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Abstracts

Clustering Network Data

Anuska Ferligoj, Tamas Rudas

Segmenting the market according to consumer's benefits and value orientations – the application of structurally determined laddering method

Bojan Korenini and Zenel Batagelj

As marketing practice accepted the viewpoint that company does best when directing its activities according to the needs and desires of customers in chosen target markets, the necessity for the research methods that would increase the depth of understanding of the consumers emerged. The laddering research method counts as one of new approaches that are trying to fulfill this request. Although there are different approaches to laddering, the method originates in the field of qualitative methodology. Theoretically it draws from means-end theory that treats objects as means to achieving certain valued states, or ends. By using a series of directed probes, typified by the question "Why is this important to you" it identifies the specific linkages between product attributes, consumer benefits and consumer's value orientations. The data create a hierarchical value map. Such map is treated as a directed graph, which shows a unique way in which a product is linked to consumer's personality. There are a lot of different quantitative and qualitative research methods that are aimed at exploring the relationship between the product and consumer's value orientations. In the case of quantitative research methods, there is a lack of information, how specifically different characteristics of a product fit into the consumer's life. On the other hand qualitative methods are better at revealing such information, but because of unstructured nature of such methods they are usually conducted on smaller samples. This fact qualifies them to explore just the respondents under examination rather than to be representative for the whole population of consumers. Laddering overcomes such problems. The method provides information about specific individual-based linkages between consumer product characteristics and consumer's value orientations. Because of structured gathering of the data, method can be conducted on larger samples. There are different approaches to laddering: soft laddering, hard laddering and structurally determined laddering method. The later was developed by the authors of this paper. Although one of the advantages of soft laddering method is that it can be conducted on larger samples, in practice sample size usually

doesn't exceed 50 or 100 respondents, because soft laddering interviews are difficult and require specially trained interviewers. Besides identification of common structures in complex qualitative data is very laborious. Most frequently the type of marketing decisions where laddering method proves supportive require statistically grounded conclusions. The new approach - structurally determined laddering can be conducted on several hundred or more respondents (it can be also conducted over the phone). In this way conclusions of the laddering research are no longer limited to the sample of respondents under the scope. Beside that structurally determined laddering opens a lot of new possibilities, in the sense of analysis and practical application of research results, which depart significantly from the possibilities that soft laddering could offer. Authors of the paper wish to discuss different approaches to laddering method in the context of quantitative and qualitative research methods, statistical analyses of such network data and benefits that follow from the application in marketing, mainly in the field of market segmentation.

Clustering Personal Networks as Symbolic Objects

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Personal or ego-centered networks are frequently encountered in the social science research. A unit of the analysis is a respondent (ego) with his/her personal network (alters). Each unit is described by selected variables, which are usually measured in different scales. Several (other) variables are also measured on alters, that describe relationship among ego and alters and properties of alters. Personal networks can be very large. In the paper we focus on two problems:

- Presentation or description of a personal network.
- Reduction of a personal network's size.

For the descriptions of personal networks symbolic objects are used. Using variable's distributions (instead of the value of an appropriate statistics - e.g. mean value used in the "standard" approach), the symbolic objects provide a more detailed description of personal networks. Based on this descriptions the adapted version of the leaders method was developed, which is a variant of the dynamic clustering method. The results of the proposed approach will be presented on the social support networks in Ljubljana 2000 data set, collected at the Faculty of social sciences of University of Ljubljana.

Towards Multilayer Network and Combinatorial Models

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We examine multilayer network, multilayer cellular automata, and their combinations. Applications are oriented to complex composite systems (social networks, organizational systems, sociotechnical systems, etc.). Multilayer network consists of the following: (1) basic elements for each layer: a set of elements (persons/individuals, tasks, groups/teams, rules, rights, rooms, goods, etc.) and some structures on them (binary relations, hierarchy, etc. as horizontal correspondence); (2) binary relations between structures of different layers (vertical correspondence). k-layer cellular automata is the following: (a) a set of elements at each layer; (b) each element has several types of basic states and four kinds of influences (logical or probabilistic functions, optimization models) as follows: self-influence, neighbour influence, influence of the higher layer, and influence of the lower layer; (c) layers can be composite ones. The following combinatorial problems are considered: (i) assignment/allocation; (ii) clustering (e.g., grouping, skeleton clustering); (iii) routing; (iv) approximation/covering; and (v) multiple matching. A list of applied examples involves the following: (a) allocation of personnel; (b) allocation of information access and/or decision making functions into a set of specialists; etc.

Visualization of Social Networks using SVG

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SVG (Scalable Vector Graphics) is a language for describing two-dimensional vector graphics based on XML (eXtensible Markup Language). Three different types of graphic objects are supported: paths consisting of straight lines and curves, images and text. SVG provides all transformations which are usual in standard vector graphics packages. Additionally, animation can be applied to SVG pictures. Pictures in SVG can be examined using Web browsers using a special plug-in. Objects in SVG DOM (Document Object Model) can be accessed using JavaScript language and in this way parts of the picture can be manipulated dynamically from the Web browser. In the paper some approaches to visualization of social networks implemented in Pajek as options for exporting layouts to SVG will be discussed and illustrated by some typical examples.

Patterns of Institutional Affiliations of Household Members and Children's Social Contacts

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The aim of this paper is to analyse the impact of properties of the local household environment on structural aspects of children's social relations. The structure of social relations of children is described by some aspects like the relative amount of social relations at different locations (home, street, school, sport clubs), multiplexity of contacts (same persons at different locations), more or less restricted size of social circles (number of persons met simultaneously), and so on which seem to be important for socialisation processes under a theoretical perspective. On this basis children are clustered into a few classes. Afterwards these classes are partly reconstructed by means of patterns of relations of other (mainly older) members of the households.

The empirical data were generated in 40 systematically selected small areas ("extreme cases") with 3000 to 15000 inhabitants each. Within each regional unit, a random sample of about 25 children age 8-9 and 13-14 was drawn. The children and one parent were interviewed, mainly about their personal relations and the institutions they were affiliated with.

Cognitive Networks

Stephen Borgatti

Formal Requirements for Using Network Metrics in Representing Cognitive Structures

Walter Bien
DJI

The representation of a network with paths build by a combination of links with an additive metric needs some formal requirements on the used data. Such requirements are e.g. that data are reflexive, symmetric, transitive, complete and for some content reasons balanced. We proved this requirements for cognitive representations of different relations between persons acting in small groups. The result show highly structured data in relation to the proved requirements, but also an extremely high number of violations against the requirements.

Some Issues in Comparing Aggregate Cognitive Networks

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Given a set of cognitive networks such as collected by Krackhardt or Kumbasar, a natural analysis to attempt is a comparison of the aggregate networks obtained from two groups of respondents, such as men and women. A typical approach to this problem uses the non-parametric, permutation-based QAP technique to correlate the two aggregate sociomatrices. However, the null distribution that QAP is based on may not be appropriate for comparing subsamples of a dataset. QAP compares the correlations between subsamples with correlations among a set of matrices that include many that are quite different from those could be obtained by aggregating subsamples. Consequently, the QAP approach reaches significance too often in this context. An alternative method is proposed here that compares the observed correlation with correlations among matrices that are of the same kind as the observed - they are obtained by aggregating data from random samples of the dataset. The new method yields results that accord better with researchers' intuition. In addition, the new method can be applied to a variety of data types beyond those appropriate for QAP.

Dreadful Ties: The Structure and Perception of Negative Interpersonal Networks

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Social network researchers tend to focus on the positive side of interpersonal relationships (e.g., friendship, advice, and trust). Negative relationships are acknowledged at times, but rarely measured because study participants are reluctant to answer questions about the disagreeable or malevolent side of their social lives. For this reason, we know little of how networks of positive and negative relationships differ in their structure, if at all. Nor can we say how transparent, or concealed, this structure is to the observer's eye. This study uses cognitive social structure data on the patterns of like and dislike among 53 students at an American university to demonstrate asymmetries between the way positive and negative relationships are built and perceived. Implications for the significance of positive and negative affect in the study of social networks are drawn.

Cognitive and Social Systems as Complex Interactive Networks

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 Sci.

Real world systems in many cases can be represented by networks. Networks can be seen everywhere (neural networks of the brain, food webs and ecosystems, electric power networks, system of social connections, global financial network, the world-wide web). Since the famous social psychological experiment of Stanley Milgram, it is known that from certain point of view we live in a 'small world'. However, the relationships between the structure of large networks and their dynamical properties generally are not well known. The performance of many biological, ecological, economical, sociological, communication and other networks can be illuminated by using new approaches coming from graph theory, statistical physics and nonlinear dynamics. The relationship between the topological structures of neural and mental structures are explained. Further examples will be given to illustrate the power of the new approaches in the understanding of the organization of cognitive and social structures.

*An Argumentative Approach to Discourse: "Topos",
Discursive Structures and Social Network Analysis*

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This paper pays special attention on methodological and analytic issues related to argumentation and discourse, and on Social Network Analysis as a way for its study. From a theoretical point of view, argumentation is an area of inquiry which can be approached from a variety of perspectives and techniques. Anscombe and Ducrot (*L'argumentation dans la langue*, 1983) define an argument as a relation between a premiss "p" and a conclusion "c", relation which can be standardized in a linguistic-cognitive rule called "topos". From this point of view, an analytic proposal is developed. The procedure is based on the successive identification of argumentative relations in the text. As a result, discourses are not segmented into preestablished themes or categories, but globally represented in networks of "topos" which keep its unity. These cognitive networks are analyzed and represented by social network analysis.

Attempting to Analyse Biased Samples of Subjective Views

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In a social group each member of the Group may have a view of any other member of the group. This view may be expressed by a value on an appropriate scale which may depend on the "true underlying measures" of both the viewed and viewer. The way in which the view-value and the true-value differ will depend on how the viewer responds to the relative and absolute perceived positions of ego and other. Some actors will be "attractors" in that they give other actors a view-score closer to their own perceived score.

Data may be collected on the views of a sample (possibly 100%) of the individuals in the group. The first question to be considered is the estimation of the "true-measure parameters", for different sample structures and for different models of behaviour structure in the group.

It is then possible to consider asking a particular actor (their second order view of) how they would expect the other actors to view each other. Does this second order view contain new information which may be used to improve the efficiency in the estimation of the group parameters? If so then it may be possible to select just a few strategically placed (i.e. biased) viewers for first and second order view measurement in order to characterise the underlying parameters of group members, as well as their attitudes. Simple models and fitting algorithms for this "relativistic" model of group attitudinal structure will be presented on test datasets.

*The Dienes-Phenomenon:
A Cognitive Switchboard between Inter-scholarly
Networks*

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The Dienes phenomenon (DPH) has been described the first time at the Second International Conference on Work Values (Prague, 1992, Proceedings, Pp. 35-42), as a radical, innovative approach to the interpretation of experimental data. The application of the method turned out to become an able instrument of interdisciplinary transformations, a Gestalt-switchboard using cognitive network operations - so to say. The basic innovation of DPH is the point that the way of presentation of data already determines their immanent disciplinary character and changes in presentations are operating switches between scholarly networks. Accordingly data have two different relations among themselves: permanent identities, differences (différence, külön-bség) and potential ones (différance, külömb-ség) varying according to disciplinary lines.

Knowledge Graphs and Network Text Analysis

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Sociological knowledge is available at many different places. It is desirable that empirically tested knowledge is available at one place. The many studies containing this knowledge contribute a little to theorising in a specific field, but do not hold a complete overview. Network structures can be used to get such a complete overview. Networks used for this representation are called knowledge graphs. This paper presents the state of art with respect to this kind of graphs and next concentrates on two issues. The first one is the determination of concepts (points) to be used in the graphs. Usually they are too broad; they are abstract concepts build up of several other concepts. The other issue concerns the use of conditional statements. Some findings hold only for a specific group, say only boys or girls. This has implications for the representation of the theory. The examples that are used come from the labour market theory.

*A Proposal of Three-dimensional Coding of Texts
Using Cognitive Networks: An Application to Narrative Interviews*

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Nowadays cognitive networks are applied to very different fields. Besides the uses in Linguistics, Psychology or Artificial Intelligence as a system of knowledge representation it is possible to use them as a valuable help in qualitative text analysis. This paper presents an analysis procedure that combines cognitive networks and causal networks in order to obtain an objective, explicit and formalized structure of discourse. The objective is to reconstruct the discourse of individuals by attaching codes to segments of text and connecting them. This structure develops in two different planes. In the first one, a hierarchical relation between codes is established, going from codes with a high level of abstraction to those with a lower level of abstraction. This procedure is applied to semi-structured interviews in which the relation between training and employment is posed. The representation of the networks by means of graphs and the simplification based on the hierarchies of concepts prove to be very useful in understanding and explaining the training and labour trajectories described by individuals, as well as to compare the description of different trajectories.

Structures of Managerial Decisions in Export Strategy

Formulation - Cognitive Maps of Austrian Managers

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Introduction. Since the Uppsala and Innovation models were developed, numerous scholars have advanced various criticisms. Some have said the models are too deterministic. It is likely that many firms rely instead on careful strategy making, which considers a number of more or less abstract success factors. By using these factors the decision to go international may be carefully mapped out in a planning process. Thus more emphasis should be given to the causal maps managers develop.

Methodological Foundations of the Study. The basic elements of cognitive maps are elicited concepts and their relations. Research, which applies cognitive mapping, utilizes a number of distinct elicitation methods. Critical design issues of mapping procedures have to cover saliency, comparability, validity, and atomism vs. holism, reliability, and practicability.

Sampling and analysis. The sampling procedure consists of a two step process. The students (n=162) of three university post-experience marketing courses for managers in export and international marketing took part. A standardized elicitation process did the elicitation to every student. In a second step general information on the respondent's firm has been collected. The structural analysis of the cognitive maps is carried out by the means of network analysis for managerial decision making. Theoretical as well as practical conclusions are drawn from the results.

Corporate and Inter-organizational Networks

Balazs Vedres

*Comparing Systems of Interlocking Directorates:
Accounting for the Duality of Inter-Organizational
and Inter-Personal Networks*

Malcolm Alexander
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This paper argues that data on interlocking directorates must be carefully interpreted to account for the interdependence of the 'dual' networks of inter-organizational and interpersonal linkages. Inter-organizational linkages involve executive officer ties and multiplicity is an important aspect of them. These same multiplicities need to be eliminated from the interpersonal network in order to distinguish among big linkers and network specialists. The paper shows how these considerations impact on historical comparisons of same country (Australian) networks in 1976 and 1996 and cross-national comparisons of Australian and Canadian data.

Social Networks and Organizational Violence

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The authors suggest an inter-influence between emergent social network and the appearance or development of violence dynamics in the workplace. This hypothesis is supported by common elements between the two concepts, for instance: power, work processes, decisional flows, sense of belonging and other psychosociological dynamics. They believe that a better understanding of social networks could be a valuable predictor of organizational violence therefore leading to appropriate action in order to prevent or eradicate violence in the workplace.

In this paper, the authors merge their knowledge of both phenomena in order to create a theoretical framework supporting research avenues which they intend to pursue.

Amongst the questions addressed in this paper, are the following:

How do friendship and support networks in organization influence dynamics of violence? How does actor's position in the networks relate to their role in the dynamics of violence? How does actor's position in the networks relate to the degree of suffering or resistance to aggression? How does the network structure help to predict the potential sources for the denunciation of violence? How does violence affect the structure and composition of networks?

*Networks and Entry into Self-employment
First results of a survey among Dutch business
starters*

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The paper investigates the question: why do people become self-employed? The general argument is that entry into self-employment is determined by the utilization of different forms of capital, which are required to start a business successfully. Earlier research also suggests that the self-employment decision is also strongly influenced by a person's social background and environment. The social environment provides social capital, e.g. access to information and financial capital, which might increase the chances of a successful business start. Thus, entry into self-employment also depends on the network a person has and the resources the person can acquire from the network.

*Elite Sponsorship, Competition, and the Construction
of Quality in the Italian Wine Industry*

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The starting point of this work is the observation that the working of markets is affected by actors who are not directly involved in production or consumption decisions, but compete for the right to influence such decisions by establishing the structural conditions that are then taken for granted by buyers and sellers. We focus on the strategic interaction between these intermediary actors, out of which the market interface between production and consumption emerges. The empirical context for our work is the Italian wine market, characterized by the growing importance of publications that (i) assess the quality of wines; (ii) affect the distribution of prestige among producers, and (iii) shape the perception and behavior of potential consumers. This study is based on information about the Italian wineries and wines listed in several issues of two guides: "I vini di Veronelli" and "Vini d'Italia" published by the Gambero Rosso and the Slow Food Association. These two guides are very influential, widely read and considered to be in direct competition.

Our basic hypothesis is that the product evaluation policies of different publications reflect more strategic differentiation among competing elite sponsors, than actual differences in product quality. As a consequence, we expect these publications to show systematic divergences in spite of their shared commitment to the objective assessment of products' quality. In particular, we expect divergence to be more accentuated in the selection of the products for evaluation than in the rating of the same products. Similarly, we expect divergence to be less pronounced both in selection and rating, for wines associated with the names of prominent producers, denominations of origin, or regions whose prestige is already historically established and internationally recognized.

In order to evaluate these hypotheses we measure the divergence of the two guides in selecting wines for evaluation by building a relative index based on the number of wines selected by both guides and of those selected by only one of them, for each region or denomination of origin. We

expect this index to be lower for wines that belong to prominent regions or denominations of origin, where prominence of regions and denominations of origin is measured by their relative weight in terms of the wines cited in the guides. We also build a matrix of absolute differences (or pseudo-networks) whose elements represent the extent to which guides diverge in evaluating quality differences among pairs of wines. We expect this measure of divergence to be lower for wines that (i) share a prominent denomination of origin, or (ii) belong to a prominent region, or (iii) come from producers whose prominence is high, as measured by their centrality in the dual network induced by the sharing of winemakers.

Determinants of Stock Buy-Back in Large Swedish Firms

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Due to an alteration in an Act in March 2000, public companies in Sweden gained the opportunity to buy back a certain share of their own stock. The paper investigates the determinants of stock-buy back programs issued in firms listed on the Stockholm stock exchange. Drawing on a theory of social influence, we suggest that the decision to buy back stock depends both on a firm's social embeddedness with other firms (indicated by interlocking directorates) and their potential economic benefit from the buy-back.

Inter-organisational Networks in Russia

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A lot of empirical and theoretical works dealt with Western and Asian inter-organisational networks. This presentation focuses on Russian distribution networks and aims at identifying their special characteristics in order to find out assumed differences to Western and Asian networks. First, a classification of different network characteristics described in theoretical and empirical literature is developed. Then, on the basis of the empirical case study, characteristics of a Russian network are investigated. Special attention is devoted to the evolution of the network from 1992 until 2000. Effectiveness of the network is discussed from the point of view of the focal company. The focal company was responsible for the formation of the network and designed it to fulfil its distribution objectives. The paper shows how the structure of the network changed during the period from 1992 to 2000 following the changes in the competitive situation, market conjuncture and focal company's objectives.

Relations between Organizations and Personal Networks:

a Case Study on the Genesis of Cooperations between Firms and Research Laboratories in France

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The question of what part personal networks take in the interorganisational relations is specifically central and difficult in the study of cooperations between research laboratories and firms, because these cooperations involve various kinds of agents. What are the agents really interacting (individuals, small teams, organizations)? How far inter-organisational relations are embedded in personal relations?

The paper will address these questions on the basis of the results of an empirical study of cooperations between firms and CNRS laboratories in the field of engineering. We have reconstructed 130 stories of cooperations (with a contract at one time, but not necessary during all of the story), involving 27 scientific leaders, 19 laboratories and 81 industrial partners (firms or inter-professional organizations).

The analysis of the cooperations genesis show that there are three great kinds of meeting between laboratories and firms: networks (when there is a chain of personal ties between scientists and firm managers before the cooperation), markets (one of the partner meets the other on the basis of public information) and institutions (government agencies get the future partners together in a co-operative group). We will discuss these various kinds of meeting using the notions of embeddedness (Polanyi, Granovetter, White), and decoupling (White).

Influence of Inter-Organizational Network Structures on the Success of a First Mover Strategy

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Entering into a new market is one of the key challenges especially in the New Economy. With regard to the different market dimensions, this paper focuses on the dimensions function and form according to Abell's definition. While the theoretical discussion about First Mover Advantage or disadvantage is still ongoing, the paper takes the view that each entry time strategy follows a different reasoning but that no strategy is per se superior to others. The success of a market entry strategy depends on a number of specific boundary conditions relevant to the chosen strategy. This paper considers the first mover strategy with its advantages like experience-curve effects, market entry barriers, longer pay-off periods, and customer binding and its disadvantages like huge R&D costs, market uncertainties and free-riding by competitors. It is based on the assumption that specific network structures have major influences on these advantages and disadvantages and in the paper it will be discussed how structural concepts like density, hierarchy or structural holes or relational concepts like range, relationship content, -form, and intensity might influence the success of a first mover strategy.

Social Capital and the Australian Corporate Experience

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As scholars attempt to come to terms with the importance of social context to business, social capital is a construct receiving increasing attention. However, within the Australian context social capital is a relatively unexplored area of research. As such, studies have tended to concentrate on the role of corporate interlocks as links between organizations. The objective of this research is to broaden our understanding of the network of corporate power in Australia by examining two specific extensions of this research. We present findings on the relationships between organizations and the individual directors (rather than organisations) as well as findings on the linkage patterns of the resource quantum of the network of top 500 listed corporations in Australia.

Analysis of Ownership and Supervisory Board Relations in Slovenian Companies

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As a result of privatization, Slovenian companies are mostly publicly-owned corporations. As follows from the privatization model that was applied, at the beginning companies' stocks

were mostly owned by the state and private investment funds and individuals. After trading in these stocks began, other companies became involved as owners. However, our main hypothesis is that the network structure of ownership relations among Slovenian companies is today still influenced by the privatization model. On the other hand, Supervisory Boards do not reflect the ownership structure of companies as they should. There are several other factors that determine their structure.

We examined a sample of 150 Slovenian companies. Most of them are companies that are quoted on the Ljubljana Stock Exchange, while some other companies are considered which are important within the Slovenian economy yet for different reasons are (still) not quoted, and certain financial institutions (e.g. banks and investment funds).

We looked at two kinds of ties between any two companies, the ownership relation and the controlling relation, defined by the presence of representatives in companies supervisory boards.

Several network analysis approaches will be used in analyzing the network obtained. Relations are analyzed separately and then compared.

The study is of special importance, because it compares the ownership and the control relation in Slovenia, a transitional economy. The results will be compared with similar studies of corporate networks in traditional and transitional economies.

*Personal relations in an organizational context.
Integrating network approach with ethometodology
and symbolic interactionism*

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This paper sets out to show the usefulness to integrate the network approach with ethometodology and symbolic interactionism for the purpose of studying interpersonal relations in an organizational context. The network approach has been used to shed light on the following questions:

- a) A comparison between the formal organizational design and the observed relations, as emerging from the day by day on-the-job interactions, with particular respect to those predicted but actually ignored. This is a methodological question that may contribute to network theory in that a substantial difference between the formal and the observed relations may conduce to a specific shape of the network structure;
- b) How employees manage to cope with a lack of information and resources through informal relationship. This is a theoretical question that may contribute to clarify how the lack of information and resources shapes the network structure;
- c) What are the consequences for network structure of the mismatching between the formal and the actual network, with respect to potential conflicting organizational goals. This is also a theoretical question.

In order to answer all such questions, information has been drawn from a former study concerning the organizational culture of a financial corporation. An analysis of the development and consolidation of its organizational context has been instrumental to obtain and elaborate this information.

*Interorganisational Networks in UK Construction:
Shifting Centrality and Learned Client Organisations*

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This piece of research is based upon the premise that the construction project team, or temporary coalition, that commissions, designs and constructs a building, might be

regarded as a network of firms providing specific, and contractually defined roles. The research has looked at five case studies, three of which represent the cutting edge of procurement strategy in UK construction. The analysis focuses upon the density of the contract, communication and financial incentive relationships between the actors or role providers and the centrality of the main actors within financial and progress monitoring, as well as design communication networks. The research is intended to establish the use of social network analysis for the evaluation of emerging reforms in UK construction procurement and provides an analysis of innovative procurement strategies involving partnering, supply chain management and technology clusters. We look at the very different systems of roles and relationships adopted by the largest public sector procurement agency (Ministry of Defence) and one of the largest private sector developers in the UK.

*Bringing the Task back in: a Network Investigation
on the Contingent Value of Resource
Complementarity in Partner Selection and Alliance
Formation*

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It has been argued that organizations create cooperative ties with other organizations in order to satisfy their resource needs. By pooling resources with other companies, firms can complement each other's weaknesses, since each partner in an alliance can access the complementary resources and capabilities of the others. Consequently, the concept of resource complementarity lays at the core of the alliance formation process, addressing both the determinants of alliances and the rationality of partner selection (Gulati and Gargiulo, 1999).

However, we argue that there is a lack in the complementarity argument traditionally adopted in alliance studies. Indeed, the research question of "with whom do firm ally?" has rarely been conceptualized and consequently analyzed combining firms' resource profiles and task requirements. The aim of this paper is to try to cover up this gap through an empirical research comparing the resources required for complex tasks and the resources and capabilities possessed by firms. We argue that in defining and using complementarity as a predictor of partner selection, two main additional concepts have to be taken into account: the task and the asymmetry in the possession of complementary resources. In order to test our propositions, we analyzed 120 Italian construction projects, worth a total value of 3750 millions Euro and involving 100 general contractors companies. Using Social Network Analysis methods, we developed a procedure for measuring task resource complementarity and its asymmetric components. Using QAP Multiple Regression analysis we then compared the task and asymmetry measures of resource complementarity with the traditional measures of niche overlap as determinants of alliances. The results strongly support the hypothesis that in order to understand alliance formation we need to take into account the task and the asymmetry in the possession of complementary resources.

*Transforming Corporate Networks in Hungary in the
90's*

Balazs Vedres and David Stark
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Using comprehensive datasets from 1990 to 1999, we analyze changes in the ownership and interlock networks of the top 500 Hungarian companies. One of the main arguments of the paper is that the post-socialist economic transformation that seems monotonic from an atomistic, firm-centered viewpoint (with the socialist enterprise at the beginning that transforms into a capitalistic enterprise) is not monotonous from a network approach. The structural story of economic transformation can be presented in three

stages. The first is the breakup of socialist firms with few interorganizational ties. The second phase can be characterized by dense interorganizational networks with cohesive subgroups. The third phase is a new atomization characterized by the dominance of multinational capital. The presence of a foreign non-financial company as a majority owner leads to the breakup of interorganizational ties around the owned company. Our analysis of the ownership and interlock networks uses dynamic network visualization techniques along with network models of the phases. We detect cohesive regions in the networks and model the existence or non-existence of the ties between firms. In addition to ownership and interlock ties the effects of geographical location and branch of industry are also analyzed.

Complementary and Alternative Medicine on the Road to Professionalization: The Role of Diverse Social Networks

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As larger numbers of people in North America use complementary and alternative medicine (CAM), there has been a corresponding growth in the number and types of CAM practitioners, many of whom are striving to achieve self-regulation and professional recognition. Social networks have the potential to explain why some attempts at professionalization succeed better than others. Our research is based on recent interviews in Ontario, Canada with leaders of a variety of complementary and alternative health care fields: chiropractors, traditional Chinese medicine doctors/acupuncturists, naturopaths, homeopaths and Reiki practitioners. We find that the more developed, diverse and extensive the networks, the closer to self-regulation and professional recognition. For example, chiropractors, the most organized and mainstream of the CAM occupations clearly have strong intra-organizational links with other chiropractic associations as well as many interorganizational links to other health care associations, business associations and governmental agencies. They are a self-regulated profession. By comparison, the networks of homeopaths are less extensive, diverse, and cohesive. They are not self-regulating. We conclude that networks are a two way street. Not only do diverse, extensive networks bring to organizations information needed for the professionalization process, networks also help to position organizations in their quest for self-regulation and professional status.

Data Mining

Paolo Giudici

An attempt to network analyse life story interviews (the network of remembrances)

Fruzsina Albert and Beata David
Sociological Institute of the Academy of Sciences, Budapest
Zsuzsanna Korosi
Oral History Archive

In a 3-year research we are attempting to analyse the network of remembrances by combining and merging qualitative oral history data with quantitative network-based sociological methodology. Our "raw" data are life story interviews of the participants and victims of the 1956 Hungarian Revolution. The interviews primarily focus on the time of the revolution and its consequences. In this paper besides giving the results of our pilot study - based on 21 interviews - , we would like to show the steps of data collection, coding and analysing.

On a Web Usage Mining technique to extract knowledge for Web personalization

Gabriella Schoier
University of Trieste

A natural combination of two active areas of research i.e.: Data Mining and the World Wide Web (WWW) referred to as Web Mining. The term Web Mining has been used in two distinct ways: Web Content Mining and Web Usage Mining. The former describes the process of information from millions of sources across the WWW while the latter is the process of mining the Web access logs on one or more Web localities. Recently Web personalization based on Web Usage Mining has been developed. To extract knowledge, for the purpose of Web personalization, different Web Usage Mining techniques such as transaction clustering, usage clustering and association rules are used. We have considered a technique for preprocessing of Web usage logs and grouping URL references into sets (user transactions) and have apply it to a real data set.

Network analysis of 2-mode data in Pajek

M. Zaversnik and V. Batagelj
University of Ljubljana, Slovenia

Often we have to analyze 2-mode data where we have a data matrix A (bipartite network) over two sets U (rows) and W (columns). Some examples: (persons, events), (customers, products), (papers, cited authors), ... One or both sets can be (very) large. We can analyze such data matrix directly or transform it into 1-mode matrix (network) over U or W. Pajek supports both types of networks. In the paper we shall present several options available in Pajek for analysis of 2-mode data and illustrate them on real life examples.

Developments in Network Methods in the 1990's

Peter J. Carrington , John Scott, Stan Wasserman

Positional Analyses of Sociometric Data

Patrick Doreian
University of Pittsburgh
Vladimir Bategelj and Anuska Ferligoj
University of Ljubljana

This paper provides an introduction to generalized blockmodeling. It starts with the definition of the location of an actor in a set of social relations. It then defines a position in a social network(s) as a cluster of social actors that have been grouped in accordance with some structural characteristic(s) that include locations. These positions are used to define and construct a set of blocks that are assembled into a blockmodel. The blocks are summaries of the ties between positions and within positions. The chapter then presents a series of ideal blocks: null, complete, regular, row-regular, column-regular, row-dominant, column-dominant, row-functional, column-functional, symmetric and triangular. Structural equivalence is shown as a special case where only null and complete blocks can be in an ideal blockmodel. Regular equivalence is another special case where only null and regular blocks are permitted in an ideal blockmodel. Clique structures, ranked-clusters, center-periphery and dominance hierarchies can all be defined in terms of permitted blocks. We discuss general methods for fitting blockmodels to data and illustrate them with examples of children's networks, inter-organizational networks, animal grooming and dominance relations, and a variety of other small groups. Methods for displaying block models are discussed also.

Analysis of Longitudinal Social Network Data

Tom A.B. Snijders

University of Groningen, The Netherlands

A review is given of statistical models for longitudinal network data. It is argued that continuous-time models are more appropriate for modeling such data than discrete-time models. The stochastic actor-oriented approach is presented, in which the network evolution is modeled as the consequence of the actors making new choices, or withdrawing existing choices, on the basis of functions, with fixed and random components, that the actors try to maximize. The change in the network is modeled as the stochastic result of network effects (reciprocity, transitivity, etc.) and effects of covariates. The existing network structure is a dynamic constraint for the evolution of the structure itself. These models are continuous-time Markov chain models which can be implemented as simulation models. The model parameters can be estimated from observed data using a Markov Chain Monte Carlo method. This presentation focuses on how this approach can be applied in practice, using the SIENA program. Some examples are given of modeling data sets with 2 to 5 repeated observations of the network.

Models and Methods for Innovation Diffusion

Thomas W. Valente
School of Public Health, Johns Hopkins University

This chapter reviews research on models and methods used to understand how new ideas and behaviors spread through social networks. The chapter describes social influence models from a network perspective and presents a substantive diffusion network model. Applications of this model in a variety of settings ranging from adolescent schoolbased studies to international community settings are reviewed. The chapter discusses statistical issues that arise in the estimation of network influences on behavioral adoption. Specifically, I address uses of HuberWhite estimators for egocentric dyadic data and issues of nonindependence for census data. As models and methods for studying network influences on adoption and diffusion dynamics are more clearly specified, they will provide fertile techniques for expanding network theory.

*An Introduction to Random Graphs, Dependence Graphs, and p^**

Stanley Wasserman
University of Illinois
Garry Robins
University of Melbourne

Statistical models and distribution theory for graphs, with applications to social networks, have been used by social and behavioral scientists for over sixty years. In this chapter, we review these approaches, and show how recent distributions, such as p^* , subsume much of the earlier research. We describe the very general notion of a dependence graph, show how it can be used to model dependencies among network relational ties, and how it gives rise to p^* . Estimation of p^* model parameters and general model fitting concerns will be discussed.

Diffusion of Innovations

Thomas W. Valente

Cumulative Behavioral Performance as a Social Influence Network Process

Eugene C. Johnson and Noah E. Friedkin
University of California, Santa Barbara

We present here an approach to estimating or determining the networks of social influences underlying the cumulative

performance of a particular observable behavior over time in a fixed group, e.g., the cumulative adoption of a particular innovation over time in the group. It turns out that such processes are readily described by extended special cases of the Friedkin-Johnsen (F-J) model of social influence (Advances in Group Processes, Vol.16,1999, JAI Press, 1-29) where the resulting inferred matrix or matrices of social influence exactly generate the time sequence of behavioral performance originally observed, thus showing that the extended F-J model can accommodate behavioral as well as attitudinal processes. We examine examples of such cumulative behavior to show how the extended F-J model can be used to describe and elucidate the workings of such processes. These examples include some of the data collected by Coleman, Katz and Menzel in their study of the cumulative adoption of an antibiotic by physicians in four U.S. Midwestern towns.

Innovation within Networks: Policy Implications for Regional Planners

Dimitrios C Christopoulos
University of the West of England-Bristol

How can policy makers stimulate innovation? In order to give a satisfactory answer to such a fundamental question of industrial and regional policy I have looked at the factors that impact on the dissemination of innovations evident in a recent study of SMEs in the South West of England. The relevance of concepts such as the 'innovative milieu' and the 'learning trajectory' provide the theoretical background. An attempt is made here to determine the efficacy of employing a network perspective in analysing the dissemination pattern of innovation. Recent theoretical and empirical investigations suggest that the regional social context and regional governance structures are directly related to regional growth. Case study findings suggest that central actors in internal innovation networks are mainly senior managers and engineers who act as 'brokers' of innovative practice. This might be related to the strong commercial dynamic behind most incremental innovations that characterise firms in the sector examined. Also identified is a particular kind of actor termed here an 'innovation entrepreneur' and a number of policy suggestions are ventured that could facilitate those actors effective networking. In the conclusions a number of concrete suggestions are made that relate to policy makers ability to effect the dissemination of innovative practice in a region.

Does friendship matter? How friendship communication and friendship rela- tions impact innovation team performance

Jan Kratzer
Groningen University

Sometimes it seems as if product development is one of those areas in which pure luck seems to be the best explanation for success. But that is not the case as research widely confirms. Innovation teams that are properly managed outperform innovation teams that are not. To manage innovation teams, however, requires managerial knowledge about relational processes and their effect on performance. One of the major issues for managers is 'does friendship among team members facilitate project progress or not?'. However, friendship is a multifaceted and ill-defined concept in research and real life.

Managers, for example, might use the term for intimate friends and for the people we meet on the job with whom one has what should be more appropriately termed 'friendly relations'. According to the two-fold usage of the term friendship, a distinction is made between friendly communication and friendship relations. Moreover, there are plenty contradicting views in theory, for instance the 'cohesion-compliance hypothesis' and the 'weakness of strong ties-hypothesis', that disallow to give any helpful advice to managers. This study examined these contradictions in innovation teams by relating

structures of friendly communication and friendship relations to their performance.

*The Politics of ISO 9000:
How Thinking and Doing are Separated*

Andrew Schenkel
Stockholm School of Economics

Since 1986 the number of ISO 9000 certified organizations has grown to over 250,000. ISO is increasingly becoming one of the dominant paradigms of quality management. The implementation of ISO, can be assumed to impact directly or indirectly on knowledge based activities. The purpose of this paper is to examine the relationship between ISO 9000 and knowledge creation, embeddedness and flows. The setting for this study is a major complex project utilizing an ISO 9000 based quality system. The specific research context examined in this paper is the management of ISO 9000 deviations or situations in which articulated procedures, processes are not followed or objectives not achieved. It was found that the emergent advice network in managing ISO 9000 deviations was significantly correlated with the formal network. This was surprising in light of the relatively high degree of industry experience of the work force and the similar nature of work conducted by the operative departments. These findings are analyzed and understood through Foucault's power/knowledge relationship and concept of discourse. This raises a number of questions about the potential role of ISO 9000 on project based organizations.

*Diffusion of Innovation in Rural Areas
Examples of a Hungarian and an Andean Quechua
village*

Laszlo Letenyey

Is technological innovation the killer of ancient society? Anthropological studies made in rural areas point out that diffusions have effects changes of social structures: the role of strong ties became less important and were replaced with market institutions. I would like to show that in some situations the diffusion of innovations can also reinforce the traditional social structures. The innovations will diffuse among the members of strongly tied communities (parents, good friends) and will re-integrate the old social structures.

Entrepreneurial Actors in Innovative Milieus

Gerhard A. Wuehrer and Petra Kuchinka
Johannes Kepler University

The rationale of the case study is to examine the ego-networks of innovating enterprises as actors in an innovative milieu. The ongoing project consists of different levels of analysis. Starting point is the importance of different areas of innovation for the dynamic of an enterprise. A written questionnaire was administered to 1489 randomly selected enterprises. The sample of n = 233 small and middle-sized enterprises is the basis for investigation. A factor analysis combined with a cluster analysis leads to four types of innovative firms. These innovative actors are of generic type. They are independent across size (measured by employees) and industry. They closely resemble the typology developed by Miles/Snow (1986) and Miller/Friesen (1982). Several hypothesis are tested regarding performance in innovative products, techniques for innovating, and support during innovation process. The type of data include attributes and relational information of innovating enterprises. So besides variable analysis, typological, and network analysis can be combined on a quantitative basis.

To investigate the supporting members of the network the milieu participants as seen by the actors are elicited. The milieu consists of consultants, chamber of commerce, trade associations, university institutes, research consultants, banks, R&D funding institutions, suppliers, and customers.

Final hypothesis testing will answer the questions whether density, and other measures of network structure of support networks vary across actor types or not. First research findings see a correlation between network structure and actor type.

Evolution of Social Networks

Phil Bonacich

*Joining up, Moving on: Change and Stability
in Repeated Small Group Formation*

Holly Arrow and Katie Burns
University of Oregon

Sets of strangers played multiple rounds of a social card game in which they formed groups repeatedly to make card hands and earn money. The structure of the game allowed for isolates to be left out of the two emergent small groups that formed each round. With co-membership in a group counted as a tie between members, we examined change and continuity across rounds to identify dynamic patterns. The developing network was perturbed in round six of the seven rounds of group formation by changing the reward structure.

Some networks had a single group configuration we could identify as an "attractor"; some had multiple attractors, and some sets of players formed a different configuration of groups in every round of the game. The variety of paths by which the networks developed appears to depend not on external conditions but on the initial conditions established by players in the first round of the game. Results are discussed in relation to complexity and chaos theory.

*Homogeneity of Attitudes towards Ethnic Minorities
within Ego-centric Social Networks*

Stephan Ganter
University of Mannheim

The paper will explore the homogeneity of attitudes towards ethnic minorities in Germany within social networks. So far, empirical research on opinions and attitudes towards ethnic minorities focuses mostly on individual attributes and characteristics. Purely "atomistic" models are, however, challenged by evidence from studies showing that such personal opinions and attitudes are strongly correlated with (perceived) opinions and attitudes of important reference groups and discussion partners. But it remains unclear whether these correlations are substantiated in processes of social influence occurring within networks of close associates who share common understandings. Are subjectively perceived opinions and attitudes of alteri simply the projection of respondents' own opinions and attitudes? Is there more homogeneity of attitudes towards ethnic minorities within dyads and social networks than across networks? In order to answer these questions I use recently collected data (N=380) including information on egos' opinions and attitudes towards ethnic minorities, on egos' perception of the opinions and attitudes of important alteri as well as on opinions and attitudes of the alteri themselves. Results reveal that the actual homogeneity of these attitudes is conditional on individual characteristics as well as on characteristics of dyads and (ego-centric) networks.

Evolution of Social Influence

Jun Kobayashi
University of Chicago

What social influence evolves when individuals change their opinions to reach a unanimous consensus? To answer this question, I model the process of imitating successful social influences in social networks. By using evolutionary game

theory, I derive the following results. (i) If an individual sympathizes with the lowest opinion, this social influence will remain behind as an evolutionarily stable strategy and will eventually be adopted by all individuals in the long run. (ii) In general, if an individual replaces her opinion with any specific person's opinion, this social influence will prevail among all individuals.

Prestige in Longitudinal Networks

Wouter de Nooy
Erasmus University Rotterdam,

Network analysts have developed several structural indices of social prestige. All of these measures focus on asymmetry in choices (choices received) within a social network at one point in time. This paper examines ways to measure prestige in (two mode) longitudinal networks which represent artistic careers. Inspired by Pierre Bourdieu's field theory and his notion of 'trajectories', several sociologists of culture have argued that the importance attached to positions as well as actors within a cultural field are interdependent and change over time. Assuming cultural importance to be a kind of social prestige, we define a simple dynamic measure of prestige based on "choices" received by cultural institutions in artists' careers, viz. authors' affiliations to literary magazines over time. We apply this measure to longitudinal data in order to inspect the stability of results and their validity. Also, we use Markov Chain Monte Carlo estimation implemented in SIENA software (T.A.B. Snijders, 2000) to test whether authors' transitions from one literary magazine to another are predicted by the prestige of magazines, which is measured either dynamically or statically.

Modeling Florentine Republicanism

John F. Padgett
Santa Fe Institute

The following model of political process is intended to be a moderately realistic representation of Florentine republicanism, during the period of the Renaissance (~1300-1500). The model is composed of two parts: (a) patronage-namely, the building up of partisan networks through the exchange of office-based favors, and (b) policy-namely, the collective deliberation and choice of "public goods" for Florence, in the Priorate (i.e., the city-council governing body). It was the tension and interplay between these two modes of governance, I contend, that produced Renaissance Florence's distinctively turbulent, and creative, history of party formation and constitutional design.

This memo proceeds in three sections: the official structure of the Florentine state, the patronage networks that grew up through these offices, and the "sacred" institutions at the center that may or may not have transcended patronage.

Using Network Analysis to Explore the Development of Training groups

Carmen Retter and Judith Schwarte
Justus-Liebig-University Giessen

This paper presents the investigation of training groups as evolving learn networks on the basis of three day training courses with students. Over this period the students had to answer three questionnaires. All three focus on attitudes towards learning and relational structures among the training members, in addition the first questionnaire entails for the demographic characterization of the students. Aim of the study is to identify influencing factors on the development of network structures. First results of the analysis reveal the following aspects: age and progress of study, the proportion of training members knowing each other prior to the course, as well as former experiences with such training courses.

Social Ethnic Segregation in Dutch High School Classes: Contact Versus Competition

Lotte Vermeil and Chris Baerveldt
Utrecht University

This study aims to clear up the effect of numerical ethnic composition of a school class on the probability that two class mates with different ethnic backgrounds develop a friendly relationship. Two arguments resulting in contradictory predictions can be made. On the one hand, the contact hypothesis predicts that the more people are exposed to members of other ethnic groups the more they will feel friendly towards them. The exposure opportunity between groups is highest between the members of two groups when they are of equal size, suggesting that the likelihood of an inter-ethnic friendship is highest in that situation.

On the other hand, social identity theory states that identity strategic motives serve inter-ethnic relationships. Ethnic groups in a school class might compete for social status and cultural space. If a minority group is very small (e.g. two persons) its members might choose the option of assimilation, but if a minority group reaches a substantial size and thereby substantial social power its members might choose competition. According to this argument competition is highest when groups are of equal size, resulting in a salient group identity and a low likelihood at inter-ethnic friendship.

The two possible effects are separated by including the intermediate variables 'knowledge about other cultures' and 'ethnic identity'. Dyadic analysis were conducted on survey data collected amongst 1450 pupils in 74 school classes in the Netherlands.

Network Evolution in the Canadian Investment Banking Industry (1952-1990)

Tim J. Rowley and Joel A.C. Baum
University of Toronto

The primary goal of our study is to build and test a model of interorganizational network evolution. The interorganizational literature suggests that tie formation is based on how firms are 'embedded' in their networks as information on the quality and reliability of potential partners comes from three sources: 1) an actor's own ties, 2) an actor's partners' ties, and 3) the status of other actors. Over time, relationships accumulate into a network that becomes a repository of such first- and second-hand information on prospective partners. In addition, we view actors as competing for interorganizational relationships endeavoring to improve their network positions (e.g., centrality/status), and compete on the basis of their current network positions.

We empirically examine network dynamics using longitudinal data from the investment banking industry in Canada (1952-1990). Syndicate relationships are formed among investment banks in order to successfully underwrite security offerings from firms attempting to raise capital. These data provide a means of studying network formation, reproduction, and evolution. Specifically, our analyses focus on the dynamics of actors' positions - the ascendance and decline of investment banks within status orders - as well as the subgroup structures within each network.

Structural Determinants of Leadership Roles in Mediated Networks

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This paper analyzes mediated communication patterns among university students. The constructs addressed in this paper pertain to roles manifest in email networks, conceptualized as social networks, and measures of influence in the form of 1) social network measures of centrality and prestige adapted to discussion board thread data and 2) actual measures of user behavior manifest via socially recom-

mended URLs. Data was collected during a comprehensive research initiative directed at investigating the effects of mobile, ubiquitous computing. The participants, students enrolled in a communication class, were issued laptop computers equipped with wireless modem cards, which remained in their sole possession for the duration of the semester. Participant email log files were collected for one semester at a large Northeastern University. A proxy server collected all of the URLs from sites students visited over the course of the semester, as well. Actors with central positions within the email (social) network are hypothesized to hold positions of leadership, or prestige, in a computer supported learning environment. The length of discussion threads and level of response to socially recommended URLs are the dependent variables measured. The reliability of the data affords a rare opportunity to assess the structure and effects of mediated communication networks.

Similarity and Beyond: Students' Friendship Networks in the Netherlands and in Japan

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University of Groningen
Hiroshi Hiramatsu
University of Kobe
Frans Wasseur
University of Groningen

In the formation of friendships, similarity seems to be an important, if not the most important, determinant. This has been found especially for 'visible' characteristics like gender, age, ethnicity, etc. In a study of two different student populations over time, we study whether beyond the visible similarity other, more 'invisible' characteristics like leisure activities and study orientation, can be identified that may give a more substantive interpretation to similarity. Although both populations are relatively closed groups of college students, many differences between Japan and the Netherlands are found. The p2 model and the SIENA model are used for the analysis.

Formation and Dissolution of Service Delivery Networks

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Patrick Doreian
University of Pittsburgh

The environment of an organization is the network(s) of organizations in which an organization is embedded. Many who examine inter-organizational networks assume that while executives have differential abilities to influence network structure and exert control over other actors located in the environment, most executives are constrained by the networks in which their organizations are located. In contrast, we argue that administrators or CEOs in the public sector have a large amount of discretion over participating with others in creating new programs and building service delivery networks. There are two dominant mechanisms for doing this. One is that while creating new forms of service delivery, administrators can spin off new programs that then become freestanding agencies or organizations within the community. The second mechanism is one where administrators to pull freestanding organizations within their own organization and thereby exert tighter control. Using data from three U.S. counties, we explore the processes of service delivery network formation and dissolution that include these mechanisms.

Infectious Diseases and Social Networks

Alden S. Klondahl

The Influence of Social Networks on the Perceived Risk of HIV/AIDS Infection and Protective Behavior

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Susan C. Watkins
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How do people alter their sexual behavior in the era of AIDS?

Individualistic models of behavioral change dominate the answer to this question. However, these models are increasingly enlarged by aspects of social networks that provide a person with opportunities for health-related communication and interpersonal influence. This paper explores the significance of social relationships to two central stages within the process of sexual behavioral change: the perceived risk to become HIV-infected by unprotected sexual intercourse and the willingness to protect oneself against infection either by sexual fidelity or by condom use. The empirical analyses rest on data from the 'Kenyan Diffusion and Ideational Change Project' (KDICP) that give information about AIDS-related, ego-centered communication networks of Kenyan men and women. The respondents' perceived risks as well as their intentions to protect themselves against HIV-infection depend heavily on the prevailing perceptions and favored protective methods within their personal communication networks. The risk-perceptions both of men and women are shaped by strong ties with relatives and friends. However, there are gender-specific relationships that lead to the willingness for protective behavior. Women tend to be influenced by strong ties whereas men report more often - especially in the case of condom use - on weak ties to distant acquaintances.

Outbreak Networks: Concepts, Examples and Implications

Alden S. Klondahl
Australian National University

The purpose here is to discuss the concept of an outbreak network, to indicate how (and why) it differs from other conceptualizations of networks, to provide some examples of actual outbreak networks, and to highlight a range of implications of this concept.

The Building up of Opinions on the Quality of Care in Local Discussion Network

Alexis Ferrand
CNRS CLERSE Universite' de Lille

Regulation of health systems implies controls on the quality of care. Apart of formal controls organized by professional associations or health organizations, patients, as clients, can play a role. But it needs that they evaluate and judge various dimensions of the quality of cares. And this is not simple for them due to the asymmetry of knowledge and legitimacy. We demonstrate that informal networks of discussion on health and cares exist often, not always and that they allows formation of opinion. An empirical research compares in two cities networks of discussion about health among people. Items about opinions on the quality of cares allow a description of references used by practitioners and by people to evaluate care. We examine the effects of belonging to various social milieus and to different local communities on the types of networks build and the types of opinions they convey. Doing so we propose new insights on the process by which quality of care is controlled by informal

networks.

The Process of Sex Partnership Formation and HIV Risk among Low Income Women who Use Drugs

Maureen Miller
Columbia University & NDRI
Alan Neaigus

National Development and Research Institutes, Inc.

Objectives: To explore the process of sex partnership formation in high HIV prevalence neighborhoods among low income women who use drugs and who are at risk of infection with HIV and other sexually transmitted pathogens.

Methods: As part of a pilot study, in-depth, qualitative interviews were conducted with 28 women who used drugs, recruited in New York City between March and November 2000. Central to the research was an assessment of factors that motivated and maintained sex partnerships.

Results: Participants were racially/ethnically diverse (29% black, 29% latina, 32% white, and 10% mixed race/ethnicity) and, on average, 30.5 years old. Most (79%) used heroin, crack (39%) or cocaine (21%); 61% had injected drugs. Sex work was the most commonly reported source of income (61%). However, the most common strategy for long term material support was the initiation and maintenance of sex partnerships. Sex partnership formation was influenced by women's immediate need for material support and the opportunity structure of available partners. Most women reported having partnerships with older male partners able to supply needed resources (i.e., drugs, food, shelter, protection). Women supplied sex in exchange for resources in these initially uniplex relationships. Many partnerships went beyond their basis in material support and became emotionally close, multiplex partnerships with strong ties of relatively long duration. Unprotected sex was frequently reported in multiplex relationships, with the exception of HIV serodiscordant relationships in which the woman was HIV infected. Sex risk within uniplex relationships also occurred, when women perceived that the provision of material support had reached a threshold that required unprotected sex in exchange.

Conclusions: Resource acquisition plays a significant role in the formation of sex partnerships for women who use drugs. Disassortative mixing patterns by age, high levels of sex partner concurrency due to women's participation in sex work and multiple partnerships, and the exchange of unprotected sex for material resources or mutual participation in unprotected sex resulting from the development of strong ties, all contribute to women's increased risk of acquiring, and also of transmitting, infection in their sex partnerships.

HCV Transmission Probability in HCV Discordant Partnerships among New Injectors

Alan Neaigus
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Maureen Miller
NDRI and Columbia University

Michele Persaud
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Objective: To determine the probability of hepatitis C virus (HCV) transmission in the injecting partnerships of new injecting drug users (IDUs).

Methods: Between February 1999 and September 2000, new IDUs (injecting for 6 years or less) in New York City between the ages of 18 and 30 were administered structured interviews and counseled and tested for HCV. They were asked whether, in the last 30 days, they had engaged in distributive equipment sharing (DES) (distributing injecting equipment that they had used first to their injecting network

members) or receptive equipment sharing (RES) (receiving injecting equipment used first by their injecting network members), and if their injecting network members were infected with HCV.

RESULTS: 124 reported injecting networks (76.5% of 162 interviewed and tested), 45 (36.3%) of whom were HCV seropositive (HCV+). Of 246 injecting partnerships reported, HCV+ index new IDUs reported 83 (33.7%) and HCV seronegative (HCV-) index new IDUs reported 163 (66.3%). Among HCV+ indexes, 67 (80.7%) reported that their partners were not known to be HCV infected and that DES occurred in 21 (31.3%) of these partnerships; the transmission probability was 25.3% of these partnerships. Among HCV- indexes, 21 (12.9%) reported that their partners were HCV infected and that RES occurred in 12 (57.1%) of these partnerships; the transmission probability was 7.4% of these partnerships. HCV transmission behavior occurred in 13.4% of all new IDU index HCV discordant partnerships (8.5% from HCV+ indexes and 4.9% to HCV- indexes). This estimate of the probability of HCV transmission is consistent with HCV seroconversion rates reported in the literature.

Conclusions: There is a high probability of HCV transmission among new IDUs and their injecting network members. The injecting partnership mixing pattern among HCV discordant new IDUs, as well as the high prevalence of HCV infection and of HCV transmission behaviors contribute to the alarming incidence of HCV among new IDUs.

Social Network Effects on the Transmission of Sexually Transmitted Diseases

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University of Chicago

This paper examines how social and sexual networks affect the risk of getting infected by sexually transmitted diseases (STDs). Social networks can affect the risk in two ways: via information or control. First, people get information about the risk of potential partners as well as cultural norms about normal or safe sex through social networks. Second, stakeholders, including primary sexual partners, kin or close friends, exert control on who are appropriate potential partners (and what is a proper relationship) through their network ties. Based on the Chicago Health and Social Life Survey (n=890) containing information on up to six social friends, our paper supports the following four observations: 1) Social network effects are found, even after controlling for individual risk factors, such as number of sexual partners, drug injection, gender, and race.

2) As the number of sexual partners increases, the network impact of information strengthens. In addition, as the number of sexual partners increases, control is more effective through third party embeddedness.

3) Among people who had less than 13 sexual partners for life time, people with no social friends are only 0.4 times as likely to be infected as people with one or more social friends. This advantage seems to be achieved through stronger dyadic control rooted in the sexual partnership itself.

4) Among people who were very sexually active (13 or more partners for life time), people with many (5 or 6) friends but weak ties to them (talk less than once a day) are only 0.2 times as likely to be infected as people with a few strong social ties. This protection seems to arise from the flow of network information and third party embeddedness.

Networks and Game Theory, Network Exchange

Elisa Jayne Bienenstock, Phil Bonacich

Chance or Intended Reciprocity

Dean M. Behrens
University of Toronto

Research on reciprocity has examined a number of characteristics of the phenomenon, such as: 1. The content of the reciprocated exchanges; 2. The timing of the reciprocated exchanges; 3. The partners involved in the exchanges; and 4. The balance or imbalance which may result in an exchange. However, in order to understand reciprocity, it is important for the researcher to consider the difference between motivated behaviour and behaviour due to chance.

In order to understand this motivated behaviour, it becomes necessary to ascertain what the base rate is for reciprocated exchanges due solely to chance. This latter assessment is contingent on a number of factors. Namely, how many individuals in a network are givers (G); how many individuals each member (E_i) is connected to (sum (A_i)); how many times each person may be a giver that is can we give the same thing multiple times, or do we have multiple things to give; and how many times each person can receive. This paper attempts to provide the formulas to calculate the base rate amount of giving due to chance, for any sized network.

The emergence and adaptation of cooperative networks

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INSEAD

Elisa Jayne Bienenstock
Stanford University

This paper uses agent-based simulations to explore the emergence of cooperative networks and their effects on the individual and systemic adaptation to sudden environmental changes. We assume rational agents that seek to enter cooperative exchanges to fulfil exogenously determined needs. In doing so, an agent (ego) engages in a variant of a Prisoner's Dilemma game in which decisions to cooperate or defect are guided by the agent's tolerance for risk, by her need for a specific other agent (alter), and by available information about the trustworthiness of that alter. This information is obtained directly from memories of past encounters with alter and indirectly through communication with third parties who have encountered alter and who usually engage in mutual cooperation with ego. We examine the cooperation networks that emerge out of the cumulative decisions to cooperate or defect between agents, as well as the effects of those networks on the system and individual ability to regain prior payoff levels after a sudden change in the exogenous needs matrix that drives agents to seek cooperation. This simulation allows us to study the relationship between agency and structure in terms of network dynamics as well as the duality between the enabling and constraining aspects of social structure central to sociological theory.

Social Control and Network Structure in Collective Action

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TARKI, Social Research Centre

Karoly Takacs
University of Groningen

In this paper, we develop a game theoretical model that explains how and under what conditions social networks rationalize participation in collective action. The collective action dilemma is combined with local interaction games, in which behavioral confirmation and social selective incentives are transmitted through relational ties.

Local interaction is embedded in the collective action game, therefore social networks affect contribution and participation also influences network relations. Our analytical and simulation results show that on average, network density

and selective incentives foster contribution. However, the model also highlights some controversial effects of them and of other network characteristics, such as structural holes. Besides, we address the question how social control influences the role of weak bridging ties in collective action. We also introduce an equilibrium refinement that takes into account the opportunity of breaking relations. We show that only networks, in which contributors and defectors are segregated, can be in stable equilibrium.

Children's Information Exchange Networks: Kids, Toys, and Play

Mirit Shoham
Cornell University

This study explores children's networks of information exchange. More specifically, it questions the role that discussion and exchange play in the formulation of toy preferences. After being given the choice of one of four toys, how will information offered from peers influence subsequent toy preference? By collecting friendship network data from an elementary school classroom, a unique intervention tests the emergence of such network behaviour: Children are allowed to discuss toy choices, and pre-discussion versus post-discussion choices are compared. Friendship networks are also investigated in contrast to the emerging information networks of the discussion. The following hypotheses, integrating Core Theory (Bienenstock & Bonacich, 1992), Equidependence Theory (Cook & Yamagishi, 1992), and Expected Value Theory (Friedkin, 1993) are tested and explored: 1) Peripheral students will seek the expertise of core members; final toy choices will reflect the core's initial toy choice, 2) Children's initial toy choice will resemble fellow-clique members' choices (Hallinan & Smith, 1989), 3) Integration in the friendship network is inversely related to proxemic distance during discussion (Festinger, Schacter, & Back, 1948). Findings are shared and discussed within an integrative framework of network exchange and child development, highlighting the importance of social networks in introducing children to the adult world.

Network Formation Models with Costs for Establishing Links

Marco Slicker and Anne van den Nouweland
University of Oregon

We study endogenous formation of communication networks in situations where the economic possibilities of groups of players can be described by a cooperative game. The goal of this paper is to study the influence that costs of forming communication links have on the structures that are formed. In order to be able to isolate the influence of the costs, we assume that costs are equal for all possible communication links. Starting from costs equal to zero, we increase the costs and see how these increasing costs induce different equilibrium communication structures.

The most surprising result of the paper is that, regardless of the number of players, under some circumstances increasing costs initially lead to the formation of fewer links, then to the formation of more links, and finally lead to the formation of fewer links again. This shows that subsidizing the formation of links does not necessarily lead to more links being formed. Hence, authorities wishing to promote more cooperation cannot always rely on subsidies to accomplish this goal. In fact, such subsidies might have an adverse effect.

Some Holes in the Consequences of Cohesiveness and Solidarity

Geoffrey Too tell
San Jose State University

Many sociologists have associated solidarity or cohesive-

ness with various "positive" consequences, from social order to less anxiety, greater contentment, or higher productivity. But research has shown these generalizations are untrue. Such processes can be conceived as a structural or relational variable operating on a behavioral variable where some contextual data are given. They can be modeled for a variety of problems with real valued variables, $Ax = y$, where x is the DV, A is an $n \times n$ matrix, and x and y are n -vectors. Where this applies, the anomaly above can be explained by a property of nonnegative matrices: If $A, y > 0$, the generalization ($x > 0$) is false. Then only under certain conditions can the inverse of A and x be nonnegative. These conditions may produce structural holes, which helps explain some very different reasons than those usually given why this concept may be useful. Where positive and negative signs denote major differences (like, dislike), this implies that in situations of this sort, solutions may be more likely to be "vexatious" than "positive," an ironic consequence of an agreeable beginning.

Networks in East Asia

Yanjie Bian

Social Networks and Job Matching in China's Transitional Economy

Yanjie Bian

U of Minnesota, Hong Kong Univ. of Science & Technology

After reviewing sociological theories about the roles of social networks in job finding and job matching in market and redistributive economies, I propose competing hypotheses to explain two related phenomena in China's transitional economy. First, why are strong ties, rather than weak ties, persistently important in job finding whether labor markets are absent or present? Second, to what extent is job matching a function of job seekers' social networks in the urban labor market? Both questions are examined by taking advantage of the changing modes of labor allocation in China from 1956 to 1999, the period in which respondents of a multi-city sampling survey of urban workers experienced occupational mobility. The focus of analysis is on the distinction between network resources of information and influence, which are for the first time in empirical research measured quantitatively.

Social Capital and Getting Ahead: Evidence in Multinational Corporations in Taiwan

Ray-May Hsung
Tunghai University

Esther Ngan-Ling Chow and Ming-feng Lin
American University

Social capital plays important roles for employee getting ahead within a firm. Employee with networks containing more social resources and more diversified social resources upwardly mobilize better. The diversified social networks produce benefits more through wider information accessibility and fast information diffusion, through effective referrals, and through efficient controlling networks. Therefore, employee with more diversified networks can play better role of managers and have greater probability to get ahead within a firm. This paper is not only interested in this rational dimension of social capital theory on the performance of employee within a firm, but also is interested in the dimension of trust, or guanxi, on getting ahead within a firm. This paper attempts to use 48 in-depth interview cases and 569 survey data of 9 manufacturing firms to study the function of two dimensions of social capital on job promotion within firms among Japanese and American corporations in Taiwan.

Composition of Support Networks in Hong Kong

Rance P.L. Lee, Danching Ruan, Y.K. Chan,
Gina Lai and Y.S. Pang
The Chinese University of Hong Kong

The composition of three types of support network (instrumental, emotional, and social companionship) were studied on the basis of a random sample of 1121 Chinese residents aged 18 or above in Hong Kong in 2000. It was found that the close kin played the most important role in all the support networks, especially in instrumental functions. Among the close kin, the spouse/partner was most important, followed by children (especially for the elderly) and parents (especially for the young adults). These finding Close friends were generally not as important as the close kin, but their roles in emotional support and social companionship cannot be ignored. Other friends (neighbors, coworkers, classmates, acquaintances, etc.) and the extended kin, however, seldom played a supporting role. The support of professional workers or institutions was rare. These patterns of social support was generally held among the different gender, age, educational, or marital status groups. It is noted that about 10 per cent of the pe Our findings in Hong Kong will be compared with those in the West and in other parts of China.

Organizational Outcomes of Use of Personal Ties in Job Search: A Study of Chinese Workers in Urban Shanghai

Gina Lai
Hong Kong Baptist University

Industrial and labor reforms launched by the Chinese government since the mid-1980s have altered the once stable, imperative relationship between workers and the workplace. The introduction of market forces in the urban economy has led to the proliferation and expansion of non-state economic activities, major restructuring of the state sector, and the emergence of urban labor markets. Some notable social consequences of the urban reforms include massive laid-offs in state enterprises, heightened job mobility, and increased variations in wages among workers. Urban workers are losing job security and welfare benefits that were once guaranteed by workplaces in the pre-reform era, but in return, gaining greater freedom to exploit market opportunities. One essential question is what has become the binding forces between workers and today's Chinese workplace. Further, personal ties have been documented as a popular method used by the Chinese in job search. Personal ties has been argued to facilitate the transfer of job information, such that job seekers would have better knowledge about the job and the organization, in addition to what is formally advertised, before making the application and/or accepting the offer. On the organization side, through personal ties, employers would have better knowledge about job candidates, which cannot be otherwise obtained from formal applications, for example, personality and character. Thus the use of personal ties would presumably allow better match between workers and organizations than formal methods. The present paper aims to examine the organizational impact of use of personal ties in job search. Focus will be put on workers' commitment to organizations. Both affective and behavioral dimensions of commitment will be investigated. Survey data of 300 Chinese workers in urban Shanghai will be used for analysis.

The Role of Trust in the Governance Structure of Subcontracting System - Taking Taiwanese Hi-Tech Firms as Examples

Jar-Der Luo and Yung-Chu Yeh
Yuan-Ze University

Among so-called New Institutionalism economists, Williamson helped the thinking of this school to move forward an

important step by linking organization structure with transaction cost. In his famous problem "markets and hierarchies", minimizing transaction cost is proposed as the rationale behind organizational structuring. Markets and hierarchies respectively provide controls for malfeasance in transactions, but also incur costs. An intentionally rational actor will choose the most cost-efficient way to carry out his/her transactions, therefore transaction cost is a determinative factor in deciding where a transaction should be executed -- in markets or in organizational hierarchies, and this in turn determines the form of organizational structure.

Granovetter, in his famous embeddedness argument, challenged Williamson's approach. He insisted that any transaction is embedded in social networks, and the trust generated by personal interactions is helpful in discouraging malfeasance. Whenever a market lacks adequate information and information searching constitutes a significant portion of transaction cost, a synergetic relationship will be valuable in reducing costs, since it is always a primary source of reliable and abundant information. Embeddedness view thus can help us to recognize the role of social relation in the governance structure of any form of contracts.

Following the approach of embeddedness, many studies in Taiwan has investigated the role of trust in building and managing bilateral governance structure between up-stream firms and subcontractors. These studies found that commercial networks in Taiwan are closely connected with traditional social structure, with social relations deciding what governance structure are to be created in traditional industries. However, it seems not characteristic of Taiwan's hi-tech industry. Since hi-tech industries require a high-level know-how in their production processes, it is understandable that quality of supplies rather than social relations is the most important criterion in choosing subcontractors. Furthermore, for fitting in the requirement of ISO9000 by that Taiwanese hi-tech firms can do OEM jobs for world-famous brands, these firms adopted a world-recognized standardized process and documentation to manage subcontracting relations. Since the governance of relational contracts is mostly ruled by institutionalized mechanisms, where are the room left for trust generated by social relations?

Is embeddedness approach still applicable in subcontracting system of hi-tech industries? In this paper, we will examine the details of governance in each step of the eight steps of ISO9000 subcontracting process. By deep-interview and direct-observation methods, the following questions will be answered: 1) What is the institutionalized mechanism controlling subcontracting actions in each step? 2) Is there any industrial norm or technological rationale controlling these actions? 3) Where is the room left for social relations to manipulate contracts? 4) In what circumstances are contract laws not followed? Thus, social relations happen to function. 5) How is transaction cost influenced by the operation of social relations in this relational contract?

The Subjective Meaning of Friendship-the case of China

Danching Ruan
Hong Kong Baptist University
Wenhong Zhang
Chinese University of Hong Kong

This study explores the subjective meaning of friendship ties in a Chinese context. In a survey conducted in Tianjin, China in 1996, we ask the respondents to list up to three qualities of their best friend. We have identified three dimensions from their responses. The dominant dimension is about trust and understanding. Under this dimension, more than 80% of the respondents have used the words such as honest, loyal, sincere, reliable, or trustworthy to describe their best friend, and they believe that best friends should be able to understand each other completely and they should be able to tell each other everything. More than 60% of the respondents have mentioned qualities under the

second dimension about mutual help. However, it is not about how much help one may receive from one's best friend, but about the person's willingness to help others without expecting any return. In other words, it is about whether the person is someone one can count on in times of difficulties. This is in fact another aspect of trust. About 1/3 of the respondents have also mentioned personal characters of the best friend-from being principled and moral, to being kind and warm. No group difference, due to gender, education or age group, is detected in regard to this general response pattern, and this implies a level of agreement among people about what friendship means, at least when they are talking about "true friends."

Networks in Politics and Public Policy

Volker Schneider, Patrick Kenis

*People of Japanese Descent
Networking throughout Pan America,
and Its Effects on Politics and Public Policy*

Millie Creighton
University of British Columbia, Vancouver, B.C., Canada

This paper presents research done on Nikkei (people of Japanese descent) attempts to create networking links throughout North and South America, Australia, and with Japan, based on an ethnic heritage of Japanese descent through a focus on the creation and activities of PANA, the Pan American Nikkei Association. The paper discusses ways in which this networking organization has enabled stronger links with Japan and a connected networking of Japanese descent communities through North and South America, while impacting policy decisions in Japan about foreign labour transmigration, particularly for Latin Americans working in Japan. It also discusses how the networking activities of this larger international organization have been pivotal in affecting political and policy decisions within individual countries. Networking through PANA helped Latin Americans who were brought to the U.S. and interned during WWII finally gain recognition for their redress claims under the Clinton administration, and how activities of this organization interfaced with Peruvian President Fujimori's political rise and fall, and Japan's public presentation of the Peruvian hostage crisis, in which a large number of Japanese were held in lengthy captivity following the takeover of a Japanese ambassadorial party in Lima.

The Last Three Governmental Periods (1982-2000)

Analysis of the Mexican Political Network

Jorge Gil-Mendieta, Jorge Castro, Alejandro Ruiz
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Instituto de Investigaciones en Matemáticas
Aplicadas y en Sistemas (IIMAS- UNAM)

The political power network in Mexico has been analyzed from different view points. We have described its historical evolution that gives origin to the formation of strong cliques; the main actors centrality, as a measure of power and as a influence distribution. Also we have analyzed the Salinas' political core through time (more than 30 years), in to known the power and their cliques pertinence of each actor through time. We have also done a global analysis of that network. We focused in the present paper in the identification of the main coteries to witch the political actors, that were working from 1982 to 2000 in the central government, belong. What groups were retaining the political control in the government through time. At the same time we find out the professional origin identification and their cliques they belong.

*From Elite Reproduction to Elite Adaptation:
The Dynamics of Change in Personal Networks of
Slovenian Elites*

Hajdeja Iglic and Andrej Rus
University of Ljubljana, Slovenia

This article deals with the process of elite adaptation in Slovenia in the period between 1988 and 1995. While negotiated settlement between the old and new elites in Slovenia contributed to high reproduction rates of Slovenian old elites, there was significant change going on within the new and old elites. By looking at their ego networks, we show that the debate on elite reproduction is overlooking an important aspect of change, i.e. the adaptation of elites. We analyze changes in the composition of elites' networks and find that in spite of high reproduction rates, there was extensive fluctuation in the old elites' networks. We also find that changes in the composition of networks were the result of strategic choice by the members of the new and old elites. These results indicate that Slovenian elites underwent significant changes that simple measures of elite reproduction fail to uncover and that they were a result of conscious elite adaptation rather than induced elite accommodation to regime change. We argue that because it shifts emphasis from elite reproduction to the actual social processes, the concept of elite adaptation provides superior tools for the analysis of transition in those societies that experienced negotiated settlement of old and new elites.

*Neoliberalism and Changes of the State Elite in
Mexico*

Larissa Adler Lomnitz, Jorge Gil-Mendieta
National Autonoma University

Since the 1950's most of the highest positions of the state apparatus in Mexico were occupied by lawyers trained at the public National University of Mexico. Their main function was to build up the post-revolutionary regime and to regulate its social and political life. By the 1980's, however, the country suffered a serious economic crisis (the so-called "the foreign debt crisis") which forced the government to introduce structural economic adjustments following the "Washington Consensus" resulting in the implementation of neoliberal policies. As a consequence a new technocratic elite of young economists trained at private universities in Mexico and the US has been replacing the old political elite of lawyers. In this paper we will present tables and graphs showing the progressive increase of economists in the upper levels of the State apparatus and some of the actor's personal networks through which they rose.

*From Authoritarianism to Democracy:
the Role of Alternative Political Networks in Mexico*

Samuel Schmidt
Universidad Autónoma de Ciudad Juarez

Jorge Gil-Mendieta
IIMAS, Universidad Nacional Autónoma de México

The Mexican political system produced seventy years of political stability, due in part to a strong political network with a complex architecture. This network secured allegiance and discipline, which allowed government to take drastic measures as well as to articulate long-range policies. The recent defeat (July 2, 2000) of the ruling Institutional Revolutionary Party (PRI) has a strong potential to disrupt the network's cohesion and simultaneously to allow the creation of alternative networks. Some of the components of these networks have historical roots but they still have to consolidate themselves. We assume hypothetically that the consolidation of Mexico's democracy will require the consolidation of alternative networks to facilitate political cohesion. A new government who needs the old network will be unable to forge the changes the country needs to move from an authoritarian to a democratic system. In this paper we will explore the origin and development of the ruling and alternative networks.

The Political Field and Cooperation among Individual Actors

Ludwig Zurbriggen
University of Fribourg

The paper addresses the question if cooperative interaction between political actors within the same party can be explained by their position in the field of the party. Network Analysis is used to determine the relations individual actors maintain among each other. The study classifies the actors in several categories (blocks), according to the structural equivalence of their relations. The position of these categories in the partisan field is explored by means of correspondence analysis. The analysis aims to show the elective affinity between the position in the partisan field, political attitudes and block membership. Furthermore, the paper explores the question if the blocks of actors can be considered advocacy coalitions and will eventually propose a typology of partisan actors.

The paper draws upon a survey of 400 Christian democrats in Switzerland, which are influential in their respective cantonal party. The paper takes advantage of the multilingual character of Switzerland by comparing christian democratic parties from different language regions of Switzerland.

Network Sampling Issues

Marinus Spreen, Tom Snijders, Ove Frank

The Effect of Sampling on Centrality Measures

Elizabeth Costenbader
Johns Hopkins University School of Public Health
Thomas Valente
University of Southern California School of Medicine

A potential barrier to network data collection and implementation of network interventions in many settings is the perceived cost that interviewing a large portion of the network will entail. Researchers have been motivated to interview a large portion of the network out of concern that network measures become increasingly unreliable as sample size decreases. This study is designed to determine more precisely the sampling level at which network measures of centrality become unstable. In this study, we consider eight network measures of centrality; in-degree, out-degree, degree symmetrized, betweenness and betweenness symmetrized, closeness, radiality and integration which we calculate repeatedly at increasingly smaller sample sizes on data collected in six studies consisting of 58 different networks.

Estimating the Size of Homeless Population in Budapest, Hungary

Beata David
Sociological Institute of the Hungarian Academy of Sciences
Tom Snijders
University of Groningen

In this study we try to estimate the size of the homeless population in Budapest by using two 'non-standard' sampling methods: snowball sampling and capture-recapture method. Using two methods and three different data sets we are able to compare the methods, the results and also suggest some further applications. Apart from the practical purpose of our study there is a methodological one as well: to use two relatively unknown methods for the estimations of this very peculiar kind of population.

Estimation of Population Characteristics from One-Wave Snowball Samples in Structured Populations

Tom A.B. Snijders
University of Groningen
Ove Frank
University of Stockholm

We consider a one-wave snowball sample in a population composed of individuals who are distinguished by their values on one or more covariates (e.g., drug users with, and without, a home). It is assumed that relation frequencies and the sampling fractions in the initial sample can depend on these covariates. We derive model-based and design-based estimators for population means and population totals of a quantitative variable in this population. This extends our earlier work on the estimation of the size of the population.

Estimating the Number of Drug Abusers Using a Network Sample

Marinus Spreen
Maastricht University

In this paper we discuss the problem of estimating the number of drug abusers for studies in which a substantial part of the study population is registered and the total unknown population is conceived as a graph. Using a random sample from the registered drug abusers and observing their drug abusing network members, we discuss 4 network order estimators, i.e. a multiplier-, truncated Poisson-, Bernoulli- and capture-recapture estimator. The different assumptions underlying these estimators are discussed and illustrated with results of a drug abuse network sample in Heerlen, The Netherlands.

Networks on the Web

Karen E. Pettigrew, Julie Hershberger

Structuring Large-scale Online Discussions: Making Use of Network Analysis Methods

Steffen Albrecht
Technical University of Hamburg-Harburg

Since long, the Internet has been discovered as the medium that is ideally suited for discussions and deliberative exchange. For example, online communities were a phenomena of the early days of the Internet, and with the invention of the WWW, web-based forums became widely used by the growing mass of "Netizens".

Online discussions provide many advantages over face-to-face or telephone based forms of communication as is well documented in the literature on computer mediated communication. But when it comes to large scale public debates, the web turns out to be a bottleneck: complex discussions are extremely hard to follow, and important messages and data are lost in the mass of information that is exchanged. For applications of online democracy as well as for any true many-to-many communication that require broad participation, this is a major drawback. This paper proposes to use approved methods of the social sciences to help structuring such large-scale debates. Especially methods of social network analysis can be used to analyse the structure of a debate, to split up discussions that become too complex, and to support the personal contacts between actors. In the paper it is shown how these methods can be transformed into technological tools to support online discussions, and it is argued that they help making discussions more attractive. The research presented here is part of "DEMOS", a R&D project funded by the European Commission to support online political participation.

A Network Analysis of International Internet Flows

George A. Barnett, Bum Soo Chon, Han Woo Park
State University of New York at Buffalo

Devan Rosen
Cornell University

This paper argues that the Internet is evolving from the existing telecommunications system, but incorporating additional functions (asynchrony and science) inadequately provided by the old system. Using network analysis, it describes the structure of international Internet traffic based on data obtained from the Organization for Economic Development for July, 1998. It also examines the relationship between the structure of the Internet and international telecommunications, as well as trade, air traffic, telephone rates, language, physical location, science citations, student and immigrant flows and structural asynchrony. The results indicate that the structure of the Internet is significantly related to the structure of the international telecommunica-

tions, air traffic, trade, science and student flow networks at earlier points in time, as well language and asynchrony. However, in combination, only telecommunications, air traffic, science citations, asynchrony and either trade or student flows were significant, accounting for over 62% of the variance in the structure of the Internet.

*Online Community Communication Networks:
Internet Club Applications*

Dean H. Krikorian
Cornell University

Wellman and Gulia (1999) laid the groundwork for examining online, virtual, communities from a network perspective. They conclude that online communities are unique forums, yet also exhibit patterns of face-to-face communities (see also Rheingold, 1993; Smith & Kollock, 1999; Wellman, 1999). This paper empirically explores online community-building processes by examining over time communication patterns of Internet clubs. Internet clubs such as www.clubs.yahoo.com (>100,000 clubs housed) provide multimedia capabilities such as message boards, online chat, calendars, links, photos, news, and private/public club formation options, and are rapidly proliferating via the Web. Based upon work by Krikorian (1999; 2000), Internetwork measures are described and applied to Internet clubs. Internetworks include extant network measures such as centrality indices, digraph techniques, tie strength, and semantic network analysis, yet also develop new network measures of message participation, thread and link proliferation, group member permeability, and lurker, visualization, and hit-rate indices. Important to this paper is the development of a self-organizing theoretic model ultimately used to assess the over-time sustainability of online communities. Implications explore the role of data mining, software development, future applications, and the relationship between online and face-to-face networked communities.

*Affiliation Network Structure of Top Websites:
Examining Affiliates with Hyperlink in Korea*

Han-Woo Park, George A. Barnett,
State University of New York at Buffalo

In-Yong Nam
Silla University

This paper argues that individual websites form affiliations with others for the purpose of strengthening their individual trust, expertness, and security. It describes the affiliation network structure of Korea's top 152 websites. The data were obtained from their websites for October, 2000. The results indicate that financial websites, such as credit card and stock websites, occupy the most central position in the affiliation network. A cluster analysis reveals that the structure of the affiliation network is influenced by the financial websites with which others are affiliated. These findings are discussed from the perspective of website credibility.

*Ranking and Visualization of Web Pages
using Social Network Analysis*

Ulrik Brandes
University of Konstanz

Methods for ranking World Wide Web resources according to their position in the link structure of the Web are currently receiving considerable attention, because they provide the first effective means for search engines to cope with the explosive growth and diversification of the Web. These methods are often based on spectral analysis and therefore quite similar to those common in social network analysis. We review some popular ranking methods (including the one used in the search engine Google) and show that, with the same type of computation utilized in all of them, a layout for effective visualization of a link structure can be determined.

Our visualizations provide valuable insight into the structure and the ranking mechanism alike, and are particularly useful for large social networks, i.e. with hundreds to thousands of actors.

*Function(s) of Inter-actors' Web Links
and Functionality of World Wide Web's Structure*

Gregor Petric
University of Ljubljana

The study proposes a theoretical typology of links between web sites of different social actors and empirically examines hypertextual features of the structure of Slovenian World Wide Web.

Following claims of founding fathers, the World Wide Web was initially designed on the idea of hypertext, a system developed for fast and efficient access to information. Two problems are under investigation: how is the hypertext's essential feature, a hyperlink, being utilized in the web and secondly to what extent does the structure of the world wide web reflect ideas of the hypertext. Starting from functionalist perspective and following Merton's and Giddens' discussion on reasons and intentions of human action, a typology of links between web sites of social actors is proposed. Categories of 'informational', 'identity formation', 'support' and 'promotional' web links are extended by considering the type of social actors. Further on, functionality of the World Wide Web is investigated on the structural level by taking relevant structural features of hypertext-intertextuality, decentrality and non-linearity as a criteria. Using a web robot, a whole network was generated with nodes representing web sites of Slovenian individuals and organizations and relations representing external links between web sites of these social actors. A limited, non-conclusive number of results will be presented.

*Fostering Social Capital Using the 'Net':
Perceptions of Community Network Users,
Information Providers and Organizers*

Karen E. Pettigrew
University of Washington

Joan C. Durance
University of Michigan

Online community networks have been lauded for their potential to strengthen physical communities through connecting individuals and groups, by increasing information flow about local services and events, and through facilitating civic interaction. Past studies, however, suggest that Internet use has the reverse effect by isolating individuals and decreasing interpersonal interaction. We present findings about how online networks benefit physical communities based on extensive case studies in three states. Our study focused on how online networks build community and affect different players such as service providers who post information about their services on the Internet and public library staff who organize and maintain these networks, as well as on citizens' online information behavior when seeking help for everyday situations. In our paper we discuss how online networks foster social capital at the individual and community levels, along with methodological challenges with conducting online surveys.

*The [Hungarian] Internet Economy: a Network
Approach*

Balazs Vedres and David Stark
Columbia University

There are numerous studies regarding the social consequences of the Internet, but few about the sociological model of the Internet economy itself. The paper presents a multi-domain interorganizational model of the Internet economy in which the various domains have distinctive

measures of value. The domains are: backbone connections, access providing, website hosting, content providing, investing, advertising and e-commerce. Each domain has a unique determinant of position, and there is a network of value-translations between the domains. The principle of positioning is distinctive to each domain, yet actors can be present on more than one. We analyze the overall position of actors in the Internet economy, the typical strategies of multi- or single domain players, especially ISPs, who are present on most of the domains. Theoretical questions about the economic-sociological models of coordination are also raised regarding the triplet of markets- hierarchies-networks.

The Hungarian Internet economy provides an empirical case for elaborating these concepts. We utilize interviews and archival data to analyze positions in each domain - some of the positions are based on attributes, some of them are based on relations, as the nature of each domain suggests it. Backbone network positions, the network of hyperlinks and hosting relations are analyzed by a multiple network approach. We also add the symbolic dimension of the discourse on the Internet economy to our analysis to help explain the struggles for positions in the multi-domain arena.

Does the Internet Depress, Amplify, or Increase Social Capital? Evidence from the National Geographic Survey 2000

Barry Wellman, Anabel Quan
U Toronto

James Witte
Clemson U

Keith Hampton
MIT

Public, policy and scholarly debate has been intense about three ways in which the internet are affecting social networks and social capital:

1. Does the internet so tie people to their screens that their in-person and organizational relationships atrophy (Kraut, Nie, Putnam)?
2. Or does the increase communication possibilities of the internet amplify people's in-person participation in community and organizations (Barlow; Wellman and Gulia)?
3. Perhaps both sides are overly privileging the internet, and there is little relationship between life online and "real life".

Our evidence comes from a 1998 40,000-person survey of visitors to the National Geographic Society website, one of the first large-scale web surveys done. We find little evidence that the internet depresses networks and capital. We find some evidence of amplification. But the most prevalent phenomenon is that people's interaction online adds on to their face-to-face community and organizational involvements.

Our evidence strongly suggests that the internet is rapidly becoming normalized as it is incorporated into the routine practices of everyday life. Rather than reducing social life, it is probably reducing a more asocial, one-way form of communication: TV watching.

The "Web" of Semantic Network Analysis: Artificial Neural Networks and the Internet

Devan Rosen
Cornell University

This paper addresses the applicability and power of using semantic network analysis to study the Internet as well as employing the Internet as a tool for developing understandings of social networks based upon shared meaning. Past research examines how content-analytic neural networks can be applied to the Internet. Among these studies is a

geographical representation of Internet navigation. Extending the research of text-based semantic networks, current projects are described which utilize semantic network analytic techniques to study interaction in visual-based virtual reality (i.e., 2 and 3-dimensional graphical spaces). Online software development highlights the incorporation of Self Organizing Systems Theory in a Web-based shell. Integral to this paper is the ever-changing face of the Internet which includes multimedia capabilities of networked communication. Potential applications are discussed in light of in educational, organizational, and environmental contexts.

Personal Community Networks

Douglas Adams

Ethnic boundaries in the class? Assessing the influence of ethnicity and ethnical population distributions on the distribution of social relationships within schools

Chris Baerveldt, Marijtte van Duijn, and Dianne van Hemert

Utrecht University

The proverb "meeting is mating" refers to the idea that the chance that two people from different origins engage in a social relationship depends on the chance that they meet. This leads to the hypothesis that the number of inter-ethnic and intra-ethnic positive relationships within a complete network is a constant proportion of the number of inter-ethnic and intra-ethnic dyads. However, many authors state that there is more to mating than meeting. They argue that people select others with similar cultural outfit. This would lead to the hypothesis that the proportion of intra-ethnic relationships is larger than that of inter-ethnic relationships.

The two hypotheses are seldom tested thoroughly on complete networks. In this paper we present results from The Dutch Social Behaviour Study, concerning the social relationships between high school pupils in 20 schools. In 1995 1,317 pupils completed a survey with individual items and ten network items.

The first hypothesis seems to be supported, but some strange effects remain. Our first analyses suggest that strong cultural distance effects exist. The hypotheses were tested by a two-step procedure, using the P2 model for each school network in the first step and relating these results to school characteristics in the second step. In the paper, we will present the results of the analyses.

Social Networks In International Migration: The Case of Hungarian Emigrants in Finland

Agnes Bayer

Department of Regional Studies and Environmental Policy

The present paper is aimed at analysing the channels and functions of migrants' social (people's) networks as well as their effects on international migration and social adaptation. Contemporary emigration trends stemming from the Visegrad Region after the collapse of the socialist regimes in 1989 have shown that traditional, neoclassic utility maximisation models are insufficient to account for all migratory events and migration related questions.

It is suggested that issues such as the path and the country of destination chosen by migrants, irrational non-migration and the people participating in these movements can be better analysed if viewed from a systems approach, as evolving a case study among Hungarian migrants moving to Finland between 1960 and 2000 was conducted based on

in-depth interviews to identify changing migratory patterns. The structural analysis of the social networks established by these emigrants has provided a key not only to mapping an ethnic community's life abroad, its social integration or to drawing a general migrant profile, but also to predict future migration patterns. The analysis has shown how the Visegrad Region has reintegrated into the world migration systems on the periphery of developed Europe and it has also reinforced the importance of various people and non-people linkages in determining international migratory patterns.

Gang Networks as a Subset of Friendship Networks:

A Preliminary Analysis

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Literature on youth gangs defines a gang as a group of individuals who commit crimes but such literature often overlooks the details of the relationships among members of gangs, does not examine the nature of the assumption that a gang is a group, assumes that a gang group is homogeneous with regard to the gang affiliation of its members, and that members of one gang will have no friends who are members of other gangs. Field research in Champaign, Illinois, focused on two cohorts of adolescent and youth adult gang-involved females: (a) girls who are actively involved in gangs; and (b) girls who used to be actively gang involved. The research is based on the premise that youth gangs are an effective means to amass social capital in neighborhoods where human capital is low and where household poverty is everpresent. Given conditions of abject poverty, it would be expected that individuals' best survival strategy would be to expand, not to minimize, the number of ties to individuals who may have the resources needed for daily survival. If this assumption is true, then the friendship networks of the members of a cross-section of local gangs should include girls who are not gang members as well as girls and guys who are members of gangs other than ego's. Friendship networks were generated from gang girls in the active and inactive cohort. This preliminary analysis provides the demographics of friendships networks and finds that networks of active gang girls are larger than inactive members, most girls were friends before they were members of the same and/or different gangs, the primary function of a gang network is protect ego against aggression, and it is common for ego to request protection from members of her own as well other gangs. These findings suggest that girls' friendship networks in a highly impoverished area serve a critical survival function where survival is best achieved with multiple relations to a wide network of long-term friends.

*Law and Order:
Explaining Obedience using Ego-Networks*

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Network correlates of deviance and civil disobedience are examined using response items involving obedience to the law, indicators of deviant behavior, and the social network module of the 1985 General Social Survey (GSS). Preliminary findings show that size and heterogeneity of individuals' confidant ego-networks best predict, above demographic correlates including education, individuals' propensities to find disobedience to the law permissible given appropriate circumstances. These networks are less likely to be family-oriented and include more friends and co-workers. Both the confidant and friendship networks are less interconnected (i.e. less cliquy) and contain ties that are unequal in their intensities of affect. Implications on social control and deviance theories are discussed.

A Structural Analysis of Fraud and Armed Robbery Networks in Norway

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There is some debate in the few existing studies of criminal networks as to the extent to which they are structured like conventional legitimate organisations. To examine this the social structure of three criminal networks were explored that mostly engaged in armed robbery, car crimes and fraud. The main hypotheses were that it would be possible to identify subgroups, key individuals and leaders in these networks and thereby understand more fully the ways in which they were organised and their inherent vulnerabilities.

Data obtained from the National Criminal Investigation Service (Kripos) in Norway consisted of police reports, witness and suspect interviews, telephone records, newspaper reports and court reports as well as information on the offenders previous convictions. This was analysed using measures taken from Social Network Analysis (SNA), using the specially developed Ucinet V program, developed by Borgatti, Everett and Freeman (1999). This allowed the determination of the centrality,

N-clan and clique properties of the networks studied. This allowed the individuals in each network to be ranked according to their influence on, involvement in, and the number of connections they had within the network.

The validity of these results were examined by relating the ranks to information available in suspect and witness interviews that included information about their roles in the crimes.

The analyses did indicate the presence of subgroups and key individuals. Each subgroup did have distinguishing crime-related features, for example focusing on fraud, robbery, car crime or being assistants in other crimes. The individuals ranked by the centrality measures as being important were found to be the potential core members in the network even though they did not seem very important from initial examination of the police files. Leaders of the networks, however, were not clearly identified through the SNA measures, possibly because they do not exist in conventional SNA terms because these groups work through a small number of individuals each of whom can take a leadership role depending on circumstances. It is further possible that the leaders, if there were any, keep a low profile and their crew might be the ones that are picked up by the analyses due to their more active involvement. Overall, the SNA program used proved to be a useful tool when it comes to exploring the data and would be of benefit to police investigations as a supplement to their normal procedures.

*Social Cohesiveness within Organizations:
Frequency of Informal Meetings and Social Bonds*

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In this paper two aspects of social cohesiveness within an organization, frequency of informal meetings and the social between employees are examined in relation to an increasing part-time employment. The problem of this paper is as follows: Is part time employment more influential on the frequency of informal meetings than on the social bond of the relationships. Besides the relationships between part-time employment and the two aspects of social cohesiveness, determinants of both aspects were examined and hypotheses were formulated. To test the hypotheses, network data of 39 employees within eight teams within one organization were collected and analyzed by means of the p2-model (Van Duijn, 1995). Contrary to our hypotheses, there

was no relation found between part-time employment and frequency of informal meetings. A relation was found between part-time employment and the social bond between employees: employees who are part-time employed have stronger social bonds.

Tramps R Us: The Social Networks of a Highly Mobile, Truly Disadvantaged Population

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The patterned array of relationships between social actors is one of the fundamental concepts of social network analysis. Such relationships potentially facilitate the transfer of information or material resources between social actors. Social network research that investigates the relationships between human social actors often generates relational data by utilizing questions about "people with whom you usually discuss important personal matters", or variations thereof. An implicit, and at times explicit assumption of the social networks generated by these relational data is that the relationships between the social actors are relatively ongoing and/or stable. However, for some groups of people, such relational stability may be an empirical question rather than a plausible assumption. In order to address this issue, we integrate concepts derived from symbolic interaction theory and social network analysis and then apply them to the ephemeral, serial interaction of highly mobile, truly disadvantaged individuals.

What we Owe to our Neighbors -Neighbor Relationships in Personal Networks in the Netherlands

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Sociological theories on modernization and individualization as well as popular opinion hold that in modern societies the quality of social relationships is traded in for quantity: although one meets many others at different occasions one does not engage in intensive relationships. Personal networks become less dense and ties become more single stranded, that is, network members hardly have any contact with each other. This development would take place mostly in urban environments and especially affect ascribed relationships such as those between family members and neighbors. In this paper we inquire into neighborhood relations, the extent to which they are there, what pattern and contents they have, how they differ among individuals, and the influence of the kind of neighborhood. Neighborhoods are a particular apt research site to study the effect of meeting chances on mating, i.e., the formation of social relationships. We inquire into the social composition of and facilities present in the neighborhood. Next to these supply-side explanations, we consider factors that relate more clearly to the demand side. E.g. the attractiveness of investments in neighbors will depend on the support that is given or the lack thereof by the personal network outside of the neighborhood. We use recently collected data (the Social Survey of the Networks of the Dutch, SSND=1008) from a national representative survey in 160 neighborhoods. Our result show that two third of the people have at least one neighbor in their personal network, and usually neighbors occupy 1-30 percent of people's networks. Neighbors are a vivid but not very intimate part of the personal network, mainly important for practical kinds of help. Preliminary analyses show that relational characteristics and the need of an individual for a certain kind of help are much more important as an explanation of neighborhood ties than the opportunities to meet neighbours.

Scholarly Networks

Anabel Quan-Haase , Barry Wellman

Co-evolution of Knowledge Networks as Public Goods and Transactive Memory Systems: Using Computational Models for Theoretical Integration and Extensions

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The pervasiveness of electronic communication media in organizations makes it increasingly difficult for individuals to discern social and knowledge networks. Specifically, it is increasingly difficult for individuals to accurately determine: "Who knows who?" "Who knows who knows who?" "Who knows what?" and "Who knows who knows what?" The "who" could be human agents or non-human agents such as knowledge repositories, webbots, or avatars.

In response to these concerns, several scholars have identified the need for recommender systems (Resnick and Varian, 1997) or community ware to help enhance individuals' ability to access an organization's knowledge network and make visible the organization's virtual social and knowledge networks. One such system is IKNOW (Inquiring Knowledge Networks On the Web; <http://iknow.spcomm.uiuc.edu>).

The availability of such systems makes it increasingly relevant to ask the following questions: Under what conditions, are individuals more likely to seek information they need from (or provide information they possess to) other human agents (such as individuals, groups) as opposed to non-human agents (such as knowledge repositories)? The theories of Transactive Memory and Public Goods both seek to describe the conditions under which agents share (retrieve or allocate) information in order to accomplish a collective task (Monge & Contractor, 2001). The Theory of Transactive Memory offers a set of peer-to-peer mechanisms to explain these processes in terms of an agent's perception of others' knowledge (directory updating and expertise recognition). Public Goods theory describes, in terms of agents' individual costs and benefits, the conditions under which as a collective they are more likely to share information with others by publishing to, and retrieving from, communal knowledge repositories. This paper describes how implementing and "docking" computational models based on these two theories offer new insights in response to the questions posed above and thereby improve the design of recommender systems.

Translating Crane's Invisible Colleges, Kuhn's Scientific Paradigms and Lotka's Law into Coauthorship, Thematic Evolution & Citation Indexing: Research Plan and Early Results

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Although largely theoretical in conception, Crane's invisible colleges and Kuhn's scientific paradigms address the sociological question of the structure of scientific innovation and its association with the individuals, teams and institutions producing scientific research literature. On the other hand, Lotka's law of scientific authorship is largely empirical with little sociological theoretical basis but is nonetheless frequently encountered in sociological studies of scientific literature. We examine the possible translation of these three ideas into operational and verifiable sociological concepts by analyzing four discernable and characteristic

aspects of scientific innovation. First, thematic evolution which is often operationalized as analysis of keywords describing research articles. Here cooccurrence methods, correspondence analysis and classification (clustering) methods are often employed. Second, coauthorship analysis which usually refers directly to social network methods. Third, the set of scientific journals publishing the research articles under analysis. Although seldom the subject of analysis, the definition of this set is often the determining factor in an analysis of scientific revolution. Fourth, citation indexing which analyzes who cites whom in their research articles. This specialty of the Institute for Scientific Information (ISI) also relies heavily upon social network analysis methods. We tie this research plan with previous analyses of sociological AIDS research literature which compared thematic evolution, coauthorship and a large set of scientific journals, finding that there are only two stable types of authors: "mainstream heavies" and "adaptive artists". We also present current research on the structure of German social science research literature ("GESIS Watch" project), looking at general thematic evolution and possible coauthorship and citation changes. We conclude with a presentation and some suggestions of research on further comparisons of the four aspects mentioned above, particularly the comparison of citation indexing with thematic evolution and coauthorship.

No argument: Problematizing cliques of exclusive knowledge production in sociology

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As a discipline sociology depends upon argument to ensure presentation of different views and to resolve differences (at least temporarily). Sociological texts must take account of the differing arguments on particular topics; doing so will be reflected in their citations of other texts in which such arguments are embedded. This is necessary to maintain disciplinary rigor and to make sociological knowledge relevant in non-academic/ public forums.

However some recent analyses have suggested the presence of potentially distorting effects upon knowledge production within sociology, and it could be that these are inhibiting effective argument. If so, this would be reflected in citations made. The ideal form of sociology described above would be representable as a well-connected network, or at least one of clusters joined by points with high degrees of inbetweenness. The second form would produce a network of isolated cliques with little or no interconnection, and connecting citations at best 'perfunctory'.

Networking scientific publications: An analysis of the coauthorship structure

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To what extent does the analysis of the coauthorship networks reflect the structure of a scientific community? In this investigation we present a useful procedure for the analysis of a coauthorship network. It consists mainly in a snowball process, combining common software packages as BiblioScape, Ucinet V and Pajek. The discussion of the results with the scientists object of study shows how the groupings obtained with algorithms based on cohesion strategies are reckoning as significant while the groupings obtained with structural equivalence algorithms were not identified.

Retrieval by Connectedness in Heterogeneous Digital Libraries

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Despite the fact that many Digital Libraries (DLs) are available on the Internet, users cannot effectively use them because of inadequate functionality, deficient visualization and insufficient integration of different DLs. In the framework of the Daffodil project (University of Dortmund, Social Science Information Center, Bonn) we develop a user-oriented access system for DLs which overcomes these drawbacks. One of the substantial innovations of the planned system is the implementation of network analysis methods to improve retrieval results. This approach takes into account information about the social status of scientific actors in co-author- and co-citation-networks. The paper presents a prototype based on heterogeneous bibliographic and citation databases in the field Computer Science.

Social Navigation and Social Networks

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Computer scientists, software designers and information architects are increasingly turning their attention to the design of algorithms and interfaces for the social navigation of information (e.g., Munro, Hook and Benyon, 1999; Dieberger, Dourish, Hook, Resnick and Wexelblat, 2000). As formulated by Paul Dourish and Matthew Chalmers in a short paper written for the international Human-Computer Interaction (HCI) conference (Dourish and Chalmers, 1994), social navigation is a means of navigating through a space of information (e.g., a database of texts, the WWW, archives of email, etc.) using the activities, comments, behavior, or appearance of others. Examples of social navigation include moving "towards" a group of people or examining a piece of information because others have examined it. Recommender systems (see Resnick and Varian, 1997) are currently a commercially important genre of social navigation systems (cf., amazon.com's "people who buy this book also buy these books..." feature). While it is true that some of these systems have been designed using a knowledge of social networks (e.g., Kanfer, Sweet and Schlosser, 1997; Smith, 1999), it would be worthwhile to open this area of software design more broadly to the criticism and suggestions of researchers who focus on social network analysis. What tools and techniques from social network analysis might be applicable to the social navigation of large archives of text, images, music, email, etc.? What results from social network analysis are currently being ignored or undervalued by designers of social navigation software? This paper sketch out the emerging area of social navigation and illustrate some of its strengths and weaknesses through demonstration of the Conversation Map (www.sims.berkeley.edu/~sack/CM), a system designed to graphically summarize large volumes of email through a calculation of emerging social and semantic networks implicit in the content and the headers of the email messages.

Does Citation Reflect Social Structure? Longitudinal Evidence from an Interdisciplinary Research Group

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Many authors have posited a social component in the citation practices of science and scholarship, the consensus being that the citers and citees often have interpersonal as well as intellectual ties. Detailed evidence for this belief has been rather meager, however, in part because social networks researchers have lacked bibliometric data (e.g., pairwise citation counts from online databases) and citation analysts have lacked sociometric data (e.g., pairwise measures of acquaintanceship). In 1997 Nazer extensively

measured personal relationships and communication behaviors in what we here call Globenet, an international group of 16 researchers with different backgrounds that was officially established in 1993 to promote work on human development from an interdisciplinary perspective. Since Globenet's membership is unambiguous, it was possible during 2000 to obtain individual citation records for all members in online searches of two databases from the Institute for Scientific Information, Scisearch and Social Scisearch. This permits examination of their citing of each other-i.e., their intercitation-and its possible growth over time. It is also possible to explore links between the citation data and Nazer's social and communication data. Intercitation networks are presented from four nonoverlapping periods: pre-1989 (baseline), 1989-92 (the four years leading up to the formation of Globenet), 1993-96 (the four years after), and 1996-2000 (the four most recent years, as institutionalization sets in). Several questions are addressed: whether intercitation grew over the periods studied; the extent to which it follows disciplinary or interdisciplinary lines; whether it patterns with degrees of acquaintanceship; whether it reflects Globenet's organizational structure; whether it is associated with particular in-group communication patterns; and whether it is related to the co-citation of Globenet members-that is, to counts of their joint appearances in the references of citers in general.

Social Capital

Nan Lin

Multiple Measurement of Social Capital in Hungary: an Assessment of National and Case Study Findings

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The catchall feature of the social capital concept, the wide range of its interpretation implies a variety of possible consequences. In addition to a new upsurge of related fields such as social network studies it may entail a boost of theoretical efforts putting a number of sociological core concepts into new light but yielding a paradigmatic focus with an interdisciplinary character as well (from economics to the newly emerging 'econometrics'). The vagueness of the concept, the blurred outlines of its operationalization hides, however, serious dangers, capable to lead to an early frustration. It is not easy to assess the trade-off between the heuristic benefits of a multilayered approach and the concomitant methodological handicaps. While it is mostly advisable to go on with conceptual clarifications and sharpening the tools of related methodology, it seems premature to narrow the concept in a radical way or get committed with any of the possible indicators or techniques. This does not mean an unbounded approach even on the short term. It seems a necessary limitation for example to distinguish between a wider spectrum of resources involved in social networks and the more specifically capital-like elements (earmarked by investment and accumulation e.g.). In the same vein, it seems important to handle relationship-assets at the core of social capital separately from output-like moments such as norms or attitudes frequently put on a par with the former. The latter should, however, have their place among significant criterion variables in the frame of validity tests, construct-related measurement experimentations alongside with tests of internal consistency in a traditional sense. The iterative coupling of theoretical and empirical efforts can be facilitated by an alteration of study settings adding specific scenes (in the frame of case studies) to more general contexts (as surveys on national samples).

This objective has been followed when supplementing the pool

of our social network surveys of the Hungarian population from 1997 and 1998 (N appr. 1000 and 800) by a four-village survey in 2000 (N=728 as a whole) based on a 2 by 2 analytical design with a regional East/West (less/more developed) dimension on the one hand and a more concept-related distinction on the other (high and low civic participation measured by recurrent patterns of voter turnout, an aspect interpreted by some authors even as a manifestation of social capital). The more or less saturated village samples (with a coverage of 75 to 80 per cent of adult populations as an average) not only permit a contrast of in-degree measures with more generally used out-degree ones but also a pronounced substantive stress on community integration.

While the small size of these settlements may suggest a local closure in social relationships, they are far not homogeneous with this regard. The one among them in the most advantageous geographic and social position is characterized by a relatively wide range of outward contacts reaching beyond the local (in some respects even national) contexts. Its leading position on most aspects of network resources exemplifies experiences concerning the consolidation of various types of social capital. The application of various techniques such as an adapted version of the Lin-Dumin position generator (Lin 1999 as a recent development), alongside with a Fischer-GSS type of name generator, added by a roster of association memberships plus some specifically designed measures (such as mail networking and kinship patron roles and also some reputation measures related to the local scene) has permitted to survey an array of resources having to do with either the strong or the weak tie pole (or taking the perhaps even more telling triad of 'bonding', 'bridging' and 'linking' ties as by Woolcock 2000). Our case finding have corroborated our earlier national findings (Angelusz-Tardos 2001) pointing to the strategic role of weak-tie type of resources in the formation of social capital indicated not the least by the central place of position generator measures in the composition of global indexes. Most criterion-related analyses (to mention participation variables in the first place, more so with national than municipal elections) have exhibited a similar pattern. Specific cases have presented some important differences from this overall picture at the same time. The 'deviant' case (the village with high participation in the less developed and, as a rule, low-turnout region) has exhibited a relatively high overall score of network resources especially by its more numerous contacts of the strong-tie type. Also, as far as participation is concerned, embeddedness in these mostly kinship-related ties proves to be here the strongest predictor. (While at the opposite deviant case of low turnout in the West region it is the kinship patron role that presents the most significant relationship with participation, this time of a negative sign.) All this suggests the - theoretically well interpretable - protective role of 'bonding' ties at regions or periods of hardships and emphasizes the need of taking the specificity of various settings into account.

The data being still fresh, our case study analyses are far from finished, with renewed efforts ahead to cope with aggregation dilemmas of index construction (as detailed by Snijders 1999). A next phase of our analyses sets out to move from the individual to the collective level including family and neighborhood entities on the one hand and community-level structural characteristics of social integration on the other. A similarly important task will be, with some initial results to be presented in the Conference paper, to outline more concrete mechanisms of the functioning of social capital (such as diffusion of norms and patterns of opinion leadership on the local scene).

The strength of philo ties: A model of within-groups social capital

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Social capital, especially at the organizational level, has the promise to become an important theoretical frame for academic research and organizational practice. But for organizational-level social capital to fulfill this promise, much

more progress needs to be made in operationalizing the construct. In the paper, I will offer a framework that first (1) develops empirical indicators of social capital among members of a small group and then (2) connects what is called within-groups social capital with organizational-level social capital. Krackhardt's (1992) discussion of philos relationships--in which social actors A and B have interaction, affection, and a relationship that has lasted over time--will be used to frame the argument that network closure is most important as a foundation for both within-groups social capital and organizational social capital, although this claim must be made cautiously in light of likely contingency factors that affect the social capital-related value of both network closure and brokerage opportunities.

The Network Structure of Social Capital

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Although there is wide consensus among social scientists on the meaning of social capital, there exist a number of alternative theoretical arguments on how social capital is generated. Three theoretical lines of explanation stand out in the current debate. The closure argument posits that actors' social capital is associated with the density of the networks in which actors are embedded, and ascribes the generation of social capital to the emergence of obligations, to faster rates of circulation of information, and to the effectiveness of social control. The brokerage argument posits that actors' social capital is associated with the amount of structural holes actors span, and ascribes the generation of social capital to information variety and bargaining power. The status argument posits that actors' social capital is associated with their position in the status hierarchy, and ascribes the generation of social capital to the signaling effect of status position.

This working paper sketches a theory of social capital that brings all three lines of explanation together in a unitary explanatory model, in which social clusters are conceived as the intersection of role and status equivalence, and the relationship between relational and positional embeddedness becomes crucial.

The Gender of Social Capital

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We have made great advances by investigating social capital in the sense of the occupational variety in a person's network. But the variety of contacts with men should have different outcomes than the variety of contacts with women, given the persistence of gender differences in our societies. This paper will develop theoretical predictions for differences in occupational, cultural, political, and health outcomes, and will present a research instrument developed to test these ideas.

Dimensions in individuals' social capital

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Although over the years several valuable measures of individual social capital have been applied, these measures and the corresponding questionnaire items have not been subjected to extensive analyses of their scaling properties. Such analyses can be useful, however, because there may be additional information hidden in the population-specific association patterns of the items and because well-constructed scales can be helpful in obtaining generalizable research results. These association patterns form an interesting feature of social capital in view of the potential mobilisation of social capital: given limited time and human resources available to individuals, low correlations between social resource items would imply a greater difficulty for

individuals in accessing their social capital in general. Hence, low correlation patterns can overall be expected to be a signal of greater difficulty in individual goal achievement using social capital. In this paper we explore and discuss association patterns between social capital items for the Dutch population. In a nationally representative sample (N=935) of the 1999-2000 Social Survey on the Networks of the Dutch, non-parametric scale analyses were performed on data retrieved with items constructed along the idea of the 'position generator' (Lin and Dumin, 1986). Results suggest the presence of a bipolar dimension largely coinciding with social network members' occupational prestige. In addition there is also some evidence that there may be independent cumulative dimensions of intellectual, financial, and practical social resources. These results may lead to scales for individuals' social capital with better generalizability properties and, in addition, they may form a confirmation of Bourdieu's supposition of separate cultural and financial social resources.

Social Capital and Market Adaptation in Slovenia

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INSEAD

Andrej Rus
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This paper analyses how the social capital of the CEOs of Slovenian firms affected their ability to reorient sales after the crisis brought about by the separation from former Yugoslavia in 1991. This crisis caused a drop in sales estimated between 25% and 33%, which was a major shock for an economy where more than 60% of the GDP was linked to trade. Yet, there was wide variation in the firm's ability to respond to this crisis. Using a representative sample of Slovenian firms, and controlling for both exposure to the Yugoslavian market and existing links to the Western markets in 1990, we show that firms whose CEOs could count on a cohesive top management team did better at recovering from the Yugoslavian shock, often maintaining or even increasing their total sales between 1990 and 1993. However, excessive closeness between the CEO and his top management team had a negative influence on sales performance. Our results suggest that while effective leadership may require a cohesive core of followers to mobilize the organization, it also requires that the leader can keep enough distance from that core to perform an effective brokerage role between the firm and the environment.

Social Capital and employment opportunities

Andromachi Hadjiyanni
National Centre for Social Research

The importance of social capital in finding job placements has already been stressed by a number of studies. The particular way and the extent of the utilisation of social capital, seem to be differentiated according to different social formation, influenced by factors such as concepts, opinions, social practices, tradition etc.

A recent survey conducted by our research team in Greece, was aiming to investigate the procedures of the integration of graduates to labour market and the role of the social capital and social networks in finding job placements. Information collected for 620 Social Sciences graduates; 500 in Athens and 120 in other urban areas. The findings of this survey provided empirical evidence on the importance of social relations-networks in accessing to labour market, something that was already a "common sense" in Greece and has reported in a number of studies. The most surprising findings was first, the emphasis on general social networks, than family networks, for finding the first job and second, the use of non-formal ways of finding job placements (family and social networks) even several years after their integration to the labour market and often after having change several jobs.

*Political Capital as Social Capital:
The Evolution of Influence in a Political Network*

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Michael K. Orbach
Duke University

Actors involved in political networks commonly use the term political capital in everyday discourse. More than in probably any other social context, politics involves a conscious awareness of network connections and how they can be used and manipulated to achieve political ends. Political actors frequently speak of 'using up capital', 'spending capital in foolish ways', and the outright exchange of capital. Such capital is manifested in the network of social and political relations and it is understood that success in politics is difficult to achieve without thorough knowledge of the political landscape. This paper follows a political network in North Carolina over a 6-year period, examining individual variation in reputed political influence as it relates to various kinds of network centrality, structural holes, cognitive knowledge of the network, and political outcomes at three points in time. Included are legislators, lobbyists, state government officials, and activists. The study finds that knowledge of the network is particularly advantageous during times of political instability and that influence in the political network is clearly related at all points in time to an actor's ability to broker (betweenness centrality) among the various political players.

Globalization, Informal Economy and Social Networks

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This paper will relate different manifestations of the informal economy (non-regulated, illegal and criminal activities), with formal institutions of society (State and regulated markets) and the interpersonal informal networks through which informal exchanges are realized. International global agencies have produced for the first time reliable information on levels of poverty in the world today, and on the dramatic increase of the informal economy in different socio-political systems (advanced capitalist, developing capitalist, communist and post-communist). Informal economic activities have been defined as those which escape State regulation both on production and distribution of goods and services and on the nature of their final goal (illegal or criminal). Informal exchanges are possible through networks based on cultural institutions of the societies where the exchanges take place, such as family, friendship and all other relations which allow the construction of social networks in which trust and loyalty among its members ensure the functional survival of informal groups. I will use ethnographic examples of studies made in the above listed types of societies showing the relationship between regulations which define formality and informal exchange networks geared towards satisfying social needs which the formal system is unable or unwilling to do. Therefore, a parallel economic sphere results from regulation and control.

An Empirical Study on the Social Capital of Networks

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Gender Differences in Workplace Authority? Social resources embedded in personal relationships (i.e., information, practical assistance and socio-emotional support) can be used in accomplishing workplace authority. In this study gender differences in supervisory, sanctioning, and decision-making responsibilities are explored, and related to differences in the social structure and/or relational content of

personal relationships at work. People's shortage of resources, as a function of their social network, could keep them from jobs at higher responsibility levels (i.e., the 'capital deficit hypothesis'). On the other hand, men and women with equal qualifications and equal amounts of social resources, may not experience equal return benefits from their networks (i.e., the 'return deficit hypothesis').

Therefore, next to the main focus of social networks as explanatory mechanism for workplace authority, various micro- and macro-dynamic influences are examined not only directly, but also indirectly through their impact on (access and benefits) of social networks. Benefits and constraints of male and female workers' social activities are incorporated to the theoretical model of Social Production Functions (SPF) theory (Lindenberg, 1996). Data is collected with 450 employees of a Dutch firm. Since the study is currently in progress empirical results are as yet unavailable. The theoretical framework of the study is discussed.

Social networks and enterprise clustering

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The paper explores the nature of social networks of small and medium size enterprise owners, in the context of an industrial cluster. In the discussion about industrial districts, it is supposed that trust is an essential component of dynamic production networks: Research made recently in a Mexican apparel industry cluster, where more than 300 small and medium size producers can be found, shows that the industrial (organizational) network and the social owner's (personal) network are very different.

In other words, evidence suggest that owners tend to establish production or commercial relationships with people which is not very close in their social networks, and to minimize the apparently effective social capital available in other producers, specifically friends and relatives.

In the article, Social Network Analysis is used to prove how the industrial agglomeration, without solid trust-based social networks, is not a warranty of entrepreneurial success by itself; even though trust is a necessary condition for the cluster generation.

Participation in Voluntary Associations as Social Capital: A Reconceptualization

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One of the fastest growing and yet controversial areas of social capital research is the linkage between participation in voluntary organizations and social capital. In this research enterprise, social capital is assessed through data collected on memberships and participation rates in voluntary organizations. Despite the promise of this approach, the field has suffered from equivocal findings. Beyond the descriptive trend analysis, there is little systematic evidence as to the extent that participation in voluntary organizations is indeed associated with other indicators of social capital or exerts expected returns. We argue that the basic assumption held previously about the necessary condition of dense or closed networks can be flawed. Instead, we must consider the proposition that sparse and open networks may be richer in embedded resources. Conceptual development and empirical evidence have lent support to the linkage between sparse and open networks and embedded resources and instrumental returns, for example, in socioeconomic statuses. Following this line of analysis, one would expect that participation in organizations more heterogeneous in member characteristics would be more beneficial to both participants and the organizations than in organizations more homogeneous in such characteristics. We therefore hypothesize that participation in cosmopolitan organizations rather than local organizations are more beneficial to the participants and the organizations. Data from a survey

study in Taiwan and from secondary analyses of the GSS survey data seem to support this hypothesis. We will extend this proposal to consider expressive as well as instrumental outcomes and for collective as well as individual entities.

Social Capital in Spain: The Emergence of a New Form of Stratification and Action

Josep A. Rodriguez and Fredesvinda Merida
Universitat de Barcelona

Using several national surveys (CIRES, CIS, World Value Survey) we undertake an assesment of social capital in Spain looking at both individual and collective forms of it. Our first objective is to analyze the distribution of social capital among social groups as well as between regions. We will then study its impact on several indicators of well-being and collective action. We will conclude looking into the relation between social participation in civil organizations and trust in social institutions and the state.

Social Resources, Modernization and Occupational Attainment

Hester Moerbeek
Wageningen University

Henk Flap
Utrecht University

Differential access to social resources has been suggested as an explanation why with ongoing modernization social origin still affects a person's educational and occupational chances and why a person's education does not have a larger and growing effect on his or her occupational attainment.

We analyse data from the Dutch Telepanel Survey from 1992/93 among 1900 households in the Netherlands. To measure social capital we use the position generator (Lin & Dumin 1986) and other positional measures. Our research establishes, first, that family ties provide better access to social resources than friends but less so than acquaintances. Secondly, family of origin, i.e., father's prestige, does affect access to social resources to a larger degree than a person's own education. Thirdly, analysing the role of access to social resources in the attainment process learns, while looking at the prestige of one's parents best friends when one was young and the prestige of one's current best friends, that there is a shift from achieved to ascribed social capital. Fourth, those who have ever unsuccessfully applied seem to be more successful in the rest of their lives, yet, and finally, using social resources is not a route for people with no other resources, since there a no clear differences between those who ever unsuccessfully applied for a job through formal means and those who ever unsuccessfully applied through informal means.

Technocrats from China: Entrepreneurship and Social Capital in a Strange Land

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University of Toronto

Arent Greve
Norwegian School of Economics and Business Administration and SCANCOR, Stanford University

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Centre for Asian Studies, University of Hong Kong

New skilled immigrants have a hard time getting jobs. Some urge professional and technical immigrants to give up efforts to break into the local work force and start a business. How they can do so is a big question. Looking at educated PRC immigrants to Canada, we develop a model to explain the conditions under which these men and women, so talented and in demand in China, might be able to avoid under employment by setting up their own businesses. We find

that their education brings the newcomer to the shores. But their human capital, was dynamically interrelated with organizational needs of large complex bureaucracies. Once in Canada, their human capital is not appreciated. Further, their social capital is impoverished. Few can start up flourishing enterprises abroad. Without social capital, skilled immigrants are not prime candidates for entrepreneurship.

Network Dependent Path Dependence

Endre Sik
TARKI, Social Research Centre

In sociology path dependence is "the consequence of small events and chance circumstances (which) determine solutions that, once prevail, lead to a particular path". (North 1990 p. 94). In the literature of transitology the emphasis is on the legacy of communism. My addition to this approach is the following: I assume that communism in general and the mature phase of it in particular was (partly due to structural reasons, partly due to historical coincidence) a network dense society (Sik 1994). Partly since post-communism unavoidably used the brickolage of communist institutions (Stark 1995), partly since networks by definitions are high-inertia institutions the post communist path was cobbled with network-fragments (from the size of pebbles to huge marble pieces).

The network-dependent path of the transformation of the communist economy was further strengthened (the more intensive the traffic on this path is, the more likely the path widens into a highway due to the mutually re-inforcing interests of and consequently of the long-term investments of all actors on the road) by the temporary weakening of alternative institutions (such as the state, the internal market, etc.). But what was really important in strengthening the network dependent nature of the transformation process, there were certain transformation-specific processes, which by their immanent characteristics were network-dependent. Such processes were the privatisation, the restitution, the emergence of the multitude of new entrepreneurs, the appearance of multinational business, the opening of the border and last but not least the increasing risks of various economic actors in the course of "transformation crisis" (such as unemployment and decreasing real wages for the average households, the total collapse of the economic viability for certain ethnic groups and regions, the increasing rate of criminality, etc.).

The ultimate question is whether a network dependent country can or cannot leave its path? Can deeply socialised networking practices of the everyday life be abandoned? Could economic actors with vested interests in maintaing utilitaristic (corruptive, barter, etc.) networks be encouraged to disclaim these assets? Can institutions embedded into a network-intensive culture disembed themselves (or being forced or encouraged) from it? My tentative answer is no, no, no, and no, respectively. The explanation follows the convincing arguments of Gerschenkron (1962) on institution specific nature of economic backwardness. I assume that just as the state substituted the colonial wealth and the banking system in the process of "original accumulation of capital" in backward economies, the network capital plays the same role in post-communist tranformation. This is the only resource these economies have in plenty consequently they cannot afford to use it. And since it is very unlikely that they ever reach the stage of economic development they could afford to rely less on network capital, and even if it were to happen they could not undo their path dependent network capital and the institutional environment it creates for itself - the network dependent path survives.

The Social Capital of Brokerageroles

Volker Taeube

SIDOS

This study shifts interest on the relational characteristics of persons that can be regarded as intermediants (brokers) between different network sectors. Using the terms of „locals“ and „cosmopolitans“ Merton (1968) pointed out the importance of such roles for explaining structural outcomes. While discussing the theoretical properties of different brokerages Gould and Fernandez (1989) referred to the idea of persons as social transmitters in a more non-formal way.

By trying to grasp these concepts in the framework of Hummell and Sodeur's (1987; see also Burt, 1990) work on the census of triadic role patterns, the measurement of different amounts of social capital associated with brokers becomes possible. In general, two classes of brokerages can be distinguished: on one side „locals“ are playing a role within dense network sectors such as cliques while on the other side „cosmopolitans“ reside in more sparsely connected network sectors which allow the connection between otherwise separated cliques. Whereas the former are decisive for ingroup communication („ingroup leaders“), the latter connect (as more „formal leaders“) ingroup leaders indirectly and allow thus for exchange of scarce resources (i.e. information about job opportunities). Due to the greater opportunities in accumulating social capital several cosmopolitan roles with differing status seem possible. Depending on the offer of scarce resources in a social network integration processes occur that bring about changes in the status of the cosmopolitans.

Social capital and economic reform in East-Central European transition countries

Claire Wallace, Christian Haerpfer, Rossalina Latcheva
Institute for Advanced Studies

Some economists have hypothesised that social capital can benefit economic reform in post-communist countries by introducing greater trust in institutions and in the surrounding society, leading to more stable patterns of development. The paper will consider the relationship between participation in civil society, trust in institutions and in society and patterns of economic and political reform in Eastern and Central Europe in comparative perspective drawing upon the World Values Survey and the New Democracies Barometer.

Social Networking of Entrepreneurs and Spatial Location of Firms as Success Factors of High-Tech Firms in Israel

Javier Simonovich and Daniel Gat
Technion-Israel Institute of Technology

The research is a Ph.D. thesis at the Technion-Israel Institute of Technology, Faculty of Architecture and Town Planning.

The thesis is a quantity, quality and ethnographic research of the influences of entrepreneurs' social networking and spatial location of high-tech firms on the company first stage at the northern region of Israel.

Sixty one entrepreneurs were interviewed with a half-open questioner. The sample was created through the snowballing method. At the end of the interviews round the sample members were asked to check on a list the names of all those that they knew from their social, academic, military and professional past. Everybody returned the list.

There is a high level of correlation between the network variables such as Freeman's Degree Centrality and Bonacich Power, spatial location variables, background and social variables and the economic success of the high-tech firms. Economic success is defined by number of workers, the ability to raise funds and market value of the firms. Data was collected during the interviews.

One hypothesis suggests that there is a competitive advantage on the especially cohesive social web and social networks of the Israeli society, which enhance and promote the creation of high-tech firms. These social networks are developed from a peculiar cultural cooperation and trust tradition based on the same personal backgrounds (especially at the army). Therefore the hypothesis that successful entrepreneurs are the most socially networked ones is approved.

The other hypothesis suggests that there is a correlation between the spatial location of the firm at the regional level and the firm's success. This last hypothesis was also approved. Firms from one strategically located town (Yokneam) are much more successful by a high percentage than firms in all the other towns and cities of the northern region of Israel. Therefore Yokneam is called the Silicon Waddi of northern Israel.

The research emphasizes the importance of the entrepreneurs' social network, and the spatial location of the firm as very influential factors on the founding process and success of high tech firms as promoters of economical growth and social development in Israel.

Informal Relations at Work

Beate Volker and Henk Flap
Utrecht University, The Netherlands

After having described the informal networks at work four theories are tested. These are theories on emotional attraction between similar people, effects of restrictions, networks as social capital, and conflicts of interests between management and employees. We conducted a representative Survey of the Social Networks of the Dutch (SSND) among 1003 persons, while we over-sampled employed persons. In total 728 respondents do have a job. Colleagues are important in work related matters, but not for other things. People seldom turn to family, friends and neighbours in work related matters. Colleagues sometimes discuss their personal problems, though usually co-worker ties are weak.

Once more it is shown that people are attracted to similar others, also at work: being of the same age or sex promotes the emergence of mutual ties. As to restrictions: meeting chances stimulate contacts at work. Yet, those who have a part-time job demonstrate more social activities at the job. Time pressure because being married or having young children at home does lead to less contact with direct colleagues. As expected, functional interdependencies at the work and good relations among one's colleagues have a positive influence on one's own informal ties to colleagues. Conditions that make a person more attractive as a social resource, like having a higher education or a shared future, also enhance informal relations between co-workers. Women in spite that they seem to have a choice in life to be worker or a 'homemaker', do not have fewer or less good relations at work. Finally, in contrast to Marxist ideas good relations with the boss are associated with good relations to co-workers.

Network Effects on Family Formation: Why are African Americans less likely to Marry

Yoosik Youm
University of Illinois at Chicago

African Americans' low marriage rate has not been successfully explained by studies focusing on sex ratio. In the present study, however, a game theoretic model of sexual matching market is developed where the equilibria of the game is contingent on the trust level of the couples, which is measured by structural embeddedness. A relatively high proportion of polygyny as one of the sexual matching market equilibria in the African American population aggravates the sex ratio effect: men with low trust are nine times more likely to be unmarried and African American men are so signifi-

cantly more likely to have low trust level that racial/ethnic difference becomes insignificant after controlling for the trust level. This explains why the marriage rate is lower than expected from the sole sex ratio explanations because unmarried single people in polygamous relationship are much less likely to marry: even if two populations have the same sex-ratio, a population with higher polygamous relationship is more likely to have a low marriage rate.

The effect of trust is empirically tested in an event history analysis using the Chicago Health and Social Life Survey, a representative sample of Chicago (n=890): relationship with high trust level is 7 times more likely to end up with marriage for men. In sum, African Americans are less likely to marry because they have a relatively high proportion of polygynous relationships as equilibrium in the sexual matching market due to the lack of trust as a social capital measured by structural embeddedness, which makes marriage implausible in many circumstances.

Social Support

Ayala M. Pines

Homelessness in Hungary from a Network Perspective Institute for Sociology of the Hungarian Academy of Sciences

Fruzsina Albert and Beata David
Institute for Sociology of the Hungarian Academy of Sciences

We would like to present our results supporting the outstanding importance of the presence or lack of interpersonal ties in the multi-causal process of becoming homeless. We analysed data of app. 2200 homeless persons from Budapest who participated at a tuberculosis screening program in 1997. We view homelessness as a system of deprived statuses, and hypothesise that within the stratum put at risk by various, often interrelated factors (lack of housing, employment, economic recession etc.), the lack of personal supportive relations is the most significant one in determining whether a person actually becomes homeless or not.

To support the highlighted importance of the lack of supportive personal relations, we compared the homeless population to other non-homeless populations who are characterised by deprivations otherwise characteristic of the homeless as well: those without housing, the unemployed and the very poor. The homeless are very different from these groups in one respect: they lack strong, mostly family-based social networks.

Traditional support systems: Are they sufficient in a culturally diverse academic environment?

Adital Ben-Ari
University of Haifa

The present study explores the relationship between perceived social support and well-being among students of the three main populations living in Israel: Israeli-born Jews, Israeli-born Arabs, and Russian immigrants. More specifically, it examines to what extent perceived social support actually contributes to their well-being. The sample was comprised of 278 undergraduate students in the schools of social work and nursing at one of the major universities in Israel. Findings show that the Arab students are significantly more distressed than their Jewish and Russian counterparts on all measures of well-being. At the same time, their perceived social support is significantly higher than that of the Jewish students (both Israeli-born Jews and Russian immigrants).

Social Support Networks and People's Level of Web Use

Eszter Hargittai
Princeton University

This paper looks at the importance of social support networks in how people use the World Wide Web. An increasing body of literature documents inequalities in people's access to and use of the Internet.

Most of this work has focused on people's individual attributes - education, income, race, gender and others - in explaining differences in use of the medium. This paper argues that information about one's social support network is also important to the puzzle of why people's use of the Internet differs. As use of the medium diffuses to an increasing portion of the population, it is necessary to start distinguishing between levels of skill exhibited by different users to understand where the real inequality in access to the medium lies. This paper draws on data about how a random sample of Internet users locates content online to discuss how access to social support networks may affect people's Web use skills.

I Keep to Myself, But...: Impediments and Catalysts to Information Flow and Social Support within Homeless Populations

Julie Hersberger
University of North Carolina at Greensboro

Karen Pettigrew
University of Washington

Social support, in its varied interpersonal and institutional forms, can greatly help with problems of daily living, particularly for homeless populations whose needs are considered acute. Our study examines homeless parents residing in shelters in North Carolina and Washington State. Using in-depth interviews and semi-structured observation, we focused on participants' relationships with network members and how they sought information about social support. In this paper we discuss: (1) how small, sparsely knit networks and the isolation of individuals impeded information-seeking, (2) how particular network members, e.g., shelter staff, social workers, church employees, facilitated information flow because they exhibited attributes of both weak and strong ties (i.e., dual tie strength), (3) how the findings expand on Chatman's information poverty, and (4) methodological concerns with identifying participants and constructing instruments using qualitative techniques.

Personal Support Networks of the Residents of the City of Ljubljana

Tina Kogovsek, Valentina Hlebec, Anuska Ferligoj
University of Ljubljana, Slovenia

Many studies (e.g., Weiss, 1974; Hirsch, 1980; Wills, 1985; an overview in Vaux, 1988) show that social support is a multidimensional concept. It can be subdivided into four major dimensions: instrumental support, informational support, emotional support, and social companionship. In the paper, the personal support networks of the residents of Ljubljana, the capital of Slovenia, are described. The data were collected in the year 2000 by telephone interview on a random sample of 1033 residents of Ljubljana. The preliminary results confirm some findings of the earlier similar studies (e.g., Fischer, 1982; Marsden, 1987; Iglic, 1988a, 1988b; van der Poel, 1993; Schweizer et al., 1998). Also some new and interesting results were obtained.

The Characteristics of the Interhousehold Transactions in Hungary in the Mid Eighties and the Late Nineties

Janos Bocz and Istvan Harcsa
Hungarian Central Statistical Office

Through the use of two surveys the lecture will present the frequency of the interhousehold transactions in Hungary, the types of these supports and the characteristics of those households who take part in the supporting system and who does not. The empirical data are based on two living conditions and time use surveys, which were carried out by the Hungarian Statistical Office in 1986 and 1999/2000, respectively. The samples included more than 10 thousand households and the comprehensive analysis of the results make possible to demonstrate the structural changes having taken place since the mid 80s.

In our lecture we will analyse the composition of the households supporting each other, the types of the households co-operation (in terms of supports in cash and or in kind), the differences in demographic features between those households, who get and those who give supports. We would present whether there is any connection between the household's network and the households taking part of the supporting system or not. Our presentation can also demonstrate what was the difference in terms of income level and property situations between supporting and supported households, and who gave and what type of supports was given in the mid 80s and the late 90s.

Network Composition and Network Structure in Secondary Education

Miranda Lubbers
Groningen Institute for Educational Research,
University of Groningen

This paper describes how the structure of social relationships between pupils in secondary education is affected by the group composition of school classes. The results are part of an empirical study, which describes the class as a social environment and its impact on educational performance. For this aim, sociometric data have been collected as an addition to a large-scale longitudinal study on secondary education in the Netherlands. The study started in 1999. All pupils (average age 13) who were then in the first grade of a sample of 139 schools belong to the cohort; this amounts to about 20,000 pupils in 800 classes. The size of this sample allows us to investigate how friendship and co-operation choices within classes are affected by both the individual social background and the composition of the class as a whole (e.g. with respect to ethnicity, SES and educational performance at the entry to the school). We could hypothesise, for example, that two classmates, both belonging to ethnic minorities, are more likely to have a friendship tie in a predominantly Dutch class than in an ethnically more heterogeneous class. Some preliminary results of the first school year will be presented.

The Functions and Utilization of Social Support: An Israeli- Chinese Comparison

Ayala M. Pines, Nurit Zaidman
Ben Gurion University
Yihua Wang, Han Chengbing, Lu Ping
Rrenmin University

The need for social support is universal but the way it is utilized is culturally determined. These two assumptions were tested in an exploratory study of the functions and utilization of social support in Israel and China. To assure similar samples (in terms of such demographics as age and education) data was collected from students who were asked whom they would turn to (a family member, a friend, an agency etc.) with various problems (an emotional problem, a financial problem etc.) They were also asked to rate the importance of various support functions (emotional support, technical support etc.) and to indicate how available are those support functions to them. It was hypothesized, based on knowledge of the two cultures and previous

research, that while both Israelis and Chinese view the various functions of social support as important and while help seeking is influenced by the type of problem, they utilize their social support differently. Findings supported these predictions. The cultural differences found can be explained by the very different size of the two counties and their very different attitudes towards the individual vs. the community. These preliminary findings demonstrate the importance of cross-cultural research on the utilization of social support.

Classroom role and school adjustment

Ronan Van Rossem and Marjolijn Vermande
Utrecht University

In the literature a child's peer relations in school are considered important not only for a child's school adjustment but also for his or her future development. This paper examines how a child's role within the informal structure of a classroom affects his or her school adjustment, not only in terms of academic achievement but also in terms of behavioral problems and feelings of loneliness. Data on the classroom social networks (both positive and negative) of 1241 first grade children in 71 classes were collected. Triad-based blockmodeling was used to identify informal social roles within the classroom. Nine different social roles were distinguished: average-weak, average- strong, leaders, bullies, mild bullies, good kids, nice kids, isolates, and followers. Classroom roles were only weakly associated with some characteristics of the children (age, intelligence, and sex) while being unrelated to others (attractiveness and ethnic origin). Stronger associations were found between classroom role and the various indicators of school adjustment.

A Social Network Analysis of Undergraduate Students and the Effects of the Social Network upon Their Group Performance

Elaine Scott
City University Business School

The concept of social networks is particularly interesting when it can be linked to a direct impact upon the performance of an organization or system of interest. Measures of performance can be difficult to define and direct links between networking and performance hard to establish. Within the field of education however, performance measures are easily identifiable. Students work within close knit communities striving for the same goal of high grades in individual and group projects. Work carried out in the field of education includes Mehra, Kilduff & Brass (1998) who undertook a social network analysis of MBA students. They concentrated specifically on the distinctiveness approach to social identity and the social networks of under represented groups. They found that there may be advantages as well as disadvantages to marginality in informal networks as this can form a basis for shared identity, social support and interaction. Baldwin, Bedell & Johnson (1997) also investigated the social fabric of an MBA program. They looked at the network effects on student satisfaction and performance. The MBA students studied by Baldwin, Bedell & Johnson were formally assigned to permanent groups for the entire program. Subsequently they hypothesized that "It may be that ongoing permanent team assignments actually hinder the widespread development of broader-reaching informal networks in educational programs."

This study will comprise of a social network analysis of three cohorts (years 1, 2 & 3) of an undergraduate degree program, measuring friendship and communication networks and the effects of such networks upon group performance. The main aim of the study will be to establish the link between individual friendship and communication networking and enhanced group performance and will also attempt to address the following gaps in the literature:

C To test the difference between permanent and non-permanent group assignments

C To test the difference between enforced and voluntary group assignment.

CCarry out the study using undergraduates. (Undergraduates have had less pre-socialization into the benefits of networking than MBA students and are less likely to carry out the behavior purposefully, but rather the networks will develop naturally over the course of the three years.)

CComparison of students throughout the three years of the degree program. How does the socialization and normalization process affect the social and communication networks and what are the subsequent effects upon group performance?

C Carry out a peer group assessment study enabling the students to rate each member of the group in terms of effort, intellectual contribution and co-operation with the group.

Through a process of social network analysis and peer-group assessment, the following hypothesis will be tested: Individual friendship and networking behavior produces a positive effect upon contribution to group performance, through the acquisition and appropriation of information, providing advantage to the group through social and intellectual capital.

*Social Solidarity and
Integration in a New Market Economy:
Aspects of Friendships and Emotional Support in
Hungary*

Agnes Etas
University of Szeged

Social solidarity is an important element of social integration. Solidarity and support among different social strata seems especially critical in a society like Hungary, that has gone through a major social and economic revolution and only ten years ago started a market economy. Some of the outcomes associated with the new market economy such as bigger inequality, absence or reeducated government organised social support and unemployment, had a negative impact on social solidarity in Hungary. In previous decades people approached first members of their nuclear family in difficult situations. In the current situation some aspects of the old social structure have disintegrated, but the instrumental cohesion in the nuclear family may possibly be stronger.

The paper addresses the questions: Who among the different social strata have friendship networks, emotional connections, outside their nuclear family? Who do people in different social strata turn to for support when in difficult situations? It describes the different kinds of support utilized in different social strata and in different times in modern day Hungary.

*Social Support of the Elderly People
Using the Security Alarm System*

Valentina Hlebec, Katarina Bitenc, Mateja Nagode,
Anja Pajtler, and Matja Robin
University of Ljubljana, Slovenia

The Center for Help at Home was established in 1992 by the Home for the Aged in Ljubljana. The security alarm system has been a part of their services ever since. This was the first implementation of a special telecommunication system for the elderly in Slovenia. Evaluation of the security alarm system done in 1996 revealed that such a system could not be used widely due to the poor telephone coverage within the aged population and expensive technical equipment and network of home-based services. Further analysis shows that the security alarm system provides only a supplementary source of social support for the elderly. Formal sources of social support are called upon only in the case of unavailable or absent social network of relatives.

Statistical Methods for Social Networks

Tom Snijders

*Eigenvector-like Measures of Centrality for
Asymmetric Relations*

Phillip Bonacich and Paulette Lloyd
University of California at Los Angeles

Eigenvectors of adjacency matrices are useful as measures of centrality or of status. However, they are misapplied to asymmetric networks in which some positions are unchosen. For these networks an alternative measure of centrality is suggested that equals an eigenvector when eigenvectors can be used and provides meaningfully comparable results when they cannot.

*Probability Distributions for Popularity and Expansiveness:
Social Process Versus Personal Attributes*

John P. Boyd
University of California at Irvine

In a directed graph, the relative frequencies of in-degrees and out-degrees are known as popularity and expansiveness, respectively. Unfortunately, some of the more familiar discrete distributions, such as the binomial, Poisson, and negative binomial, have to be rejected by the Ord criterion: the ratio of the second central moment to the first, and the ratio of the third to the second. However, a study of probability distributions that do fit these marginal distributions can shed light on the social process that formed the links. For example, one of the Pólya urn sampling schemes is to replace each ball sampled with c balls of a similar color, producing a negative hypergeometric distribution. When c is positive, then both colors are contagious. In the context of friendship choices, this can lead to a runaway popularity effect. However, the contagion model has, by Gurland's theorem, a dual genesis as a mixture (or stopped-sum) of distributions. We suggest experimental ways to distinguish these two ways of generating the same distribution.

*The Exploratory Statistical Analysis of Networks:
Fixed Choice Scheme*

Ove Frank
Stockholm University
Michael Capobianco
St. John's University

O. Frank and M. F. Capobianco initiated the study of statistical inference in networks in 1969-70. More recently, Capobianco has devoted attention mainly to exploratory analysis. Here, rather than being interested in a specific property of the net, such as its size, or connectedness, we consider only the possibility of learning something about its structure, e.g., is it clustered or widely separated.

We studied, among other more complicated problems, two "choice schemes" namely, the Fixed ("name your three best friends"), and the Variable ("name all your friends"). This paper deals only with the former. It was found that just 10 configurations are possible between any pair of sampled points, and that the distribution of these in the sample yields information about the structure of the population network.

*Centrality Testing and the Distribution of the
Degree Variance in Bernoulli Graphs*

Jan Hagberg
Department of Statistics

Exact and asymptotic distributions of the degree variance

are investigated for Bernoulli graphs and uniform random graphs. In particular the range of values of the degree variance and its maximum value are considered. We show that the degree variance is approximately gamma distributed with parameters obtained from the first two moments of the degree variance.

Since centrality of a graph can be interpreted as a measure of its heterogeneity in terms of vertex degrees, we can perform a centrality test with a critical value obtained from the gamma distribution.

Bayesian Approaches to Social Network Modeling

Ove Frank
Stockholm University

Bayesian statistics derives its models from exchangeability assumptions and other invariance principles that apply to data observed. Social network data present special opportunities for Bayesian approaches. Both measurement models and sampling models for networks could be approached by Bayesian methods. Some examples are discussed in order to demonstrate the potential of this approach and illustrate some alternatives to Holland-Leinhardt models and other log-linear models for social networks. The discussion also provides a way to handle the difficulties involved in evaluating models for which the number of parameters increases with the number of nodes in the network.

Estimating Reliability and Validity of Egocentered Network Measurements

Tina Kogovsek and Anuska Ferligoj
University of Ljubljana, Slovenia

In the paper the quality of data in terms of reliability and validity of egocentered network measurements is estimated by the multitrait-multimethod (MTMM) approach. This approach usually requires at least three repeated measurements (methods) of the same variable (trait) for model identification purposes. This poses a considerable burden on the respondent and increases the cost of the data collection. A split ballot MTMM design (Saris, 1999) was used, in which separate groups of respondents got different combinations of only two methods. The design can also be regarded as a planned missing data design and the procedures suggested by Allison (1987) are used for maximum likelihood estimation of the confirmatory factor analysis models for MTMM designs specified in Saris and Andrews (1991). The influence of factors, such as methods used and demographic or personal characteristics of respondents, that can affect the quality of data is estimated by the Multiple Classification Analysis. The procedures are applied to social support data collected in the city of Ljubljana (Slovenia) in the year 2000.

Stochastic Actor-oriented Models for Networks of Changing Composition

Mark Huisman
ICS, FPPSW, University of Groningen

Markov chains can be used for the modelling of complex longitudinal social network data. A probability model for the evolution of social networks is the stochastic actor-oriented model for network change proposed by Snijders (1996, 2001). The basic idea for the model is that actors in the model evaluate their position in the network and strive for the 'best' possible configuration of relations. The evaluation of the configuration is defined as a function of the actor's position in the network, and depends on parameters that are estimated from the data by a Markov chain monte carlo procedure.

This paper describes the problem of changing network composition due to actors leaving the network at some time point and new actors joining the network. The actor-oriented model of Snijders is extended to handle longitudinal data in

which the composition of the network and its size change. For that purpose continuous-time Markov chain models are implemented as simulation models in which actors are allowed to leave or enter the network at fixed time points.

Gibbs Regression and Some Tests for Goodness of Fit

Lynne Seymour
University of Georgia

We explore a model for social networks that may be viewed either as a conditional extension of logistic regression or as a Gibbs distribution on a complete graph (a model from particle physics). The model was developed for data from a mental health service system which includes a neighborhood structure on the clients in the system, and models client responses while

assuming that the network bonds between clients always exist (but could perhaps be degenerate). Markov chain Monte Carlo methods are required for fitting the model. We will also present goodness of fit statistics for assessing the fit of this model.

Markov Chain Monte Carlo Estimation of the p^ Model*

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The estimation method which is at this moment usual for the p^* model is a maximum quasi-likelihood procedure which is implemented as a logistic regression method. The statistical properties of this procedure, however, are questionable and not yet completely understood. Maximum likelihood estimation for the p^* model is possible, however, and can be carried out by Markov Chain Monte Carlo. Various implementations are possible in principle and practical difficulties have to be solved to make the algorithm work well.

A method is proposed which uses a Robbins-Monro-type procedure for approximating the solution of the likelihood equations. The p^* model is simulated as the asymptotic distribution of a particular specification of the network evolution model also used in the SIENA program. Examples are given for various triadic p^* models.

Aggregation of Perceived Social Networks

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Measurement accuracy is an inherent problem in social network analysis. The issue of actor accuracy in reporting their interactions with others, was raised by Bernard, Killworth and Sailer (e.g. Bernard et al., 1980, Information accuracy in social network data IV: A comparison of clique-level structure in behavioral and cognitive network data, *Social Networks*, 2:191-218) and provoked extensive debate. Krackhardt (1987, Cognitive social structures, *Social Networks*, 9:109-134) later introduced the concept of Cognitive Social Structures and several methods for aggregating different actor reports on the network into a single graph, with the aid of which actor-actor congruence could be gauged. A statistical model for aggregating separate reports into a single consensus network, with the additional benefit of allowing estimates of actor accuracy to be obtained in the process, was proposed by Batchelder, Kumbasar and Boyd (1997, Consensus analysis of three-way social network data, *Journal of Mathematical Sociology*, 22:29-58). The purpose here is to investigate this approach to the problem in a Bayesian framework. The emphasis is put on the effects of the choices of different distributional assumptions on the ability of the models to capture our prior knowledge and yield estimates of actor "accuracy", the consensus/central graph and, various summary measures.

Bayesian Network Modeling of Block Structures

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A Bayesian approach is taken to model block structures in social networks. In particular, a stochastic block model is considered comprising a block of central actors and a block of non-central actors. Prior probabilities are assigned to the different alternatives for choosing the central block, and posterior probabilities are derived for different possibilities for the central block. Furthermore, posterior probabilities are calculated for the order of the central block. A generalization is also considered where the number of blocks is allowed to be larger than two, and where centrality is extended to other structural properties governed by the edge probabilities within and between the blocks.

Confidence and Complexity in Blockmodel Selection

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This paper explores how a Bayesian approach can be used to address the problem of blockmodel selection for social networks. The Minimum Description Length (MDL) principle is used to develop a prior probability distribution for the set of possible blockmodel structures for a given social network. The method presented here can be used not only to determine how actors should be assigned to a given partition of a network into blocks, but also provides a statistical basis for determining how many blocks actors in a given network should be partitioned into.

Furthermore, this method provides a statistical basis for determining confidence intervals for blockmodel parameters. The method developed in this paper is predicated on the existence of a stochastic blockmodel, or a posterior probability distribution for the observation of a set of network ties given a particular blockmodel structure. The stochastic blockmodeling approach presented in this paper represents a generalized model, of which many of the existing stochastic blockmodeling approaches are special cases.