source code contributions and mailing list participation.

Open source software is developed in the open where anyone can view the source code and anyone with the knowledge to do so can contribute to the project. With no central group responsible for coordination of tasks, collaboration on the development of this software is emergent. Because people from around the world work on these projects together using online tools with publicly accessible interactions between people, it is a relevant setting for using social network analysis to understand and model network relationships.
Exploring the dynamics of depressive symptoms and face-to-face interactions with DyNAM
Timon Elmer; Christoph Stadtfeld
ETH Zurich

Depressive symptoms are associated with various social deficits and thus reduced psychosocial functioning. Such deficits potentially contribute to changes in an individual’s social network. Recent studies suggest that individuals with depressive symptoms tend to have fewer friends and become friends with others who have a similar level of depressive symptoms. Similar mechanisms should operate in face-to-face interaction networks. Assessing social interactions directly can improve our understanding of how depressive symptoms affect social embeddedness and thus the reinforcing cycle of social isolation and increase in depressive symptoms. This study investigates how an individual’s level of depressive symptoms affects his/her social interaction ties. The following research questions are explored: (1) Do individuals with higher levels of depressive symptoms have fewer social interactions? (2) Do individuals with higher levels of depressive symptoms prefer interacting in smaller groups? (3) Do individuals interact more frequently with others that have similar levels of depressive symptoms? In particular, we analyze how these patterns change over the course of two days and in dependence on preexisting friendship ties. We do so in a newly formed community of 50 students attending a social event on the first weekend of their studies. Throughout the weekend, students participated in social activities that intended to facilitate social integration. Prior to the event, 48 (96%) of the students administered an online survey assessing social ties within the cohort (e.g., friendship) and depressive symptoms. During the course of the weekend social interactions were assessed using radio frequency identification (RFID) badges. The research questions are investigated Dynamic Network Actor-Oriented Models (DyNAM).
Financial markets as evolving relational systems: Models and preliminary results from a study of European interbank market

Federica Bianchi; Alessandro Lomi
Università della Svizzera italiana

We represent financial markets as evolving relational systems. Using data that we collected on one major European regional interbank market, we examine how market structure emerges from sequences of relational events connecting quoters and aggressors – the two main roles that banks assume in financial transactions. We frame the interbank lending market as the institutional interface that regulates exchange across these roles and that allows sellers and buyers of money to coordinate. We show how individual acts of exchange produce and, at the same time, are produced by structured time-ordered sequences of transaction events connecting buyers and sellers. Building on current theoretical understanding of the dynamics of interorganizational relations, and on available empirical evidence we focus our analysis on relational micro-mechanisms that regulate tendencies toward: (i) repeated transactions – or inertia; (ii) reciprocity – or symmetry; (iii) popularity – or centralization of selling; (iv) activity – or centralization of buying activities, and (v) path-shortening – or closure. The study identifies the mechanisms by which dyadic coordination between buyers and suppliers of money is actually achieved, and clarifies how market structure and individual exchange activities are related.
Dynamics as an innovation indicator in a longitudinal social network
Gloria Álvarez-Hernández; Óscar Pérez-Zapata
Universidad Carlos III de Madrid

Very few studies have focused on knowledge sharing networks from a longitudinal social network (LSN) perspective. We aim to expand this literature in the context of diffusion of technological innovation Foster (1986), Rogers (2010) & Valente (2005). This research uses a new methodology that includes a set of dynamicity measures for LSN, developed and described at Uddin, Khan and Piraveenan (2015). More specifically, this allows to compare two or more LSN regardless of their network sizes, the number of interactions or the number of short intervals of the aggregated network.

These dynamicity measures contemplate two types of behavioral patterns that change over time (variations in the position of the network and variations in participation). Both are considered at three different levels: the actor, the total LSN and the short interval level. They are built by using empirical data from a multinational corporation belonging to the ICT industry. Primary data is collected from a virtual Community of Practice composed by 174 engineers that exchanged 918 emails during a period of four and a half years while deploying different telecommunications networks on a worldwide basis. This total period is subdivided into several sub-periods that match periods of innovation adoption (new software and hardware deployment). In addition, we include some measures based on the innovation adoption dates.

The results suggest that there are differences between the network positional and the participation dynamicity. For both measures the trend over the total period is decreasing with peaks at the beginning of each period. As the performance of the technology improves and the number of technology adopters increase, the participation dynamicity seems to follow different patterns depending on the type of actor (innovator/early adopters, vs. followers). Together, these results suggest that in situations of new technology deployment, dynamicity (positional and participatory) should be encouraged to foster greater access to knowledge, something scarce when new technologies are introduced.

Keywords: longitudinal social networks, dynamicity, innovation, innovation models, participation dynamicity, positional dynamicity,
The Serendipity of Friendship
Zsófia Boda; Timon Elmer; András Vörös; Christoph Stadtfeld
ETH Zurich

An extensive line of research into the evolution of friendship networks in communities emphasizes the importance of endogenous structural processes, individual characteristics, and meeting opportunities. First, much has been discovered about how endogenous structural processes such as reciprocity or transitivity shape friendship networks, inducing dependencies between network ties. Second, the role of individual characteristics is well-studied: people prefer others similar to them in their sociodemographic, behavioral, and intrapersonal attributes. Third, meeting opportunities for dyads or groups are essential in stimulating friendship formation between individuals. While structural mechanisms and individual characteristics can be considered more or less stable, at least in an initial period, the quantity and quality of meeting opportunities seems more arbitrary. This is crucial, since even little changes in initial network patterns could lead to significant differences over the evolution of the network. Investigating the randomness in meeting opportunities and its effect on social ties is thus a key to better understand social network dynamics.

Using a unique combination of survey, observational, and experimental methods, our aim is to better explain the long-term role of initial random factors in friendships and dislike relations. For this, we focus on the complete network of over 200 first-year students at a Swiss university starting their studies together at the same department. We investigate network dynamics of the first semester (3 months). Survey data were collected in two different ways. First, detailed surveys, including questions about social ties, individual social background, and personal and behavioral characteristics, were administered three times: during the students’ first week; four weeks later; and during the last week of the semester. Second, mini-questionnaires were sent out 21 times (twice a week), collecting information about students’ interactions with each other. Observational data were collected using RFID-tags, which recorded actual face-to-face interactions during a socializing weekend at the beginning of the semester attended by almost third of the students. An experimental element has also been added to the study design. Three months before the semester started, freshly admitted students had a chance to attend an informal informational event at the university. Part of the event was organized in small groups, for which we randomly sorted students into groups.

Data were analyzed using longitudinal network models. Results show that the initial grouping of students still has an effect on social ties several months months later. This provides evidence that randomness in initial meeting opportunities can indeed strongly influence network evolution.
Adolescents’ socio-digital participation and school achievements: Selection and influence effects of peer friendship networks

Shupin Li1, Tuire Palonen1, Kai Hakkarainen2
1University of Turku, 2University of Helsinki

Socio-digital technologies (e.g. Internet, smart phones) have been increasingly pervasive in adolescents' daily lives nowadays. Socio-digital participation is transforming adolescents’ peer friendship networks whereas peer friendship networks are reshaping adolescents’ socio-digital participation. On the other hand, previous studies revealed mixture results on relationship between adolescents’ socio-digital participation and their school achievements. The purpose of present study is to investigate peer selection and peer influence effects regarding adolescents’ socio-digital participation, their school achievements and peer friendship networks over time. Sample was from a secondary school in urban area of Finland. Altogether 103 7th graders (at T1) participated in present study. Social networking questionnaire with roster was used to collect complete friendship connections of the same grade (i.e. with whom they spent time). Self-report questionnaire was administered to collect data of socio-digital participation and school achievements (i.e. mathematics and Finnish language). Both social network and node attribute data were collected at two time points (2013 and 2014 respectively). Mice package in R was used to impute missingness of node attributes and RSiena package was employed to estimate SAOMs including selection and influence effects. Results of univariate models showed that socio-digital participation positively influenced the formation of adolescents’ friendship networks overtime; adolescents appeared to select peers with similar performance in Finnish language to be friends over time whereas mathematical achievement was not a factor for adolescents to select peers as friends. In multivariate model including socio-digital participation and school achievements, adolescents with similar socio-digital participation tended to have peer friendship ties overtime, which was same in univariate model. Our findings indicated that similarity of adolescents' socio-digital participation positively related to their peer friendship network ties whereas adolescents appeared to select peers of similar Finnish language performance as friends.
Social and human capitals in academic performance. The complex coevolution of student health, social networks and academic performance

Sofia Dokuka\textsuperscript{1}, Maria Yudkevich

\textsuperscript{1}National Research university Higher School of Economics

The structure of academic achievements is very complex and student's success can be explained by many different factors. The main component of academic productivity is, obviously, individual abilities, but there are also two important factors that are in close connection with academic performance: social and human capital. Social capital describes the role of social environment in the process of academic achievement formation. In recent studies (Lomi et al., 2011; Flashman, 2012; DeLay et al., 2015; Dokuka et al., 2015; Rambaran et al., 2014; Gremmen et al., 2017) scholars investigate different mechanisms of social network and academic achievements coevolution. We can conclude that both social connections and academic achievements are closely interrelated.

Human capital describes the individual capacity of the person, and one of the most important parts of the human capital is health. Researchers (Becker, 2007; Bergen et al., 2005; Trockel et al., 2000) find connections between the academic productivity and health.

At the same point social and human capital, in our operationalization, health and social environment, are also closely bonded (Christakis and Fowler, 2007; Mercken et al., 2010). People tend to influence the health-related behavior of each other.

Despite the tightly connection between these three components of student life, researchers are usually concentrated on studying the interactions between two of them. In this study we aim to fill this substantial gap and explore the complex triadic interplay between the academic performance, health and social networks. Based on longitudinal study we model the coevolution of friendship and advice social networks, academic achievements and health-related behavior of first year university students. SAOM applied.
Peer Effects on Adolescent Delinquency and Substance Use: A Meta-Analysis of Stochastic Actor-Oriented Models

André Ernst
University of Cologne

Adolescents' involvement in delinquent behavior resembles that of their peers, and the same is true for substance use including smoking, alcohol consumption and the use of illicit drugs (Akers, 1998; Warr, 2002). Whether this similarity is due to influence processes within the peer group, i.e. friends' behavior becoming more similar over time, or due to selection, i.e. adolescents with similar behavior choosing each other as friends, is still an open and hotly debated question with theoretical arguments for both causal directions (see e.g. Akers, 1973; Gottfredson, 1990; Knecht, 2008). Recent advances in statistical modeling for longitudinal network data, namely the development of stochastic actor-oriented models (SAOM) for network dynamics (Snijders, 1996; Snijders, Van de Bund and Steglich, 2010), have renewed interest in this longstanding empirical question. These models allow to simultaneously estimate selection and influence processes in longitudinal network data, disentangling these two possible causal processes. In the last two decades, SAOMs have been employed in a sizable number of empirical studies on delinquency and substance use, mainly analyzing school samples. Results of these studies are heterogeneous, though, with some studies only finding influence (e.g. Weermann, 2011), some only finding selection effects (e.g. Knecht, 2008), and some finding evidence supporting both causal pathways (e.g. Osgood, Feinberg and Ragan, 2015). In addition, some researchers have started to move beyond the question of selection vs. influence, addressing follow-up questions such as possible moderators and mediators (Veenstra, Dijkstra, Steglich and Van Zalk, 2013).

The current study systemizes the existing literature employing SAOMs. We follow the protocol set forth by Moher, Liberati, Tetzlaff and Altman (2009) to ensure that all relevant studies are found. By now more than 5300 journal abstracts are identified by search terms at the databases SSCI and PsycINFO.

We employ meta-analysis to integrate the heterogeneous results found in different studies regarding influence and selection effects and present preliminary results of our study.
Social Influence in the Formation of Attitudes towards Homosexuality among Adolescent Friends: An Instrumental Variable Approach

David Kretschmer

Over the past decades, Western European societies have seen a strong shift in attitudes towards homosexuality, with positive attitudes becoming more and more prevalent over time. Among adolescents, however, negative attitudes towards homosexuality are still widespread. This study investigates social influence processes in the emergence of such attitudes, examining whether adolescents’ attitudes towards homosexuality are influenced by their friends’ attitudes.

To analyze friend influence effects in the formation of attitudes towards homosexuality empirically, this study relies on data from the first wave of the Children of Immigrant Longitudinal Survey in Four European Countries (CILS4EU). It uses an instrumental variable approach that exploits the rich relational information available in the CILS4EU, which does not only comprise information on adolescents’ friendship networks and friends’ attitudes, but also on their parents’ characteristics, including parents’ attitudes towards homosexuality. As attitudes tend to be transmitted across generations, friend influence effects can be identified by instrumenting friends’ attitudes by their parents’ attitudes, which—under reasonable assumptions—can be expected to be unrelated to the focal adolescent’s own attitudes (apart from the dependence working through friend influence effects). This methodological approach avoids many of the selection and simultaneity problems that oftentimes plague research on influence effects, thus helping to provide causal estimates of friend influence.

Results from the instrumental variable analyses indicate strong and consistent friend influence effects across three of the four countries surveyed in the CILS4EU: Germany, the Netherlands, and Sweden; only in England influence effects are weak and statistically insignificant. All results stand up to a variety of robustness checks that address potential biases in the instrumental variable approach.

The study contributes to the social influence literature both from a substantive and a methodological perspective. Substantively, it provides causal evidence of friend influence effects in the formation of attitudes towards homosexuality, which have largely been neglected in the past social influence literature. Methodologically, it shows how the relational data available in the CILS4EU—and in comparable surveys—can be employed in an instrumental variable framework to avoid many of the methodological problems associated with estimating social influence effects in general.
Social Influence (Session 23; Part 2)
Tom Snijders\textsuperscript{1}, Christian Steglich\textsuperscript{2}
\textsuperscript{1}University of Groningen; University of Oxford, \textsuperscript{2}Linköping University

Collapse of an Online Social Network: The Blame on Social Capital
László Lőrincz\textsuperscript{1}, Julia Koltai\textsuperscript{2}, Anna Győr\textsuperscript{3}, Károly Takács
\textsuperscript{1}Hungarian Academy of Sciences, Centre for Economic and Regional Studies, \textsuperscript{2}Hungarian Academy of Sciences, Centre for Social Sciences, \textsuperscript{3}Corvinus University of Budapest, Institute of Sociology and Social Policy, \textsuperscript{4}Hungarian Academy of Sciences

The rise and popularity of online social networks is a recent phenomenon. In this study, we analyze the reasons and mechanisms behind the collapse of an online social network (OSN), iWiW. Significant cascading mechanisms have been identified in the pattern of abandoning the site at its peak of popularity and after. It is of key importance to study who were the key actors that started these cascades and abandoned the site early compared to others in their network. We contrasted explanations based on preserving accumulated social capital vs. building new social capital with motives influenced by innovativeness. On the one hand, those who are well embedded in their existing network have more to lose. On the other hand, people might want to escape from redundancy and indebtedness indicated by a high local clustering coefficient. We find with heterogeneous choice models that lower degree and a high local clustering are associated with early abandonment. The significant effects of age and innovativeness that depend on the life stage of the OSN indicate that mechanisms related to social capital are not the only reasons for the collapse.

keywords: social capital, online social networks
Mechanisms of social capital formation within non-commercial local exchange and trade system (LETS)
Beata Łopaciuk-Gonczaryk
University of Warsaw, Faculty of Economic Sciences

The paper will examine socio-economic mechanisms operating in a Polish, non-commercial local exchange and trade system (LETS), based on community currency, and its impact on social capital formation. LETS allows, through the use of an internet platform, to extend the traditional neighbourly help to a wider group of people, and also contributes to the creation of social ties, especially if transactions include direct interpersonal interactions and are accompanied by additional events strengthening the existence of the community. Performance of peer-to-peer transaction platforms is conditioned both by technical solutions, as well as norms and preferences of their users. To some extent, those norms and preferences may be influenced and developed by social interactions connected with conducting transactions within LETS. The main focus of the study is to determine how interpersonal interactions connected with transactions within the LETS under study may influence social norms and collaboration attitudes.

Data have been obtained from the web-based platform, supporting the transactions and enabling to give recommendations. Additional information has been acquired from in-depth interviews. Data on transactions, in context of the LETS analysed, can be treated as evidences of interpersonal interactions, as most of them involve face-to-face contact and have a social component. Some users are given recommendations, which are almost in all cases enthusiastically positive (only one recommendation is negative) and look like credentials that somebody fits well into the system. Therefore they may be treated as information that the recommended user follows the system norms and suits its internal culture. Comparing the network of transactions with the data on recommendations may provide information on norms’ diffusion.

The study faces the challenge of distinguishing between influence and selection, as system users may not only influence each other while interacting but also they may be attracted into the system in the first place because of their specific views and attitudes. In order to try to solve this puzzle, evolution of the network is going to be observed, as the data cover the period from September 2012 to December 2016. During the whole period, there were in total 919 active users, 6599 transactions completed and only 446 (positive) recommendations given. There are no incentives to give recommendations, other than sense of gratitude, and as a result the number of recommendations is very small in comparison to the number of transactions. Therefore a fact of receiving recommendations by an actor in a given period is treated as a proxy attribute indicating following system norms and showing highly collaborative attitudes. This attribute’s change from period to period is supposed to be influenced by interactions with well-behaving, experienced system users in a role of providers of goods or services. Stochastic actor-based model for co-evolution of social network and individual behaviour is utilized to verify the hypothesis stated. The approach taken involves controlling the effects of endogenous network formation (reciprocity and network closure), possible selection effect (system users with good reputation will probably
have high popularity as providers) and other attributes (like the fact of being a recommendation giver).
Smoking motivations differences according to peer groups’ gender composition. A social network study of 12 000 European adolescents.

Adeline Grard¹, Vincent Lorant

¹UCL Université catholique de Louvain

Background: In the last decades, gender differences in smoking prevalence have reduced, and in some European countries, girls smoking rates now exceed boys’ ones. Most regular smokers initiate smoking during adolescence, when they are particularly susceptible to peer influence. Yet, if peer effect explains the way smoking spread in a peer group, it does not explain why it may affect differently boys and girls. Recent studies have underlined the important role of peer group gender composition in adolescent smoking. For instance, adolescents with other-sex friends are more likely to smoke than those with same-sex friends. One possible explanation is that same-gender peer groups entail specific norms and values regarding tobacco. Yet, to establish a common norm regarding tobacco, peer groups have to share similar beliefs or motivations to smoke. To test this hypothesis, it is important to analyze how motivations are shared by adolescents connected to each other in a network and to consider their gender as a characteristic of clusters.

Methods: In 2016, 12 000 students of 14-16 years participated to a social network survey in 60 different schools, located in 7 different European cities. Adolescents had to nominate up to 5 best friends in their school directory. We also collected data on smoking status, smoking motivations, and sociodemographics. We classified smoking motivations in four categories, depending on their position on two axes: negative versus positive motivations; and individual versus social motivations. We then organized adolescents’ clusters into three groups: only-girls triads; only-boys triads and mixed gender triads.

Hypothesis: we hypothesize that (1) motivations for (not) smoking differ across genders, and that (2) smoking motivations are shared differently according to triads’ gender composition.

Results: Results indicate that social (positive and negative) motivations are more common among girls, while positive individual motivations were more reported by boys. On the clusters level, analysis reveal differences in the type of motivations shared, and in the motivations scores, according to the gender composition of the cluster. This underlines that smoking norms are different, but also that they are more embedded, depending on the gender composition of the peer group.

Conclusions: Smoking prevention programs could be more efficient if they would adapt to gender differences in smoking motivations and use peer group prevention techniques.
The role of social networks to explain political behaviour and attitudes (Session 24; Part 1)
Nadine Meidert
Zeppelin University

Facebook and revolutions: new evidence from Ukraine.
Tymofii Brik
University of Carlos III

Online social networks, Facebook in particular, are often regarded as the important tool for mobilization during the 2013-2014 Euromaidan revolution in Ukraine. The present study investigates empirically to what extent this claim is true. A unique data set of online activities was collected from the Euromaidan Facebook page. Overall, 27,458 posts and 1,123,049 comments generated from November 2013 to May 2014 are analyzed by means of social network analysis tools. The present analysis suggests that the role of Facebook communication in mobilizing was limited. However, there are some indications that Facebook played coordination role. Furthermore, the analysis shows that structure of networks of communication affected success of communication measured through likes.
A Network Model of Selective News Consumption-Induced Fragmentation
Pascal Jürgens; Birgit Stark
Johannes Gutenberg-Universität Mainz

For most political issues, the news remain citizens' primary source of information. This privileged position forms the core of mass media's persuasive power. But with the vast range of outlets and the cacophony of opinions available on the net, readers can pick and assemble their preferred information digest more than ever before. And they do: The well-documented phenomenon of selective exposure (Stroud 2011) leads recipients to favor attitude-consistent content over reports that challenge their views. In extreme cases, they might even choose to limit their reading to coverage that, to an outside observer, constitutes a parallel universe. Such biased information behavior represents more than an individual's curious taste: Selective exposure can drive fragmentation of news audiences along partisan lines. A fragmented society, in turn, loses the crucial ability to reconcile different positions and act on a common conception of political issues.

The rise of the internet has also brought a second shift: The chain of brokers involved in delivering news to an internet user grows steadily. Where the evening news are directly broadcasted to their audience, an online article often reaches its readers in the form of a recommendation from social networking sites or a search engine result. Faced with these new intermediary positions, the need for a network analysis of selective exposure and audience fragmentation becomes more and more evident.

Hence, news consumption behavior becomes both a network research topic and a matter of societal cohesion. The methodological fit is convincing: Consumption relations between recipients (nodes) and news sources (nodes) form a two-mode network that conceptualizes news preferences. Global and local structural metrics may then be used to measure fragmentation (for a first application of this approach, see Webster & Ksiazek 2012).

In this paper, we develop a full network theoretic approach to the analysis of recipient-news relations. It introduces two major contributions: (1) in addition to recipients and news sources, we add topics of news coverage as a third node type. Sources may be linked by covering the same topics. A distance-based similarity metric then reflects the degree of differences between any two user vertices. By connecting either directly though shared use of the same source or (with a distance penalty) through a topic shared by two different sources, we can accurately position individuals on a gradual instead of a binary similarity scale. (2) we further introduce intermediary nodes that represent the broker role of news recommenders such as social networking sites and search engines. Their impact upon the similarity metric is computed through an interactive removal algorithm. The whole approach is validated using natural extreme states (zero/full fragmentation) and a simulation study of gradually increasing selective exposure.
Experimental Designs in Election Research: Are Online Political Stock Markets a New Option?

Björn Klein; Olaf Jandura
Heinrich Heine Universität Düsseldorf

Election research studies have asked whether surveys influence the voters' electoral expectations about the election results and which effects have risen from these expectations of voting decisions. The theoretical assumptions (e.g. the bandwagon effect) have been empirically examined with different methodological designs. Experimental designs have been considered particularly relevant. The following points are critically seen in the previous experimental designs: the voters' electoral expectations about election results via questioning, the self-assessment can lead to errors; and from a chronological perspective, the measurement of the voters' electoral expectations takes place only once. Influences of survey dynamics could not be displayed.

Our study questions whether experimental designs within Online Political Stock Markets (OPSMs) open up further methodological possibilities to investigate the impact of surveys on the expectations about election results. OPSMs operate according to the following principle of market logic: the convergence of many participants leads to realistic prices of objects. The goal of participants within OPSMs is to forecast the election result by exchange stocks of the parties. The exchange creates the price of the parties, which is interpreted as a forecast value.

In order to evaluate our question, in the period of May 1 to July 17, 2013, 413 active participants of the Handelsblatt OPSM on the national election 2013 in Germany were randomized and divided into four groups. These groups were shown different presentations of the parties' survey results: group 0 (n=117) was shown no surveys; group 1 (n=97) was shown a survey trend over the course of 10 weeks; group 2 (n=94) was shown a survey trend over the course of 100 weeks; and group 3 (n=105) was shown a survey trend from a daily cross section. The values of the stimulus materials were calculated from the mean values of the current daily survey results. The daily number of trading activities, the kind of transaction, and the transaction price generated the dependent variables. The dynamics of the survey results are included as an intervening variable.

The results show that the trading activities of the four groups were different. Participants who were not shown any survey results traded 48.5 percent of all transactions (group 0 mean value=69 trading activities/group member), which was more than any of the other groups that were shown different forms of surveys (group 1 mv=20; group 2 mv=31; group 3 mv=35). In addition, the data-analytic temporal subdivision shows that dynamics in the survey values of the parties had an effect on the trading activities and the price of the stocks of the respective parties (group 1-3). If the survey values were changed, more stocks of the parties were traded, and the price of the stocks became more favorable or more expensive.

Contrary to previous experimental designs, the voters' electoral expectations could be measured in form of real actions as a result of knowledge or non-knowledge about survey
results. Temporal dynamics of different expectations could also be mapped during the long-term experimental period.
The role of social networks to explain political behaviour and attitudes (Session 24; Part 2)
Nadine Meidert
Zeppelin University

It is not only who you are, it is also who you know and whether they know each other.
Exploring the effect of social networks on political participation in Belgium
Emilien Paulis; Matteo Gagliolo; Emilie van Haute
Université libre de Bruxelles

The mobilizing effects of social networks have attracted a growing attention in political science. Many theoretical and empirical studies stressed the role that peers can play on triggering or hindering political participation (Burt & Klofstad 2008, Wolf et al. 2010, Huckfeldt & Sprague 2003, Sinclair 2012, Zuckerman 2005). Nonetheless, these contributions have not always relied on the full analytical power of Social Network Analysis to investigate the role of (personal) social networks in mobilizing individuals in politics: they simply integrate network indicators in basic statistical regressions. Moreover, they tend to focus on electoral participation and do not emphasize other, less conventional forms of participation. Based on data collected via an online survey among a sample quota of 2,800 Belgian citizens, this paper proposes a statistical network analysis of ego network data, using exponential random graph models (ERGM), to account for the structural effect of social networks on political participation. We question how social network structure (more specifically local density) might mediate peer pressure in affecting citizens’ political participation. As observations are sampled, inference regarding the whole Belgian population could also be drawn.
Dissimilarity in political discussion networks and change of political orientations in Switzerland
Anne Schäfer
Universität Mannheim

The relevance of citizens’ embedding into their immediate networks of political discussants for their electoral behavior has been established in numerous studies. Most of these studies, however, focus on cross-sectional observations leading to a deficit in our understanding of the consequences of political talk for the change of political orientations at the individual level. One feature of citizens’ interpersonal communication about politics attracted prominent attention – the dissimilarity of those engaged in these exchanges. Democracy is based on difference and on the recognition of conflict in complex societies; this should pertain not only to the public sphere but equally to private experience. In addition, dissimilarity is a necessary condition for change fueling the democratic process. The outstanding interest in experiences of dissimilarity in citizens’ daily interactions gained special momentum with the deliberative turn in democratic theory. However, there is a vivid debate whether exposure to dissimilar viewpoints is a blessing or a curse for democracy. While exchange with dissimilar others might instill democratic attitudes, its consequences for cognitions and behavior are a source of controversy. One such debate rests on the question whether dissimilarity is a source of individual instability or helps anchoring political preferences. Part of this controversy surely originates in the cacophony of conceptualizations of this feature of interpersonal political communication in existing research. Against this backdrop, the proposed paper investigates how citizens’ exposure to dissimilarity in political discussion networks affects the stability of their political orientations. The paper thus links two either controversial or understudied aspects in existing research. I will investigate the stability with regard to voting intentions throughout the course of the 2015 election campaign in Switzerland, but also in a long-term perspective comparing electoral choices at the 2011 and 2015 elections to the National Council. As the case of Switzerland very much contrasts with the conflict-ridden context of the United States on which most research in this field has been conducted it is of special interest in comparative perspective, suggesting the discussion of concepts and mechanisms in this specific institutional and cultural context. On the dissimilarity side the paper develops a conceptual framework for understanding the (dis)similarity of those engaged in interpersonal communication about politics and proposes to innovatively compare the consequences of disagreement originating in different types of content – disagreement experienced during political exchanges, based on partisan preferences and rooting in dissimilarities on fundamental ideological orientations. The paper will investigate these questions using unique survey data from the 2015 Swiss National Election Study: The data includes a measure of citizens’ perception of the position of their political discussion partners on the left-right ideological dimension combined with other disagreement measures that have been successfully used in other election studies throughout Europe. Due to the panel design of the 2015 study intra-individual change can be linked to citizens’ embedding in (dis)similar discussion networks. The proposed paper will thus not only provide unique insights on electoral behavior in Switzerland, but enrich the international debate on the consequences of discussion disagreement for democratic citizenship more generally.
Big data and alternative facts: The changing face of information as power

Akor Opaluwah
Nottingham Trent University

Access to information has been argued to be a major tool for the fight against poverty and underdevelopment. The unavailability of knowledge/information (along with a number of other factors) has been argued to be a primary factor that incapacitates people from being able to lead a good life. This access to information will enable people make decision that will be beneficial to them and their future. It is believed that such information will aid in development, increase the capacity of people to understand their society, use and protect the environment, and also in the process of electing competent leaders that will work for the benefit of the society. Unfortunately, the already difficult process of accessing information (for many of the world’s population) has (potentially) been thrown into more chaos as humanity travels further in to the era of big data, and the increased availability of unchecked information source. The rise of “fake news” and “alternative facts” are but only a part of the challenges of the information age (and its growth). It is pertinent therefore, to understand the sort of information being made available. It is also important to note the shift in the task of verifying the source of information (and hence its authenticity) from “gatekeepers” to the hand of the users. This along with the proliferation of social media has facilitated the speedy propagation of unverified information. This research therefore questions both the overwhelming nature of the information available, but also the will and capacity of people to utilise this information. This paper will explore the concept of information as power through the perspective of the marginalised. This will question their will and capacity to access, verify, and utilise information.
Do we really discuss important things with unimportant others? On the tie strength of discussion networks and important tie networks - a comparison between The Netherlands and Slovenia

Beate Volker
University of Amsterdam

Recently, the assumption that the well-known ‘important matters’ name generator elicits the names of strong social ties was questioned (Small 2013). The important matters or core discussion name generator asks respondents about partners with whom they discussed important matters during the last six months, and should measure people’s ‘core network’. Small found that almost half of the discussion partners are not listed by respondents whom they ‘would consider important’, and concludes that the important matters question does not only elicit strong but also relative weak ties. These weaker ties would either be particularly useful, or available when people need to discuss specific important matter with others. This conclusion, however, stems from the assumption that important ties are the same as close ties and that both are strong ties, as well as that the important ties respondents have listed are all the important or strong ties they have. What is lacking is a theoretical and empirical assessment of differences between discussion and important ties in terms of their tie closeness. We analyze the characteristics and the overlap between discussion networks and important tie networks. We compare discussion and important ties with respect to various features such as closeness of the relationships, duration, frequency of contact, role relationship, and geographical distance. By this we contribute to the ongoing discussion about whether strong ties (should) reflect actual or potential resource flows, and whether the defining feature of tie strength is resilience of relationship or frequency of contact and what is their empirical relationship to closeness. We also look at the sociological importance of both ‘discussion’ and ‘important ties’ by examining their impact on people’s behavior and attitudes. Finally, we model the two types of networks on background characteristics of the focal actors. We use newly collected data from an online survey in The Netherlands and Slovenia (n=1000 respondents in each country).
Pathways to Support: The Role of Entrepreneurs’ Indirect Relationships on Advice Flows

Sean R White¹, Andrew Parker²
¹Grenoble Ecole de Management, ²University of Exeter Business School

Two crucial elements for an entrepreneur’s survival are stocks of knowledge and their relationships with other people (Davidsson & Honig, 2003; Hoang & Antoncic, 2003). Knowledge is gained by entrepreneurs through conversations with their supporters from which they can receive advice. Hanlon and Saunders (2007: 602) define supporters as actors who “willingly provide” entrepreneurs “access to a valued resource”. This definition builds upon the relational dimension of entrepreneurship which indicates an entrepreneur's access to resources is achieved through social interaction with supporters (Stevenson & Jarillo, 1990; Venkataraman, 1997). Some relationships, however, render better access to resources than others (Brüderl & Preisendörfer, 1998)—but the reasons as to why these particular relationships do so remains unclear. We contribute to unraveling the peculiarities of these particular relationships by expanding observation to include one dyad beyond the direct tie, observing support paths. This way, we contribute to what Slotte-Kock and Coviello (2010) refer to as research in “Business Networks”: Emphasis is both on dyads—here, entrepreneurs’ direct and indirect ties—as well as how they relate to a wider structure—in this case, the support path—to follow both what happens within relationships and across them, with a view towards the complexities of relationships. To this end, we use cross-case analysis (Eisenhardt, 1989), guiding analysis by QCA (Ragin, 2008; Schneider & Wagemann, 2012) to compare these cases because this method reveals through boolean algebra which pairs of tie characteristics form a path that is sufficient for obtaining advice.

Our findings add to research on entrepreneurs’ support by extending the inquiry into the supporters’ network to understand entrepreneurs’ indirect relationships. We call upon insights from discussions of tie features related to obtaining advice, such as association with a supporter or third party of higher status (Borgatti & Cross, 2003; Jack et al, 2004; Ridgeway, 2006; Stam et al, 2014; Wegener, 1991) and multiplexity, which is the accumulation of different types of relationships within a tie (Batjargal, 2003; Dahlander & McFarland, 2013; Ferriani et al., 2013; Kuwobara et al., 2010; Shah et al., 2016). Particular attention is given to experience of negative affect within the relationship (Labianca & Cross, 2006), since advice seeking involves exposing difficult problems (Higgins & Kram, 2001; Levin & Cross, 2004) and the experience of negative affect can cause people to avoid certain conversations with counterparts (Lewicki et al., 1998). We follow up the analysis by combining our findings around negative affect with those around unequal status and multiplexity to further explore the subsets where affect plays a role.

We find that advice is given when a) at least one of either the indirect or the direct tie is of equal status, b) the indirect tie is multiplex, and c) there is negative affect directed at the supporter from at least one of the two ties in question, although if there is absence of negative affect between the supporter and the third party, the entrepreneur can receive advice when negative affect is avoided with the supporter.
The relevance of space, distance and mobility for egocentric networks (Session 26; Part 1)
Sören Petermann
Ruhr-Universität Bochum

Does digitalization contribute to career advancement? Social networks of early career academics
Irina Gewinner
Leibniz University of Hanover

Since the pioneering work of Granovetter (1973) and subsequent theorization of Bourdieu (1983), social networks and social capital represent an important explanation for the labour market success. Contacts not only play a significant role in the process of labour market allocation, but they also fulfill a structuring function (Lin 2001, Runia 2003, Voss 2007).

While most studies focus on social networks in the commercial sector of economy, the importance of social resources for academia, in general, and for early career researchers, in particular, is less addressed. In fact, it is postulated that networking and accumulation of social resources can also yield success in scientific career in terms of obtaining professorship or demonstrating academic achievement (Bozeman & Corley 2003, Besio 2011, Heinze 2012, Sagebiel 2014). However, a detailed study with a prospective design is a rare matter. All the more important it is to investigate effects of various aspects of social networks for career advancement under precarious employment conditions, which is the case in German academic system. Here, the scarcity of resources leads to severe competition against the background of the lack of employment opportunities in the academic labour market. For this reason, the qualification phase is becoming increasingly important. For junior scientists, this status passage is usually the key to further career advancement and professional success.

Yet, the issue of spatial location of social actors in creating academic networks has not enjoyed much attention so far. To this end, this contribution aims at reducing the existing research gap and seeks to explore, to what extent spatial location of early career academics affects establishment of their scientific networks and, more broadly, contributes to career advancement in academia. Do digital modes of communication and hence, diminishment of spatial distance constraints, make it less difficult to shape scientific networks and benefit from them in terms of career promotions?

This contribution exemplifies publication related networking activities of young German researches at the early career stage. These are examined from the perspective of social contacts. The paper extends our knowledge based on individual doctorate by taking into account various forms of doctorate opportunities in Germany comparatively, namely individual and structured doctoral studies. Drawing upon an interpretative research perspective, the investigation rests upon a series of telephone interviews with early career academics in social sciences and the humanities. Additionally, it thematises gender related differences in publication strategies of young researchers.
The subject of innovative technology in humanities and social sciences: A methodological approach on analyzing academic egocentric networks

Elke Hemminger¹, Michael Waltemathe²
¹EvH Bochum, ²Ruhr-Universität Bochum

In a trans-disciplinary project analyzing the engagement among academics in humanities and social sciences in projects that are concerned with innovative technology, one particular sub-project is focussing on the personal academic networks of researchers and university educators. In order to answer several key questions for the project, a mixed method approach has been selected, combining network analysis with creative visual research and interview techniques. The ultimate purpose of the sub-project is to identify significant factors that influence which academics in humanities and social sciences are working on teaching or research projects focussing on innovative technology and how those particular academics are connected to researchers and university educators from science and engineering disciplines.

The paper focusses on the methodology of the sub-project and emphasizes the necessity of triangulating methods in order to get significant results. The researchers are looking at how the regional location of academics influence their professional ties, as well as how they are using digital media for academic networking purposes. In addition, the mobility of the academics is analyzed as an item that influences the possibilities of trans-disciplinary ties. Among others, the project seeks to answer the question, how spatial distance and mobility influence the engagement of academics in trans-disciplinary projects and if communication technologies are enhancing network formation between humanities or social sciences and sciences or engineering disciplines. In order to identify restricting and supporting factors for the formation of such ties, in a second step, the quality of the ties is correlated to other items such as mobility, location and the use of digital networking possibilities. Based on these data, additional qualitative methods such as creative visual research and in-depth interviews are used to further complement the knowledge about enhancing and restricting factors for the formation of trans-disciplinary academic networks.

As the methods to access the required data are necessarily multifaceted, the proposed paper concentrates on how these various methods can broaden the benefit from a preliminary analysis of personal academic networks and how they can be combined in a purposeful and practical way. In addition, the implications of particular results will be discussed regarding possible strategies and means to support the formation of trans-disciplinary academic egocentric networks in a broader context while the project will provide a good example of why such a formation seems to be not only desirable, but academically and socially indispensable.
Personal networks and narratives about academic mobility: Visualizing the transnational mobile patterns of early stage researchers

Nina Jung

This is a qualitative study about transnational mobile decision making of Early Stage Researchers (ESR) in Mexico. The study is based on follow-up data of ESRs’ career paths who had served a postdoctoral assignment at a public university in Mexico City between 2004 and 2015. Semistructured interviews reveal details about their mobility patterns and motivations. In this context I take into account the three types of mobility by Cairns (2014) that are important within the contexts of ESR: short-term mobility, degree mobility, and post-degree mobility. Categorizing the ESRs’ mobile decision-maker profiles considering their particular mobility patterns I found it helpful to make a division into three: 1. the Home Stayers, i.e. non mobile ESR 2. the Back Comers, those who perform and return from an assignment abroad and 3. the Away Keepers, those who never get back home from their stay abroad. As many of the interviewees show, mobile decisions taken by ESR do have to do with influences of people who offer them opportunities in other institutions and countries. Using narratives and visual personal network analysis career trajectories of ESR are illustrated and discussed.
The relevance of space, distance and mobility for egocentric networks (Session 26; Part 2)

Sören Petermann
Ruhr-Universität Bochum

Researching transnational networks in South Europe

José Luis Molina¹, Miranda J. Lubbers, Ashton Verdery, Marian-Gabriel Hancean, Isidro Maya-Jariego, Juergen Lerner, Adriana Suiu, Ignacio Fradejas-Garcia, Natxo Sorolla
¹Universitat Autònoma de Barcelona

One of the foremost consequences of the European integration is the growing number of citizens that either live permanently in another country than where they were born or follow a pattern of circular/temporary migration. In this communication we address the issue of how to elicit the transnational networks of persons and their affiliations to organizations / institutions in South Europe. Drawing on the approach followed by Mouw et al. (2014) for the transnational networks of Mexican migrants in the USA, in the research project ORBTIS (MINECO-FEDER-CSO2015-68687-P) we study the flows of contacts among two Romanian enclaves in Spain (Castelló & Roquetas de Mar), and their places of origin in Romania (Dambovita & Bistris-Nassau, respectively). This approach uses a link-tracing design where people interviewed in one place invite others in the place of residence and in origin to participate. In total 800 questionnaires will be collected (200 in each place), along with the affiliation to organizations/institutions. With this methodology, we aim to describe not just the web of contacts among individuals in this transnational space but also the network of organizations and institutions playing a role in it. Once the multilevel network has been elicited, 50 cases will be selected in order to conduct an in depth personal network analysis. With this research we aim to understand the dynamics of migrants enclaves within Europe, and the role of multilevel networks in explaining this phenomenon.

Residential environments and personal networks in Germany
Sören Petermann
Ruhr-Universität Bochum

In models of establishing and maintaining personal networks, spatial conditions can facilitate or restrict actions. Contexts like residential environments support the formation of networks by offering diverse encounter opportunities as well as a variety of people who possess different resources. On the other hand, residential environments with scarce opportunities to encounter others and with a homogenous resource-poor population restrict the development of personal networks. However, contemporary theories of societal change question the impact of spatial conditions as mobility and communication technology break down spatial boundaries. Furthermore, spatial conditions may work different for different people depending on stage of life and mobility resource at hand. We investigate in spatially conditioned personal networks in modern societies like Germany and examine which structural characteristics of personal networks (size, density, composition) will be affected by space. We use data from the German General Social Survey 2010. The analysis shows that network sizes is less affected than density and composition.
In Passing: The relational meaning of space for the occurrence of informal knowledge sharing in R&D
Philip Roth
Fraunhofer-Institut für System- und Innovationsforschung

Research has shown that informal advice networks are a key success factor for developers working on innovation projects in enterprises (Allen 1977). Following this, questions arise concerning the emergence of these networks and the corresponding milieu of interpersonal, spatial, and contextual interactions that facilitate their formation.

The research on these questions focuses particularly on the knowledge that actors have about others. This is grounded in the assumption that the occurrence of interactions results from a cognitive selection process. Contrasting research has demonstrated that unplanned encounters are essential to the emergence of informal advice networks (Backhouse & Dew 1992). In this context, the spatial work environment is of great importance, since it structures the occurrence of these encounters (Sailer et al 2016).

So far, it has not been possible to satisfactorily explain why some encounters encourage interactions, in particular professional exchanges, while others do not (Rivera et al 2010, S. 107). It is assumed that the context of the encounter is significant for this endeavor (Feld 1981; Fayard & Weeks 2007).

I suggest considering space relationally (Löw 2001) to reveal the structural meaning of contexts. We must account for the shared schemes of perception, thought, and action that structure the practical effect of space in Communities of Practice (CoP).

In the lecture, I will present the results of an investigation in which I examined the importance of the socio-spatial contexts of encounters at the occurrence of focused interactions in three development departments embedded into large corporations. Methodically, I applied the diary method (Roth 2015) and interviews. In sum, I worked with 43 developers for one month and analyzed 129 interactions.

The results clearly show that contexts have a CoP-specific but systematic impact on the unplanned occurrence of professional exchange. Furthermore, these findings relativize some basic assumptions about the connection between unplanned exchange and space. For example it is found, that open spaces, which promote the chance for co-presence, in two of three cases are counterproductive in regards to encouraging the interpersonal interactions critical to productive, informal advice networks.

These studies can be further employed to specify spatial conditions that promote unplanned encounters resulting in professional exchange, as well as those conditions that do not encourage productive network transactions. This enables the research community to determine the effect of spatial work environments on network interactions more precisely than is currently possible.
Social Networks and Spatial Embedding (Session 27; Part 1)
Olaf Rank¹, Kerstin Sailer²
¹Albert-Ludwigs-Universität Freiburg, ²University College London

The Effect of Small Distances – Investigating Interaction Networks in a Workplace
Kerstin Sailer¹, Ros Pomeroy
¹University College London

Research has long shown the impact of physical distances on communication and collaboration patterns. The propinquity effect first proposed by Festinger et al in the 1950s showed how communication decreased with increasing distance. This was underlined by the seminal study of R&D engineers by Allen in the 1970s, giving rise to a distance – communication curve often found in organisations, where the probability for frequent communication tailed off after as little as 22-25 metres walking distance between work stations. More recently, it was suggested that the impact of small distances is often underestimated. Investigating dispersed software development teams, Siebdrat et al found that teams located on different floors of the same building performed as badly as globally dispersed teams when it came to task efficiency. In other words there is a non-linear relationship between distance and team performance. The authors argued that more geographically dispersed teams were possibly more aware of their spatial disadvantage and put more effort into overcoming barriers induced by physical distances than teams in the same building.

Against this background, this talk aims to investigate the effect of small distances in the case of the headquarters of a medium-sized retail organisation, which moved from a partitioned office across two floors into an open plan office with all staff placed on a single floor. In line with the above-mentioned findings, it would seem likely that the organisation experienced improved communication due to the overall decreased distances between teams. The opposite was the case, as networks of face-to-face interaction decreased in density in the new workplace design, and often also showed fewer ties bridging between departments. Exploring small distances in more detail using both architectural floor plan analysis tools (including space syntax) and theories of subjective distances, perceived distances and psychological distances, we will aim to explain why ties in the interaction networks of the organisation formed in constrained ways, and what role the physical design of the workplace, particularly visibility relationships played in this.
Spatial diffusion and churning over the life-cycle of innovation

Balazs Lengyel\(^1\), Riccardo Di Clemente, János Kertész, Marta C. González

\(^1\)Massachusetts Institute of Technology

Social networks have been extensively used to study how innovative ideas, products or services spread through society. However, it is not fully understood how social contagion happens in space, how diffusion takes place over the life-cycle of products, and how churning happens in spatial social networks. In this paper, we use a unique dataset compiled from a Hungarian online social network (OSN) that was established earlier than international OSNs and was closed down after failing the competition with Facebook [1]. We find that the OSN was adopted early in large towns where churning also happened early. However, while the coefficient of imitation in the Bass DE diffusion model varies, the rate of exponential growth in churning is surprisingly stable across towns. Using information on invitations to register on the OSN, we show that the extent of town-level transmission became a superlinear function of town size by the middle of the product life-cycle. Interestingly, invitations became less and less likely to be sent to large distances; we find that the exponent of the distance decay function increases over the life-cycle. Further, we discover that the cascade of churn is local because the fraction of proximate friends who already churned is smaller than the fraction of distant friends who already churned when the user in focus decides to churn [2]. Finally, we develop an agent-based Bass model of diffusion on the one hand and an agent-based threshold model of churn on the other hand. With these models we target town-level peaks of adoption and town-level critical mass of churn, respectively, in order to exploit how geographical distance influences diffusion and churning processes in social networks.


The Place of Interaction: Social Networks and Practices of Visual Artists in European Studios

Dafne Muntanyola-Saura¹, Nikita Basov², Anisya Khokhlova³
¹Universitat Autònoma de Barcelona, ² St Petersburg State University, ³ St. Petersburg State University

Artistic residencies are designed to foster collaborations, and collaborations happen as distributed artistic practices. How does studio space shape the artistic practices of visual artists? Does a studio design have something to do with the patterns of collaboration among artists, as compared to friendships between them? How does the studio structure foster moments of informal communication? Following Bourdieu (1984) and Portes (2010), artistic practices are part of the artists’ cultural capital. Meanwhile, collaborations and friendships build social capital. We ought to find the empirical roots of collaboration and friendships. Our general objective is to understand the role of spatial organization of the artistic residence space in artistic practice that involves collaboration and friendship patterns. We developed a cognitive ethnography of visual artists sharing studios in St Petersburg, Barcelona and Hamburg. As part of a mixed methods approach, we mapped the artists’ personal networks within each of the studios running verified sociometric surveys, collected interview narratives and traced their daily creative practices with photoelicitation and video recording during observations of their daily creative practice. We defined patterns of interaction and distributed practices that arise from working together in the same building. We analyzed the audiovisual data with the following software: UCINET & EGONET for the quantitative analysis of personal networks, ATLAS.ti for the qualitative analysis of artists’ narratives, and SPACE SYNTAX for the analysis of architectural space. To test if there is a relationship between sharing a studio and being connected with a social tie (collaboration or friendship) we applied exponential random graph models using MPNet. Our findings show how the residence structure is related to patterns of collaboration and friendships of artists. Collaboration takes place mainly in the studios, while friendship happens in common areas as well. Thus, the studio space is a resource for distributed artistic practices among artists. Moreover, the artists’ use of both physical space and objects consolidates friendship patterns. We conclude that mixed methods approach allows us to shed more light on the role of interaction in artistic practice.
Why some encounters encourage unplanned discussions on R&D-projects and others do not
Philip Roth
Fraunhofer-Institut für System- und Innovationsforschung

Research has shown that informal advice networks are a key success factor for developers working on innovation projects in enterprises (Allen 1977). Following this, questions arise concerning the emergence of these networks and the corresponding milieu of interpersonal, spatial, and contextual interactions that facilitate their formation. The research on these questions focuses particularly on the knowledge that actors have about others. This is grounded in the assumption that the occurrence of interactions results from a cognitive selection process. Contrasting research has demonstrated that unplanned encounters are essential to the emergence of informal advice networks (Backhouse & Dew 1992). In this context, the spatial work environment is of great importance, since it structures the occurrence of these encounters (Sailer et al 2016).

So far, it has not been possible to satisfactorily explain why some encounters encourage interactions, in particular professional exchanges, while others do not (Rivera et al 2010, S. 107). It is assumed that the context of the encounter is significant for this endeavor (Feld 1981; Fayard & Weeks 2007).

I suggest considering space relationally (Löw 2001) to reveal the structural meaning of contexts. We must account for the shared schemes of perception, thought, and action that structure the practical effect of space in Communities of Practice (CoP).

In the lecture, I will present the results of an investigation in which I examined the importance of the socio-spatial contexts of encounters at the occurrence of focused interactions in three development departments embedded into large corporations. Methodically, I applied the diary method (Roth 2015) and interviews. In sum, I worked with 43 developers for one month and analyzed 129 interactions.

The results clearly show that contexts have a CoP-specific but systematic impact on the unplanned occurrence of professional exchange. Furthermore, these findings relativize some basic assumptions about the connection between unplanned exchange and space. For example it is found, that open spaces, which promote the chance for co-presence, in two of three cases are counterproductive in regards to encouraging the interpersonal interactions critical to productive, informal advice networks.

These studies can be further employed to specify spatial conditions that promote unplanned encounters resulting in professional exchange, as well as those conditions that do not encourage productive network transactions. This enables the research community to determine the effect of spatial work environments on network interactions more precisely than is currently possible.
The role of spatial and industrial proximity on the formation of inter-cluster linkages in Germany.

Georg Wolff, Michael Wältermann, Olaf Rank
University of Freiburg

Industrial clusters can be seen as regional agglomerate of companies operating in an environment where tacit and specialist knowledge is easily circulating and, hence, the cluster-members may gain competitive advantage over organizations outside the cluster boundaries. However, recent literature points towards a competitive advantage as well as long-term success of clusters through inter-cluster ties. In particular, these inter-cluster ties may contribute to the acquisition of new knowledge from different regions as well as industries to foster innovation and avoid negative effects of lock-in and over-embeddedness within the cluster.

Selecting external partners is not a random process but resulting from strategical considerations. First, industrial proximity may positively affect the formation process of inter-cluster ties. This process appears to depend on the development stage of the underlying cluster’s main industry. Furthermore, it can be reasonably assumed that clusters trigger partnerships with clusters operating in complementary industries to provide their member organizations with access to new sources of knowledge and market opportunities. Second, geographical proximity may influence the choice of the cooperation partner. There is a tendency to select partners which are located nearby, due to the higher probability of face-to-face contacts and the lower cost in setting up such relations. However, operating in the same region may lead to strong competition among cluster organizations for acquiring members, especially if they focus on the same industry. Therefore, spatial and industrial proximity interact together. While theoretically the cluster benefits from ties with other cluster organizations, no empirical evidence in recent literature exists. All in all, we see a major research gap in the understanding of inter-cluster cooperation’s and how they emerge across regions and industries.

For our research purpose, we collect a unique dataset from 93 leading clusters operating across different industries and regions in Germany. It contains information about the formal cooperation agreements between the clusters as well as geographical and industrial details. We contribute to recent work by a comprehensive network analysis of the cooperation structures between industrial clusters. At the same time, we investigate the impact of geographical and industrial proximity on the formation of external inter-cluster linkages.
Spatial, Social and Professional Proximity in Hospital Wards
Rosica Pachilova, Kerstin Sailer
University College London

This paper discusses the role of spatial proximity in hospital wards on team proximity – the formation of social and professional networks. A comparison was drawn between interactions in coffee and breakout spaces – social conversations that indicate a form of closeness between individuals, and interactions in bays and patient rooms – conversations that are classified in this study as professional. It is considered that when caregivers interact professionally but do not interact socially, their relationship is socially distant and would affect their professional relationship negatively and result in poor team communication and performance. Several research questions are of interest for the study: 1) Do interactions in coffee rooms differ from interactions in patient bays? 2) What happens within and across roles and seniority? 3) Does spatial closeness matter for social closeness? 4) What type of relationships lead to good quality of care? These questions are of interest because there is a lack of research in healthcare that investigates the role of the architectural layout on communication networks of caregivers and how this affects their team work. Moreover, how professional roles and seniority influence the formation of social and professional ties in hospital wards has been sparsely studied.

The study is multidisciplinary and combines theories and methods from the fields of space syntax, social networks and organisational behaviour. Space syntax is used to assess the layout of the wards and compare the potential emanating from visibility relationships quantitatively. The method represents the continuous flow of space as a series of linked elements, for instance rooms and corridors in a building are connected by doorways or staircases. Caregiver communication was captured with sociometric sensors developed at MIT. The devices contain a microphone, Bluetooth and infrared sensors as well as an accelerometer and provided information about the duration and frequency of communication between participants, their body movement and posture as well as turn taking, tone and pitch of voice during conversations. A staff survey was conducted to assess communication among caregivers and teamwork. The research takes place in the intensive care units of three different public hospitals situated in London that were specifically selected to contrast in their setup and spatial organization.

Results suggest that the layout of hospital wards facilitates the formation of social and professional ties, which are important for good teamwork and communication and consequently good patient care. However, space is not the only factor affecting communication and professional role and seniority of staff also have an effect on caregiver interactions. The paper enhances the current understanding and knowledge on the influence of the ward layout on the formation of professional and social networks.
Social Network Analysis and its methodological potential to identify general features on Ebola Related Knowledge Producing Networks

Thiago Mendes, Teresa Sá Marques

Universidade do Porto

The last Ebola outbreak (2014) in West Africa shown again the huge problems caused by this virus. Despite of the enormous numbers of infected and fatal cases, this wasn’t the first crisis related to this disease. Before this, it was registered at least six others crisis involving more than one hundred deaths. Over the years, and during these different crisis, namely between 1977 and 2016, the scientific community have published 3871 papers, softwares, revisions, book chapters and other kinds of works from a very diversified knowledge field, that were indexed on the Web of Knowledge platform with the name “Ebola” on the title.

The aim of this work is to show and discuss some analytical methodologies on social networks analysis, that are potentially capable to describe the behavior of Ebola related knowledge networks, over the time, highlighting the periods of outbreaks. It has considered the institution nationality of the author and co-author on each publication. Among the different indicators analyzed, the Self-Loops and the Average Geodesic Distance showed the most interesting results. A non-directional network was structured on NodeXL software, including the first author as Vertex1 (repeating this by the number of connected partners) and the co-authors as Vertex2. The Self-Loops indicated how many times the first author links to co-authors institutions of the same country. This indicator was compared to the total edge and to the total number of publications produced on the same period. Comparing the Self-Loops and the total edges on ten different periods, considering epidemiological crisis and non-crisis periods, in the 1990’s decade it was observed an intensive reduction of the self-loops weight compared to the total number of connections. This result may point that, on that moment, the scientific knowledge production ecosystem of Ebola were geographically more diversified if compared to the others periods after and before. On the other hand, on the last decade, the Self-Loops became bigger. Comparing this same indicator with the total indexed scientific publications, looking for the same periods, it was observed that the average of Self-Loops on each work grown up on a relatively constant way over the years, starting on 0,75 in the 1970s, going to 1,44 in 2002-2004 period and reaching to 2,20 in the last period (2014-2016). These data can point that, over the years, each publication further valorized the endogenous knowledge, even if it seeks distant partnerships. This distant partnership become clear when, observing the network Maximum Geodesic Distance, as well as the Average Geodesic Distance. It’s possible to verify that in both cases there was an increase in values over the year, indicating that the networks that compose the Ebola related knowledge production ecosystem becomes wider. In this sense, is possible to observe that the social network analysis methodologies introduce indicators that tend to reflect the scientific community behavior in front of Ebola.
Toward a Network Model of Soft Law: what gives Soft Law its Power?

Bryan Druzin

What gives soft law its power? What is meant here by soft law are quasi-legal instruments that have no legal force, such as non-binding resolutions, declarations, and guidelines created by governments and private organizations. Why is it that these instruments, possessing no legal force or coercive mechanisms, are often widely adopted and, even more perplexing, generally followed? This question is of particular relevance to international law where a centralized legislative authority is absent and yet has seen the proliferation of quasi-legal documents, such as ‘protocols,’ ‘principles,’ ‘guidelines,’ ‘codes of conduct,’ ‘communications,’ ‘checklists,’ and ‘rules.’ This growing body of soft law wields considerable international influence. Situated somewhere in the ill-defined hinterland between hard law and non-law, soft law has far-reaching implications for international governance.

I argue that soft law derives much of its power from network effects. A network effect occurs where the value of a product or service increases as the number of other agents using the same product or service grows. Network effects arise from the need for compatibility between standards. The classic example of a network effect is language: as a language grows in popularity, so too does its usefulness, which encourages further growth. Moreover, the rules of a language—its grammar, spelling, pronunciation—hardly need enforcement. They are self-enforcing. The paper argues that international law—particularly international commercial law—is susceptible to network effects and that this helps explain why, despite lacking coercive force, so much soft law is voluntarily adopted and complied with. Parties wishing to interact require common standards. Like left and right-hand drive, it is often the case that parties have no strong preference for which rules are adopted so long as they are commonly adopted. In such circumstances, parties merely require gentle direction as to which rules they should adopt in order to successfully coordinate. Network effect pressures then take care of the rest, triggering coalescence around these rules and ensuring that they evolve into common standards, widely adopted and followed.

I argue that areas of soft law that exhibit strong network effects are uniquely calibrated to induce voluntary adoption and compliance. Identifying the presence of network effects with respect to soft law is useful on both descriptive and prescriptive fronts. It not only provides an explanatory account of the process through which certain soft law gains ascendancy, but several important considerations of a prescriptive nature flow from this insight. I argue that it is possible for policy-makers to strategically harness this dynamic to stimulate legal harmonization. For instance, there are concrete steps that international bodies, such as the United Nations Commission on International Trade Law [UNCITRAL] can take to promote the standardization of the rules and practices of arbitration. Network effects, however, can also give rise to significant problems, such as ‘lock-in’, rent-seeking exploitation of path dependency, and the drawbacks to ‘over-standardization’. I also consider some of these
potential problems at length, and caution that policy-makers need to be mindful of these dangers.
Legal interpretation and network structures in mock trials shaping the European Unified Patent Court

Emmanuel Lazega\textsuperscript{1}; Isaac Lambert\textsuperscript{1}; Eric Quintane\textsuperscript{2}
\textsuperscript{1}Institut d'Etudes Politiques de Paris; \textsuperscript{2}University des Los Andes

This paper presents a combined relational and cultural approach to transnational institution building by focusing on a network analysis of a small collegial oligarchy of European judges and their controversies concerning the right interpretation of the European patent. We use a combination of observation of mock trials and interviews at the so-called Venice Forum – a field-configuring event that was central in creating and mobilizing a network of European patent judges for the construction of a new transnational institution, the European Unified Patent Court.
The Economization of EU Competition Policy: Mapping the Network of EU Merger Control Decisions

Sebastian Billows\textsuperscript{1} \& Fabien Tarissan\textsuperscript{2}

\textsuperscript{1}Centre de sociologie des organisations; \textsuperscript{2}CNRS

Since the early 2000s, sociologists have paid more and more attention to the growing role of economics in various social fields. It is now common knowledge that the concepts and models devised by economists have an impact beyond academia. Rather than merely describing economic life, their models and their instruments shape both market interactions and the way market agents make decisions. Recent contributions have started questioning the political implications of economization. The influence of economics on social life is not just a matter of academic prestige or whether economic models provide calculative capacities. Economization is often a deliberate choice made by governments, regulatory agencies, or supranational institutions to shed themselves from the controversies that are inherent to policymaking.

This research considers the economization of competition policy, a major area of business regulation which is now mainly enforced by the European Commission. In 2004, regulations 139/2004 and 802/2004 introduced a comprehensive reform that dramatically increased the role of economic analysis in European merger control. A core aspect of the 2004 reforms was the introduction of SIEC (“Significant Impediment of Effective Competition”), a sophisticated test assessing the impact of a merger on future consumer welfare. Economization is predicted to have streamlined the way the European Commission’s handles merger cases. The 2004 reforms unify and codify a wide array of pre-existing informal practices. Those criteria were used in the past, yet not in a systematic way: they were applied in an ad hoc analysis of the case. The shift towards more precise criteria was implemented to make decisions more predictable. One of the outcomes of the introduction of guidelines we predict is that decision-making is less and less geared towards substantive, industrial policy goals and more and more oriented towards abstract notions of “consumer utility” and “efficiency”.

The fact that merger control has become more universal and that sector-specific concerns are less relevant can be traced using the network of citations of merger cases. Each time the EU Commission handles a merger case, a detailed written account of the decision is made public. In those texts, EU officials spell out the legal and economic reasoning that justifies why they fully authorized, conditionally authorized or prohibited a merger proposal. EU Commission decisions are considered as nodes connected to each other through citations. By analyzing merger decisions as a network, it becomes possible to delineate clusters of decisions and single out the most cited cases. More importantly, this will allow to test whether sector remains a predictor of citation ties. We hypothesize that since the reforms implemented in 2004, more and more cases cite other cases from other sectors. As merger control integrates economic models, we predict that some cases are used as a benchmark for deciding mergers and acquisition, regardless of the sector the firms belong to.
Mapping the scholarship in International Courts: An exploration of scholar networks.
Yannis Panagis; Juan-Antonio Mayoral
University of Copenhagen

Collaboration networks in scientific articles is a well-studied area, pioneered by the work of de Solla Price and Garfield. There have been many attempts to study collaboration networks in social sciences, with one of the most recent examples in Political Science (Metz & Jäckle, 2017). Nevertheless, there is no scientific work, to the best of the authors knowledge, in the field of Law, in general, and International Courts in specific.

This paper attempts to fill this gap by exploring the development of the interdisciplinary communities of knowledge devoted to the study of International Courts. For that purpose, and following previous contributions in other social science fields, we have collected information about co-authorships up to 2016 from the core journals in law, political science, history and international relations. The paper aims to offer a general overview of the links between the main scholars and journals leading the production of knowledge in the field and to highlight changes in collaboration patterns.

Our initial focus is on the prolific scholars in the field and on studying the network's connected components as an attempt to link with various domains of expertise. Moreover, the paper explores the different sub-networks organized by type of court, discipline and the networks of cooperation between academic institutions, in order to identify processes of cross-fertilization between the scholarships in International Courts.