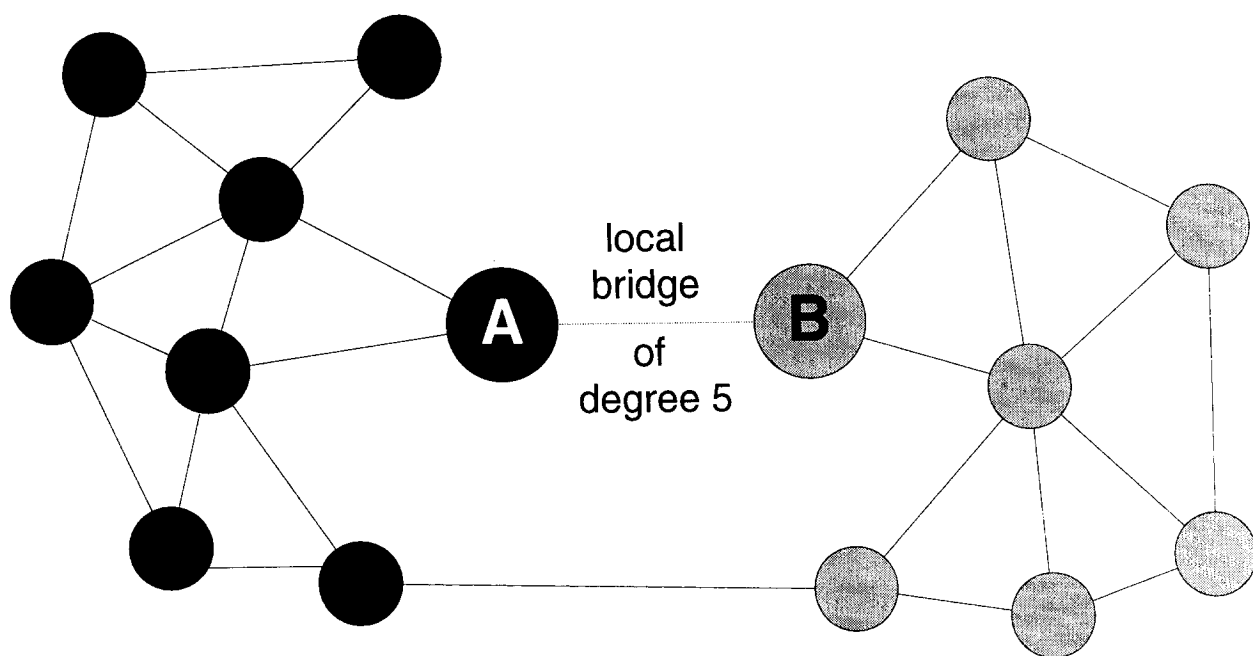


CONNECTIONS

Fall 1996 Volume 19 Issue 2



Automated
Theoretical Analysis
Of Exchange Networks

Seeing
Groups In
Graph Layouts

The
Diffusion
Network Game

Official Journal of the International Network for Social Network Analysis

CONNECTIONS

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Mission. CONNECTIONS is an official publication of INSNA. Its primary purpose is to support network analysis in general and INSNA members in particular by providing a method of pooling and sharing news about the membership, tools for teaching and research, data for analysis and results of scientific investigations. Wherever possible, items referenced in CONNECTIONS (such as data and software) are made available electronically on **INSNALIB** (accessible by anonymous ftp from host thecore.socy.sc.edu, directory /pub) and via our WWW site <http://thecore.socy.sc.edu/insna.html>. The web site provides access to a directory of members' email addresses, network datasets, software programs, and other items that lend themselves to electronic storage. In addition, the web site provides updated information on upcoming conferences.

Policy. CONNECTIONS welcomes short articles, data, software, course materials, news and advertisements dealing with network analysis. Articles are peer-reviewed and will be edited for content and style. Authors are automatically granted the right to republish their material in other journals or books, provided appropriate citation is made.

Contributions. All materials should be submitted in electronic form, either via email (connections@scarolina.edu), INSNALIB, or IBM-compatible diskettes. This includes all text, figures and tables in articles (files may be sent in any wordprocessing and/or graphics format). Articles and other text materials should also be accompanied by printed versions (2 copies). Send contributions to CONNECTIONS, Dept. of Sociology, University of South Carolina, Columbia, SC 29208 USA. Telephone: (803) 777-3123. Fax: (803) 777-5251. Email address: connections@scarolina.edu.

Subscription. The standard subscription fee is US\$40 per volume (\$25 for students). Subscribing to the current volume is synonymous with obtaining current membership in INSNA. Send subscription requests to: INSNA, Dept. of Organization Studies, Carroll Graduate School of Management, Boston College, Chestnut Hill, MA 02167 USA. Telephone: 1+ 617-552-0452. Fax: 552-2097. Email: steve_borgatti@msn.com. Checks must be made payable in US dollars to "INSNA" and drawn on a US bank. Wire transfers are not permitted, but Visa and Mastercard (or Eurocard) are accepted. Credit card orders must include card number and expiration date.

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January

Linguistic Society of America. Jan 2-5. Chicago.
<http://www.lsadc.org/>

Third Annual Organization Science Winter Conference. Jan 2-5. Park City, Utah, USA
<http://www.rpd.net/Info/conferences/conf/1997-01-02-orgsci.html>

February

Sunbelt International Social Networks Conference. Feb 13-16. San Diego, CA
<http://thecore.socy.sc.edu/IN SNA/sunbelt2.html>

WSCG97: The Fifth Int. Conf. in Central Europe on Computer Graphics and Visualization 97. Feb 10-14. Plzen, Czech.
<http://yoyo.zcu.cz/~skala/wscg97.html>

March

Conference on Human Factors in Computing Systems. Mar 22-27. Atlanta, GA.
<http://www.acm.org:82/sigs/sigchi/chi97/>

3rd Italian Conference on Algorithms and Complexity Mar 12 -14. Rome, Italy
<http://www.rpd.net/Info/conferences/conf/1997-03-12-ciac.html>

Society For Applied Anthropology. Mar 4-7. Seattle, WA.

<http://www.telepath.com/sfaa>.

American Ethnological Society. Seattle, WA. Mar 6-9
rh3y@virginia.edu.

April

Association for the Study of Play. Apr 2-3 . Washington, DC. Deadline for abstracts: January 15, 1997. Contact Alice M Meckley 717/872-3390;
ameckley@mu3.millersv.edu.

Society For Economic Anthropology. Apr 25-26. Guadalajara, Mexico. Theme: "Globalization and Regionalism." Contact Josephine Smart, Dept of Anthropology, U Calgary, Calgary, Alberta, Canada T2N 1N4; fax 403/284-5467;
smart@acs.ucalgary.ca.
<http://www.lawrence.edu/~peregrip/seahome.html>

Pacific Sociological Assoc. Apr 17-20. San Diego.
<http://www.csus.edu/psa/body.html>

May

INFORMS. May 4-7. San Diego. General Chair: Fred Raafat.
<http://www.informs.org/index.html>

June

International Network for Personal Relationships. June 28 - July 2. Oxford, Ohio.

July

EURO/INFORMS. Jul 14-17. Barcelona. General Chair: Jaime Barcelo.
<http://www.informs.org/Conf/BAR97/barcelona-call.html>

August

Cognitive Science Society. Aug 7-10. Stanford
<http://www-csli.stanford.edu/cogsci97/cogsci97.html>

Rural Sociological Society, 60th Annual Meeting. Aug 13-16. Toronto, Canada. Theme: "Global Competition and Community." Deadline for abstracts: January 31, 1997. Contact Paul Lasley, Dept of Sociology, 107 East Hall, Iowa State U, Ames, IA 50011-1070; 515/294-0937; fax 515/294-0592; plasley@iastate.edu.

American Sociological Assoc. Aug 9-13. Toronto, Canada.
<http://www.asanet.org/annmtg97.htm>

European Sociological Assoc. Aug 27-30. Colchester, UK.
ESA97@essex.ac.uk

Academy of Management. Aug. Boston.
<http://www.aom.pace.edu>

November

American Anthropological Assoc. Nov 19-23. Wash., DC.
<http://www.ameranthassn.org/mtgs.htm>

Sunbelt XVII - International Social Networks Conference. February 13 - 16, 1997.

The 17th Annual International Sunbelt Social Network Conference will be held at the Bahia Resort Hotel in San Diego, California from Thursday, February 13 through Sunday, February 16. The conference provides an interdisciplinary forum for social scientists, mathematicians, computer scientists, ethologists and all others interested in social networks. Conference sessions allow individuals interested in theory, methods or applications of social networks to share ideas and common concerns.

This year's conference is sponsored by The International Network for Social Network Analysis (INSNA), the School of Social Sciences and the Program in Social Networks at the University of California, Irvine and the Department of Sociology at the University of Pittsburgh. On Monday, February 17, 1997, immediately following the regular conference, there will be a special, full-day session honoring Harrison White.

Those who wish to submit a paper or chair a session should contact one of the program coordinators:

Pat Doreian
Dept. of Sociology
2G03 Forbes Quad
Pittsburgh, PA 15260
phone 412-648-7537
FAX 412-648-2799
pitpat+@pitt.edu

Sue Freeman
Dept. of Sociology
University of California
Irvine, CA 92697-5100
phone 714-824-8591
FAX 714-824-4717
sue@aris.ss.uci.edu

To submit a paper send an abstract of no more than 200 words by e-mail (or in an ASCII file on a diskette and a paper copy) no later than December 1, 1996. You can find the first announcement and solicitation for papers for the San Diego Sunbelt Meeting at:

<http://thecore.socy.sc.edu/insna.html>

About *The Networking Game*

The Networking Game is now available to download at no charge.

This booklet by Patricia Wagner and Leif Smith was written for use at conferences. We had been running the Office for Open Network, in Denver, Colorado, since February 1975, and people were asking for something in writing that would help make their conferences into the same kind of information exchange they had found at our Office for Open Network Open Houses and networking workshops.

The booklet was originally published in 1980, and over the next few years about 7,000 copies were distributed. It's pretty simple, and a lot has happened since then, but we still find the five rules of networking useful. We hope you enjoy it! (it's about 24k)

This booklet offers five rules of networking:

1. Be useful
2. Don't be boring
3. Listen
4. Ask questions
5. Don't make assumptions

Feel free to let others know.

<http://www.rmii.com/~leif/game1980.html>

New online sociology journal

The first issue of *Sociological Research Online*, the new refereed electronic journal of sociology, was published at the end of March 1996. To see the journal, you will need a World Wide Web browser running on your computer. This will let you read the journal and print copies of the articles.

At the same time we launched a new 'look' and a new URL (address on the Web):

<http://www.socresonline.org.uk/socresonline/>

This URL should be used in preference to our previous address.

The journal is edited by Martin Bulmer of the University of Surrey and Liz Stanley, University of Manchester, with Victoria Alexander, University of Surrey, and Sue Heath, University of Manchester, as review editors. The first issue has a number of book reviews and five articles:

Alison Bowes. Evaluating an Empowering Research Strategy: Reflections on Action-Research with South Asian Women.

Jacqueline O'Reilly. Theoretical Considerations in Cross-National Employment Research.

Geoff Payne, Judy Payne, Mark Hyde. 'Refuse of all Classes'? Social Indicators and Social Deprivation.

Amanda Coffey, Beverley Holbrook, Paul Atkinson. Qualitative Data Analysis: Technologies and Representations.

Jennifer Platt. Has Funding Made a Difference to Research Methods?

Issues will be published quarterly, with the next one due at the end of June. There is still plenty of time to submit papers for the next issue, so if you have an article almost finished, why not consider *Sociological Research Online* for publication?

In addition to standard articles, *Sociological Research Online* hopes to encourage use of the features of the World Wide Web. A discussion forum is planned for our next issue for debates on published articles, or sociology in general. It will also be possible to carry out rapid searches of all the articles.

Any feedback on the journal, and the first issue in particular, is welcome. Hopefully we can build the site into more than a traditional journal but for this we need to know what you like and what you don't. Any ideas on how we may improve or notification of problems will be gratefully received. We look forward to hearing back from you. In the meantime, we hope that you enjoy the first issue of *Sociological Research Online*.

SOCIOLOGICAL RESEARCH ONLINE

Editors: Martin Bulmer and Liz Stanley

Book Review Editors: Victoria Alexander and Sue Heath

Editorial and IT Officer: Stuart Peters

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tel: (+44) (0)1483 259292

fax: (+44) (0)1483 259356

European Sociological Association 3rd European Conference

CALL FOR PAPERS

The European Sociological Association hosts its Third European Conference on August 27-30 1997 at the University of Essex in Colchester, north of London. The conference theme is: "20th Century Europe: Inclusions/Exclusions".

The theme will be explored focusing particularly on the issues of gender, ethnicity, class and age in the restructuring of European

societies throughout this century and the role of European sociological insights in the understanding of inclusionary and exclusionary changes. Sessions will be organized around the following themes:

Revisiting Classical Theory

- Modernity and Post modernism
- Feminist Theory Meets the Classics
- A Sunset of Socialism?

Work, Welfare and Citizenship

- Welfare States, Welfare Societies
- Gender and Citizenship
- Inclusions/Exclusions: Power / Ethnicity
- Gender Relations in the Labour Market

Inequalities Old and New

- New Forms of Patriarchy
- Generational Contracts and Conflicts
- A Future for Social Class?
- Ethnicities, Racism and nations (RN)
- Youth and Generations in Europe (RN)

Globalizations

- Globalization, Social and Economic

Restructuring

- Migration and Fortress Europe
- Globalization: Technologies,

Environments and Futures

European Processes & Institutions

- East Meets West
- Social Rights and Economic Powers
- Europe of the Regions
- Europe in Process: Social Movements
- Democracy in Europe

Cultures and Identities

- Sexual citizenship
- Cultural Identities and Homogenisation?
- Technology and Culture
- European Values in Transition
- Biographical Perspectives on European

Societies

- Families in Europe
- Consumption
- Sociology of Mass Media and

Communication

Suggestions are also welcome for round-table luncheon sessions.

The European Sociological Association invites scholars working on European questions to submit ideas for papers (Abstract of 250 words - Deadline 15 January 1997, including an indication of which thematic group they would prefer), and expressions of interest to:

Conference Organiser - ESA Conference

Department of Sociology

University of Essex

Wivenhoe Park

Colchester, Essex CO4 3SQ

United Kingdom

e-mail: ESA97@essex.ac.uk

Fax: +44 (1206) 873410

International Network for Personal Relationships

The 1997 INPR conference will be held on Saturday, June 28 through Wednesday July 2, 1997 on the Miami University campus in Oxford, Ohio. Sally Lloyd and Paul Mongeau will act as local hosts. Invited speakers include William Cupach, Illinois State University (Communication), Clyde and Susan Hendrick, Texas Tech University (Psychology), and Susan Mosley-Howard, Miami University (Educational Psychology and Black World Studies).

CRISP Electronic Journal

Current Research in Social Psychology has published a new article, "An Algorithm to Generate Connected Graphs," by Professor John Skvoretz, University of South Carolina. The article describes a method for producing all networks with a given number of positions and number of relations among those positions. It includes an appendix listing all possible networks with from 4 to 7 positions. This is an excellent example of the kind of article CRISP was designed for. Many researchers interested in social exchange and social networks will find it useful and the information is now easily accessible without the usual 1 - 3 year publication delay at print

journals. The article also confronts a more general problem as it copes with how to categorize and name networks.

CRISP (an electronic journal) is published by the Center for the Study of Group Processes, University of Iowa. Access it on the web at <http://www.uiowa.edu/~grpproc>, then select Current Research in Social Psychology.

The quality of manuscripts we have received is high, but we have not received many. If you have a short manuscript that has not found a home at a print journal, please submit it to the CRISP editor via email:

michael-lovaglia@uiowa.edu

Peer review and an editorial decision is usually completed within 10 days of submission. If you have any questions about submitting your article, please email me as well.

Michael Lovaglia
CRISP Editor

Mathematical Sociology

A new Section of the American Sociological Association (ASA) in Mathematical Sociology is now in the process of formation. We currently have 185 members and need to reach 200 to become a permanent Section of the ASA. If we reach 200 by December 31, 1996, we will have two Section Sessions for research papers at the 1997 Annual ASA Meeting in Toronto. Social Networks is a natural interest area of the Section (there is no Section on Social Networks). Papers on social network theory, analysis or methodology, and empirical work using them, would qualify for Sessions. Upon our initiative in 1995, the ASA Program Committee invited Stanley Wasserman to present a Didactic Seminar on "Recent Advances in Social Network Theory and Methodology" at the 1996 ASA Meeting.

To get a better sense of the Section please read our Mission Statement at

<http://www.sscnet.ucla.edu/soc/groups/mathsoc/mission.htm>

Annual Section dues are currently \$4.00 for both regular and student members of the ASA, which will be increased to \$8.00 for regular and \$5.00 for student members when we become a Section. Members of the Section must be members of the ASA. Those who are not sociologists in U.S. Sociology Departments may take advantage of the reduced annual membership dues of \$60 for Associate Members.

If you have graduate students please consider underwriting them as well. Thanks for your attention. I look forward to seeing all of you at the Network Conference in San Diego.

Eugene C. Johnsen, Chair
Mathematical Sociology Section-in-Formation

Department of Mathematics, University of California, Santa Barbara, CA 93106
phone: (805) 893-2706,
e-mail: johnsen@math.ucsb.edu

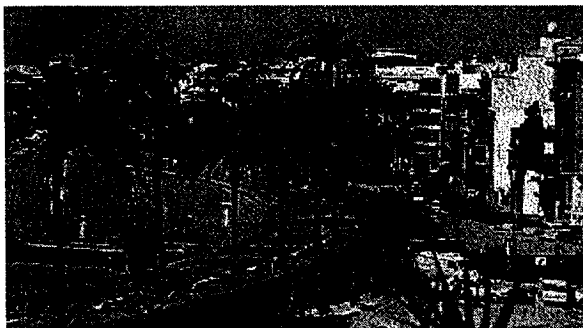
Elections, Webzines & Sunbelt

Network News is a regular column whose function it is to disseminate news about INSNA, the professional association for social networks researchers.



Painting by Joan Drachman, SanDiego artist

1997 Conference. The next Social Network conference will be held in San Diego, February 13-16, 1996 at the Bahia Hotel. The conference is being organized by Pat Doreian (pitpat@vms.cis.pitt.edu, 412-648-7537) and Sue Freeman (sgfreema@uci.edu, 714 8248591). See Announcements for further details.

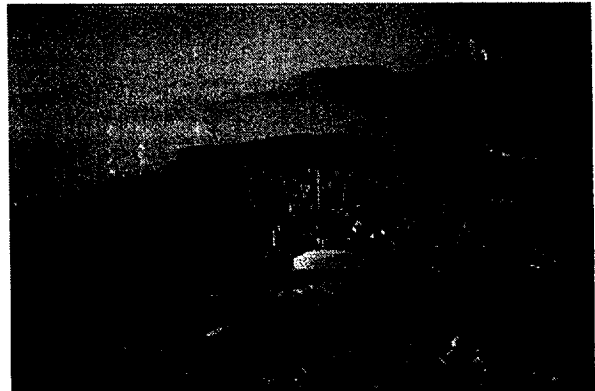


Sitges

1998 Conference. The '98 International Social Network conference will be held in Sitges (near Barcelona, Spain). The dates are not yet final, but are expected to be Thursday, May 28 to Sunday, May 31. The meetings are jointly organized by:

Alain Degenne Degenne@criuc.unicaen.fr
 José Luis Molina Jlm.OPS@hermes.asertel.es
 Thomas Schweizer . Thomas.Schweizer@uni-koeln.de
 Tom Snijders T.A.B.Snijders@ppsw.rug.nl
 Frans Stokman F.N.Stokman@ppsw.rug.nl
 Evelien Zeggelink E.P.H.Zeggelink@ppsw.rug.nl

1999 Conference. The '99 conference will return to Charleston, South Carolina at the Hawthorn Suites Hotel. Contact John Skvoretz (skvoretz-john@sc.edu) for information.



Vancouver (aerial view)

2000 Conference. The new century will be ushered in by a new site: the '00 conference will be held in Vancouver, BC, hosted by Bill Richards. For information contact Bill (604 251-3272 or 291-4119, richards@sfu.ca) at:

School of Communication
 Simon Fraser University
 Burnaby B.C. V5A 1S6
 CANADA

Elections. In accordance with our bylaws (see <http://thecore.socy.sc.edu/bylaws.html> to read them), the terms of all INSNA officers are expiring in February. A letter was sent to all INSNA members requesting nominations for all positions. For the position of coordinator of INSNA, no one was nominated besides me. For the position of INSNA director, Barry Wellman and Stan Was-

serman were nominated. No other nominations were received. Since there is room on the board of directors for two additional directors, and since no other positions are contested, we do not need any elections this time around. The two new directors are hereby appointed, and I will serve another three years as coordinator.

Plans for '97-'99. In order to improve INSNA efficiency, my first priority will be to re-organize the INSNA division of labor. In particular, I plan to split up the coordinator's role into smaller pieces and recruit other people to fill these new roles. Besides making my job easier and making things run more smoothly, this will have the benefit of involving more people in the running of INSNA. As part of the efficiency effort, I will also be moving as much of our operations as possible to the web (e.g., we are already accepting subscription orders via our online order form). The next step is to provide an automated method for members to update their own records (especially email and postal addresses).

A second goal is to revamp **CONNECTIONS**. Three years ago, we upgraded the look and feel of the journal. However, we did not try to change the basic concept of the journal nor did we try to upgrade the quality and quantity of submissions. Given the arrival of web publishing (see below) I think it makes sense to rethink the mission of **CONNECTIONS** as we slowly move to an electronic format. I also feel it is time to aggressively solicit quality manuscripts. In addition, I want to improve the individual editorial departments, such as the abstracts (wider coverage of disciplines) and calendar (appropriate selection of conferences and events).

A third major goal is to increase INSNA membership. As I have reported before, I am very much aware that the number of people doing network analysis has increased significantly over the last decade, but membership in INSNA has increased only slightly. We are already taking some steps. Candy Jones, our new Associate Editor for Management, has written a letter to a couple hundred organizational researchers who have recently given papers involving social networks, but have not joined INSNA. Devon Brewer, our PR man, has been doing a great job getting other associations to include announce-

ments about social network conferences in their newsletters. We need to do more of this sort of thing.

CONNECTIONS on the Web. The sense of the SOCNET discussion on moving **Connections** to the WWW was this:

1. It should happen, somehow, sometime..
2. There should be a transition period in which both web and paper versions exist.
3. Members who live in countries where WWW access is limited should always have an alternative available.

Accordingly, I will put all subsequent issues of **CONNECTIONS** on the web, as well as on paper. Over the next year, people can comment on the format of the web version and help create the new product. The objective is to make the web version the primary version by 1998. After that, a print version will be available to those who request it, but it will essentially be a print-out of the web pages.

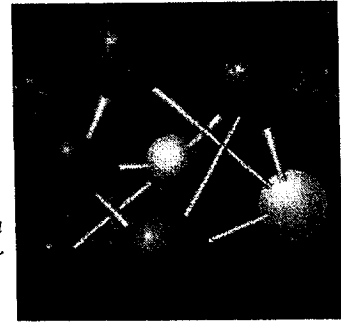
Social Networks Subscriptions. As many people are aware, we have had trouble in recent years with Elsevier, the publisher of *Social Networks*. A typical problem is receiving the first issue of *Social Networks* (sometimes two copies), then receiving nothing else. It then takes them a very long time to fix the problem (e.g., we tell them in writing that so-and-so is not receiving issues; they say we never sent a renewal for that person; we send them a copy of the original request with check number; they say ok, they found it; then nothing happens for three months).

So this year we are trying something new, suggested by "Al" Stachura, our subscriptions manager and Boston College MBA student. INSNA has purchased a number of *Social Networks* subscriptions for its own use. When a member fails to receive an issue of the journal, we will immediately send them one of our copies. We will then ask Elsevier to replace our own copy — but regardless of how that goes, the INSNA member will not be inconvenienced.

Steve Borgatti
INSNA Coordinator

Ties & Bonds

Ties & Bonds is a regular column written by Barry Wellman. The contents of this column are solely determined by Barry Wellman and do not necessarily reflect the opinions or concerns of INSNA. Contact Barry at wellman@epas.utoronto.ca.



BBS

.... **Robert Milardo** (Fam Studies, U Maine) elected Board Member, Int'l Sty for the Study of Prsl Rel'shps.... **Pearl Dykstra's** (Neth. Interdisc. Demog. Inst.) new email address is dykstra@nidi.nl.... Former INSNA Coordinator **Al Wolfe** (Anthro, U So Florida) on editorial board of *Applied Behavioral Science Review*, "a multidisciplinary journal with a broad focus on policy studies, intervention strategies & the assumptions & ideologies which undergird policy formation".... Former INSNA Assoc. Coordinator **Peter Carrington** has been promoted to Full Prof., Soc, U Waterloo, Canada.... INSNA founder **Barry Wellman** has been appointed to the Electronic Community Committee of the Association for Computing Machinery. Historians of cyberworlds please note: This committee meets in-person.... **Elisa Bienenstock** moving from Soc, U North Carolina to Soc, Stanford.... **Tom Valente** has moved internally within Johns Hopkins' Schl of Hygiene to Dept of Pop. Dynamics, 615 N. Wolfe St, Room 4033, Baltimore MD 21205; tvalente@phnet.sph.jhu.edu/410-955-7819.... **John Walsh** tenured at Soc, U Illinois-Chicago.... **Eric Wright** (Indiana U - Purdue; wrighte@indiana.edu) new co-editor of Am Soc Assoc's *Medical Sociology Newsletter*.... **Debra Umbers-on** (Soc, U Texas) has been elected to the section's council....

....INSNA info tech honchos **Cathleen McGrath** & **Jim Blythe** (aka the plot behind

Krackplot) married, 5/96.... **Melvin Oliver** (Soc, UCLA) now VP in charge of poverty, community development & reproductive health for Ford Fdn.... **Jane Jacobs** (now of Toronto, but once of NYC) has been appointed an Officer of the Order of Canada (the closest thing we have to a knighthood). I sometimes see Jane rolling her shopping cart down our neighbourhood shopping street.... **Susan Cott Watkins** (Soc/Demog., U Pennsylvania) mostly in Nairobi 1996-1997 where she is studying diffusion of information (re AIDS, reproduction).... **Ronald Kessler** has moved from U Michigan to the Dept of Health Care Policy, Harvard Medical Schl, 25 Shattuck St, Boston 02115.... Two Princeton sociologists have won Guggenheim fellowships: **Michèle Lamont** to study "racial and class communities in France & the US" and **Viviana Zelizer** to study "payments and social ties".... There was a special symposium honoring **Anatol Rapoport** at the 8/96 meeting of Psychologists for Social Responsibility. It included a talk by Anatol: "Counter-productive consequences in the application of rational models to the quest for peace & social justice" + short talks by Marc Pilisuk & others.... **Bernice Pescosolido** (U Indiana) now on Am Soc Assoc's Committee on Professional Ethics.... **David Knoke** (Soc, U Minnesota) has received the "Scholar of the College Award" for 1995-1996.... **Bonnie Erickson** (U Toronto) elected to the Sociological Research Assoc.... **Lynn Smith-Lovin** (& I presume Miller McPherson) on sabbatical in North Carolina, 1996-1997 **Devon Brewer**

(INSNA's PR man) has moved within the U Washington to the Alcohol & Drug Abuse Inst (ddbrewer@u.washington.edu)... **Holly Arrow**, U Illinois Psych PhD in hand, is now Asst Prof of Social Psych, U Oregon & a member of the interdisciplinary Inst for Cognitive & Decision Sciences.¹

Structural Analysis now Embedded in GSS

The large-sample, professionally-run, US General Social Survey, will have in 1996 a module on Economic Behavior and Attitudes (EBA), thanks to a group containing Mark Granovetter & Paul DiMaggio. Among the topics addressed:

- Social embeddedness of product & service market transactions (including home & car purchase, borrowing money).
- Normative constraints on exchange (including body parts, sexual intimacy).
- Participation in garage sales and family businesses.
- Attitudes towards inequality and capitalism.
- Divisions of influence between wives and husbands in domestic economic decision-making.
- Giving and volunteering.

In Memorium

Paul Erdős: Paul Erdős' number came up, Sept, 1996. Aged 83, he died in Warsaw as he lived, an itinerant mathematical collaborator. A great mathematician, he was also one of the most prolific, publishing more than 1,500 papers, most of them co-authored. "Stooped and slight, often wearing socks and sandals, Erdős stripped himself of daily life: finding a place to live, driving a car, paying income

taxes, buying groceries, writing checks. 'Property is nuisance,' he said. Concentrating on mathematics, [the Hungarian-born] Erdős traveled from meeting to meeting, carrying a half-empty suitcase & staying with mathematicians wherever he went. His colleagues took care of him, lending him money, feeding him, buying him clothes and even doing his taxes. In return he showered them with ideas and challenges....

"Mathematicians like to brag about their connections to Erdős by citing their 'Erdős number'. A person's number was 1 if he or she had published a paper with Erdős. It was 2 if he or she had published with someone who had published with Erdős, and so on. [BW: I believe that some social network analysts have an Erdős number of 2.] At last count, Erdős had 458 collaborators. An additional 4,500 mathematicians had an Erdős number of 2. So many mathematicians were still at work on problems they begun with Erdős that another 50 to 100 papers with his name on them were expected to be published after his death." [Gina Kolata, *NY Times*, 24Sept96].²

Scott Greer: Scott Greer, who died 1/96 from cancer of the larynx, was never a formal network analyst, but after Chuck Tilly, he was the guy who got me thinking most about community networks. Scott's *The Emerging City* was almost a network book, with its discussions of people's partial ties to their neighborhoods as "communities of limited liability." When I met him, I was energized by his taking a young scholar seriously. Indeed, I considered moving to U Wisconsin-Milwaukee to join them. He and his wife Ann Lenarson Greer had a lovely visit to Toronto, and I also recall playing hooky with them at a NYC ASAs and taking the cablecar to visit then-new Roosevelt Island. Ann herself wrote

¹ Harrow@darkwing.uoregon.edu

²See also on the Web: <http://www.acs.oakland.edu/~grossman/erdoshp.html>.

a lovely book, *The Mayor Steps In*, about how a midwest mayor manipulated his networks to accomplish projects and retain power.

The Resurrection of *Social Structures*

I'm delighted that Ablex Publishing Co. has continued the publication of Barry Wellman & S.D. Berkowitz, eds., *Social Structures: A Network Approach*. Cambridge Univ. Press had let this go out of print about a year ago. We were puzzled by the decision - the book had sold 2500 copies and was still selling 150/year. Apparently, so was Ablex. The new edition should be available for use in January, 1997 courses. It is largely the same as the old one, except that I've added a short updating preface and we've replaced John Delaney's job search article with an edited version of Mark Granovetter's economic embeddedness article. (Order from Ablex, Norwood, NJ, tel: 201-767-8450).

Journal Stuff

Bondage: I guess that because this column is called "Ties and Bonds," it's not surprising that I recently received a free subscription to a new Canadian magazine, *Client/Server World*. Rather than S&M, this mag. is about distributed databases.

Journal of Social & Personal Relationships is expanding in 1997 from 4x to 6x/year, with a 25% increase in pages. *Steve Duck*, the current editor, will step down 1997-1998; Michael Cunningham is coordinating the search for a new editor. The associated professional society, the *International Network for the Study of Personal Relationships*, had 279 attendees at its 6/96 Seattle conference.

Transnational Organized Crime is a new journal with such topics as "The Globalization of Criminology," "The Internationalization of Business Crime" and "Transit States and the Dynamics of Illicit Transshipment." Edited by

the (US) FBI's Carl Florez. Publisher: Frank Cass, UK. \$50/yr. Also on the scene is *Trends in Organized Crime* which has already run pieces on the Italian and Moscow mafias, and organized crime in South Korea. It's sponsored by the (US) National Strategy and Information Center, which Scott McLemee calls "a secretive think tank with close ties to the military and intelligence communities" (*Lingua Franca*, 7/96:20) and published by Transaction Press (which I believe Irving Louis Horowitz still heads at Soc, Rutgers U, New Brunswick, NJ). \$60/yr.

Short Schticks

Peter Gets What He Deserves: Peter Blau (U North Carolina) has won the Am Soc Assoc's 1996 "Career of Distinguished Scholarship Award. His career has included service as ASA prexy & a member of the Nat'l Academy of Sciences. His books include *The Dynamics of Bureaucracy* (1955), *Exchange & Power in Social Life* (1964), *The American Occupational Structure* (1967, my pick for sociology's most influential substantive book in the past 30 years), *Inequality & Heterogeneity* (1977).

Peter Would Never Write This: In the introduction to *The Beginning of the Great Game, 1828-1834*, author Edward Ingram states: "Writers often thank their colleagues for their help. Mine have given none.... Writers often thank their typists. I thank mine. Mrs George Cook is not a particularly good typist, but her spelling and grammar are good. The responsibility for any mistakes is mine, but the fault is hers. Finally, writers too often thank their wives. I have no wife." [Quoted in *The Economist*, 7Sept96].

But Marty Did Write This: "Some years ago at a cocktail party in Washington, I approached General Colin Powell, then still head of the Joint Chiefs [of Staff, i.e., U.S.

military's high command], and told him that he and I had a lot in common. The General, who did not know me, reacted with a quizzical look. I commented that we were both born in Harlem, moved when quite young to the Bronx, and went to and graduated from City College. I did not add what was more relevant, that he had joined the ROTC, the Reserve Officers training Corps, while I joined the youth section of the Trotskyists, then known as the Young People's Socialist League, Fourth International.' [Seymour Martin Lipset, "Steady Work: An Academic Memoir," *Annual Review of Sociology* 22: 1-27.]

Honors Explained: A Portnoyesque Analysis: "I am pleased to have been elected to the Royal Society [of Canada] because my election will permit me to make more frequent and more severe criticisms of the mediocrity and indolence of fellow academics. I also feel that my election will go a long way towards persuading my mother that I have chosen a suitable vocation." Philosopher Jay Newman, in *At Guelph* [U Guelph, Ont, Canada], sometime in 1995.

Perhaps Goethe explained it all: "Tell me with whom thou art found, and I will tell thee who thou art." [quoted in "Deep Thoughts" section, *Toronto Globe & Mail*, 4Sept94. BW: Original source appreciated.]

PEN Writers Confront Imperialism: "My first international congress was in Seoul, Korea. we had a great battle with the Americans, led by Susan Sontag. She came in like a gunboat firing off in the harbour saying they were going to show the Koreans -- they were going to boycott this and boycott that and we just didn't want any part of it, figuring that's not going to get any prisoners out of jail. We had a real battle over this, and the interesting thing was that the people who lined up with us had all been colonies in their time, and the people who were opposed to us had all been imperial powers.... We [Canadians] tend to

have more in common with 3d-world countries than we do with the imperial centres." [Canadian Pen founding father, Graeme Gibson, *Canadian PEN Newsletter*, Summer96: 4.]

Separatism Explained: Pierre Vallieres, famous for his Quebec separatist book, *White Niggers of America*, has asserted that the current separatist struggle merely "reflect the desire of 1 part of the elite to attach itself to world commerce without having English-Canadian competitors. The Pequites [separatist Parti Quebecois] are like any other politicians - they have given up their responsibilities in the economic domain." [Now, Sept 21, 1995: 18, quoting from *La Presse*, Montreal.]

Singaporean Reciprocity: The Small Kindness Movement is a new program in which citizens will be encouraged to be kind and caring. The movement urges such deeds as opening doors for others, giving up seats on trains, or simply smiling. Schoolchildren, the 1st to be taught, are receiving a booklet outlining 80 acts of kindness they must perform to earn a bronze star, with higher rewards to follow. The movement will later be extend to adults in offices and neighborhoods. [Toronto *Globe & Mail*, 13Sept96].

Japan Economic Growth is Network Driven: "Japan is frequently accused of lacking clear rules, and of operating instead through chummy personal networks that discriminate against outsiders. The report [by Eisuke Sakakibara for Japan's international finance bureau, Min. of Finance] cites a survey that compared people's regard for rules with their regard for friendship. In the US, 95% put rules before their friends; Germany 92%, Britain 83%, Japan 61%, followed by Italy 52% and France 50%. [*The Economist*, 7/95].

Little Women Knew This: "A faithful friend is a strong defense, and he [sic] that hath

found him [sic again] hath found a treasure." attributed to Madeline Stern in the dedication of her 1950 biography of Louisa May Alcott; Dinitia Smith, *NY Times*, 29Aug95: B1. BW: This sounds as if it were a quotation from somewhere else: source appreciated.]

Network Survival: The Soviet Union still exists - on the Internet. I just received a message from Moscow, where the last 2 letter country codes are ".su" instead of ".fr" for France and ".ca" for Canada. (American university addresses are ".edu" (for "education") because they were set up before folks in the US thought the system would go international one day.)

Turn On / Tune In: "What are the 2 types of businesses that call their services `users'? . Drug pushers and Internet service providers." Clive Thompson, [Toronto] *Report on Business Magazine*, 6/96: 65. [Upon getting this thought from me on email, Rebecca Adams (Soc, U N Carolina — Greensboro — replied, "Timothy Leary would have loved it." Leary died 6/96, btw.]

Which reminds me of a Tim Leary story. While you might think of Erik Erickson as the height of Viennese sophistication, I once saw him pull a piece of pure guerrilla theatre. Timothy Leary had been Erickson's protege at Harvard Soc Rel until Leary was fired in 1963. Leary returned to Harvard Soc Rel about 1966 at the height of his fame to lecture there. Right in the middle of Leary's "turn on, tune in, drop out" oration, Erickson stood up from his front row centre seat, proclaimed very loudly, "Dr. Leary, I drop out!" and stalked from the lecture hall. I have always assumed that Erickson had planned the whole piece.

Right Message / Wrong Medium: The *Toronto Globe and Mail* ran a silly-season story June 15, 1996 about how some even sillier doctors writing in the *Canadian Medical Association Journal* about "internet addiction."

It struck me that Tim Leary's slogan would be a perfect rallying cry for those who live life on-line. Once again: "turn on, tune in, drop out."

Social Computing: Not only is a computer network a social network, Phil Agre (Communic Studies, UCal-San Diego) argue that a microcomputer is. "The people who invented the PC said, `Hey, it's personal - we don't need a full-blown operating system with security and multitasking.: So first we had viruses until finally we systematized the kludges by which we fend them off. Then we connected our PCs to the Internet, and we haven't seen a 10th of the heck that's going to break loose from that. The problem is that a `personal computer,' despite its misleading name, is fully as social a creature as the old time-sharing systems ever were. And yet its design embodies no coherent model of how to negotiate those social relationships." [from his online *The Network Observer*³. Agre, btw, puts out a wonderful mail-forward service of interesting reports & comments about the cyberuniverse (much like *Connections*, except online). It's called "Red Rock Eater". Contact him at pagre@ucsd.edu.

Has Agency Come to the Internet? Network Solutions, the private company that controls the registration of internet domains, is owned by Science Applications International Corp. (SAIC), whose boards of directors reads like the Who's Who of the US intelligence community. Current directors include Bobby Ray Inman, former director of the National Security Agency and former deputy director of the CIA, and Donald Hicks, former Pentagon R&D head. In recent years, the board has included John Deutsch, current CIA director; Anita Jones, director of defense research and engineering; Melvin Laird, Nixon's Secretary of Defense; William Perry,

³ <http://communication.ucsd.edu/pagre/tno.html>

now Clinton's Secretary of Defense; Maxwell Thurman, who commanded the US invasion of Panama. [from a letter by Rolf von Richter to *Wired*, 7/96: 28].

Community Liberated/Community License: "The difference between mailing lists and newsgroups is the difference between inviting a group of friends over for wine on a Sunday evening and putting a billboard that says "Free Booze Here!!!" in your front yard." [Lazlo Nibble, quoted in *Wired*, Feb, 1996: 96].

Bucky's Comforting Thought: "Because network is apolitical and amorphous, it has no 'cells' to be attacked, as did communism of former decades. The fearful sovereign nations' politicians will find that trying to arrest networking is like trying to arrest the waves of the ocean." [R. Buckminster Fuller, 1983, as quoted in *Wired*, 4/96: 102. BW: I'd like to find the original source for this quotation.]

A CyberContradiction: The NY Public Library (once my 2nd home) has opened a spiffy new "Science, Industry and Business Library" in the former B. Altman's department store (where Bev learned to be a salesperson). It's "heart" is its Electronic Information Center where 70 workstations connect to the library's internal data bases as well as science and business information worldwide.⁴

This sounds like planned premature obsolescence: Why build a fancy building to house terminals when any Web search engine can do the whole thing from the comfort of your home/office? My guess is that they found it easier to get private donations for the (unneeded) site rather than for the (needed) service.

Stress and the Graduate Student: We all know that grad student life is both fun and

stressful, but where in the grad student life course is there the most stress? Bruce Robertson, a U of Toronto Soc. undergrad. studied this cross-sectionally, and found that thesis writers were the most stressed and distressed, M.A. students the least, with Ph.D. course-takers in-between. Bruce attributes this to the social loneliness of the thesis writer (only some Toronto students have offices). High levels of social support tend to lower the distress of the highly stressed but didn't have any impact on those who had little stress. Female students report more stress and distress. (This paper won our department's "Barry Wellman Prize for Best Undergraduate Research Paper.")

Stress Test: How do you know when you're stressed? "When you are as inefficient as I am, you let work leak into every damn cranny into your life, and the result is that the rest of your life doesn't exist." [retiring St. Martin's Press CEO, Thomas McCormack, *NY Times*, 9 July 96].

Neural Network Stats: SPSS now markets *Neural Connection 1.0* [US\$995] which "brings neural network technology to bear on forecasting and classification algorithms are either inappropriate or difficult to apply. A standalone program, it links with standard SPSS/Win in I/O. And when I was reading the 9/96 issue of *AI* [newsletter of the ACM's SIGAI], I was surprised to read that SPSS is a program of choice for data mining. The statistician wondered out loud if social scientists also knew about it.

Affirmative Editorial Action: I just read the following explanation of authorship order in the frontispiece of *Recasting Steel Labour: The Stelco Story*, edited by June Corman, Meg Luxton, D.W. Livingstone and Wally Secombe (Halifax, 1993):

When books are co-authored by authors of different genders, it is the policy of

⁴ Visit it at <http://www.nypl.org/research/sibl>

Fernwood Publishing to list women authors first rather than follow the usual alphabetical sequencing. The fact that the male author/editor appears after the female does not imply subordinate status. This procedure is intended to counteract the common assumption that the female author/editor is subordinate.

I'd always thought that it was folks whose last name began at the end of the alphabet who were the most oppressed. This is an interesting book by the way, about social relationships and management decisions in a large Canadian steel company.

Job Search: The British Columbia provincial government has launched a Youth Works program that will teach job search information and job search training. [Premier's Office press release 18July96]. The government didn't note how it will cope with the multinationals' flight of jobs to lower-cost environments.

Job Mobility: The "Jobtalk" column in *Lingua Franca* is an interesting (and amusing) source of data: It lists new academic hires by two universities: with a "Trained By" and a "Hired By" column. This would make a neat matrix manipulation, except that the "Hired By" column is much more heterogeneous.

Job Immobility: The 2 biggest factors holding US women execs back were male stereotyping & preconceptions of women (cited by 52%) and *exclusion from informal networks of communication* (49%). The third reason, "lack of significant general management or line experience" (47%) was the overwhelming reason male execs gave for their own lack of progress (82%). [Catalyst Research survey of 325 male & 1251 female execs, *Parade Magazine*, 20Oct96: 20].

Job Stagnation: "While the German economy expanded, managers encountered few problems. But when recession hit, their incompetence plunged their companies and themselves into trouble. [Gunter Ogger, *Nitwits in Pinstripes*.] Business prof. Ekkhard Wenger "fingers the two-tier system of corporate management, saying a clubby relationship between supervisory boards and management boards often meant they were accountable to no one but themselves." [Marlene Drohan, "Crime Fighters Stalk Boardroom," *Toronto Globe & Mail*, 10Sept94].

A Good Name Helps: In dealing with the film industry, Protocol Entertainment head Paul Bronfman asserts, "This whole business is based on relationships. It's building blocks of relationships." [Susan Gittins, "Bronfman in Prime Time," *Report on Business Magazine*, Sept96:92]. The Bronfman family is one of Canada's 2 or 3 richest; billionaire class.

So Does Wine: Sociologist Oscar Marchiso says that the key to the development of Emilia Romagna's small business networks is "cooperation. It is a strategic tool used here to compete globally. It begins in bars after work, where informal conversations over food and wine between business people lead to bottom-up economic development." [*Now*, Toronto, 22Aug96:17]. To compete, the Americans have developed Starbucks.

If Big Labour Had Read Granovetter, They Might Not Be Small Labour Now: "There's a hidden network of jobs out there. I would say 90% of companies don't advertize. They don't have to advertize." [Dennis Barlett, job placement coordinator for the Canadian Steel Trade & Employment Congress, in Edward Greenspon, "Rushing to Match People with Jobs," *Toronto Globe & Mail* 22July95: D7.]

Are UnAmericans Preoccupied with Structural Holes? When thinking about Ron Burt's seminal *Structural Holes*, I started

wondering about his implicit assumption that all organizational members are constantly seeking to get ahead. I wonder if the generalization is somewhat American-specific, and perhaps not generally true even within the U.S.A. Having work lots with the private sector recently in Canada, US, Europe and Japan, I have a sense that many members of such organizations are more concerned to stay where they are within their comfort zones. They expend much effort in developing mutually-supportive, family-like relations within their organizations. On a larger scale, John Kenneth Galbraith made a similar argument a generation ago in *The New Industrial State*: that organizations (really their managers) want to have predictable futures rather than to dominate the competition and the system.

The New Baconian Analysis: Caroline Haythornthwaite (InfoSci, U Il) writes (19Aug96): "Have you heard about the 6 degrees of separation from Kevin Bacon game? You get an actor's name & have to find movies they were in with someone who was in a movie with someone who was in a movie ... with Kevin Bacon. Shortest route wins. This is on a web site, I think." This must be all they think about at U Illinois, because Stan Wasserman writes (20Sept96) on *SocNet*, "The main story line is that Kevin Bacon is the most central individual, due to his large degree and the fact that the movies that he has been in have had large casts. For example, Bacon is connected to Marilyn Monroe by a geodesic of length 4, to Greta Garbo by a geodesic of length 4, and so on (Miss Piggy, Elvis, John Wayne, ...) -- a great example of the use of closeness centrality."⁵

⁵ For further info see the *NY Times*, 19 Sept 96). Lin Freeman (UCal-Irvine) suggests you look at the following web sites:
<http://www.cs.virginia.edu/~bct7m/bacon.html> or
<http://www.acs.oakland.edu/~grossman/erdoshp.html>

Group Selection: "The once shunned idea of group selection is creeping back into evolutionary theory. The concepts posits that natural selection can operate not only on genes and individual organisms but on hives, herds, clans and other aggregations of organisms. David Sloan Wilson of SUNY-Binghamton has been publishing papers on the topic for some 20 years. Perhaps his most influential paper is coauthored with Elliott Sober [phil, U Wisconsin] in *Behavioral and Brain Sciences* [12/94]. They argue that just as separate organisms can be viewed as collections of mutually dependent genes, so groups can be like 'individuals in the harmony and coordination of their parts.' A group may be not only a close-knit family but also a community of unrelated individuals and even a pair of different species locked in symbiotic relationship. When these groups compete, natural selection can favor one group over another and so exert a strong influence on the group's characteristics." [edited from John Horgan, "Group Think," *Scientific American*, 7/96: 29-30.

No Social Support, No Transplant: An article in the *Canadian Medical Association Journal*, 1/96, suggests some families aren't put on waiting lists for liver transplants because they don't have families or "social supports." Gary Levy, director of multiorgan transplants at Toronto General Hospital, says this is 1 of several criteria used to weigh who gets a transplant, along with addiction, HIV, liver cancer and Hepatitis B. [Lisa Priest, *Toronto Star*, 2Feb96: A5.]

Robotic Groups: A Brandeis computer scientist has been teaching robots to work together and learn from each others. Each robot is programmed with certain behaviors and a rating system that rewards for tasks completed and subtracts points for mistakes. By teaching the robots to share the work (locating and picking up pucks), it takes only 15 minutes for the robots to learn turn-taking

and working together." [*Discover*, 9/95: 37 by way of Educom e-news service.]

Perhaps Even Economists Will Learn Something? To get solid results from rational expectations models of economic behavior, "you have to specify who knows what when," an overwhelming task in a complex economy, Nobel prize winner James Tobin commenting on the awarding of the 1995 to Robert Lucas (U Chicago) for developing rational expectations analysis.

The Health-Giving Qualities of Large, Sparsely-Knit Networks: "Hysteria tends to spread largely by line of sight. It is one thing to hear about people collapsing, quite another to witness it. Researchers [BW: who?] have also how mass hysteria travels along social networks -- if you do not know, or do not like, the person you see collapse in front of you, you are less likely to collapse. Hence outbreaks in tight-knit communities such as isolated villages or islands last the longest.... The trigger is often trivial - one person has a heat-induced faint or a panic attack. Normally bystanders take little notice, but if the community is already in a state of tension, a rumour can develop, usually 'we are being poisoned.' If the rumour is plausible to a wider group, it spreads rapidly." [Simon Wessely, "'Have You Heard? We are Being Poisoned?' after Tokyo metro riders fearing poisoning, *Times* [London], 4July95.

Alternative Mental Health: "Mistress! Giddess! Nurse Kia-Leader. PEP-Nashville (respected fetish support group) offers erudite phone consultation for sincere people interested in dominant/submissive love relationships. Love, Kiam MA (Soc), MA (medical anthro), PhD (almost)" [ad in *NY Review of Books*, 13July95:63].

Mathematical Structuralism: "The main difference between [mathematician Saunders] Mac Lane and me is a matter of temperament.

He is by temperament a reductionist, and I am not. He believes that the reduction of mathematical concepts to their abstract logical components is the main road of progress in understanding. I prefer to deepen my understanding of abstract components by building them up into concrete structures. I do not deny the power and the beauty of reductionist science, as exemplified in the axioms and theorems of abstract algebra or algebraic topology. But I assert the equal power of constructive science, as exemplified in Gödel's construction of an undecidable proposition or in Gentzen's construction of an enlarged domain for mathematical logic." [Physicist Freeman Dyson in a debate about David Hilbert, *New York Review of Books*, 5Oct95].

Is the Ultimate Reduction the Sociotechnical Network? "Leon Lederman, the physicist & Nobel laureate, once half-jokingly remarked that the real goal of physics was to come up with an equation that could explain the universe but still small enough to fit on a T-shirt. In that spirit [English geneticist] Richard Dawkins offered up his own slogan for the ongoing evolution revolution: Life results from the non-random survival of randomly varying replicators.... Human evolution is now inextricably bound up with technological evolution. Taken to its natural conclusion, Dawkins' idea suggests that humankind is really co-evolving with its artifacts: genes that can't cope with the new reality will not survive into future millennia." [*The Guardian*, UK, 4July95].

Hello Dolly? We all know that sexually transmitted diseases are network-borne. Perhaps the definition of network members should expand to include inflatable life-size dolls (a category that Laumann forgot to include). This is the argument of the paper that won the 1996 IgNobel Prize in Public Health: Ellen Kleist (Nuuk, Greenland) & Harald Moi (Oslo, Norway), "Transmission of Gonorrhoea through an Inflatable Doll." [Note:

The editors of the journal *Social Text* won this year's Ig Nobel prize for literature for publishing research "that they could not understand, that the author said was meaningless, and which claimed that reality does not exist."

The Death of a Dyadist: Here's my avant-postmodernist interpretation of Mozart's opera *Don Giovanni* (played in Toronto, 10/96). The Don is a consummate dyadist, going from affair to affair, and totally focusing on each relationship. Because it is only the present relationship that is important, he lives only in the present, and has no sense of social or historical context. One modernist touch: for an aristocratic Don, he's remarkably egalitarian, an equal-opportunity seducer. If you're focusing only on the relationship, there's no hierarchy to place it in. But dyadism is not a longterm strategy.

Alas, Don Giovanni is brought down in part by a network -- three of his lovers -- who do compare notes and by the past -- the statue of the Commandatore (father of 1 of his lovers) whom he had killed at the start of the opera. Could it be that as a rule, densely-knit networks (my "Community Saved") have a greater sense of collective history than sparsely-knit networks? The continuity and frequency of interaction with the same people in densely-knit networks should support more of a collective memory than the switching among partial network clusters that each person does in more sparsely-knit ("Community Liberated") networks.

CyberConfessions: Perhaps the Don would have seen the light if he'd had the benefit of the *Confession by Computer* CD (Lazarus Society, Germany), with a menu of the 200 most frequent sins & a separate program to allow folks to customize their confessions to more idiosyncratic and iniquitous sins. Appropriate penances are prescribed, and an Internet link to priests is provided. Rev. David Courtier of the Independent Catholic

Church runs a complementary service. He is starting to celebrate mass online and will allow people to take communion via computer by placing unleavened bread in front of their monitors.

Sign-off: Recent .sig line I've seen on the Internet: "I want to die in my sleep like my grandfather, not screaming in terror like his passengers."

Give a Ghost a Network: According to the Toronto Globe & Mail (12Sept96), Sept 12 marks the end of the month-long Hungry Ghost festival. The spirits of those who died without descendants -- or who were ignored by their kin while alive -- have been wandering the streets looking for mischief. They must return before the annual closing of the gates of hell on Sept 12. [As Woody Allen pointed out in *New York Stories*, hell hath no fury like a Jewish mother ignored.]

The Structural Affairs of ODD

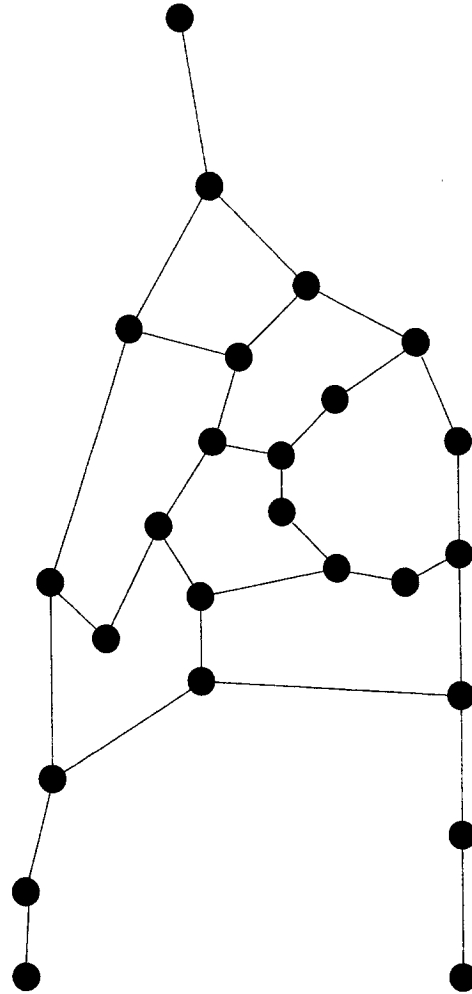
Did you know that Otis Dudley Duncan was William Sewell, Jr's babysitter? Dudley's pa was Otis Durant Duncan, a fellow grad student with William Sewell Sr. in the 1930s at Soc, U Minnesota. This is from p. 137 in Jennifer Platt, *A History of Sociological Research Methods in America 1920-1960*. Cambridge: Cambridge University Press, 1996. However, I found the book disappointing: disorganized structure, clunky writing and sloppy proofing. The only network-ish folks to make it -- and only in passing -- are Jim Davis and Anatol Rapoport.

The Otis D. Duncans' names popped up again when I spent a night reading Barry Johnston's, *Pitirim A. Sorokin: An Intellectual Biography* (Lawrence, University Press of Kansas, 1995). It seems that Otis Durant Duncan also hung out at U Minnesota in the 1920s with dashing young faculty member,

Pitirim Sorokin, then in the throes of social mobility. (Hmm..., haven't the Sewells and Otis Dudley dabbled in that too?) Sorokin, of course, was recently arrived from Russia where he'd worked for Kerensky before being diss'ed by the Bolsheviks. Anyway, in a nice bit of reciprocity, forty years later, Otis Dudley led the move for Sorokin to finally get elected president of the American Sociological Association. Anticipating Milgram, Dudley organized a small-world-like pyramidal chain letter to get Sorokin nominated as a write-in candidate for president. Dudley gathered 7 others into a Committee of 8, who in turn wrote to about 130 others, who in turn wrote to thousands... Sorokin won in a landslide. (Johnston's book is a bit better written: page 246 has the key parts.)

And while we're on the subject of forbearers, did you know that **Margaret Mead's** father, Edward Mead, was a Wharton Business School prof. who wrote *The Story of Gold*. His wife, Emily Mead, was an economist also. Her "The Place of Advertising in Modern Business" appeared in Thorsten Veblen's *Journal of Political Economy*. [Median tidbits from William Leach, *Land of Desire*, p. 160 - it's a book about the growth of American department stores, ad. agencies and other consumption institutions.]

— *Barry Wellman*



Counter example to the claim that in every connected graph, all longest paths have a point in common.

ERRATA!

The references were incorrect in Frank and Yasumoto's article, "Embedding subgroups in a sociogram: linking theory and image," which appeared in *Connections*, Volume 19, Issue 1, pages 43-57. The correct references are given below and related files can be obtained from INSNALIB in the /incoming or /pub subdirectory: embsub3.wpd (full WordPerfect document, including figures); embref.wpd (references in WordPerfect document); embref.txt (references in ascii file). *Connections* regrets the error.

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Seeing Groups in Graph Layouts¹

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Introduction

Social networkers frequently make use of drawings to communicate information and ideas about networks. However, the impact of the layout of a network on the conclusions that a viewer is likely to draw has so far received very little scrutiny. In this paper, we extend work begun in (Blythe et al, 1995) and (Mcgrath et al, 1996) to understand how the layout of graphs depicting social network data influences the inferences viewers draw about social networks. Our previous work focused on the perception of prominence or bridging of a particular node. Here we focus on perceptions of clustering among nodes.

Previous empirical work studying graph layout and social networks has shown that layout influences viewers' perception of the prominence, or importance of individuals in the network (Blythe et al, 1995). Purchase et al. (1995) report on experimental work validating general graph layout aesthetics. Both of these empirical studies of human perception of graphs build on earlier work on graph drawing aesthetics (see Battista et al.(1994) for a survey of this work).

Finding groups in networks of people is an important part of social network analysis. According to Scott (1991):

One of the most enduring concerns of those working in social network analysis has been the attempt to discover the various 'cliques' and cohesive sub-groups into which a network can be divided.

We extend experimental work testing viewers' understanding of graphs based on layout by using an interactive system that allows us to closely track the responses and response time of people answering questions about the graphs.

Experimental Design

The Study

This paper reports results of a larger study of network perception in which sixty-one graduate students who had just completed a course in organizational theory emphasizing networks in organizations participated. Participants evaluated one of five different orderings of five

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layouts chosen at random. The layouts presented to the participants had nodes labeled with first names which differ with each layout.

Our test platform is a modified version of KrackPlot 3.0 (Krackhardt et al, 1994), a social network drawing package, which participants use to interactively assign nodes to groups. Participants were able to assign nodes to one of (at most) five different groups by clicking on a square to activate a group and then clicking on the nodes they believed to be in that group. Participants were able to change a node's group assignment by clicking on the node while a different group was activated. This system allows us to track the exact order of assignment of nodes to groups as well as the time spent assigning each individual node to a group.

We brought participants together in a computer lab as we demonstrated the program. Before they began the exercise we told them :

In the following exercise, you will practice finding groups when the social network is presented as a graph. After we do two warm-up exercises together, you will have a chance to identify groups for five different graphs that show communication patterns among people, that is, a line between two people means they talk often.

To ensure that they participants were comfortable with the system we led the participants through two exercises: one in finding a particular node and clicking on it and one in activating a group and then assigning nodes to that group. Before each of the five graphs appeared, the following message appeared on the screen:

In the next screen, you will be shown a graph and asked to divide its nodes into separate groups. Each time you click on a node, its shape and color will change. You can select the shape and color by selecting the appropriate node in the menu bar at the top of the screen. Please make use of different shapes and colors to divide the nodes into the groups that seem appropriate.

Since each node could belong to only one group, respondents assigned nodes to the group in which they fit "best".

The Network

We report on the results of three different layouts representing an interaction among bank employees. These data were obtained by Krackhardt as part of a research project on networks in banking. The ethnography of the site suggests that there are two groups, each with their own subculture within the bank. The network is dense with 26 nodes and 93 edges. Figure 1 shows the three layouts. The first layout depicts two spatial groups with two edges connecting the groups. In the second layout, a node labeled "N" from the right spatial group is positioned in the left spatial group. Six edges connect the spatial groups. Four of those edges are connected only to N which is not itself connected to any nodes in its spatial group. Finally, the third layout has the nodes clustered in three spatial groups with many edges connecting the spatial groups.

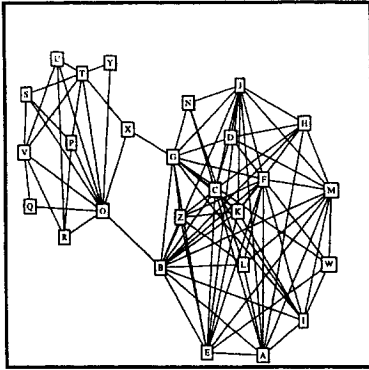


Figure 1: Layout 1

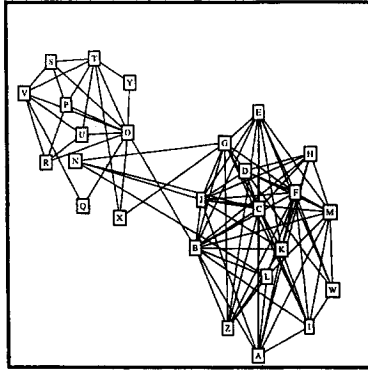


Figure 1: Layout 2

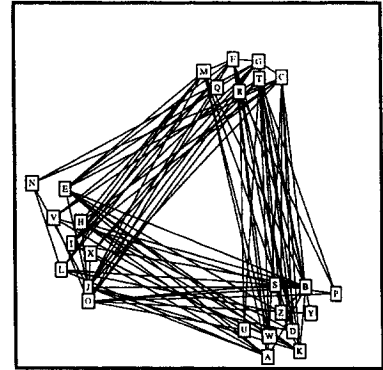


Figure 1: Layout 3

Results

Because the purpose of graphical presentation of data is to convey information quickly in a clear and correct form, we will consider a "good" layout to be one that allows viewers to draw inferences about the information presented quickly and correctly. We evaluate graphs based on the amount of time viewers take to finish assigning nodes to groups. We show that different layouts of the same graph suggest different numbers of groups to viewers. The following sections will compare each layout based on viewers' time to complete assignments, perception of the number contained in the graph, and perceptions of group co-membership for pairs of nodes. We define a dyadic relationship between nodes called "co-membership" as the proportion of times viewers place two nodes in the same group. We test a model that predicts the proportion of times two nodes, i and j , will be placed in the same group based on structural properties of the graph, the adjacency matrix and the path distance between i and j , as well as spatial properties of the layout, the Euclidean distance between i and j .

Time

The more quickly viewers can look at a layout and make inferences about the underlying structure of the graph, the better the layout is at conveying information. We compare time to complete group assignments for all three layouts.

Table 1: Time to Complete Group Assignment

| Layout | N | Time in seconds (St. Dev) |
|----------|----|------------------------------|
| Layout 1 | 31 | 72.5 (32.48) |
| Layout 2 | 24 | 100.7 (43.89) |
| Layout 3 | 33 | 132.8 (98.54) |

Table 1 shows that on average viewers took the least amount of time assigning groups for Layout 1. The average amount of time for Layout 1 was 72.5 seconds. Viewers took 100.1

seconds on average to assign nodes for Layout 2 and 132.8 seconds on average to assign nodes for Layout 3. Of the three layouts of the interaction data, Layout 1 presents the information in a way that is most quickly understood by the viewers.

Perceived Number of Groups

Manipulating the layout of the graph can change viewers' perceptions of grouping even though the underlying structure of the graph is unchanged. The number of groups that viewers find for a given layout is a good first estimate of how their perception of the graph changes when layout changes.

Figure 2 shows the proportion of viewers reporting one, two, three, four, or five groups, respectively. Forty-five percent of respondents who evaluated Layout 1 divided the nodes into two groups. Of those respondents evaluating Layout 2,

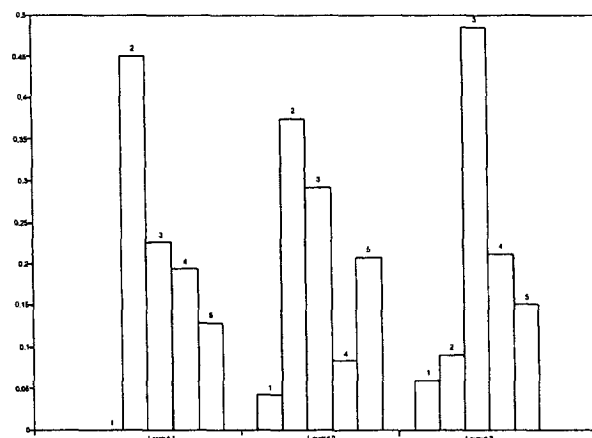


Figure 2: Number of Groups Assigned by Layout

38% divided the nodes into two groups. For Layout 3 only 9% divided the nodes into two groups; instead 49% divided the nodes into three groups. This suggests that the spatial clustering of nodes, not simply the structure of the graph, is influencing respondents' perceptions of the group structure. A chi-square test of independence supports the hypothesis that the number of groups reported by respondents is not independent of layout.

Group Co-Membership

We can describe participants' perceptions of grouping by showing how often they assign pairs of nodes to the same group. Viewers will assign pairs of nodes, i, j , to the same group based on i and j 's structural relationship and i and j 's spatial relationship. We measure i and j 's structural relationship by adjacency and path distance. We measure i and j 's spatial relationship by the Euclidean distance between i and j in each of three layouts. For each layout we calculate co-membership as the proportion of times i and j are assigned to the same group. Using multi-dimensional scaling (MDS) we can represent viewers' perceptions of co-membership. We can further test the effect of adjacency, path distance, and Euclidean distance using QAP to model group co-membership.

MDS of Group Co-Membership

The MDS representation of the proportion of times i and j are assigned to the same group shows some interesting differences between Layouts 1, 2, and 3. Figure 3 shows the MDS of

Layout 1 shows two clear clusters of nodes. Nodes X, O and B, G are pulled more toward the middle of the suggesting that their group assignments sometimes coincide.

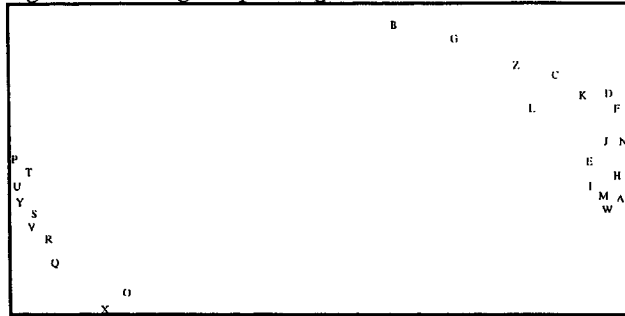


Figure 3: MDS: Co-Membership for Layout 1 (Stress=.094)

The MDS of Layout 2, Figure 4, shows a different picture. In the second layout, N is pulled from the spatial cluster to which it is connected structurally and is positioned in the spatial cluster to which it has no ties. While there are still two main groups, N has moved to the middle of the display, suggesting that N shares co-membership with nodes in both of the main groups. The nodes X, O, B and G are completely integrated into their groups, suggesting that their bridging role is no longer noticed. A third group, {F, H, I, M, W}, emerges on the right. In Layout 1, {F, H, I, M, W} was more integrated into the larger group.

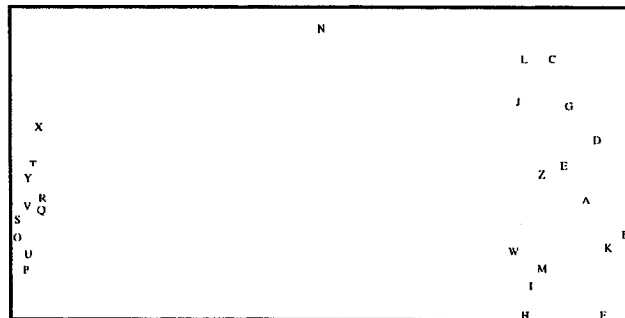


Figure 4: MDS of Co-Membership for Layout 2 (Stress=0.111)

Finally, in Figure 5, the MDS of Layout 3 is more disperse than the previous two MDS representation. However, three groups can be distinguished.

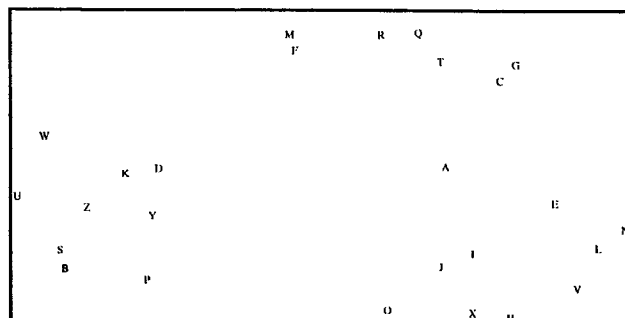


Figure 5: MDS of Co-Membership for Layout 3 (Stress=.196)

QAP Analysis of Group Co-Membership

For the QAP analysis, we ran three separate models for each layout. The Euclidean distance matrix is the distance (in pixels) between each pair of nodes, the adjacency matrix is a binary matrix where 0 means that there is no edge between a pair of nodes and 1 means that there is an edge connecting the pair of nodes. The path distance matrix shows the number of links in the shortest path between each pair of nodes. QAP analysis allows us to test the independent effects of these three matrices on individuals' perceptions of grouping. We see that Euclidean distance has an important effect on perception of grouping no matter what the graph layout is.

Tables 2 through 4 show that, as Euclidean distance between a pair of nodes increases, the proportion of times that pair of nodes will be assigned to the same group decreases. This effect remains significant through all three layouts. Path distance between pairs of nodes is also negatively related to the proportion of times the pair will be assigned to the same group. The adjacency matrix is positively related to co-membership, but this effect is weakened with the addition of path distance. Path distance is negatively correlated with the adjacency matrix. Table 5 shows the correlations between all independent variables.

Table 2: QAP analysis predicting proportion of times i and j are assigned to the same group: Layout 1

| Independent Variable | 1 | 2 | 3 |
|-----------------------------|-----------|-----------|----------|
| Euclidean Distance/100 | -0.14 *** | -0.08 ** | -0.08 ** |
| Adjacency Matrix | 0.26 *** | 0.10 | |
| Path Distance | | -0.28 *** | -0.24 |
| R ² | 0.568 | 0.690 | 0.685 |

Table 3: QAP analysis predicting proportion of times i and j are assigned to the same group: Layout 2

| Independent Variable | 1 | 2 | 3 |
|-----------------------------|-----------|-----------|-----------|
| Euclidean Distance/100 | -0.14 *** | -0.11 *** | -0.11 *** |
| Adjacency Matrix | 0.23 *** | -0.02 | |
| Path Distance | | -0.19 *** | -0.18 *** |
| R ² | 0.615 | 0.683 | 0.683 |

Table 4: QAP analysis predicting proportion of times i and j are assigned to the same group: Layout 3

| Independent Variable | 1 | 2 | 3 |
|------------------------|------------|------------|------------|
| Euclidean Distance/100 | -0.090 *** | -0.090 *** | -0.090 *** |
| Adjacency Matrix | 0.040 * | 0.035 | |
| Path Distance | | -0.003 | -0.020 |
| R ² | | 0.767 | 0.764 |

Table 5: Correlation Matrix for Independent Variables

| | Adjacency | Path Distance | Euclidean Distance 1 | Euclidean Distance 2 | Euclidean Distance 3 |
|-----------|-----------|---------------|----------------------|----------------------|----------------------|
| Adj | | -0.806 *** | -0.500 *** | -0.487 *** | 0.216 *** |
| Path Dist | | | 0.675 *** | 0.614 *** | -0.125 ** |
| Euc. 1 | | | | 0.810 *** | -0.091 ** |
| Euc. 2 | | | | | -0.068 * |
| Euc. 3 | | | | | |

Conclusions

The results of our analysis suggest that spatial clustering has a significant effect on viewers' perceptions of the existence of groups in networks. When the single node N is drawn in a cluster to which it has no links, its group membership is made maximally ambiguous as evidenced by its placement squarely between the two clear factions displayed in the MDS representation of Layout 2 (Figure 4). Moreover, the consistency of reports of group membership decreases for the entire graph. In the first layout, nodes {B,G,X,O} are seen as bridging nodes. In the second layout, by moving N and allowing more line crossing, their role as bridges is lost. These preliminary results emphasize how fragile conclusions drawn from layouts of networks can be, and how important it can be to seek a clear depiction of a network.

One simple principle that must be followed to create a clear depiction of a network is clearly shown in this study: adjacent nodes must be placed near to each other if possible, and Euclidean distance should be correlated with path distance. This might be considered a "First Principle" in network layouts. Indeed, the third layout in our study produces results so different from the first two because it is in opposition to the first principle.

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The Diffusion Network Game¹

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Effective, entertaining, realistic and achievable learning tools can be hard to find. While attempting to explain network analysis and diffusion of innovations to students, it occurred to me that one could devise an activity that students could do in class to learn the basic principles. Thus, I created the easily adaptable diffusion network game which is instructive in the lessons that it teaches and can be implemented on multiple levels.

The game requires a set of plastic poker chips (I purchased a set for \$9.00 containing 100 white, 50 red, and 50 blue, which I also use to teach survey sampling concepts) and a willing class or group. The optimal size is anywhere from 20 to 50 students, but any size class or group greater than 15 should do. I will present the basic approach as well as our results, then present some variations that expand the approach.

Before class, a roster of the students in the class was used to create a roster questionnaire (appendix A) asking students to check the boxes of those other students in the class that they: (1) spent free time with; (2) had lunch with in the past three months; and (3) discussed health issues². The questionnaires were collected and used to create three sociograms and rank-order the out-degree scores. While the data were being analyzed, a lecture on the role of interpersonal communication and network analysis was given for about an hour. A short break was taken during which time the questionnaires were returned to the participants.

Two versions of the game were introduced: (1) KAP-gap diffusion curves; and (2) network influences on diffusion. KAP-gap is designed to demonstrate diffusion curves which show that awareness of an innovation (also referred to as knowledge) precedes a positive attitude, which precedes practice (or adoption). Scholars have long known that diffusion of an innovation follows an S-shaped pattern like a growth curve or logistic function (Pemberton, 1936; Rogers, 1995; Valente, 1993; Mahajan & Peterson, 1985). Before diffusion can occur, however, individuals must be aware that the innovation exists and then must make a decision to try it. The diffusion of knowledge and attitude occur before practice/adoption and these information-based factors can diffuse more rapidly than practice. Consequently there is a gap between the

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²This course is a health communication course, so health issues are relevant. Any topics relevant to the course could be used.

time a person becomes aware of an innovation and when he/she adopts it. This gap is referred to as the KAP-gap (Knowledge Attitude Practice gap) and reducing this gap is a goal of many interventions (Chaffee & Roser, 1986; Hornik, 1989).

The KAP-gap is a key concept in behavior change theory, yet students sometimes have a hard time understanding it. Furthermore, the shape of diffusion curves (or production functions) indicate an audience's location in terms of the size of the existing KAP-gap and how rapidly or slowly it is increasing (or decreasing) over time. Thus, diffusion curves are an excellent diagnostic and evaluation tool for understanding the KAP-gap. Consequently, there are many opportunities to teach diffusion curves.

Game 1: KAP-gap. The first game was begun by putting up an overhead with the following four rules:

1. You can only give a chip to those people you nominated (chosen on the survey). You give chips to others only at the start of a turn. (In other words, you can not get a chip during a "round" and immediately give it to someone else.)
2. To receive a blue chip you must have a white one. To receive a red chip you must have a blue one.
3. You can only give one chip to a person at a time, but you can give chips to as many people as you are connected to. For example, if I have three white chips, two blue chips and one red chip, I can give away two whites to two different people I am connected to, and give away one blue to one person I am connected to.
4. Once you have one chip of a color you want to keep it, but more than one chip of a color is of no use to you, so please pass it on.

Three random numbers were chosen and 45 chips of each color were given to the three people who corresponded to these three numbers (I had 32 students in the class, so I could use a 30-sided die to select the semi-random numbers.)

In this game white chips referred to knowledge (awareness), blue chips referred to attitude (decision), and red chips to practice (adoption). Thus, the diffusion of knowledge (white) should occur more rapidly than attitude (blue), which in turn should occur more rapidly than practice (red). The three colors then correspond to the KAP-gap. The data for the first game are reported in Figure 1.

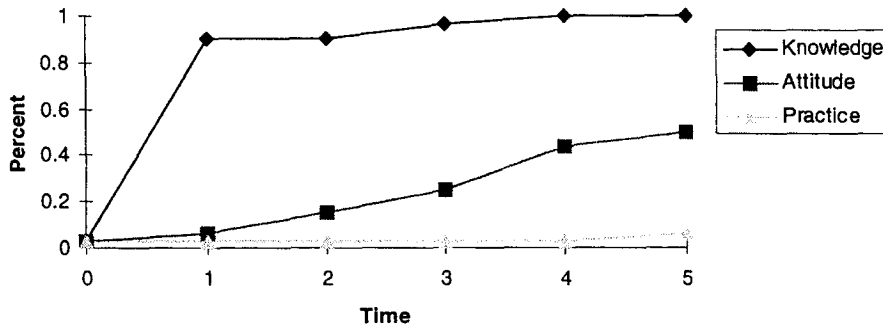
It so happened that the first randomly chosen person had the highest out-degree score so the diffusion of knowledge occurred rapidly and clearly demonstrated the KAP-gap. At time zero, the starting point, there is one person who is aware, one person at the attitude stage and one adopter. We then start the game by allowing the students to get up from their chairs and give chips to those people they are connected to as indicated by their questionnaires (and who have the necessary colored chips, such as having a blue chip prior to receive a red one). After they are finished exchanging chips, a show of hands is requested to indicate how many people have white, blue, and red chips. One can then write on the chalkboard (or transparency) the number

in each category. The chip exchange process is then repeated for three, four, five or more time periods until saturation or stasis is reached.

Figure 1. Game 1, Trial 1: KAP-gap demonstration with three random starters.

| Stage | Time | | | | | |
|-------------------|------|----|----|----|----|----|
| | 0 | 1 | 2 | 3 | 4 | 5 |
| Knowledge (White) | 1 | 29 | 29 | 31 | 32 | 32 |
| Attitude (Blue) | 1 | 2 | 5 | 8 | 14 | 16 |
| Practice (Red) | 1 | 1 | 1 | 1 | 1 | 2 |

**Diffusion Network Game:
KAP-gap Demo**



In this example the group was saturated with knowledge quite quickly while attitude and practice grew more slowly. Knowledge saturation happened rapidly because the first person with awareness could pass on that awareness to many other people (handing white chips to everyone he was connected to) since he had many nominations and there was no restriction on whom he could hand chips to (no one was required to have a chip of another color). Thus, knowledge diffusion occurred quickly for two reasons: (1) the random start for the knowledge chips was a person with high out-degree, and (2) there was no restriction on who the knowledge chips were given to. We had greater than 95% knowledge by time period one, and reached 50% attitude by time period five. Even after five time periods, however, practice was still at a relatively low level. To reiterate the lessons learned a second trial of this game was run and I selected three new random starts. The data and curves are shown in Figure 2.

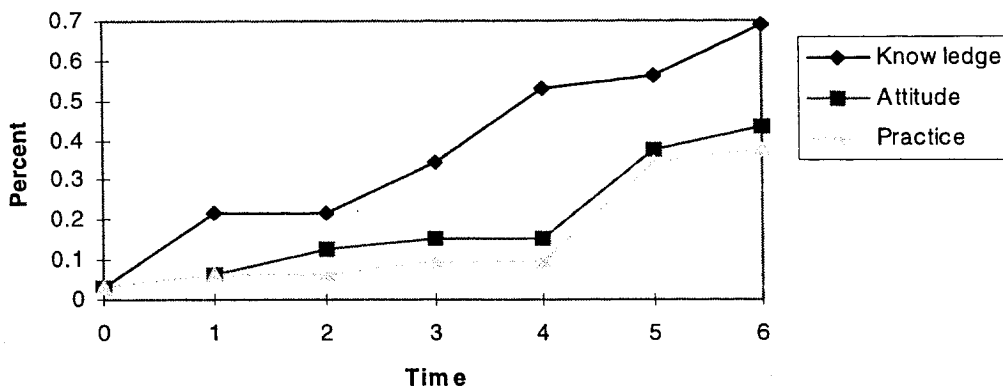
Trial two also began with distributing 45 chips to each of the three random starts, but in this case the three random starts had relatively similar out-degree scores (range 7-9). Trial two had slower knowledge growth than trial one since the initial person diffusing awareness had fewer nominations. Trial two had similar growth in attitude than trial one and more rapid growth

in practice than trial one. The fluctuations in KAP growth rates between trials are a function of the number of the out-degree ties possessed by the random starters and the subsequent ties of their ties and so on. Figure 2 reports the data for the second trial and shows how knowledge, attitude and practice begin at the same level. Knowledge grew more rapidly than attitude and practice since knowledge could be passed on to all of an individual's contacts, not just those who had the requisite chips. The KAP-gap still persisted at each time period and widened over time, but the gap between attitude and practice was small.

Figure 2: Game 1, Trial 2: Second KAP-gap demonstration with three random starters.

| Stage | Time | | | | | | |
|-------------------|------|---|---|----|----|----|----|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| Knowledge (White) | 1 | 7 | 7 | 11 | 17 | 18 | 22 |
| Attitude (Blue) | 1 | 2 | 5 | 8 | 14 | 12 | 14 |
| Practice (Red) | 1 | 1 | 1 | 1 | 1 | 11 | 12 |

**Diffusion Network Game:
KAP-gap Demo 2**



While the KAP-gap is an important concept, of still further theoretical interest is the relationship between the network structure and adoption/diffusion behavior. Many, if not all, planned change programs rely on random or *ad hoc* methods for recruiting new users and targeting interventions. This exercise is designed to show how enlisting opinion leaders first accelerates the diffusion process. This game contrasts diffusion curves when initial adopters fit three different conditions corresponding to initial adoption by opinion leaders, marginals, and randomly selected starters.

The second version of the game is designed to demonstrate how the network structure influences the speed of diffusion. The second game models adoption-diffusion only (not knowledge, attitude, or decision), but contrasts the diffusion speed depending on whether the

initial adopters are central members in the network or marginals. Thus, if initial adoption is by the opinion leaders then diffusion occurs more rapidly, and if initial adoption is by marginals it occurs more slowly.

The basic opinion leader model argues that early adoption by opinion leaders accelerates diffusion of an innovation (Valente, 1995). Attempts to reach a critical mass of adopters are thus centered on recruiting opinion leaders to be early adopters to speed the diffusion process. In contrast, early adoption by marginals (individuals on the periphery) or those less central should yield diffusion curves that grow more slowly. This game provides empirical evidence to support such a theory.

Game 2: Network structure. To run game two, I posted a new set of rules which eliminated rule two above. The new rules are:

1. You can only give a chip to those people you nominated (chosen on the survey). You give chips to others only at the start of a turn. (In other words, you can not get a chip during a "round" and immediately give it to someone else.)
2. You can only give one chip to a person at a time, but you can give chips to as many people as you are connected to. For example, if I have three white chips, two blue and one red I can give away two whites to two different people I am connected to, and give away one blue to one person I am connected to. Note: You can give chips of different colors to the same person during a turn.
3. Once you have one chip of a color, you want to keep it, but more than one chip of a color is of no use to you, so please pass it on.

This game was constructed to directly compare the effects of starting diffusion with (1) opinion leaders (OLs), as designated by high out-degree; (2) randomly selected adopters (Rs); or (3) marginals (Ms), as designated by low out-degree³. I distributed 15 red chips each to three OLs; 15 white each to three Rs; and 15 blue each to three Ms. Any differences found in the diffusion, then, are simply a result of the start nodes since we are not otherwise modifying the network structure.

The results are reported in Figure 3. Diffusion occurred more rapidly for the leader condition compared to the random condition, which was more rapid than the marginal condition. After one run of the second game, I graphed the diffusion curves and explained to the class the purpose of the exercise and how it demonstrated the diffusion conditions. I then displayed the sociograms⁴ which generated considerable interest in the class.

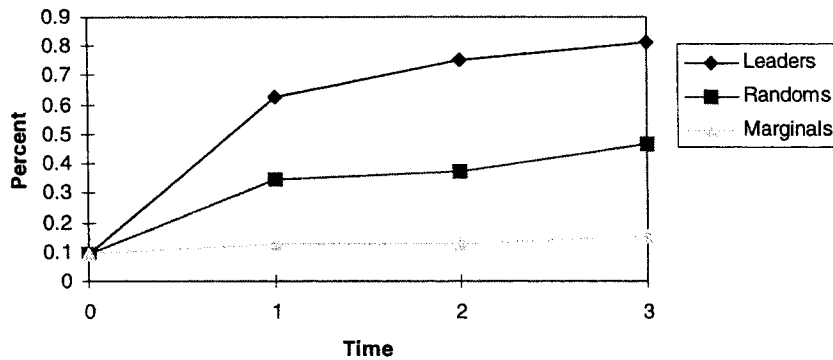
³I used marginals that had at least one out-degree nomination rather than those with zero.

⁴I had an assistant analyze the data "behind-the-scenes" while giving a lecture.

Figure 3: Game 2, Trial 1: Diffusion network demonstration with three starters for each condition.

| Condition | Time | | | |
|------------------|------|----|----|----|
| | 0 | 1 | 2 | 3 |
| Leaders (Red) | 3 | 20 | 24 | 26 |
| Randoms (White) | 3 | 11 | 12 | 15 |
| Marginals (Blue) | 3 | 4 | 4 | 5 |

**Diffusion Network Game:
Opinion Leader Model**



These exercises were enlightening to the students (and to us) and provided a number of lessons learned and possible extensions that others might want to know for their use of this activity. Five lessons and five extensions are reported here:

4. Often it was easier to ask for the incidence rather than the prevalence at each new time period. That is, I could simply say: how many new whites? Or how many new reds? And add that number to the running total. This also helped teach the difference between incidence and prevalence (and saturation)⁵.
2. Repeatedly I emphasized the importance of marginals who act as bridges in diffusion in order to avoid stigmatizing those who made few nominations.
3. Participants are extremely sensitive about question wording and go through great lengths to tell you how they interpreted the questions. One suggestion was to ask people to state who they spent free time with outside of school.

⁵Students quickly interpreted these diffusion results as contagious disease outbreaks. When numerous hands shot up in a time period they would say "outbreak" or "TB."

4. In one trial, I had two marginals that had at least one tie, but it turned out that they were connected to each other. Check to be sure that your marginals are not just connected to one another.
5. There was a problem of not having all students involved at all times which created a lot of opportunity for them to talk about other things and get distracted. One suggestion was to try some variant of the telephone game to be circulating simultaneously.

Five possible extensions:

1. One could limit the number of network choices allowed, or not use a roster at all and have participants write down the names of their network contacts.
2. If you have contact with the class before the scheduled demonstration, one could conduct the survey prior to the meeting.
3. One could vary the number of initial adopters, start nodes, to see how this affects diffusion.
4. One could use different chips to signify rumors/misinformation or competing innovations. This would perhaps model real life diffusion situations a bit more realistically.
5. Finally, in our second day of trials I was able to conduct games using only reciprocated ties, this narrowed the networks and stretched out the time needed to reach saturation.

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*Appendix A***Interpersonal Communication**

This questionnaire will be used to demonstrate how interpersonal networks channel diffusion. Please follow the instructions by answering the following questions:

1. Please circle your name from the list of names in the first column. If your name does not appear, please write it in at the bottom of the list and let the instructor know.
5. In column two, put an "X" by the names of those people you **spend free time** with outside of school (your friends).
3. In column three, put an "X" by the names of those people you **have had lunch** within the past three months.
4. In column four, put an "X" by the names of those people you **talk to about health matters**.
5. In column five, put an "X" by the names of those people you **seek advice from about academic matters**.

| # | Name | Free Time | Lunch | Health | Acad. Advice |
|----|---------|-----------|-------|--------|--------------|
| 1 | Name 1 | | | | |
| 2 | Name 2 | | | | |
| 3 | Name 3 | | | | |
| | . | | | | |
| | . | | | | |
| | . | | | | |
| 31 | Name 31 | | | | |
| 32 | Name 32 | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

[Note: Blank rows are left at the end for additions to the list.]

Automated Theoretical Analysis of Exchange Networks: Prerequisites and Prospects¹

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Abstract

Network exchange theories predict how profits from exchange are divided among network positions. The network structure, or pattern of exchange relations, is the initial condition upon which predictions are based. Previous research has been limited by the small number of networks found suitable to test theories. We propose to accelerate theoretical development by automating analysis of network structures to find strategic test sites. To do so, two prerequisites must be met: (a) two successful theories of network exchange must be sufficiently formal to incorporate into a computer program and (b) a program must be developed to systematically generate network structures. We describe recent developments in network exchange theory that meet both prerequisites. Not only do we now have two successful theories of network exchange incorporated into computer programs, but at least two successful computer models of network exchange also exist. In addition, a prototype computer program has been developed to systematically generate all exchange networks with a given number of positions. Having met the prerequisites of automated analysis, we can now build a master program which generates networks, produces predictions from two or more theories for the power of positions in those networks, and compares predictions. Strategic test sites are indicated when predictions of two theories differ. Automated theoretical analysis has the potential to accomplish in a few hours what had required years of patience, skill, and luck. Once a strategic site has been located, experiments using human subjects can be conducted and other empirical evidence can be collected to aid theoretical development. Then, automated analysis can be re-applied using the developed theories on ever more complex networks. We may soon be able to analyze networks of the size and complexity typically found in society. Possibilities for automated theoretical analysis exist in other areas of sociology as well.

¹ We are grateful to Devon Brewer who first called our attention to the structuralist line of research in developmental and educational psychology.

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INTRODUCTION

Research on exchange networks is some of the most theoretically formal and cumulatively progressive in sociology (Cook, Molm and Yamagishi 1993; Knottnerus 1994; Molm and Cook 1995; Szmataka and Lovaglia 1996; Willer and Markovsky 1993). Rapid progress has been due to network exchange research programs that push theoretical growth and problems amenable to experimental research techniques. The result has been what Fararo (1984: 155) termed "the physics-like interplay between abstract theories, appropriate formalisms, and relevant data." In contrast, the more common approach in sociology has been repeated attempts to verify or refute less formal theories that gain or lose favor but change little (Szmataka and Lovaglia 1996). Work on a recent problem in the fundamental basis for Network Exchange Theory (Lovaglia, Skvoretz, Willer, and Markovsky 1995) suggests that network exchange research has developed enough to automate computerized techniques for comparing theories and locating strategic test networks from the countably infinite number of possible network configurations. Such automation could result in the rapid solution of problems in more complex networks typical of naturally occurring social situations.

The concept behind automated theoretical analysis is simple: A computer program generates test networks, then computer models of two or more theories generate predictions for the test case, finally, the program compares the exchange predictions of the two theories. When predictions of two theories differ for a given network, a strategic test site has been located. Such strategic test networks have previously required years to discover. Automation could cut that to a few days, perhaps to a few hours.

In contrast, the prerequisites of automated theoretical analysis are demanding: There must be (a) two— or more—competing theoretical models, both sufficiently formal that a computer can be programmed to make predictions in specific cases using them, and (b) a computer program to generate progressively more complex test networks on which to compare predictions of the competing theoretical models. Not only must theoretical models be sufficiently formal, but they must both also be successful. That is, both must explain the amassed body of empirical results. More generally, (Cohen 1989 and Markovsky 1992) set out criteria met by scientific theories. Theories should be "(i) free of contradiction, (ii) free of ambivalence, (iii) communicable, (iv) abstract, (v) general, (vi) precise, (vii) parsimonious, and (viii) conditional." (Markovsky 1992: 2). The prerequisite of automated theoretical analysis—that theories must be sufficiently formal to be programmed into a computer—helps ensure that several of the above criteria are met. Programming theories usually frees them of internal contradictions. Further, programmed theories are precise and not ambivalent when they produce a single accurate prediction for a given set of initial conditions. They are communicable to anyone who uses the programming language in which the theory is written. And, programming lends itself to parsimony. Automating theoretical analysis culminates from the development of more than one successful scientific theory in a research area, and from finding a way to systematically generate problems for these successful theories to solve.

When many results are available in a research area, it is unlikely that two theories will explain them. Thus the chance of two successful theories coexisting in one field after decades of cumulative research is small. It is significant that we now have two such theories in social

exchange research: (1) network exchange theory², (2) a variant of network exchange theory, *iterative likelihood analysis*, described below. In addition, two computer models also successfully predict exchange behavior Markovsky's (1995) X-NET program and Burke's (forthcoming) identity model.³ We also describe below a computer program being developed to successively generate every possible network configuration with a given number of connected positions. It will generate all networks with a small number of positions and the fewest possible ties among them, then we can progressively add ties until we exhaust all networks of a given size before tackling larger networks. Here we show how both prerequisites for automated theoretical analysis have been met for network exchange research and describe development of the automated program.

TWO SOLUTIONS TO A FUNDAMENTAL PROBLEM IN NETWORK EXCHANGE

Network exchange research strives to predict the resources each position in a network will acquire through exchange with other positions. A position's power in the network determines the advantage or disadvantage it has in acquiring resources through exchange.⁴

Network exchange theory analyzes the power of network positions in three stages.⁵ First, the theory determines which connected positions are likely to exchange with each other, and whether any positions have overwhelming advantages over one or more of their partners—a condition termed *strong power*. The first stage is accomplished using the Graph-theoretical Power Index (GPI) analysis (Markovsky, Willer, and Patton 1988). Second, the theory determines whether small, self-limiting advantages and disadvantages exist between exchanging positions where no strong power advantage exists—a condition termed *weak power*. This stage of the analysis considers the likelihood that a position can be included in an exchange (Markovsky, Skvoretz, Willer, Lovaglia, and Erger 1993). Third, the theory predicts the exact profit a position will acquire through exchange at equilibrium. It uses a mathematical function derived from assumptions about actor behavior to transform the qualitative differences between positions identified in stage two into exact quantitative predictions of exchange power (Skvoretz and Willer 1993; Lovaglia, Skvoretz, Willer, and Markovsky 1995).

Recent work on stage three presumed that the foundation of network exchange theory was solid. In particular, we believed that the GPI analysis of power advantages could accurately identify the type of power differentiation that network structures would exhibit: strong power,

² Markovsky, Willer and Patton (1988); Markovsky, Skvoretz, Willer, Lovaglia, and Erger (1993); Skvoretz and Willer (1993); Lovaglia, Skvoretz, Willer, and Markovsky (1995); Lovaglia, Skvoretz, Markovsky, and Willer (1995).

At least two other models have the potential to be used as part of automated theoretical analysis: Friedkin's (1992, 1993, 1995) expected value model and Fararo and Hummon's (1994) discrete event simulator. However, we have not examined their predictions closely enough to establish their success in explaining existing results.

The early development of network exchange research can be seen in these classic papers: Emerson 1962, 1972; Cook and Emerson 1978; Willer and Anderson 1981; Cook, Emerson, Gillmore, and Yamagishi 1983; Willer 1986; Cook, Gillmore and Yamagishi 1986; Markovsky, Willer, and Patton 1988; Yamagishi and Cook 1990; Markovsky, Willer, and Patton 1990.

⁵ A succinct formal statement of network exchange theory is included in an appendix.

weak power, or equal power. These types of power structures fundamentally differ. In a strong power structure, a high power actor can continually increase its power to acquire resources until no more resources remain. In weak power, the use of power (i.e., when an actor negotiates an advantageous exchange) temporarily alters the network structure to reduce power differences. And, when power is equal, no differences in resource accumulation occur. To adequately analyze network power, correct classification as strong, weak or equal power is essential. Yet, Friedkin (personal communication) showed the Markovsky et al. (1988) method of determining which networks were strong power and which were weak power to be flawed. He noticed that the simple 5-position network in Figure 1 could not be easily classified by GPI analysis.

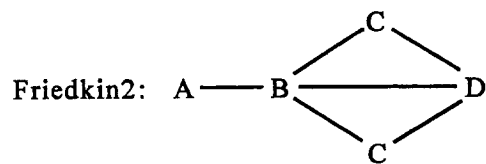


Figure 1: A Problem Network

encountered on the way led to an entirely new method of identifying the power type of a network. *Iterative Likelihood Analysis* (ILA) is based on the probability tree algorithm already in use to analyze weak power structures. Both methods give identical predictions for the power of positions in all networks of 6 or fewer positions and in all 7-position networks considered so far (105). Furthermore, the predictions are consistent with results from Markovsky's X-Net simulations, a program in which earnings differentials emerge as simulated actors adjust offers based on their experience of being included or excluded from exchanges Markovsky (1995).

*Iterative GPI*⁶

The Graph-theoretical Power Index (GPI) developed by Markovsky, Willer and Patton (1988) and Markovsky, Skvoretz, Willer, Lovaglia, and Erger (1993) uses a path-counting algorithm to identify how advantaged one position is in comparison to another. A position's GPI value is calculated by counting non-intersecting paths of different lengths leading away from it, with odd-length paths adding advantage, even-length paths taking away advantage.

Consider the network in Figure 1. Position A has a single 1-path to B, a 2-path to C (the 2-path to D would intersect with the first 2-path at B and so is not counted), a 3-path through B and C to D, and a 4-path through B, C, D, and ahead to the other C. Adding 1 to the GPI index for the 1-path and 3-path while subtracting 1 for the 2-path and 4-path yields a GPI value of 0 for position A. In contrast, position B has four 1-paths, a 2-path through C to D, and a 3-path

⁶ Material in this section has appeared in Lovaglia, Skvoretz, Markovsky, and Willer 1995.

GPI path-counting method were proposed for specific problematic networks and then new networks were painstakingly assembled to test the revised and elaborated procedure. This intense process of conjecture and refutation had two outcomes. First, we developed an *iterative GPI* method of analysis that we now believe correctly classifies networks. Second, problems en-

through C and D to the other C. Thus its GPI value is $4 - 1 + 1 = 4$. (See Markovsky, Willer, and Patton 1988 for details of GPI analysis.)

When GPI values differ for two positions, one has a strong power advantage over the other. Axiom 2 of Markovsky, Willer, and Patton (1988) asserts that actors seek exchange with partners whose GPI value is lower than theirs. Or, if all partners have a GPI value equal to or greater than an actor, the actor is assumed to seek exchange with the weakest partner(s) available. However, exchange is possible only when an actor and a partner mutually seek exchange with each other. Hence, if an actor and a partner do not mutually seek each other, that tie is broken. When such broken ties cause networks to break into subnetworks, GPI is applied iteratively to resulting subnetworks.

Using Axiom 2 to analyze the network in Figure 1, C actors will seek exchange with D, but not B. The network breaks into an A-B dyad and a C-D-C 3-line network. GPI equals 1 for the positions in the dyad. In the 3-line, D's GPI equals 2, whereas C's equals 0. Axiom 2 then applies to these new GPI scores. C's seek exchange with B, but not with D, thus leaving D isolated from the rest of the network. Iterating GPI again returns the dyad and 3-line. The analysis cycles indefinitely from one iteration to the next. Thus, the network in Figure 1 cannot be classified as strong power. Nevertheless, simulation using Markovsky's X-Net program suggests that B and D are in fact strong power positions (Markovsky 1995 describes the simulator).

The anomalous Friedkin network has a relatively easy solution, a modification of Axiom 2. Markovsky, Willer, and Patton (1988) assume that C actors will seek exchange with D while avoiding B because B is more powerful than D. However, whenever a strong power advantage exists, low power actors eventually lose nearly all available resources. Intuitively, it matters little to a disadvantaged actor whether the difference in GPI scores is large or small. As such, a better specification of the exchange-seek assumption is:

Revised Exchange-Seek Assumption (Axiom 2). Actors seek exchange with those less powerful than they are. If no actors with less power are available, actors seek exchange with actors of equal power. If no actors of equal power are available, actors seek exchange with more powerful actors.

Applying the revised exchange-seek assumption to the network in Figure 1, C actors seek both B and D and the network does not break into subnetworks. We classify it as a strong power network because GPI values differ for related actors. Although this new axiom satisfactorily resolves the anomaly of the Friedkin network, exploring its implications soon revealed other networks that challenged GPI analysis.

Our explorations uncovered many networks for which GPI analysis produced repeating cycles of subnetworks that would not allow simple classification, even though simulation suggested that strong power was present. Further theoretical development yielded a generalized GPI procedure which includes 7 rules that decompose a network into strong power, weak power, and equal power components (for details see Lovaglia, Skvoretz, Markovsky, and Willer 1995).

Iterative Likelihood Analysis (ILA)

At one point in the development of iterative GPI, the problem seemed intractable. The difficulty prompted search for a solution that did not require the path-counting algorithm of the GPI. We found the alternative solution by extending likelihood analysis — already in use to determine the extent of weak power.

After applying GPI to determine which network positions will exchange and whether strong power exists between exchange positions, likelihood analysis has been used on network structures where no strong power differences have been found. By comparing the likelihoods that positions will be excluded from exchange, likelihood analysis determines relative weak power for those positions (Markovsky, Skvoretz, Willer, Lovaglia, and Erger 1993).

As an example, consider the four actor line of Figure 2a, where connected actors can exchange at most once in a given round. $GPI = 1$ for all positions. Because positions have equal GPI, no strong power differences exist. Therefore, we calculate l_i , the probability that i is included in an exchange, to check for any weak power differences. In this network, A_1 can negotiate and exchange with B_1 ; B_1 may do so with A_1 or B_2 ; and so on down the line. Assuming that each actor is indifferent as to exchange partners, each B has a .5 probability of seeking exchange with an A and a .5 probability of seeking exchange with the other B. The probability that an A will seek exchange with a B is 1.0 because the A's have no alternatives.

Figure 2b shows a probability tree used to calculate l for each position. Each branch of the tree shows an *exchange-seek* and its associated probability. The "Exchanges" column shows mutual exchange-seeks and the "l" column shows the product of branch probabilities leading to each possible exchange.

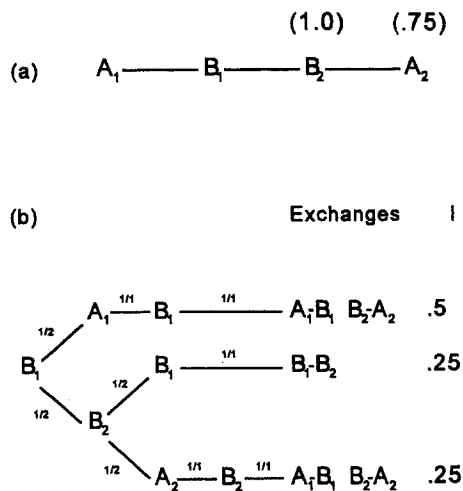


Figure 2: Likelihood Analysis for 4-line

The "Exchanges" column shows mutual exchange-seeks in the Exchanges column. An actor's likelihood of being included in (any) exchange is the sum of the probabilities associated with all exchanges that include that actor. From the tree we derive that $l_{AB} = .75$ for both A-B pairs; $l_{B1B2} = .25$; $l_A = .75$; and $l_B = 1$. Thus, the inner B positions have a weak power advantage over the outer A positions.

Likelihood analysis had been applied only after GPI indicated no strong power differences in a network. Likelihood analysis had not replaced GPI analysis because it was, by itself, incapable of distinguishing between strong and weak

power networks. For example, the 5 actor line, C-D-E-D-C, is a strong power network. D positions can eventually acquire nearly all available resource from exchange with C or E. Yet $l_C = .69$; and $l_D = 1.0$. The likelihoods of being included in exchange are not much different for the strong power 5-line and the weak power 4-line. In fact the difference between high and low

power positions in the strong power 5-line is *smaller* than the difference between high and low power positions in some weak power networks (see analysis of the Stem network in Markovsky, Skvoretz, Willer, Lovaglia, and Erger 1993). Yet actual differences in resources acquired through exchange are larger in strong power than in weak power networks. Thus it was hard to see how likelihood analysis alone could be used to replace GPI entirely in predicting power differences in both strong and weak power networks.

However, we found it possible to analyze power differences in both strong and weak power networks by iteratively applying likelihood analysis. The overall strategy is to look for characteristics of strong power structures. Then, when a strong power structure has been identified, break it off from the rest of the network. This approach follows from the idea that a rational actor in a relatively equal, weak-power relationship would not seek exchange with a more demanding high strong power position; and, a low strong power actor would acquire power if a weak-power alternative were available. Analysis continues breaking out identified strong power structures until none remain. The following rules use likelihood analysis to determine whether networks break and whether strong, weak or equal power exists among network positions. No path-counting algorithm is required.

Rules for Iterative Likelihood Analysis

On the surface, the ILA rules may appear to be somewhat complicated. In fact, each rule involves only simple procedures and is easily formalized in a computer program that automates application of the analysis.

- A. Apply the likelihood analysis to the network as a whole in the first iteration or on identified substructures—if any—in subsequent iterations.
 1. Potential low strong power positions have $l < 1$ and are connected only to positions with $l = 1$.
 2. Potential high strong power positions have $l = 1$ and must be connected to at least two potential low strong power positions which satisfy 1 above.
 3. Potential low strong power positions must be connected to at least one potential high strong power position and to nothing but potential high strong power positions.
 4. Potential strong power structures must contain only potential low strong power and potential high strong power positions; and, potential strong power structures must have more potential low strong power than high strong power positions.
- B. Break out potential strong power structures and break any ties that occur between potential high strong power positions in potential strong power structures to test for strong power.
- C. Repeat steps A and B until structures remain unchanged from one iteration to the next.
 1. Strong power structures contain only potential strong power positions (high and low); and, have more low than high strong power positions.
 2. Reconnect all original ties between positions not in strong power structures. These are potential weak power structures.
- D. Decompose complex potential weak power structures to detect concealed strong power.

1. Check to see if the network has at least one position with $l = 1.0$, if not then use likelihood analysis a final time to determine relative weak power.
2. Remove from the network one position with $l = 1.0$ along with the position connected to it that has the lowest l .
3. (a). If the residual network is strong power and the removed $l = 1.0$ position can reconnect to a low power position in the residual, then the original network is strong power. (b) If the residual is strong power and the removed 1.0 position can reconnect only to high power positions in the residual, then the stem breaks from the residual as an equal power dyad. (c) If the residual breaks into strong and weak power components and the removed 1.0 position connects to a low strong power position in the residual, then the network breaks in that manner once the stem has been reconnected.
4. For remaining structures not identified as strong power, apply steps 1 - 3. Continue decomposing until the residual network becomes trivial. Reconnect all ties among weak power structures. Use likelihood analysis a final time on potential weak power structures to determine weak power differences among connected positions.

At this point in the analysis, the procedure in Lovaglia, Skvoretz, Willer and Markovsky (1995) can be applied to obtain exact predictions for the resources different positions will acquire in weak power networks at equilibrium.

An example will help to clarify the details of applying iterative likelihood analysis to a network. Consider the 7-actor line, F-G-H-I-H-G-F. Line networks with an odd number of actors have been predicted to be strong power structures (Willer, Markovsky, and Patton 1989). This is a good example of the ILA method because differences in l between high and low power positions become smaller as the length of the line increases. Inclusion likelihoods for positions in the 7-line network are given below:

| | | | | | | | | | | | | |
|------|-----|-----|-----|------|-----|------|-----|------|-----|-----|-----|------|
| F | --- | G | --- | H | --- | I | --- | H | --- | G | --- | F |
| 0.70 | | 1.0 | | 0.76 | | 0.92 | | 0.76 | | 1.0 | | 0.70 |

Note that for the high strong power, I, position $l = .92$, and for the low strong power position, H, $l = .76$. The difference in l between high and low strong power positions is only .16. Compare this to the weak-power 4-line where the difference in l between high and low power positions is larger, .25.

To apply iterative likelihood analysis, start with rule A1. It tells us that F is a potential low strong power position in the network because it is connected only to a position with $l = 1.0$. However, rule A2 says that G cannot be a high strong power position because it is connected to only one potential low strong power position, F. Rule A4 tells us the 7-line is not a potential high strong power structure because it contains positions (G, H, I, J) which are neither potential low strong power nor potential high strong power. Iteration following rules B and C produces no change because there is no identified strong power substructure to break out. Rule D1 tells us to decompose the network to check for concealed strong power because $l = 1.0$ for position G. Rule D2 tells us to remove an F and a G position from one end of the 7-line, leaving a residual network—in this case, the 5 actor line. We apply ILA to the residual network and find that it is strong power by rules A, B and C. Then following rule D3a, we note that the residual network is strong power and the removed $l = 1.0$ position, G, will reattach to the low strong

power position on the end of the residual 5-line. By rule D3a, we conclude that the 7-line is a strong power network.⁷

Iterative GPI analysis and ILA give us two theories to predict the relative power of positions in exchange networks. Both are sufficiently formal to be operationalized in a computer program.⁸ Both successfully explain existing research results. Thus the most difficult prerequisite of automated theoretical analysis has been met.

CREATING TEST NETWORKS

The second prerequisite for automating theoretical analysis is the systematic creation of new test networks. Finding a strategic test site to compare theories of network exchange has been the major factor slowing the progress of exchange research. Previously, the identity of a network suitable to test a theory had been stumbled upon or intuitively divined. Thus advances in network exchange theory came several years apart through the 1970s and 80s. Note that in spite of ongoing research by numerous scholars using diverse approaches, seven years elapsed between the publication of the Markovsky, Willer, and Patton (1988) method and Friedkin's discovery in 1995 of a simple, 5-position network that the method could not classify. A somewhat better way to find strategic test networks was developed during work on the iterative GPI method (Lovaglia, Skvoretz, Markovsky, and Willer 1995). It uses heuristics for systematically adding ties to simple network structures with known properties. This produces more complex networks with known properties. Still, finding a good test network using the heuristic method requires intuition or luck.

Even for networks with relatively few positions, there are too many potential networks for researchers to systematically examine all of them using paper and pencil techniques. The number of potential networks with a given number of positions grows rapidly with the size of the network. For example, there are 49 networks with 5 positions, 112 networks with 6 positions and 853 networks with 7 positions. However, automated theoretical analysis using computers would allow us to follow the direct strategy of analyzing every network with a certain number of positions, progressing to larger and more complex networks.

Developing a program to systematically construct networks is made difficult by the problem of isomorphism. The number of unique network configurations grows rapidly with the number of positions, but the number of isomorphic variants of each network configuration grows more rapidly still. For example, consider the three actor line, A-B-C. One isomorphic variant is A-C-B, another is C-B-A. With networks larger than about 7 positions, the number of isomorphic variants becomes astronomical. Even fast computers would not be able to analyze all networks of a reasonable size if isomorphic variants were included. Skvoretz (1996) solved the problem using the method described by Read (1978). His program systematically generates all networks with a given number of positions and excludes isomorphic variants, leaving a unique example

⁷ A more complex network, the 9 actor line, would be decomposed in the same way. It would first be decomposed to a 7 actor line, from there by rule 4, the analysis is the same as for the 7 actor line.

⁸ Prototypes of both iterative GPI and ILA computer programs are available on request from John Skvoretz.

of each network configuration. Thus the second prerequisite for automated theoretical analysis of exchange networks has been met.

DISCUSSION AND CONCLUSION

We have shown how the prerequisites are satisfied for the automated theoretical analysis of exchange networks. Two successful theories of network exchange have been incorporated into computer programs, and a program has been developed to systematically generate networks of a given size. To conduct an automated analysis now requires a master program that generates a network for analysis, produces predictions for the power of positions in that network for each theory, and compares the predictions. When predictions of the two theories differ, a strategic test site has been located. At that point, laboratory research using human subjects can be conducted and other empirical evidence collected on behavior in the critical networks. The empirical evidence can then be used to further develop network exchange theory. The likely result will be the ability to analyze networks of the size and complexity found in typical social situations.

While automated theoretical analysis requires at least two viable theories, it is not limited to two theories. We can compare results from several theories, adding new theories as they are developed and discarding theories which fail to develop successfully. There already exist, in addition to iterative GPI analysis and ILA, at least two successful computer models of exchange behavior: Markovsky's (1995) X-NET and Burke's (forthcoming) identity model of network exchange. Computer models attempt to program basic assumptions about exchange behavior, then model how actors complying with such assumptions will behave and how long-run exchange profits will be distributed. For example, a computer model might create actors who always accept the higher of two offers in negotiation or who raise their own offers after being excluded from a profitable exchange. In a computer model, the program is the theory and running the program produces predictions for specific networks. These models can also be incorporated into automated analysis.

Automated theoretical analysis has potential in other areas of sociology. For example, as computer modeling becomes increasingly sophisticated, models of behavior in stratification, mobility, demography and collective action can be compared to patterns of behavior built up in large databases that have accumulated over years. The key will be the ability to systematically generate new test sites on which to compare the predictions of two or more theories.

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Appendix

A. The Graph-theoretic Power Index

The Graph-Theoretic Power Index (Markovsky, Willer, and Patton 1988) was developed to predict ordinal profit differentials among actors in network positions. It may be expressed as follows:

Key Terms

- actor*: an entity with the capacity to observe conditions, make judgments, and act upon them
- position*: a location that may be occupied by an actor
- relation*: an exchange potential between a pair of positions
- network*: a set of positions, their relations, and the actors in positions
- exchange*: a mutually agreed-upon distribution of valued resources between actors
- power*: a structurally determined potential for obtaining relatively favorable resource levels

Scope Conditions

- (1) actors consistently excluded from exchanges raise their offers
- (2) those consistently included in exchanges lower their offers
- (3) actors accept the best offer they receive, and choose randomly in deciding among tied best offers
- (4) each position is related to, and seeks exchange with, one or more other positions
- (5) exchange rounds begin with equal pools of positively valued resource units in every relation
- (6) two positions receive resources from their common pool if and only if they exchange

Terms in GPI Calculations

- i, j, k*: position in the network
- e*: number of others with which an actor may exchange (once each) in an exchange round
- d*: domain in the network. Let *i* and *j* indicate two related positions, and an *e*⁺ position is one having more than *e* relations. Given the set *V* of all positions on a path between *i* and *j*, *i* and *j* are in the same domain if and only if there exists a path such that either (1) $V = \{\emptyset\}$, or (2) all members of *V* are *e*⁺ positions.

- k : length of a path. For example, $k = 3$ for the path from A to D in network A—B—C—D—E. Two paths from i are non-intersecting when they have only that position in common. Thus, C has two non-intersecting paths of length 2: C—B—A and C—D—E
- h : the longest non-intersecting path from a position
- m_{idk} : the number of non-intersecting paths of length k in domain d from position i
- p_{id} : power index for position i for exchanges in domain d .

Axioms

Axiom 1: $p_{id}(e_d) = (1/e_d) \sum_{k=1}^h (-1)^{(k-1)} m_{idk}$ or just p_i when $e=1$ and there is only one domain.

Axiom 2: i seeks exchange with j if and only if $p_i > p_j$ or if $(p_i - p_j) \geq (p_i - p_k)$ for all k related to i .

Axiom 3: i and j can exchange only if each seeks exchange with the other.

Axiom 4: if i and j exchange, then i receives more resources than j if and only if $p_i > p_j$.

B. Weak Power

An extension of NET builds on the GPI to generate refined predictions for “weak power” effects (Markovsky et al. 1993). Ongoing exchanges can produce temporary changes in the number of an actor’s available partners, in the number of the partners’ partners, and so on. This formulation takes into account *temporary* power shifts that arise as some actors exchange and leave behind temporary, altered substructures.

- Step 1: Apply Axiom 1 to calculate initial GPI (that is, $p_{id}(e_d)$) values for each position.
- Step 2: Apply Axiom 2 to determine which positions seek exchange with which others.
- Step 3: Apply Axiom 3 to identify and remove relations with non-mutual exchange-seeks.
- Step 4: Apply Axiom 1 to the resulting substructures.
- Step 5: Repeat Steps 1 - 4 until the GPI values stabilize.

If $GPI = p_{id}(e_d) \neq 1$ for all positions in the network (or a given substructure), then resource distributions in the network (or substructure) will be ordered by GPI and approach maximum differentiation.

If $GPI = p_{id}(e_d) = 1$ for all positions in the network (or a given substructure), then resource distributions in the network (or substructure) will be ordered by the likelihood of i ’s being included in exchange.

The likelihood of being included, l_i , is calculated as follows:

Under an equiprobability assumption, determine the probability that the actor in position i and actors in each of its relations will mutually seek exchange (where actors are allocated e exchange-seeks). l_i is then the sum of these probabilities across i ’s relations.

C. Exact Predictions

Recent extensions (Skvoretz and Willer, 1993; Lovaglia, Skvoretz, Willer, and Markovsky 1995) provide supplementary theoretical assumptions that build on the weak power formulation. (The 1995 version is employed here). These assumptions allow us to derive exact predictions for exchange outcomes. The extension employs a modified *resistance* model for predicting negotiation outcomes. Then, modifications to the resistance model account for the assumed effects of (1) inclusion likelihoods, using the *Resistance-Likelihood Assumption*, and (2) relative degree—the number of an actor’s direct ties relative to another’s— using the *Resistance-Degree Assumption*. The *Profit Theorems* are used to generate the actual predictions for exchange outcomes at each network position.

- P : total points available in resource pool
- P_i : i 's profit from exchange
- M_i : i 's maximum expectation or "best hope" for exchange profit
- C_i : i 's worst fear or "conflict outcome" for exchange profit
- R_i : i 's resistance to a given exchange profit P_i
- l_i : i 's likelihood of being included in exchange
- t_i : i 's number of network ties
- d_{ij} : i 's relative degree in the $i - j$ tie: $d_{ij} = t_j / (t_i + t_j)$

Resistance Assumption: $R_i = \frac{M_i - P_i}{P_i - C_i}$

Equiresistance Assumption: In equilibrated $i - j$ exchanges, $P_j = P - P_i$, and P_i is obtained by solving

$$\frac{M_i - P_i}{P_i - C_i} = \frac{M_j - P_j}{P_j - C_j}$$

Resistance-Likelihood Assumption: $C_i = \frac{P}{2} l_i$ $M_i = \frac{P}{2} (l_i + 1)$

Resistance-Degree Assumption: $C_{ij} = \frac{P}{2} l_i d_{ij}$

Profit Theorems: From the Equiresistance and Resistance-Likelihood Assumptions, we derive:

$$P_{ij} = (P + C_{ij} - C_{ji}) / 2 \quad P_{ji} = P - P_{ij}$$

Embedding Subgroups in a Sociogram: Linking Theory and Image¹

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Abstract

By embedding subgroups in a sociogram we generate images consistent with longstanding theoretical descriptions of network structure. Moreover, these images sustain an eclectic array of theoretically based interpretations, thus providing a basis for theoretical integration. We generate and interpret two images, one of professional discussions among high school teachers and the other of friendships among the French financial elite. Our findings suggest that this approach has great potential for informing characterizations and interpretations of the structure of various social networks.

1. Theoretical Images of the Structure of Social Networks

One of the strongest and most consistent theoretical images of the structure of social networks is that of interactions concentrated within, but not confined to, cohesive subgroups. Such a description was offered early by Roethlisberger and Dickson (1941) who studied workers who organized themselves into cliques within a bank-wiring room, and has been treated theoretically by Durkheim in *The Division of Labor in Society* (1933), Simmel in *Conflict and the*

¹ This paper contains portions of a paper presented at The Annual Meeting of the Classification Society of North America, Houston Texas, June, 1994, and a paper to be published in *Social Networks*. The research reported in this article was supported by a grant from the National Science Foundation and the National Center for Educational Statistics (SES -8803225). The opinions expressed herein are those of the authors and not of the sponsoring agencies.

We thank Tony Bryk, Charles Bidwell, Betsy Becker, Nicole Ellefson, Phil Schuum, Kazuo Yamaguchi and Benjamin Wright for their thoughtful comments on work related to this article. Thanks to Jan De Leeuw for providing a Fortran version of Smacof (which later became ALSCAL). Thanks to Charles Kadushin for providing data on the French financial elite and the much sought after book *The Power Brokers*. Fortran routines from SLATEC, RANLIB, and CDFLIB were called in the Fortran program *KliqueFinder*. Correspondence regarding this paper should be addressed to Ken Frank, Department of Counseling, Educational Psychology and Special Education, Room 460 Erickson Hall, Michigan State University, East Lansing, Michigan, 48824-1034. E-mail: kenfrank@msu.edu.

Publisher's Note: This paper was originally published in CONNECTIONS 19(1), but contained word-processing errors. In addition to printing an erratum, we reprint the paper here in its entirety.

Web of Group Affiliations (1955), and Blau in *Inequality and Heterogeneity* (1977), each of whom described the integration of cohesive subgroups into organizations or society through interactions which extend beyond subgroup boundaries. This image is also central to recent theoretical advancements, such as the primary and secondary structural holes which Burt (1992) defines using the theoretical image shown in Figure 1. Granovetter's (1973) hypothesis regarding strong ties (actors who are friends with many common others are inclined to interact more frequently) also is consistent with an image of dense patterns of interactions concentrated within the boundaries of cohesive subgroups.

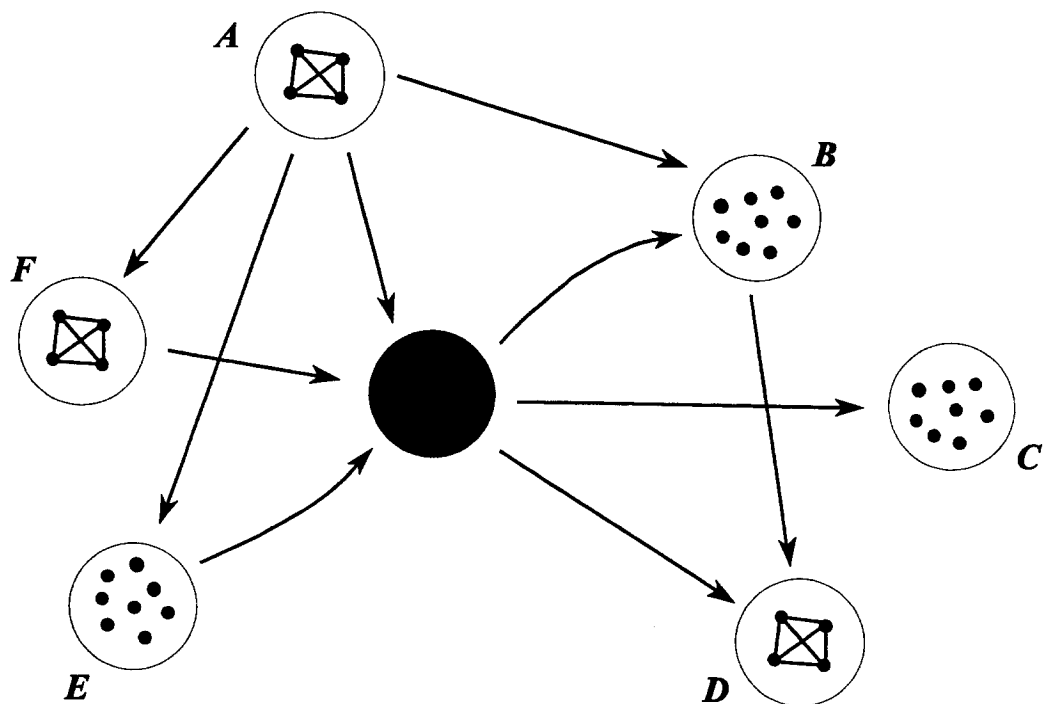


Figure 1. Theoretical Representation of Subgroups Embedded in a Sociogram (Burt, 1992:95)

Unfortunately, data analysts have not successfully represented the pattern of *observed* interactions among actors in a form that is consistent with theoretical descriptions. Some data analysts have used Multidimensional Scaling (MDS), such as is performed by Krackplot 2.0 (Krackhardt *et. al.* 1994), to represent the pattern of interaction among actors. While this approach renders an image of actors located in a few dimensions, it offers no objective basis for identifying those actors who are members of a given subgroup. It is left to the researcher to use heuristic and visual criteria to identify subgroups of actors on a *post-hoc* basis.

Other data analysts have identified blocks of structurally similar actors, and relied on the information contained in the block diagonal to represent the pattern of the social network (Anderson *et al.*, 1992; Borgatti and Everett, 1994; Burt, 1982; Doreian *et al.*, 1994; Panning, 1982; Snijders and Nowicki, 1994; Wasserman and Anderson, 1987; White *et al.* 1976). Although recent adaptations have represented the information using shading instead of the numerical information contained in each cell (Freeman, 1994), the information remains organized in

essentially the tabular form of an adjacency matrix instead of a graphical image such as is generated by MDS.

Frank (1996) combined MDS and a special form of blockmodeling to generate an image of observed social network data that is consistent with the theoretical depiction of interactions concentrated within subgroups. In the next section we will discuss Frank's *stochastic* definition of cohesion which is key to Frank's ability to identify non-overlapping cohesive subgroups. The criterion is also the basis of the two statistical tests Frank uses to evaluate the salience of the recovered subgroups. Once such subgroups have been identified, we extend traditional MDS by applying it within and between subgroups to generate an image of the structure of social network data consistent with theoretical description. In Section 3 we generate and interpret an image of the structure of professional discussions of teachers in a high school, and in Section 4 we generate and interpret an image of patterns of friendship among the financial elite in France (Kadushin, 1995). In Section 5 we discuss the possibilities for the general application of this approach.

2. Identifying Non-overlapping Cohesive Subgroups

Frank (1995) defined a stochastic criterion for identifying cohesive subgroups from a reduced form of the p_1 model (Fienberg and Wasserman, 1981; Fienberg et al. 1985; Frank and Strauss, 1986; Holland and Leinhardt, 1981; Strauss and Ikeda, 1990; Wang and Wong, 1987; Wasserman and Galaskiewicz, 1984; Wasserman & Pattison, 1994). Maximizing Frank's criterion is equivalent to maximizing the odds ratio (AD/CB) of Table 1.

The odds ratio of Table 1 is large to the extent that actors interact with members of their subgroups (cell D) and do not interact with members of other subgroups (cell A). The odds ratio is small to the extent that actors do not interact with members of their subgroups (cell C) and actors interact with others who are not in their subgroup (cell B). Moreover, the odds ratio has the direct interpretation as the odds that two actors in the same subgroup will interact relative to the odds that two actors in different subgroups will interact. Because the odds ratio is stochastic, with values on the diagonals essentially evaluated relative to the marginals, the odds ratio accommodates variation in the data, and thus allows the researcher to identify non-overlapping, but permeable, subgroup boundaries instead of overlapping subgroups of actors satisfying a fixed criterion (most of the criteria available in UCINET and STRUCTURE are not stochastic, and therefore generate overlapping subgroups --see Frank, 1993, Freeman, 1992, and Kadushin, 1995). Given the stochastic criterion, Frank described a simple hill-climbing algorithm for identifying subgroups by iteratively reassigning actors so as to maximize the odds ratio of Table 1. Frank applied the algorithm to data indicating professional discussions (ranging from once a month [1] to daily [4]) among teachers in a high school called "Our Hamilton High".

While the boundaries of the cohesive subgroups may be the key component of the structural representation of the pattern of professional discussions, the placement of actors in subgroups constitutes an incomplete representation of the data. Lost in the simple categorization of actors into subgroups is the variability of patterns of interactions among actors within each subgroup, and the variability in the extent and nature of interactions in which actors engage with others

outside their subgroups. Our Figure 2 (and Frank's Figure 2) represents the variability of the observed interactions by representing all of the original data, while simultaneously supporting data reduction by locating actors within their cohesive subgroups. The subgroups were embedded in the sociogram by applying MDS within each subgroup to obtain the locations of subgroup members relative to one another, and then MDS between subgroups to obtain the locations of subgroups relative to each another, and then combining the information in a single image.

Table 1.
Association Between Common Subgroup Membership and
The Realization of Interaction Between Actors

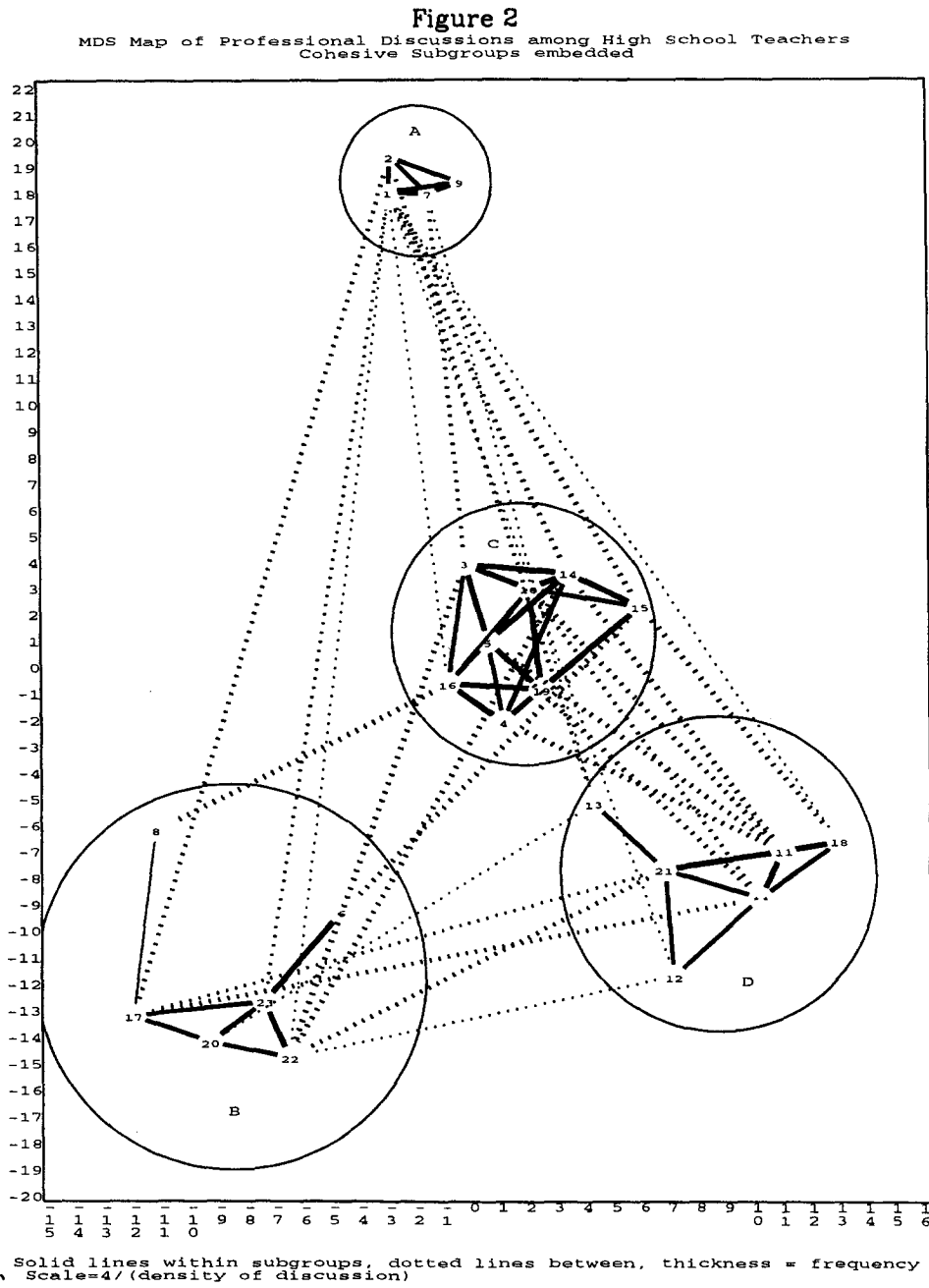
| | | Interaction Realized | | |
|---------------------|-----------|-------------------------|-----------------------|--|
| | | No | Yes | |
| Subgroup Membership | Different | A | B | Possible interactions between actors in <i>different</i> subgroups |
| | Same | C | D | Possible interactions between actors in the <i>same</i> subgroup |
| | | Unrealized interactions | Realized interactions | Total possible interactions |

Before using the subgroups as the basis for characterizing the pattern of professional discussions among these teachers, we need to know the extent to which the interactions are concentrated within the subgroups at a rate that is unlikely to occur by chance alone. That is, we must answer the question: "Are there really subgroups in the data, or have subgroups been imposed on a fluid pattern of interactions?" Frank (1996) determined that the probability that the interactions were concentrated within the subgroups in Figure 2 at a rate that could have occurred by chance alone is less than one in a thousand. Further, Frank determined that the algorithm was likely to have recovered the "true" subgroup memberships. In simulated data in which the subgroup memberships were known and in which interactions were as concentrated within subgroups as they are in Figure 2, Frank (1995) showed that the algorithm was more than four times as likely to assign two actors who were in the same known subgroup to the same observed subgroup as it was to assign two actors in different known subgroups to the same observed subgroup. Thus the subgroups of teachers represented in Figure 2 are more than boundaries imposed to facilitate an analysis of a pattern of interactions — they represent an empirical tendency of teachers to interact within the identified subgroup boundaries.

3. Interpreting the Image of Professional Discussions in "Our Hamilton High"

The image in Figure 2 reveals the basic structure of professional discussions within each subgroup and between the subgroups. For example, subgroup B can be characterized in terms

of a central dyad (teachers 20 and 23), two teachers closely associated with the dyad but who do not engage in direct discussions with one another (teachers 17 and 22), and two peripheral members (teachers 6 and 8).



Each of the subgroups can be similarly characterized, as can the structure of subgroups, which might be characterized in terms of a central subgroup (C), a closely linked neighbor (subgroup D) and two peripheral subgroups (A and B). Further, because the metric in the original data is preserved within and between subgroups (see Frank, 1996 for a discussion of how the metric

is preserved), sets of distances in the map can be compared. For example, the members of subgroup A are mapped, on average, about 1.68 units apart, reflecting the density of discussions within subgroup A of 2.42, or almost once a week ($1.68 = [\text{Maximum weight}] / [\text{density within subgroup A}] = 4 / [2.42]$). The average distance of 1.68 between members of subgroup A can be sensibly compared to the average distance of 2.48 between members of subgroup B who engaged in discussions on average about once a month ($2.48 = [\text{Maximum weight}] / [\text{density within subgroup B}] = 4 / [1.6]$). The distances within the boundary of subgroup A also can be compared with the distances between members of different subgroups, such as the 16 units that separate the members of subgroups A and C².

The image in Figure 2 sustains an analysis of the structure of interactions at many levels and with respect to many different theories precisely because it is consistent with theoretical descriptions of the structure of interactions. The subgroup boundaries embedded in Figure 2 reveal strong and weak ties (Granovetter, 1973). Ties which occur within subgroups, such as within subgroup A, are strong. They typically reflect a greater frequency of discussion and typically occur between two actors who engage in discussions with many common others -- the other members of their subgroup. Weak ties between subgroups are typically less frequent, and occur between actors who engage in interaction with few common others because they are members of different subgroups.

The subgroup boundaries embedded within the image in Figure 2 also reveal structural holes within and between subgroups (Burt, 1992). For example, within subgroup C, the limited amount of direct discussion between teachers 14 and 15 in the upper right and teachers 4 and 16 in the lower left constitutes a structural hole within the subgroup (only one of the four possible interactions occurs). This hole is filled primarily by teachers 5, 10, and 19, each of whom engage in direct discussion with three of the four disconnected teachers. In Burt's language, the action of teachers 5, 10, and 19 would be less constrained than that of teachers 4, 14, 15, and 16. There also are structural holes between teachers in different subgroups. For example, there would be a hole between subgroups A and B were it not for the connections between actor 2 (of subgroup A) and actor 17 (of subgroup B) and teacher 1 (of subgroup A) and teachers 22 and 23 (of subgroup B).

The identification of structural holes can be generalized to define the positions of actors in terms of their location in the image (Freeman, 1992). For example, in Figure 2, teachers 20 and 23 occupy similarly central positions in subgroup B, and teachers 6 and 8 occupy similarly peripheral positions in subgroup B. Further, comparisons of positions *across* subgroups operationalize recent redefinitions of structural similarity in which two actors occupy a similar position if the actors *to whom they are related* occupy structurally similar positions. Faust (1988) refers to this as general equivalence and Borgatti and Everett (1994) characterize such relationships in terms of structural isomorphisms. Using Faust's term, teachers 20 and 23 who are central to subgroup B may be characterized as generally equivalent with teachers 21 and ** who are central to subgroup D. General equivalence also may be defined relative to between subgroup discussions; teacher 13 in subgroup D, who bridges between teachers in subgroups A and B, might be characterized as generally equivalent with teacher 3 in subgroup C who does

² Distances in different images also could be compared to the extent that the weights in the original data are measured on comparable scales and the metric is preserved in constructing the image.

the same. Therefore teachers 13 and 3 occupy similar positions, even though there are no direct and few indirect (through a single intermediary) interactions between them. The similarity is in the subgroup memberships of those with whom they engage in discussions outside of their own subgroup.

In general, the internal structures of an organization, including the structure of interaction, will affect the way in which the entire organization responds to external influences (Katz and Kahn, 1966; Pfeffer and Salancik, 1978). At "Our Hamilton High," the student population has become increasingly disadvantaged over the years, as poor families have moved to the district from a nearby city and as the children of the more established wealthier families have aged. The teachers have responded in various ways to this exogenous change. Some who had difficulty adapting to the change sought early retirement. Others altered their mode of interaction with the students, befriending the students whom they felt were in the most need. But a core of teachers in the school have responded by becoming "moral agents," inculcating students into a specific set of values emphasizing citizenship and responsibility. These teachers pursue their goal by keeping firm control of the classroom and leading by example. We used the ranks of the teachers' measures on moral agency as measured by responses to survey items (reliability=.74, see Frank, 1995, for a description of the items), as a basis for the teacher identification numbers in Figure 2. The lower the ID number, the more the teacher emphasized moral agency.

Unfortunately, we did not obtain longitudinal data to adequately observe processes through which teachers influenced one another to create the organizational responses to the change in student composition. This is often the case for those who study the social networks of organizations, and statistical techniques have been developed for estimating the parameters in models which are based on hypothesized processes of influence, even though the data are only cross-sectional (e.g., Doreian, 1981; Friedkin and Marsden, 1994). Similarly, an image of interactions can be interpreted with respect to a *hypothetical* cycle of influence that occurs repeatedly and continuously. If we assume the pattern of professional discussions to be relatively stable (which is likely, given that most of the teachers have been in the school for more than 15 years and have settled into a pattern of discussion with a fixed set of colleagues), we can use the information indicating frequency of professional discussions to construct a hypothetical pattern of influence in the school.

We begin describing the process with the core of emphasis on moral agency, the members of subgroup A (teachers 1, 2, 7, and 9). Moral agency is cultivated within subgroup A as the teachers in subgroup A engage in discussions with one another on a near daily basis. Then one of the teachers in subgroup A engages in discussions with a teacher outside the subgroup, thus possibly influencing the member of the other subgroup. For example, teacher 1 establishes her emphasis on moral agency as she engages in professional discussions almost daily with teachers 2, 7, and 9 in her subgroup. Occasionally (less than once a month) teacher 1 engages in professional discussions with teacher 16 of subgroup C through which she may have some small influence on teacher 16 to emphasize moral agency more than he otherwise would. In turn, teacher 16 engages in daily discussions with subgroup members 3, 4, 5, 10, and 19, supporting the moderate emphasis on moral agency in subgroup C. The professional discussion between teachers 1 and 16 constitutes a weak tie, in that it occurs infrequently and between two teachers who have few others in common. Yet the effect of these discussions is

critical to integrating the subgroups into the totality of the organization, as opinions, information, etc., accumulated in each subgroup during a typical week are transmitted to another subgroup through the weak tie.

The effect of cross-subgroup discussions is not limited to those in subgroup C with whom teachers in subgroup A engage in direct discussions. For example, teacher 15 in subgroup C, who engages in frequent discussions with teacher 1 in subgroup A, also engages in discussions with teacher 18 in subgroup D, and likely influences teacher 18 to emphasize moral agency more than he otherwise would. Again, the effect is not limited to teacher 18 who then engages in professional discussions with subgroup members 11 and **, and either influences them to emphasize, or sustains their emphasis on (in the case of actor 11), moral agency. Therefore even teachers who do not adopt moral agency in direct response to changes in the student population may be affected, through direct and indirect interactions, by the teachers in subgroup A who do adopt moral agency, although the effect is likely to be attenuated with each step in the process.

Of course, teachers may experience the context of the school differently depending on their formal position in the school. For example, the teachers in subgroup D, many of whom teach physical education, interact with a subset of students in a non-academic context, that of coach and athlete. In these non-academic contexts the coaches develop a personal relationship with their students, which Quiroz et. al. (1991) described as indicative of the "pal" orientation (the pal establishes a close personal relationship with the student, characterized by sharing information about personal lives outside of the classroom). Like the teachers in subgroup A with regard to moral agency, the teachers in subgroup D may reinforce each others' emphasis on the pal orientation through their frequent discussions. Then when the teachers of subgroup D engage in discussions outside their subgroup they are likely to influence the members of other subgroups towards the pal orientation.

Although this description of the processes of influence has been at the level of the individual teacher, a similar description can be sustained at the level of the school. For example, we may describe moral agency as being cultivated within subgroup A and then spreading to other subgroups where it encounters the competing pal orientation which is cultivated in subgroup D. Indeed, at the organizational level, the image in Figure 2 represents an equilibrium of the system, with those in subgroup C who are mixed and moderate in their orientations mediating between the competing orientations of those at the top and bottom.

It should not be surprising that the subgroup boundaries are key to the simultaneous description of influence with regard to individual contexts and organization processes. We characterize the general nature of influences of, and on, an individual in terms of interactions within the subgroup. We characterize organizational processes by referring to a host of influences within subgroups and then the occasional between subgroup effect. Thus the image in Figure 2 reveals how effects at the level of individual teachers in one subgroup become "effects of the organization" as they are transmitted to teachers in another subgroup.

4. Application: Subgroups Among the French Financial Elite

Our description of influence within and between cohesive subgroups in Figure 2 pertains to data representing professional discussions among essentially collegial actors -- teachers in a single school -- and relates the pattern of discussion to the distribution of orientations to teaching. But cohesive subgroups also form the basis of other organizations, and may be defined based on other types of social network data. For example, actors in highly politicized groups (Pfeffer, 1982) such as the members of Kadushin's French financial elite (1995) may be organized into cohesive subgroups. Here, the subgroups establish the "ongoing systems of social relations" (p.487) described by Granovetter which create embedded trust. Combining Granovetter's perspectives with Burt's theory of action, Kadushin characterized the conditions which engender *enforceable trust*, which

"cannot be an attribute of friendship pairs, nor is it deducible from the possession of common social attributes. Rather it stems from an interwoven network in which there is a clear expectation that actions will have positive and negative sanctions -- not necessarily from one's immediate friends, but from a more diffuse friendship circle" (page 219).

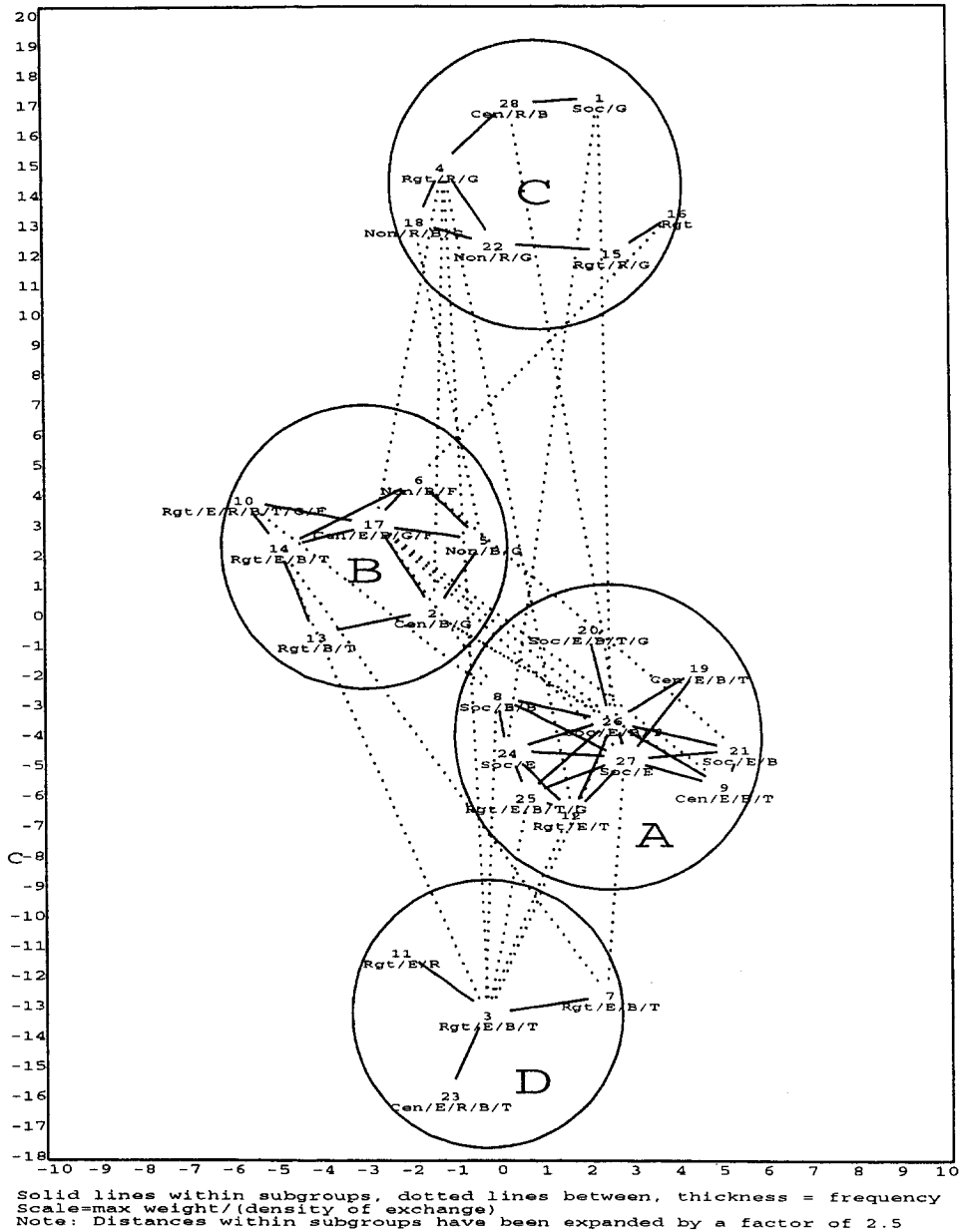
Kadushin characterized these conditions in terms of a combination of structural equivalence and cohesion. These two mechanisms are effected through the "interwoven network," which we contend is contained by the boundaries of the cohesive subgroup. From the level of the individual, the others within one's subgroup with whom one interacts are likely to be associated through direct and indirect ties. It is these ties among subgroup members which constrain the actor. If the ties are friendships, then an actor who betrays a friend within a subgroup will likely encounter negative sanctions as the effect reverberates throughout the subgroup -- the "diffuse social circle." Thus trust is enforced within the subgroup. Because there is no similar structure through which actors can enforce the trust of non-subgroup members, members of different subgroups may compete openly and directly with one another, even if there are a few friendship ties which cut across subgroup boundaries.

In order to reveal more fully the structure through which actors enforce trust, we have generated an image of the structure of unweighted friendships among the French financial elite within and between subgroups in Figure 3. Friendships were concentrated within the subgroups at a rate that would have been found in the identified subgroups less than one time out of one thousand if the actors engaged in friendships without regard for subgroup membership. That is, although as Kadushin noted the density is high among the financial elite as a whole, there is evidence that the friendships are concentrated within cohesive subgroups. Further the algorithm likely has recovered the true subgroup memberships; in simulated data with comparable network properties, the algorithm was five times as likely to assign two actors in the same known subgroup to the same observed subgroup as two actors in different known subgroups.

The representation of the entire friendship network in Figure 3 as consisting of a series of cohesive subgroups which are loosely integrated into a whole is consistent with Kadushin's interpretation of the pattern of friendships constituting a moiety which "defines a system in which the members of the community ... are divided into two parts which maintain complex

relationships varying from open hostility to very close intimacy, and with which various forms of cooperation and rivalry are associated (Levi-Strauss, 1969: 69)."

Figure 3
MDS Map of Friendships among Kadushin's French Elite
Cohesive subgroups embedded



In particular, Kadushin's left moiety appears at the top of our figure and his right moiety appears at the bottom. But the cohesive subgroups indicate the basis of enforceable trust more

so than the left versus right dichotomy of Kadushin's image. First, actors share common socializing experiences mostly with members of their subgroups. Following Kadushin, we include information regarding party membership (*Soc*=Socialist, *Cen*=Central, *Rgt*=Right, and *Non*=None, or unknown) and whether or not the actor was a graduate of ENA as indicated by an "E". In addition, we include other characteristics of the actors which we found to be related to the structure of friendship (some of this information was obtained from De Quillacq, 1993). We indicate which actors were members of *Résistance du Socialisme* (an antisocialist organization) by including an "R" in the actor's line of information, which actors were bankers by including a "B", which actors were members of the treasury by including a "T", which actors were partners in the prestigious financial advisory firm *Firme de la Finance* with an "F", and which members were associated with *Grande Banque* with the letter "G."

Because the subgroups are consistent with Kadushin's moiety, it is not surprising that party affiliation and graduation from ENA are related to subgroup membership, but the alignment of party membership, education and friendship are clearer in our Figure 3 than in Kadushin's Figure 1 (page 211). The majority of actors in subgroup A are socialists, all of whom graduated from ENA. Subgroup B is anchored by three partners from *Firme de la Finance* (actors 10, 17, and 6) and others who are directly linked to them through activities in the financial advising and banking industries. Most of the members in subgroup C have participated in the soap opera involved in changing chairmanships and board memberships of *Grande Banque*. Three of the members of subgroup D were appointed by one conservative prime minister, and the fourth, actor 23, by another conservative prime minister.

There are enough commonalities between actors of different subgroups to integrate the whole into a moiety. For example, the basis of the bridges between the members of Subgroup A and the members of subgroup D were formed during attendance at ENA and employment at the treasury. Also, there are ties based on party membership between members of subgroup A and members of subgroup C. Actors 24 and 26, two of the socialists in subgroup A, are friends with the lone socialist in subgroup C, actor 1 (although actor 1's commitment to socialism is not as strong as that of many of the actors in subgroup A), and actor 12 of subgroup A, one of the few members of the right in subgroup A, is friends with a staunch supporter of the right in subgroup C, actor 4. These ties which span across subgroups allow the socialists who are central in subgroup A to establish themselves as mediators between those affiliated with the *Grande Banque* in subgroup C and the more advantaged members (in terms of attending ENA) of the right in subgroup D. Perhaps the role was established when the socialists were in power and adopted the pragmatic route of privatizing industry, requiring them to draw on commonalities with members of other subgroups of varying economic advantage and politics. This interpretation would be consistent with the bridges between the members of subgroups A and B, many of which have a basis in employment in the banking industry.

The commonalities within subgroups provide a basis for the norms which apply to each subgroup. For example, the actors in subgroup D are united by their commitment to conservative principles such as privatization of industries and banks, while the members in subgroup A, except for actor 12, are committed to the nationalization of industry and banks, and are reluctant to enter into the common European community. Further, many of the members of subgroup A were socialized by experiences in the treasury, with its reputation for, and emphasis on, technical prowess. Although the actors in subgroup C are only loosely

connected and the common association with the Grande Banque soap opera has produced some animosities, they share common understandings about the rules of takeovers and ousters, manipulating events through board memberships and back room influence.

While the prior experiences of the members of each subgroup provide the basis for establishing the norms and mores of the subgroup, it is the dense friendship patterns within subgroups, especially subgroups A and B, which establish the structure through which trust is enforced. In Burt's (1992) terms, the actions of those individuals who are closely tied to a set of actors who are members of a single subgroup are constrained. In their dealings with one another they must conform to the subgroup norms, for to violate the subgroup norm may result not only in the loss of a specific friend, but may bring negative sanctions among the circle of friends defined by the subgroup. For example, the capacity for friendship of actor 26 in subgroup A and actor 17 in subgroup B places them in the middle of fairly densely knit subgroups. Given their location in the network structure, one might assume that they were highly influential. On the contrary, their behavior is constrained by the host of others with whom they are friends. To deal aggressively with a member of their own subgroup may result in the loss of several friendships, which would be particularly difficult personally for these two actors who are described as "too nice" or "too social" to be highly influential (these actors have ID's among the highest in the group because we assigned ID's according to the extent to which the actor's were described as influential by other members of the group — the lower the ID, the more influence the actor has³).

The constraints on actors 17 and 26 as a result of their centrality in cohesive subgroups represents the effect of enforceable trust described by Kadushin and Granovetter. At the level of the subgroup, this illuminates Granovetter's (1973) and Kadushin's (1995) argument which describes enforceable trust as occurring among actors who are located in a complex web of interactions among actors who share a normative environment. Although the commonality of actors lies partly in their structural equivalence, it is difficult to observe the commonalities in Kadushin's figure in which actors are segregated into structurally similar blocks. In our figure, the whole of the phenomenon is captured by the cohesive subgroup. Actors 17 and 26 are constrained by their pattern of friendships because, not only are they directly connected to their friends, but they occupy structurally similar positions as their friends; e.g., the friends of actor 26 are themselves friends. Thus a cohesive subgroup, although defined by a criterion which emphasizes direct connections within the subgroup, contains a set of actors who are directly connected and structurally similar by virtue of their interacting with common others within the subgroup. It is these compounded processes which define the structure through which trust is enforced.

In contrast to actors 17 and 26, who are highly central to their subgroups but not very influential in the network, stands actor 1 (of subgroup C) who is only loosely tied to his or any subgroup and is the most influential in the network. This has provided him the freedom to deal aggressively with subgroup members such as actor 22 (also of subgroup C) whom he kept from control of Grande Banque. Given the cross-sectional nature of the data one can interpret actor 1's actions two ways. First, actor 1 had the freedom to deal aggressively with actor 22

³ Only the relative influence of actors 1 through 20 were known. The ID's of actors 21 through 28 were assigned randomly.

because actor 1 would experience little loss of friendship as a result of the conflict (the only friendship actor 1 has in this subgroup is with actor 28, whom actor 1 helped install as head of a bank rival to Grande Banque). On the other hand, perhaps actor 1 had more friends within subgroup C prior to his dealings with actor 22, and the data reflect this loss of friendship, which actor 1 was apparently willing to risk for his action of opposing actor 22. There is no indication of any falling out between actor 1 and other members of subgroup C, and so the data support the first explanation. But either explanation is consistent with the argument that cohesion within subgroups forms the basis of enforceable trust. There was no recourse for actor 22 when he was not supported by actor 1. Any negative effects which he could have created in actor 1's friendship network either did not exist or were expendable from actor 1's perspective⁴.

The effects of enforceable trust can be described at the level of the subgroup, as there was little conflict within the most densely knit subgroups. In fact, the only reported direct conflict within subgroup A occurred when actor 12, now designated as a member of the right, and the socialist actor 24 stopped talking during actor 12's appointment by a conservative prime minister. Most interestingly, this friendship was resumed when power changed hands and actor 12 was no longer the appointee of a conservative politician. Perhaps this was facilitated by actors 25 and 26 who are both friends of actors 12 and 24. The only reported conflict between actors in subgroup B occurred when actor 10 resisted the push actor 6 made for his son-in-law to become a partner in *Firme de la Finance*. This was not a direct conflict between the two, as it concerned a third party, and there are indications actor 17 has played an important role in maintaining the cohesiveness of the subgroup. Moreover, this event occurred recently, and the diagram of friendships may not fully reflect the consequences of this event. Time will tell if the conflict between actors 6 and 10 is great enough to divide the subgroup.

On the other hand, there are several examples of conflict among members of loosely knit subgroups C and D, and between members of different subgroups. Actor 9 (of subgroup A) strongly resents actor 1 (of subgroup C) who opposed actor 9 as the head of Grande Banque. The lack of enforceable trust applies as much to actor 9, whose resentment no one attempts to mediate, as well as to actor 1, who experienced few repercussions as a result of his opposition to actor 9. Actor 3's bid for actor 5's bank also represented conflict between subgroups (subgroups D and B respectively), as did actor 23's bid to merge with the bank headed by actor 28 (a conflict between a member of subgroup D and a member of subgroup C). By far the deepest and most enduring animosities run between subgroups because there are few mechanisms for enforcing trust or mediating relationships between members of different subgroups. Thus the location of friendships within and between subgroups helps us to understand the specific mechanisms through which trust is enforced among the French financial elite.

⁴ Other actors occupy positions similar to actor 1's, and are similarly unconstrained in their actions. Actors 4 (of subgroup C) and 3 (of subgroup D) also are relatively unconstrained by enforceable trust, and they take advantage of their position to engage in aggressive dealings (bidding for companies, take-overs, ousters) with other actors in the network, with few personal repercussions.

5. The General Value of Embedding Subgroups in a Sociogram

We have revealed the structures of two very different social networks. The image of professional discussions among teachers in "Our Hamilton High" helped us to explore the structure through which teachers influenced each other's approach to teaching. The image of friendship patterns among the French financial elite helped us to specify the mechanism through which actors enforced the trust of other actors. Further, each image sustained a description of the processes at the level of the individual and the group as a whole; the subgroups define the context for individuals and capture processes which form the backbone of a group or organization. Visually, subgroups are the key to generalizing a set of interactions in the sociogram making it possible to describe effects on actors of members of a given subgroup, and effects of subgroups on one another. The visual representation is consistent with theoretical descriptions of subgroups linking individual and organization as individuals influence one another through direct interactions within the subgroup, and then integrate into the larger organization through interactions outside of the subgroup (Granovetter, 1973; Nadel, 1957; Simmel, 1955).

The techniques demonstrated in this article hold great potential for characterizing the structure of other social networks⁵. The extent to which the potential will be realized will depend on several factors. The definition of a cohesive subgroup almost inherently assumes that the data are not directed. Actors influence each other through discussions, and trust is enforced through friendships, both of which are mutual ties. For directed data, perhaps it may be more sensible to first categorize actors into structurally similar blocks instead of cohesive subgroups, although to the extent that blocks are structurally equivalent and not cohesive the interpretation of such figures will not benefit from the generalization of processes within subgroups (see Frank 1996 for the difficulty in interpreting figures based on blocks of structurally similar actors).

Most importantly, the interpretation of images of network structures will depend on theoretical descriptions of processes related to the substance of the social network data. We interpret Figure 2 in terms of influence, and Figure 3 in terms of enforceable trust. While the methods for generating the sociograms may be applied across many disciplines, the interpretations of the figures, will, of course, be discipline dependent. Figures representing economic exchange may be interpreted using theories of rational action. Figures representing political support may be interpreted according to game theory. And yet the representation of social networks in our figures has allowed us to integrate components from seemingly eclectic theories. Our images reveal representations of strong and weak ties, structural holes, and processes at individual and group levels. We hope that broader applications will reveal commonalities in theories of several disciplines even as each set of data is interpreted using the predominant theories of the most relevant disciplines.

⁵ We are working with Steve Borgatti to incorporate the clustering program *KliqueFinder* and the techniques for constructing the MDS-based images into the next version of UCINET in order to make the approach described in this article more accessible.

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Articles and Chapters

Baker, Wayne E. 1996. "Bloodletting and downsizing." *Executive Excellence*. 13(5):20.

Corporate America is caught in a powerful social movement that compels executives to cut jobs even when cuts are not justified, and to repeat the downsizing treatment even when it causes more damage. Today, downsizing is firmly implanted in business culture - beliefs and norms about what constitutes proper business policies and practices. Many reasons are cited for the failure of downsizing: loss of morale, loss of organizational memory, increased conflict. But these are caused by a deeper problem - the destruction of the corporation as a social institution. The way out of a crisis is to focus on creating new forms of organization - the reformation of social networks, not their deconstruction. Ways to create new social networks that empower and boost performance are presented.

Banks, David L. and Kathleen M. Carley. 1996. *Models for Network Evolution*. *Journal of Mathematical Sociology*. 21:173-196.

This paper describes mathematical models for network evolution when ties (edges) are directed and the node set is fixed. Each of these models implies a specific type of departure from the standard null binomial model. We provide statistical tests that, in keeping with these models, are sensitive to particular types of departures from the null. Each model (and associated test) discussed follows directly from one or more socio-cognitive theories about how individuals alter the colleagues with whom they are likely to interact. The models include triad completion models, degree variance models, polarization and balkanization models, the Holland-Leinhardt

models, metric models, and the constructural model. We find that many of these models, in their basic form, tend asymptotically towards an equilibrium distribution centered at the completely connected network (i.e., all individuals are equally likely to interact with all other individuals); a fact that can inhibit the development of satisfactory tests.

Barnett, George A., and Young Choi. 1995. *Physical Distance and Language as Determinants of the International Telecommunications Network*. *International Political Science Review*. 16: 249-263.

The language of the inhabitants of an individual country and its physical location may be viewed as antecedent conditions which predict a nation's position in the international telecommunications network. Survey data published in *The World's Telephones* are used to describe this network during the 1980s. The results of a network analysis suggest that the world's communication network may be described as a "star" with a "hub" and three "spokes", one for Latin America, one for Europe and a third for Asia and the Middle East. Language occupied an important position on each spoke, Spanish in Latin America, German in Europe and English in Asia. They further suggest that language has a major impact on international telecommunications accounting for nearly 28% of the network's structure; physical location explained over 17% of the structure. Together, these two factors accounted for 36.2% of the variance in the network's structure.

Barnett, George A., and Reggie YingLi Wu. 1995. *The International Student Exchange*

Network: 1970 & 1989. *Higher Education*. 30: 353-368.

Using data published in *UNESCO Statistical Yearbooks* (1972 & 1991) on the 50 countries with the largest number of exchange students, this article describes the international student exchange network and its changes between 1970 and 1989. The results indicate that the network changed significantly over this 20-year period. While the United States and some Western countries have remained at the center of the network, Asian and Middle Eastern countries have become more central and African countries have become more peripheral. The role of colonial and linguistic factors has become less important, while economic development has a more important role in international student exchanges. The international student exchange network suggests an academic hegemony consistent with that of economic and politics. The changes in the network reflect the hierarchical structure of the hegemonic powers in the modern world system.

Bartle, Suzanne E. 1996. Family of Origin and Interpersonal Contributions to the Interdependence of Dating Partners' Trust. *Personal Relationships*. 3:197-209.

The purpose of the present investigation was to further the study of factors that contribute to trust in relation to a dating partner. Specifically, this study investigated the interdependence of dating partner trust using a nonrecursive path model that included present-day family-of-origin experience. The most reliable data available suggest that self-disclosure and trust from the other partner are significant contributors to trust (cf. Butler. 1986: Haas. 1981: Larzelere & Huston. 1980: Rubin. 1975). However, these do not appear to explain completely the ability to trust another. Using these findings and theoretical linkages between trust and family-of-origin experiences, a model was specified with a reciprocal path

between male partner and female partner trust. The reciprocal paths were not significant. However, male partner trust was best explained by his emotional reactivity toward his parents, and female partner trust was best explained by her comfort with self-disclosure. These results are discussed in relation to previous research.

Berscheid, Ellen and Sarah A Meyers. 1996. A Social Categorical Approach to a Question About Love. *Personal Relationships*. 3:19-43.

Although scholars' interest in love phenomena has continued to increase in recent years, a common conceptual language for the study of love has not yet emerged, as is evidenced by the large number of love taxonomies and associated vocabularies that have been advocated. A promising avenue for the development of a common scientific vocabulary of love lies in the systematic examination of the love vocabularies of laypersons to identify what varieties of love, if any, their lexicon reflects. Several means by which love researchers have attempted such examinations are described and illustrated with reference to the linguistic expressions "love" and "in love." These methods include direct questioning, autobiographical reports, inferential studies, and the prototype approach, which introduces the probabilistic view of cognitive categorization structure and process to the study of love. Several of the underlying assumptions of the prototype approach are discussed and contrasted to those of the social categorical approach we present here. The social categorical method is described: in this approach, respondents place persons in their actual social worlds into social categories, and the associations among the memberships of those categories are examined. Finally, the implications of some of the findings derived from this method for a taxonomy of love and for the study of interpersonal relationships are discussed.

Bonacich, Phillip. 1996. Analysis of Discrete

Structure: An Overview. *Social Networks*. 18:315-318.

The papers in this issue of *Social Networks* represent a distinct point of view outside the methodological framework in which most American social scientists operate. In this overview I wish to highlight the ways in which this analysis is different. Although these papers are appearing in a networks journal, the papers develop a set of data analysis methods that are quite general and can be applied to almost any data structure. I will focus first on the general data analysis approach exhibited by these papers.

Bordia, Prashant. 1996. Studying Verbal Interaction on the Internet: The Case of Rumor Transmission Research. *Behavior Research Methods, Instruments, & Computers*. 28(2): 149-151.

This paper describes the advantages of computer-mediated communication networks (Internet, bitnet, and Usenet) in the study of verbal interaction. Research involving observation and analysis of rumor transmission patterns is presented as an illustration. Issues related to the generalizability of findings and the ethics of observational research are also briefly discussed.

Boulton, Michael J. and Peter K. Smith. 1996. Liking and Peer Perceptions among Asian and White British Children. *Journal of Social and Personal Relationships*. 13(2): 163-177.

Study 1 investigated liking and perceptions of classmates in 140 Asian and White boys and girls in three racially mixed schools. All four groups selected significantly more own-race than other-race classmates as Like Most choices. For like Least choices, White girls and boys selected significantly more other-race classmates, Asian boys significantly more own-race classmates Asian girls did not differ in own-race and other-race choices. Using

ratings, White children and Asian children showed greater liking of own-race than other-race classmates. White children received more nominations for Starts Fights and Disrupts from Asian than White raters but more nominations for Cooperates from White than Asian raters. Perceptions of cooperation in individual peers were hypothesized to influence liking and to explain the weak links between liking of classmates and liking expressed for unknown own-race and other-race children shown in photographs. Study 2 investigated further the reasons why children (N = 124) like some classmates most and others least. Supporting the hypothesis from Study 1, the most common reasons given for liking classmates most were because they were cooperative and played with the interviewee; the most common reason given for why classmates were liked least was because they were bullies. The results are discussed in terms of the development of inter-racial liking in children and attempts to enhance liking among children from different racial backgrounds by cooperative group work methods.

Brock, Douglas M., Irwin G. Sarason, Barbara R. Sarason, and Gregory R. Pierce. 1996. Simultaneous Assessment of Perceived Global and Relationship-Specific Support. *Journal of Social and Personal Relationships*. 13(1):143-152.

Perceived global social support and support from specific relationships are not synonymous, yet existing measures typically assess only one or the other. However, it might be possible to simultaneously assess both using the same instrument. In So studies, the reliability and validity of scores derived for specific relationship categories from the Social Support Questionnaire were examined. Separate scores were developed for mother, father and a composite score for friends. Each score exhibited good internal consistency and correlational analyses revealed both convergent and discriminant validity for each of the scores.

Support from friends tended to correlate more strongly with both received support and adjustment than did parental support. Support from friends and mother, but not father, predicted perceptions of support availability. Parental support was more predictive than support from friends of the self-perceived past and present quality of familial relationships. Regression analyses indicated that support from individual relationships predicted relationship quality and adjustment even after accounting for global support.

Burleson, Brant R., Adrienne W. Kunkel, Wendy Samter, and Kathy J. Werking. 1996. Men's and Women's Evaluations of Communication Skills in Personal Relationships: When Sex Differences Make a Difference - And When They Don't. *Journal of Social and Personal Relationships*. 13(2):201-224.

Much recent research on gender and communication has emphasized differences in men's and women's communicative conduct, with some theorists going so far as to claim that men and women constitute different cultures. However, comparatively little research has assessed both similarities and differences in men and women's communication to determine whether the sexes are more alike or different. The present paper provides such assessments with respect to men's and women's evaluations of the importance of diverse communication skills in two relationships, friendship and romance. Two studies are reported. In Study 1, participants (N=382) evaluated the importance of eight communication skills in same-sex friendships. Results indicated that although females rated affectively oriented communication skills as somewhat more important than males and males rated instrumentally oriented skills as somewhat more important than females, both males and females overwhelmingly viewed affectively oriented skills as more important than instrumental skills. Study

Carley, Kathleen M. 1996. Artificial Intelligence Within Sociology. *Sociological Methods and Research*. 25(1):3-30.

The potential linkages between artificial intelligence and sociology are growing. This growth is due to importation of artificial intelligence techniques into methodological tools for data analysis, a growing interest among researchers in artificial intelligence in the socially situated agent, and a growing interest among sociologists in using artificial intelligence techniques for theorizing about social phenomena. Increasingly, researchers are addressing concerns of traditional importance within sociology, such as the bases for cooperation, the rule of structure in affecting individual agency, and interaction using computational models of intelligent adaptive agents. This article provides an overview of the role that artificial intelligence currently plays within sociology.

Carroll, Glenn & Albert Teo. 1996. "On the social networks of managers." *Academy of Management Journal*. 39(2):421-440.

Using data from the National Opinion Research Center's General Social Survey, the organizational membership networks are compared with core discussion networks of managers and non-managers. For the two groups, the networks differed on a variety of characteristics, including ties to outside organizations and to co-workers, network size, and closeness of ties. Evidence was also found that network differences were associated with income differences for non-managers.

Clark, Sarah L. and Mary Ann Parris Stephens. 1996. Stroke Patients' Well-Being as a Function of Caregiving Spouses' Helpful and Unhelpful Actions. *Personal Relationships*. 3:171-184.

This study examined the perceptions that 55 older married stroke patients had about

themselves and about the motivations of their caregiving spouses when they judged their spouses actions to be helpful and when they judged them to be unhelpful. It also examined how these perceptions were related to patients' well-being (depression, positive affect, marital satisfaction). Patients had more negative perceptions of themselves and of their spouses when they judged the actions to be unhelpful than when they judged them to be helpful. The hypothesis that perceptions about unhelpful actions would be more strongly related to patients well-being than would perceptions about helpful actions was only partially supported. Perceptions about unhelpful actions were related to patients depression, but perceptions about helpful actions were related to positive affect. Both kinds of perceptions were related to marital satisfaction. Findings begin to explicate the complex relationship between perceived helpfulness of actions and well-being.

Cole, Tim and James J. Bradac. 1996. A Lay Theory of Relational Satisfaction with Best Friends. *Journal of Social and Personal Relationships*. 13(1):57-83.

Three research questions were addressed to examine people's lay beliefs regarding the causes of relational satisfaction among best friends. The first question dealt with the specific beliefs that people hold about satisfaction with a best friend. Forty-three sources of relational satisfaction were identified. The second question focused on the dimensions underlying people's beliefs about satisfaction. Multidimensional scaling suggested that three general dimensions underlie people's beliefs about satisfaction with a best friend. The third question examined the perceived causal structure underlying people's beliefs about relational satisfaction. A network analysis revealed that people have a detailed and elaborate set of assumptions regarding the causal relations between the sources of satisfaction. Taken together, our results suggest

that people have many, well-integrated beliefs about satisfaction in best friendships. Specifically, these beliefs are organized dimensionally and they are causally intertwined, constituting evidence for the existence of a lay theory of this relational outcome.

Conley, Dalton Clark. 1996. Getting It Together: Social and Institutional Obstacles to Getting Off the Streets. *Sociological Forum*. 11(1):25-40.

Avoiding macrostructural or individualistic explanations as to why homeless individuals cannot get off the streets, this paper examines the social structure of street life as it impinges on a sample of homeless persons' chances of obtaining nonshelter housing. Specifically, by interviewing 42 homeless individuals about a housing grant offered by New York State and the possibility of obtaining shared housing arrangements with such a grant, this study documents possible ways in which the social relations homeless people have with institutions and each other may dash potential efforts to obtain nonshelter housing. The research finds that distrust of the homeless among landlords and a high level of contingency with respect to welfare cases interact with distrustful personal relations among the sample of homeless themselves to reduce the likelihood of successful utilization of the housing grant. Due to sample limitations, findings from this study cannot be generalized to all homeless; nonetheless they offer insight into a dynamic which may be similar to those at work among other homeless sub-populations as well.

Connolly, Jennifer A. and Anne M. Johnson. 1996. Adolescents' Romantic Relationships and the Structure and Quality of their Close Interpersonal Ties. *Personal Relationship*. 3:185-195.

Several interpersonal theories suggest that adolescents' romantic relationships are associated with distinct patterns of social experience.

In this study, 1,049 adolescents indicated whether they had a boy/girlfriend and the temporal duration of the relationship. They described the structure of their peer networks and the quality of their relationships with a parent/adult and best friend. Adolescents with a boy/girlfriend reported larger networks, more opposite-sex friends, and more nonschool friends. Adolescents with longer romantic relationships reported more social support with the boy/girlfriend than did adolescents with short-term romantic relationships. Temporal duration also moderated the salience of the romantic relationship. Those of short duration were viewed less favorably than friend and parent/adult relationships, whereas those of longer duration were viewed more favorably. Finally, continuity in perceived quality was evident between romantic and other relationships. Overall, the results support the view that romantic relationships are embedded within adolescents' ongoing social experience and show important links to the structure and quality of their relationships with parents and with peers.

Contractor, Noshir, David R. Seibold, and Mark A. Heller. 1996. Interactional Influence in the Structuring of media Use in Groups: Influence in Members' Perceptions of Group Decision support System Use. *Human Communication Research*. 22: 451-481.

The aim of this study is to examine the ways in which individuals' perceptions of media use are influenced by others. Traditional theories of media use have proposed that perceptions of media use are shaped by individuals' demographic characteristics and the media's characteristics. However, three recent theories—critical mass theory, social influence model of media use, and adaptive structuration theory—suggest that individuals' perceptions of media emerge as a result of their interaction with others in their social network. Results from a longitudinal study of 30 group decision support system (GDSS)

groups and 25 non-GDSS groups over a 3-week period indicate that interactional influence was a better predictor of individuals' perceptions of media use than were individuals' demographic characteristics or characteristics of the media.

Cramer, Duncan, Scott Henderson and Ruth Scott. 1996. Mental Health and Adequacy of Social Support: A Four-Wave Panel Study. *British Journal of Social Psychology*. 35:285-295.

LISREL analyses with manifest variables were used to examine the causal relationship between mental health and adequacy of social integration and of attachment, measured at four consecutive waves each four months apart, in a representative sample of 225 adult residents in Canberra. Mental health was assessed with the 30-item General Health Questionnaire. The analyses suggest that while there is no temporal relationship between adequacy of attachment and mental health, adequacy of social integration is influenced by earlier mental health. The temporal relationship between adequacy of attachment and adequacy of social integration appears to be reciprocal.

Cramer, James C. and Katrina Bell McDonald. 1996. Kin Support and Family Stress: Two Sides to Early Childbearing and Support Networks. *Human Organization*. 55(2): 160-169.

Family assistance helps many teenage or young unmarried mothers to cope with poverty and the challenges of childrearing. Kin support to young mothers, while beneficial, should not be romanticized. It also often entails conflict, stress, frustration, and disappointment due to interpersonal tensions, or conflicting interests, or relatives' limited ability to provide support. Nearly always the underlying issue is a discrepancy between the young mother's expectations and her support

network's performance. We describe three sources of unrealistic expectations: relatives' initial reactions to her pregnancy, a history of early childbearing by relatives, and desires for a relationship with baby's father.

Culling, John F. 1996. Signal-Processing Software for Teaching and Research in Psychoacoustics under UNIX and X-Windows. *Behavior Research Methods, Instruments, and Computers*. 28(3):376-382.

A package of software is described that generates, analyzes, stores, and displays sampled wave-forms. The package is designed for use under UNIX and includes C source code, UNIX manual pages, and tutorial documents. The programs interact via UNIX pipes using an ASCII-text data format, which enables the user to view the data in numerical form as well as through the use of plotting programs. Among many other functions, the programs can do the following: efficiently generate linear-phase FIR filters with arbitrary transfer functions; generate impulse responses for rectangular rooms of specified dimensions; convolve waveforms with each other; perform Fourier transformation and inverse Fourier transformation; filter waveforms in the Fourier domain; filter waveforms according to the peripheral frequency selectivity of the human auditory system; cross-correlate waveforms; autocorrelate waveforms; synthesize complex waveforms, including vowel sounds and white noise. The software can read and write a variety of commonly used waveform file formats. The data can be plotted on an X-Window display using the *gnuplot* software, which has been included in the package. The complete software package is available via anonymous ftp from [ftp.ihr.mrc.ac.uk](ftp://ftp.ihr.mrc.ac.uk) in `~ftp/pub/johncu/wave.tar.Z`

Daws, John T. 1996. The Analysis of Free-Sorting Data: Beyond Pairwise Cooccurrences. *Journal of Classification*. 13:57-80.

Free-sorting data are obtained when subjects are given a set of objects and are asked to divide them into subsets. Such data are usually reduced by countings for each pair of objects, how many subjects placed both of them into the same subset. The present study examines the utility of a group of additional statistics, the co-occurrences of sets of three objects. Because there are dependencies among the pair and triple co-occurrences, adjusted triple similarity statistics are developed. Multidimensional scaling and cluster analysis-which usually use pair similarities as their input data-can be modified to operate on three-way similarities to create representations of the set of objects. Such methods are applied to a set of empirical sorting data: Rosenberg and Kim's (1975) fifteen kinship terms.

Degenne, Alain, and Marie-Odile Lebeaux. 1996. Boolean Analysis of Questionnaire Data. *Social Networks*. 18:231-245.

The principle of Boolean analysis is to look for entailments between variables in a questionnaire. If all the respondents answering "yes" to the question X answers "yes" to the question Y, we note the entailment $X < Y$. Boolean algebra generalizes this approach. A questionnaire of n binary variables generates a set of 2^n possible patterns of response. These patterns generate a Boolean algebra. If only some of the possible patterns are present, the bipartition in this set defines a Boolean equation, the solutions of which are entailments. Usually we use approximations of this structure to analyse a questionnaire. A presentation of the method is given here with application to sociological data.

Dolgin, Kim Gale. 1996. Parents' Disclosure of their Own Concerns to their Adolescent Children. *Personal Relationships*. 3:159-169.

This study examines middle-aged parents' disclosure about their own lives and current concerns, with their late-adolescent children.

Three hundred seventy-two parents of college freshmen, averaging 47 years of age, participated by filling out an anonymous questionnaire that asked about 28 topics, varying in intimacy, of concern to adults. The subjects indicated whether they had discussed each topic with their child, and, if they had, the motivations that prompted them to do so. The data revealed that mothers disclosed more than did fathers, and they were more likely to cite "venting," "asking advice," and "seeking emotional support" as reasons for disclosure: fathers were more likely to cite "trying to change his/her behavior" as a rationale for disclosure. Child's gender did not affect disclosure rates, but sons and daughters were disclosed to for different reasons. Divorced parents disclosed more than did parents from continuously intact families, and they cited somewhat different reasons for disclosure.

Dreher, George F. and Taylor H. Cox, Jr. 1996. Race, Gender, and Opportunity: A Study of Compensation Attainment and the Establishment of Mentoring Relationships. *Journal of Applied Psychology*. 81(3): 297-308.

In this article, hypotheses concerned with how race, gender, and mentoring experiences account for compensation outcomes among master of business administration (MBA) program graduates are considered. African-American and Hispanic MBAs were less likely than their White counterparts to establish mentoring relationships with White men. Women with MBAs were less likely than men with MBAs to form such relationships. Graduates who had been able to establish mentoring relationships with White men displayed an average annual compensation advantage of \$16,840 over those with mentors displaying other demographic profiles. There were no compensation differences between those who had established mentoring relationships with women or minority men and those who had not established a mentoring relationship.

Duquenne, Vincent. 1996. On Lattice Approximations: Syntactic Aspects. *Social Networks*. 18:189-199.

Lattice theory and Galois lattices can help in formalizing the sharing of properties by subjects, together with the corresponding group intersections, by means of a well-known -- since the early 1970s -- duality which formalizes intensional/extensional approaches, as well as implication models, by means of another natural lattice/implications duality. As Galois lattices may grow exponentially, this construction calls for some approximation procedures, for which we suggest making homomorphic reductions by constructing (sub-)semilattices, which can be defined by revising the original lattice by an extra list of 'quasi-implications' that are contradicted by only a few counter-examples in the original data. These claims and procedures are illustrated on a classic example of network theory with some appropriate outputs from our graphic program GLAD.

Duquenne, Vincent. 1996. Lattice Analysis and the Representation of Handicap Associations. *Social Networks*. 18:217-230.

A main goal of this paper is to show how lattice analysis and the computer program GLAD can help in understanding the associations among psychological/somatic handicaps for a population of children excluded from school because of those handicaps. The lattices can be taken as a conceptual as well as an implicational model of multiple handicaps because of their capacity for formalizing the definitions of disorders in terms of extensions or intensions. Certain substructures of the lattice, weighted by the frequencies of the subject groups, can display the assessed associations between handicaps, thus addressing quite directly the research questions of the health services.

Erickson, Bonnie H. 1996. Culture, Class, and Connections. *American Journal of Sociology*. 102(1):217-251.

Bourdieu's analysis of class and culture errs in neglecting two important aspects of social structure: social networks and class relations at work. He expects high-status culture to be useful in class because it is correlated with class, but culture used at work includes both genres related to class (used in domination) and genres unrelated to class (used in coordination). High-status culture is correlated with class but excluded, not used, in the competitive private sector. The most widely useful cultural resource is cultural variety, and social network variety is a better source of cultural variety than is class itself.

Frazier, Patricia A., Anne L. Byer, Ann R. Fischer, Deborah M. Wright, and Kurt A. DeBord. 1996. Adult Attachment Style and Partner Choice: Correlational and Experimental Findings. *Personal Relationships*. 3:117-136.

Three studies were conducted to assess the role of attachment style in partner selection using both correlational and experimental methods. Study 1 ($n = 83$ couples) assessed correlations between partner ratings on attachment-style dimensions and the relations between own and partner attachment style and relationship satisfaction. In Study 2 ($n = 226$) and Study 3 ($n = 146$), participants who varied in terms of attachment style rated the desirability of potential partners who also differed in terms of attachment style. Results of all three studies generally suggested that individuals were most attracted to partners with similar attachment styles. For example, anxious individuals tended to be dating anxious partners in Study 1 and they preferred anxious partners over secure and avoidant partners in Studies 2 and 3 (combined data). Thus not all individuals preferred secure partners. Second, unlike previous studies that

looked primarily at partner correlations there was no evidence of anxious/avoidant matching. In fact, anxious individuals seemed particularly adverse to avoidant partners. Finally, ratings of parental caregiving styles (especially ratings of mothers) were associated with adult attachment dimensions and partner choices. For example, individuals who rated their mothers as more cold and ambivalent were less attracted to secure partners. Clinical and research implications are discussed.

Freeman, Linton C. 1996. Cliques, Galois Lattices, and the Structure of Human Social Groups. *Social Networks*. 18:173-187.

The mathematical definition of clique has never been entirely satisfactory when it comes to providing a procedure for defining human social groups. This paper shows how the Galois structure of containment among cliques and actors can be used to produce an intuitively appealing characterization of groups—one that is consistent with ethnographic descriptions. Two examples, using 'classical' social network data sets, are provided.

Gaines, Stanley O. Jr.. 1996. Impact of Interpersonal Traits and Gender-Role Compliance on Interpersonal Resource Exchange Among Dating and Engaged/Married Couples. *Journal of Social and Personal Relationships*. 13(2):241-261.

The following hypotheses regarding interpersonal resource exchange among (a) dating couples ($n = 206$ couples) and (b) engaged/married couples ($n = 103$ couples) were tested: (1) levels of affectionate behavior are reciprocated (i.e. paths are bidirectional) among couples; (2) levels of respectful behavior are reciprocated among couples; (3) individuals' reported affectionate and respectful behaviors are correlated positively; (4) individuals' affection-giving traits are better as positive predictors of individuals' affectionate behavior among engaged/married couples

than among dating couples; (5) individuals' respect-giving traits are better as positive predictors of individuals' respectful behavior among engaged/married couples than among dating couples; (6) individuals' gender-role compliance is better as a negative predictor of individuals' affectionate behavior among dating couples than among engaged/married couples; and (7) individuals' gender-role compliance is better as a negative predictor of individuals' respectful behavior among dating couples than among engaged/married couples. Individuals' interpersonal traits and gender-role compliance were self-reported, whereas individuals' interpersonal behaviors were reported by their partners. Results supported Hypotheses 1-3 (derived from resource exchange theory proposed by Foa & Foa, 1974) but not Hypotheses S7 (derived from the model of levels of relational involvement proposed by Levinger & Snoek, 1972). Unexpectedly, affection-giving traits generally were positive predictors of affectionate and respectful behavior, whereas respect-giving traits generally did not predict affectionate or respectful behavior. Implications for the study of interpersonal traits, gender roles, and behavioral reciprocity in heterosexual relationships are discussed.

Gascuel, Olivier and Denise Levy. 1996. A Reduction Algorithm for Approximating a (Non-metric) Dissimilarity by a Tree Distance. *Journal of Classification*. 13:129-155.

We propose a development stemming from Roux (1988). The principle is progressively to modify the dissimilarities so that every quadruple satisfies not only the additive inequality, as in Roux's method, but also all triangle inequalities. Our method thus ensures that the results are tree distances even when the observed dissimilarities are non-metric. The method relies on the analytic solution of the least-squares projection onto a tree distance of the dissimilarities attached to a single quadruple. This goal is achieved by using geometric

reasoning which also enables an easy proof of algorithm's convergence. This proof is simpler and more complete than that of Roux (1988) and applies to other similar reduction methods based on local least-squares projection. The method is illustrated using Case's (1978) data. Finally, we provide a comparative study with simulated data and show that our method compares favorably with that of Studier and Keppler (1988) which follows in the ADD-TREE tradition (Sattath and Tversky 1977). Moreover, this study seems to indicate that our method's results are generally close to the global optimum according to variance accounted for.

Gillis, A. R. 1996. So Long as The Both Shall Live: Marital Dissolution and the Decline of Domestic Homicide in France, 1852-1909. *American Journal of Sociology*. 101(5): 1273-1305.

This article suggests that the growth of European states, the decline of familism, and the rise of individualism generated the institutionalization of judicial separation and divorce. Time-series analyses of France (1852-1908) reveal a persistent negative association between separation/divorce and domestic homicide, especially among males. Neither indicators of economic change nor trends in the wider pattern of violent crime account for the relationship. Although marital dissolution is a negative correlate of premeditated domestic homicide, the rate of separation/divorce is directly associated with spontaneous domestic homicide, for both females and males and may indicate that abandoned spouses can become homicidal.

Gower, John C. and Michael J. Greenacre. 1996. Unfolding a Symmetric Matrix. *Journal of Classification*. 13:81-105.

Graphical displays which show inter-sample distances are important for the interpretation and presentation of multivariate data. Except

when the displays are two-dimensional, however, they are often difficult to visualize as a whole. A device based on multidimensional unfolding, is described for presenting some intrinsically high-dimensional displays in fewer, usually two, dimensions. This goal is achieved by representing each sample by a pair of points, say R_j and r_j , so that a theoretical distance between the i -th and j -th samples is represented twice, once by the distance between R_j and r_j and once by the distance between R_j and r_j . Self-distances between R_j and r_j need not be zero. The mathematical conditions for unfolding to exhibit symmetry are established. Algorithms for finding approximate fits, not constrained to be symmetric, are discussed and some examples are given.

Groenen, Patrick J. F. and Willem J. Heiser. 1996. The Tunneling Method for Global Optimization in Multidimensional Scaling. *Psychometrika*. 61(3): 529.

This paper focuses on the problem of local minima of the STRESS function. It turns out that unidimensional scaling is particularly prone to local minima, whereas full dimensional scaling with Euclidean distances has a local minimum that is global. For intermediate dimensionality with Euclidean distances it depends on the dissimilarities how severe the local minimum problem is. For city-block distances in any dimensionality many different local minima are found. A simulation experiment is presented that indicates under what conditions local minima can be expected. We introduce the tunneling method for global minimization, and adjust it for multidimensional scaling with general Minkowski distances. The tunneling method alternates a local search step, in which a local minimum is sought, with a tunneling step in which a different configuration is sought with the same STRESS as the previous local minimum. In this manner successively better local minima are obtained, and experimentation so far shows

that the last one is often a global minimum.

Hagan, John, Ross MacMillan and Blair Wheaton, 1996. New Kid in Town: Social Capital and the Life Course Effects of Family Migration on Children. *American Sociological Review*. 61:368-385.

In a national and international economy that requires fluid movement of both labor and capital, it is important to know that families and other helping institutions can mitigate the losses of social capital that may accompany family migration. Coleman's (1990) theory of social capital emphasizes the roles of mothers and fathers in enhancing the life prospects of their children. However, Coleman's (1988) analysis of family migration and high school completion found an anomalous null effect of parental support. Elder's (1994) life course perspective on "linked lives" suggests that parental involvement with their children can have interactive effects as well as main effects in mitigating losses of community social capital resulting from a family's moves. Following this lead and using more elaborate measures, we find that the negative effects of family migration are significantly more pronounced in families with uninvolved fathers and unsupportive mothers. In these families the diminished social capital provided by parents does not compensate for the community social capital lost as a result of a family's move.

Hansen, Pierre, Brigitte Jaumard and Bruno Simeone. 1996. Espaliers: A Generalization of Dendrograms. *Journal of Classification*. 13:107-127.

Dendrograms are widely used to represent graphically the clusters and partitions obtained with hierarchical clustering schemes. Espaliers are generalized dendrograms in which the length of horizontal lines is used in addition to their level in order to display the values of two characteristics of each cluster

(e.g., the split and the diameter) instead of only one. An algorithm is first presented to transform a dendrogram into an espalier without rotation of any part of the former. This is done by stretching some of the horizontal lines to obtain a diagram with vertical and horizontal lines only, then cutting off by diagonal lines the parts of the horizontal lines exceeding their prescribed length. The problem of finding if, allowing rotations, no diagonal lines are needed is solved by an $O(N^2)$ algorithm where N is the number of entities to be classified. This algorithm is then generalized to obtain espaliers with minimum width and, possibly, some diagonal lines.

Les dendrogrammes sont fréquemment utilisés pour représenter graphiquement les classes et les partitions obtenues par les méthodes de classification hiérarchique ascendantes ou descendantes. Les espaliers sont des dendrogrammes généralisés où la longueur des lignes horizontales est utilisée en plus de leur niveau pour représenter deux caractéristiques de chaque classe (par exemple l'écart et le diamètre) au lieu d'une seule. On présente d'abord un algorithme pour transformer un dendrogramme en espalier sans permettre de rotation d'aucune partie du premier. Ceci est fait en allongeant certaines des lignes horizontales de façon à obtenir un diagramme utilisant seulement des lignes horizontales et verticales, puis en coupant par des lignes diagonales les parties des lignes horizontales excédant la longueur qui leur est affectée. Le problème de déterminer si, les rotations étant permises, aucune ligne diagonale n'est nécessaire est résolu par un algorithme polynomial en $O(N^2)$ où N est le nombre d'objets à classer. Cet algorithme est généralisé pour résoudre le problème de déterminer un espalier de largeur minimum avec, éventuellement, des lignes diagonales.

Hewson, Claire M., Dianna Laurent and Carl M. Vogel. 1996. Proper Methodologies for Psychological and Sociological Studies

Conducted Via the Internet. *Behavior Research Methods, Instruments, and Computers.* 28(2): 186-191.

This paper outlines specific methodologies for conducting research via computer networks. We discuss advantages of Internet experimentation over previous modes of telecommunication-facilitated research and characterize features of studies that can benefit from Internet access and those which are unlikely to. We point out pitfalls and suggest a range of potential solutions in terms of specific practical techniques for managing the design, dissemination, and collection of Internet materials. We also discuss techniques for minimizing attrition and for adapting to recalcitrance presented by "hacker" vandalism.

Horwitz, Allan V., Susan C. Reinhard and Sandra Howell-White. 1996. Caregiving as Reciprocal Exchange in Families with Seriously Mentally Ill Members. *Journal of Health and Social Behavior.* 37:149-162.

Caregiving for people with chronic illnesses, including serious mental illnesses, has generally been seen as support that a care provider gives to a dependent receiver. In contrast, this research views caregiving as a process of mutual exchange. It tests the hypothesis that how much support a mentally ill family member receives depends on how much support they provide to other family members. We also examine whether or not reciprocity depends on the role relationship between recipients and providers of care, the level of patient symptomatology, co-residence, and several socio-demographic characteristics. The sample includes 66 patients who have at least one sampled parent or sibling. The results indicate that the amount of support patients give parents and siblings is very strongly associated with how much support they receive from family members. In comparison to the other variables considered here, patient support provision is by far the best predictor

of the amount of family support. These results indicate that it is worthwhile to examine caregiving in families with a member who is seriously mentally ill as a process of mutual exchange.

Kenny, David A. 1996. Models of Non-Independence in Dyadic Research. *Journal of Social and Personal Relationships*. 13(2): 279-294.

In dyadic research, the responses of the two members of the dyad are likely to be non-independent. Statistical estimation for three different processes that bring about non-independence are presented. In each, a variable X influences K First the X variable of one person may influence the Y variable of his or her partner Second, the Y variables of the two people may directly influence each other Third, the two X and Y scores may be indicators of couple-level factors.

Kim, Kyungmo, and George A. Barnett. 1996. The Determinants of International News Flow: A Network Analysis. *Communication Research*. 23: 323-352.

This research examines the structure of international news flow and its determinants, using network analysis. International newspaper and periodicals trade data in *Commodity Trade Statistics* published by the United Nations are used to describe the international news flow network. NEGOPY reveals the inequality of international news flow between the core and the periphery. The Western industrialized countries are at the center, dominating international news flow. Cluster analysis reveals that the international news flow network is also structured into eight geographical-linguistic groups. The periphery is not only dominated by the unequal vertical exchange among the core, but also marginalized by the news exchange among the core. Regression analysis indicates that the structure of international news flow is influenced by a country's eco-

economic development, the language(s) its people speak, its physical location, political freedom, and population. Among them, economic development is the most important factor.

Klijn, Erik-Hans. 1996. Analyzing and Managing Policy Processes in Complex Networks: A Theoretical Examination of the Concept Policy Network and Its Problems. *Administration and Society*. 28(1): 90-119.

In the last 10 years, policy networks have become a popular concept to analyze policy making in multi-actor settings. This article argues that, although stimulating and interesting, the research that has been done in this field can be improved in three ways. The first way to improve the usefulness of the concept network is to pay more attention to the dynamics of policy making. In this article, the concept game is used to conceptualize this dynamic character of policy processes. Second, the concept network stresses the context of policy making, but a coherent theoretical framework on how this context is formed and changed is lacking. This article attempts to make some steps toward such a theoretical framework. Central in this framework is the idea of the duality of structure proposed by Giddens and the notion of rules. Finally, the literature on networks could gain relevance by directing more systematic attention on how complex policy processes in these networks can be managed. Building on earlier work, especially in inter-organization theory, some management strategies are discussed.

Larson, James R., Jr., Caryn Christensen, Ann S. Abbott, and Timothy M. Franz. 1996. Diagnosing Groups: Chartering the Flow of Information in Medical Decision-Making Teams. *Journal of Personality and Social Psychology*. 71(2): 315-330.

Several hypotheses derived from an information sampling model of group discussion were tested with 3-person teams of physicians given

2 hypothetical medical cases to diagnose. Some of the information about each case was given to all 3 team members before discussion (shared information), whereas the rest was divided among them (unshared information). As predicted, shared information was, overall, more likely to be discussed than unshared information, and it was brought into discussion earlier. In addition, it was found that team leaders repeated substantially more case information than did other members and that, over time, they repeated unshared information at a steadily increasing rate. The latter findings are interpreted as evidence of leaders' information management role in problem-solving discussions.

Latané, Bibb, James H. Liu, Andrzej Nowak, Michael Bonevento, Long Zheng. 1995. Distance Matters: Physical Space and Social Impact. *Personality and Social Psychology Bulletin*. 21(8):795-805.

Studies of college students and citizens of south Florida, United States, students in Shanghai China, and an international sample of social psychologists show that social influence, measured by the frequency of memorable interactions, is heavily determined by distance. In all three cases, although there was a great deal of interaction with distant persons, the relationship between distance and interaction frequency was well described by an inverse power function with a slope of approximately -1, consistent with the expectation that social impact is proportional to the inverse square of the distance separating two persons. This result confirms one principle from Latané's 1981 theory of social impact and helps explain the ability of opinion minorities to cluster and survive in the face of majority influence.

Latané, Bibb and Todd L'Herrou. 1996. Spatial Clustering in the Conformity Game: Dynamic Social Impact in Electronic Groups. *Journal of Personality and Social Psychology*.

70(6):1218-1230.

Motivated by bonuses for agreeing with the majority of their 24-person group, 192 participants in a study of electronic communication sent and received messages from their neighbors in each of 4 spatial configurations over 4 rounds of asynchronous communication. Analyses of the 48 resulting cases showed that over time opinions reorganized themselves so that most people thought they were in the majority, even though substantial numbers of them were not. This spatial clustering was prevalent in all 3 spatial geometries, in contrast to a nonspatial control geometry, whereas consolidation (reduced diversity) was affected by the clumpiness and dimensionality of social space. The results confirm robust derivations of and thus provide empirical support for, dynamic social impact theory.

Lind, Rebecca Ann, and James A. Danowski. 1996. The Representation of Arabs in U.S. Electronic Media. In Y. Kamalipour and T. Carilli (eds.) *Cultural Diversity and the U.S. Media*. Albany, NY: SUNY Press.

This chapter analyzes semantic networks of representation of Arabs in U.S. electronic media by studying the full-text transcripts of approximately 35,000 hours of television and radio content aired on ABC, CNN, PBS, and NPR from February, 1993 to February, 1996. The basic unit of analysis was the word pair. Using Danowski's WORDLINK software, the study search through over 135 million words. The major finding of the study is that there was little mention of "Arab culture". Culture in its various lexical forms was mentioned only 13 times. Arab wealth was not a frequent subject of media content. There was, however, a moderate level of mention of terrorism. Aggressive words were frequently mentioned, especially in the context of Israel.

Luhmann, Niklas. 1996. On the Scientific Context of the Concept of Communication.

Social Science Information. 35(2): 257-268.

Observing is a paradoxical operation: a duality as unity, and a distinction between distinguishing and indicating, that is, a distinction that is repeated in itself. One can speak of scientific observation only if such an operation of distinguishing-indication is achieved through concepts. If one observes observation one cannot avoid observing the paradox. When a second-order observer wants to know how the observe observer observes, it has to observe how the observed observer deals with its own paradox, how it de-paradoxizes the paradox. Even scientific communication is an actualization of the paradox of observation, and therefore it is in principle incapable of dealing with logic. A theory of scientific observation should then be concerned with how science has nevertheless managed. The point comes to be: who observes with the aid of the concept of communication, and how does it observe?

Maeda, Nobuhiko. 1996. **The Structure of a Personal Community of Elderly People in the Urban Situation: A Social Network Study in Metropolitan Tokyo.** *The Studies of the Japan Institute of Labor*. 11:17-43.

With the rapid aging of the population in Japan, there is heightened concern of researchers and policy makers regarding the care of frail elderly people. Equally important is attention to improving the urban living conditions of the healthy elderly people. One purpose of this article is to analyze social relations of elderly people living in the urban situation. This is because it will become increasingly important to consider the informal social relations of the elderly at the same time as the physical dwellings and city environment is considered. Data is analyzed regarding the social network of elderly people from the view point of the 'personal community' as suggested by Canadian sociologist, Barry Wellman. We conclude that friends and the neighborhood network are key elements in

the personal community of elderly people in the urban setting. However we also confirm that elderly people don't live in the traditional local community which is constructed in solidarity with the neighborhood and kin, but live in the personal community that fits with the 'liberated' model of personal community. Also we confirm the effect of variables such as being able to 'drive a car or motorbike' and 'riding a bicycle' to be able to utilize the personal network. We conclude that in order to maintain independence of activity of elderly people, urban policy must improve the transportation environment to enable the elderly to move more easily on their own.

Meyer, David S. and Suzanne Staggenborg. 1996. **Movements, Countermovements, and the Structure of Political Opportunity.** *American Journal of Sociology*. 101(6):1628-1660.

Movement-counter movement interaction is an ongoing feature of contemporary social movements and, indeed, of contemporary politics. Yet the interplay of contending movements is understudied and undertheorized. This article begins to remedy this deficit by arguing that new work on political opportunity structure provides important insights and significant theoretical leverage for this study. Through a review of the literatures on counter-movements and political opportunity, this article argues that this interaction increases when states enable but do not satisfy challengers. This article presents a general framework of theoretical propositions for understanding the interplay of movements and their opponents animate and guide subsequent research.

Merill, Deborah M. 1996. **Conflict and Cooperation Among Adult Siblings During the Transition to the Role of Filial Caregiver.** *Journal of Social and Personal Relationships*. 13(2): 201-224.

Based on data from 40 open-ended interviews

with working and middle class adult children and children-in-law currently caring for an elderly parent, this study focused on the transition to the role of filial caregiver. Class differences in the formation of parent-caring networks among siblings and in the conflict that ensued when siblings did not provide assistance were examined. Although only one-third of the sample received assistance from siblings, it occurred more often in working class families and was usually the result of family values which emphasized helping one another and an obligation to provide care for one's parents. When siblings did not provide assistance, sisters were more likely to ask for help while brothers demanded it. Often, lack of sibling assistance was a reflection of prior family histories. Implications for later life families were discussed.

Nee, Victor. 1996. The Emergence of a Market Society: Changing Mechanisms of Stratification in China. *American Journal of Sociology*. 101(4): 908-949.

This article examines the effect of institutional change — the shift from redistribution to markets-in altering the mechanisms of stratification. New institutionalists maintain that interests are embedded in institutional arrangements and change as institutions change. China has undergone rapid and extensive household income mobility, incrementally altering the stratification order based on socialist redistribution. The shift to markets causes a decline in the significance of positional power based on redistribution relative to the gains of producers and entrepreneurs. Comparative institutional analysis is employed to examine the effect of regional variation in the extent of institutional change.

Patterson, Brian R. 1995. Communication Network Activity: Network Attributes of the Young and Elderly. *Communication Quarterly*. 43: 155-166.

This study describes a preliminary examination of the relationship between aging and changes in communication network composition and quality. Two age groups (young and elderly) were asked to recall their interpersonal communication for two days. Subjects also completed a relational assessment instrument for each person they communicated with. The results suggest that the elderly engage in greater communicative contact with their families and that the level of contact with non-family members is lower than for the young. However, levels of family solidarity do not differ between these groups. Positive relationships exist between communication network contact and solidarity for both groups. However, inverse relationships were found when network composition was considered. As contact with family increased, friendship contact and solidarity declined. On the basis of these findings, a dialectic model is proposed that reflects a tendency to maintain a homeostatic level of communication network activity.

Peng, Mike W. & Peggy Sue Heath. 1996. "The growth of the firm in planned economies in transition: Institutions, organizations, and strategic choice." *Academy of Management Review* 21(2):492-528.

Highlighting an important facet of diversity among organizations operating in different institutional environments, a model of growth strategy of the firm in planned economies in transition is presented. The interaction between institutions and organizations in the former Soviet republics and China is explored. Given the institutional constraints, neither generic expansion nor acquisitions, 2 traditional strategies for growth found in the West, are viable for firms in these countries. Instead, firms settle on a network-based strategy of growth, building on personal trust and informal agreements among managers. The institutional environment that leads to this unique strategy of growth is examined.

Pittenger, Khush. 1996. "Networking strategies for minority managers." *Academy of Management Executive*. 10(3): 62-63

To answer the question of whether it is better for minorities to form networks like those established by their successful majority peers, or to take a different approach to reach the same career goal, Herminia Ibarra of Harvard University conducted research comparing the informal networks of white and minority managers and examined the impact of these networks on careers. Ibarra found that fast-track minorities developed networks that differed in a number of significant ways from the networks of their fast-track white peers and non-fast-track minority counterparts. Ibarra's study suggests that it may be in the best interests of individual minority managers to imitate the strategies of their successful white peers.

Powell, Walter, Kenneth Koput, Laurel Smith-Doerr. 1996. "Inter-organizational collaboration and the locus of innovation: Networks of learning in biotechnology." *Administrative Science Quarterly*. 41(1): 116-145.

It is argued that when the knowledge base of an industry is both complex and expanding and the sources of expertise are widely dispersed, the locus of innovation will be found in networks of learning, rather than in individual firms. The large-scale reliance on interorganizational collaborations in the biotechnology industry reflects a fundamental and pervasive concern with access to knowledge. A network approach to organizational learning is developed, and firm-level, longitudinal hypotheses are derived that link research and development alliances, experience with managing interfirm relationships, network position, rates of growth and portfolios of collaborative activities. These hypotheses are tested on a sample of dedicated

biotechnology firms in the years 1990-1994. Results support a learning view and have broad implications for future theoretical and empirical research.

Ridgeway, Cecilia L., David Diekema and Kathryn Johnson. 1995. *Legitimacy, Compliance, and Gender in Peer Groups*. *Social Psychology Quarterly*. 58(4):298-311.

Peer groups pose special problems for understanding the legitimation of informal hierarchies. How and to what extent are cultural accounts evoked to support these hierarchies and make them normative for group members? We test a theory of this process that makes two predictions: 1) peer group members are less likely to treat their hierarchy as legitimate than are members of a group where standing is based on consistent external status advantages that evoke more cultural support for the hierarchy; 2) legitimation in peer groups is more likely than in groups where standing is based on high task ability but low external status and cultural support is uncertain. Using compliance with a high-ranking member's directive dominance attempts as an indicator of legitimacy, an experiment with same-sex dyads confirmed both predictions for male groups, the first prediction was supported but not the second. Other effects of gender composition occurred as well.

Robnett, Belinda. 1996. *African-American Women in the Civil Rights Movement, 1954-1965: Gender, Leadership, and Micromobilization*. *American Journal of Sociology*. 101(6):1661-1693.

Through an analysis of gender in the civil rights movement, this article illustrates that the conceptualization of social movement leadership requires expansion. This study concludes that an intermediate layer of leadership is critical to the micromobilization of a social movement. This intermediate layer provides a bridge (1) between the social

movement organization(s) and potential adherents and constituents, (2) between prefigurative and strategic politics, and (3) between potential leaders and those already predisposed to movement activity. The latter illustrates that mobilization does not always occur in a linear fashion (i.e., formal leaders mobilize and recruit participants). In the case of the civil rights movement, this intermediate layer of leadership was the primary area for women's leadership.

Reuveny, Rafael and Heejoon Kang. 1996. International Trade, Political Conflict / Cooperation, and Granger Causality. *American Journal of Political Science*. 40(3):943-970.

Theory: Causality between international trade and bilateral conflict/cooperation, to be investigated, is dyad dependent. *Hypotheses:* Either international trade causes bilateral conflict/cooperation or bilateral conflict/cooperation causes international trade. *Methods:* Granger causality is formally tested between quarterly trade data and quarterly series for conflict/cooperation. A long conflict/cooperation series is constructed from 1960 to the early 1990s by splicing COPDAB and WEIS, two events data sets that are most widely used. A total of 16 dyads are investigated individually by assuming that the direction and the strength of causality may differ from one dyad to another. *Results:* Granger causality between bilateral conflict/cooperation and international trade, which is dyad dependent, tends to be reciprocal.

De la Roche, Roberta Senechal. 1996. Collective Violence as Social Control. *Sociological Forum*. 11(1):97-127.

Collective violence is often social control: self-help by a group. It typically defines and responds to conduct as deviant. When unilateral and non-governmental, it appears in four major forms — lynching, rioting, vigilantism,

and terrorism -- each distinguished by its system of liability (individual or collective) and degree of organization (higher or lower). Following Donald Black's paradigm of pure sociology, the central assumption is that collective violence varies with its location and direction in social space-the conflict structure. I offer ten propositions that predict and explain the likelihood and severity of collective violence in general and the four forms of collective violence in particular. Conflict structures with a high degree of relational distance, cultural distance, functional independence, and inequality between the adversaries are associated with collective violence in general. Each of the four forms depends on the degree of social polarization between the parties as well as the continuity of the deviant behavior to which the violence responds.

Van Rossem, Ronan. 1996. The World System Paradigm as General Theory of Development: A Cross-National Test. *American Sociological Review*. 61:508-527.

Much of the literature on development uses the world system model as a grand conceptual scheme rather than as a theory of development. I test the world system paradigm as a general theory of development by focusing on three central constructs: world system role, dependency, and development. Data for five networks among 163 countries are used to operationalize world system role. The findings indicate that world system role can be operationalized in terms of role equivalence, yielding results closer to the theoretical model than the more commonly used structural equivalence measures. Contrary to theoretical expectations, world system role was more a function of absolute size of the economy than of level of development. The results weakly support the world system model of economic performance for the period 1980 to 1989. During this period, world system role had weak to moderate effects on several dependency indicators by did not directly affect

economic performance. Dependency had a moderate effect on economic performance.

Saltstone, Robert and Ken Stange. 1996. A Computer Program to Calculate Hubert and Arabie's Adjusted Rand Index. *Journal of Classification*. 13:169-172.

It is virtually the consensus of the clustering community that, as an index of cluster recovery for comparing two partitions, Hubert and Arabie's (1985) adjusted Rand (1971) index possesses the most desirable properties (Milligan and Cooper 1986). Microcomputer programs to calculate the adjusted Rand index, however, have not been readily available to researchers. AD_RAND.EXE is a microcomputer program which calculates the adjusted Rand index from data files containing numerically labeled clustered entities. The program is written in Microsoft QuickBASIC and runs under the MS-DOS operating system.

Settoon, Randall P., Nathan Bennett and Robert C. Liden. 1996. Social Exchange in Organizations: Perceived Organizational Support, Leader-Member Exchange, and Employee Reciprocity. *Journal of Applied Psychology*. 81(3): 219-227.

Social exchange (P. Blau, 1964) and the norm of reciprocity (A. W. Gouldner, 1960) have been used to explain the relationship of perceived organizational support and leader-member exchange with employee attitudes and behavior. Recent empirical research suggests that individuals engage in different reciprocation efforts depending on the exchange partner (e.g., B. L. McNeely and B. M. Meglino, 1994). The purpose of the present study was to further investigate these relationships by examining the relative contribution of indicators of employee-organization exchange and subordinate-supervisor exchange. Structural equation modeling was used to compare nested models. Results indicate that perceived organizational support is associated with

organizational commitment, whereas leader-member exchange is associated with citizenship and in-role behavior.

Schweizer, Thomas. 1996. Actor and Event Orderings Across Time: Lattice Representation and Boolean Analysis of the Political Disputes in Chen Village, China. *Social Networks*. 18:247-266.

So far qualitative data on political disputes in a Chinese community, 1950-1980, have been presented in a narrative historical account (Chan, Madsen and Unger, 1984, *Chen Village. The Recent History of a Peasant Community in Mao's China*, University of California Press) and analyzed with statistical network tools (Schweizer, 1991, *Journal of Quantitative Anthropology*, 3, 19-44). In this paper, lattice and Boolean analyses are applied as new procedures. First, lattice analysis is used to explore the dual order structure among actors and events in different periods. This gives a systematic understanding of the power struggle across time. Second, Boolean algebra is applied to specify and test explanatory hypotheses trying to account for the success or failure of actors in the disputes. In this application Boolean analysis detects multivariate causal order patterns in a small and qualitative data set.

Sigelman, Lee, Timothy Bledsoe, Susan Welch, and Michael W. Combs. 1996. Making Contact? Black-White Social Interaction in an Urban Setting. *American Journal of Sociology*. 101(5): 1306-1332.

Although numerous studies have examined the consequences of social contact between black and white Americans, relatively little is known about the determinants of such contact. Drawing on a survey of residents of the Detroit area, this article probes to what extent and in what manner interracial contact (a) has changed over the past quarter century and (b) is shaped by propinquity and personal charac-

teristics. Interracial contact is more common than it was during the late 1960s, especially for whites, but still consists primarily of brief, superficial encounters. For whites, the quantity and quality of contact with blacks are determined primarily by propinquity. For blacks, place of residence matters less, and early childhood experiences matter more.

Skvoretz, John and Thomas J. Fararo. 1996. Status and Participation in Task Groups: A Dynamic Network Model. *American Journal of Sociology*. 101(5):1366-1414.

This article presents a dynamic model for the formation of status orders in small task groups whose members may be differentiated by a diffuse status characteristic. This theoretical strategy embodies "E-state structuralism," which unites the social psychological formalism of expectation states theory with social network research. Using the development of status hierarchies via differential participation in group discussion, the formal model synthesizes (a) the conceptual structure of Fisek, Berger, and Norman, (b) Balkwell's formula for status effects on probabilities of directed participation, and (c) Fararo and Skvoretz's E-state structuralism model for the formation of dominance structures. After describing this synthesis, the article presents the model in axiomatic form and provides a simulation of its dynamic consequences.

Smith, Peter W., John W. McDonald, Jonathan J. Forster and Ann M Berrington. 1996. Applied Statistics. Monte Carlo Exact Methods Used for Analysing Interethnic Unions in Great Britain. *Applied Statistics*. 45(2): 191-202.

In the analysis of symmetric intermarriage and social mobility tables, interest is focused on the models of quasi-independence and quasi-symmetry for the off-diagonal cells. Typically, many of the off-diagonal cell counts are small. This causes concern about the validity of using

asymptotic tests, and exact tests should be considered. We develop Markov chain Monte Carlo methods for estimating the exact conditional p-value and the exact distribution of the residuals, for quasi-independence and quasi-symmetry. These methods are used to analyse a sparse 10 x 10 symmetric table of interethnic unions, extracted from the 1% household sample of anonymized records from the 1991 UK census. With the exception of Pakistani/White and Other Asian/White unions, there is no evidence against quasi-symmetry. We conclude that, with these exceptions, there are no gender differences in the affinities between ethnic groups.

Sørensen, Aage B. 1996. The Structural Basis of Social Inequality. *American Journal of Sociology*. 101(5):1333-1365.

This article discusses the concept of rent and its use in analysis of inequality in society. Rents are resources that provide advantages for incumbents of social positions that are independent of the characteristics of the incumbents. Inequalities created by rents generate interests in the protection and the acquisition of advantages that can be said to form "objective" interests attached to positions in social structure. Rent, therefore, is the basis for the formation of classes, in the general meaning of conflict groups. The article also discusses rents not located in positions in social structure but based on natural abilities.

Stark, David. 1996. Recombinant Property in East European Capitalism. *American Journal of Sociology*. 101(4): 993-1027.

Recombinant property is a form of organizational hedging in which actors respond to uncertainty by diversifying assets, redefining and recombining resources. It is an attempt to hold resources that can be justified by more than one legitimating principle. Property transformation in postsocialist Hungary involves the decentralized reorganization of

assets and the centralized management of liabilities. Together they blur the boundaries of public and private, the boundaries of enterprises, and the boundedness of justificatory principles. Enterprise-level field research, data on the ownership structure of Hungary's 220 largest enterprises and banks, and an examination of the government's recent debt consolidation programs suggest the emergence of a distinctively East European capitalism that will differ as much from West European capitalisms as do contemporary East Asian variants.

Timmer, Susan G., Joseph Veroff and Shirley Hatchett. 1996. Family Ties and Marital Happiness: The Different Marital Experiences of Black and White Newlywed Couples. *Journal of Social and Personal Relationships*. 13(2): 201-224.

This paper explores the relationship of family ties to black and white couples' marital happiness over the first three years of their marriages. Respondents were 115 black and 136 white couples interviewed as part of the "Early Years of Marriage" study. Although there were many similarities in the way blacks and whites felt about and interacted with their families, black couples were less likely to argue over matters pertaining to family, visited their families more often, but perceived fewer family members able to help if needed. Hierarchical panel regressions showed that close family ties had no effect on the marital happiness of whites, but significantly predicted black couples' marital happiness, particularly the ties to the husband's family. Predictions of marital happiness further varied by low and high structural stress (low income combined with early family formation), such that low-stress blacks increased closeness to their in-laws from year 1 to year 3 predicted marital happiness. For high-stress blacks, the couples' closeness to the husband's family in year 1, and increases in that closeness by year 3 predicted increased marital happiness. Find-

ings point to the importance of accounting for both ethnicity and structural context for understanding the paths that couples take in establishing happy marriages.

Taylor, Ralph B. 1996. Neighborhood Responses to Disorder and Local Attachments: The Systematic Model of Attachment, Social Disorganization, and Neighborhood Use Value. *Sociological Forum*. 11(1):41-74.

This paper investigates neighborhood-level connections between ecological structure, responses to disorder, and local attachment and social involvement. We develop predictions integrating the systematic model of community attachment, neighborhood use value, and the social disorganization perspective. The systemic model predicts neighborhood stability will deepen attachment and local involvement; the social disorganization perspective anticipates effects of stability on responses to disorder; and neighborhood use value suggests effects of status, racial composition and problems such as crime and deterioration on attachment. We further propose, building on earlier work, that attachment may influence responses to disorder, or vice versa. Data include resident surveys, census information, on-site assessments, and crime rates from 66 randomly selected Baltimore, Maryland, neighborhoods. In support, respectively, of the systemic and neighborhood use value models, we find strong impacts of stability and class on neighborhood attachment / involvement. Neighborhood fear and perceived informal social control depend upon emotional investment and social integration. We see no overall impacts of deterioration on responses to disorder, calling into question some key aspects of the incivilities thesis. Earlier investigations of deterioration and responses to disorder that excluded person-place transactions may have been miss-specified. Results underscore the strong relationship between person-environment transactions and responses to disorder. Asking how to encourage

citizens to resist disorder is questioning, in part, how to increase the bonds residents have with the locale and with one another.

Unger, Donald G., Sharon B. Jacobs and Christine Cannon. 1996. Social Support and Marital Satisfaction Among Couples Coping with Chronic Constructive Airway Disease. *Journal of Social and Personal Relationships*. 13(1):123-142.

Couples in which one spouse has chronic obstructive airway disease (COAD) face great distress and change over the life course. Couples experience multiple losses and feelings of anxiety, depression and hopelessness, usually beginning in mid-life and continuing into older age. This study explored two sources of social support — family support and friend support — as resources for coping with illness. The relation of family and friend received and provided support with marital satisfactions and the effects of sex and length of marriage were studied. Results indicated that the association between support and marital satisfaction was moderated by the couple's length of marriage, the sex of patients and spouses, and the degree of congruency between husbands' and wives' evaluations of their marital satisfaction. Support acted as a stress buffer in regard to marital satisfaction only for male spouses and male patients. Implications for theory, research and preventive interventions are discussed.

Vespo, Jo Ellen, Kathryn A. Kerns and Elizabeth M. O'Connor. 1996. Social Organization in Preschool Classrooms: Social Sets as Social Units. *Journal of Social and Personal Relationships*. 13(1):41-55.

The purpose of this study was to examine age-related changes in preschoolers' affiliative groups. In this study, the peer group rather than the individual child was treated as the unit of analysis. Forty-seven 3-year-olds in four classes and 50 4-year-olds in four other

classes were observed during free play. Observers recorded the person with whom each child interacted. McQuitty's (1957) cluster analysis was performed on the children's interaction scores to derive the affiliative groups in each classroom, which were called social sets. Social sets depict the peer interactive networks within each classroom. The social sets of 4-year-olds were both larger and higher in density than the social sets of the 3-year-olds. The findings are consistent with expectations that older preschoolers are better able to maintain several peer relationships simultaneously than are younger preschoolers. We discussed ways in which identification of social sets helps to understand the dynamics of individuals, relationships and groups.

Wasserman, Stanley, and Philippa Pattison. 1996. Logit Models and Logistic Regressions for Social Networks: I. An Introduction to Markov Graphs and p. *Psychometrika*. 61(3): 401-426.

Spanning nearly sixty years of research, statistical network analysis has passed through (at least) two generations of researchers and models. Beginning in the late 1930's, the first generation of research dealt with the distribution of various network statistics, under a variety of null models. The second generation, beginning in the 1970's and continuing into the 1980's, concerned models, usually for probabilities of relational ties among very small subsets of actors, in which various simple substantive tendencies were parameterized. Much of this research, most of which utilized log linear models, first appeared in applied statistics publications. But recent developments in social network analysis promise to bring us into a third generation. The Markov random graphs of Frank and Strauss (1986) and especially the estimation strategy for these models developed by Strauss and Ikeda (1990; described in brief in Strauss, 1992), are very recent and promising contributions to this field. Here we describe a large

class of models that can be used to investigate structure in social networks. These models include several generalizations of stochastic blockmodels, as well as models parameterizing global tendencies towards clustering and centralization, and individual differences in such tendencies. Approximate model fits are obtained using Strauss and Ikeda's (1990) estimation strategy. In this paper we describe and extend these models and demonstrate how they can be used to address a variety of substantive questions about structure in social networks.

Weinberg, Lisa. 1996. Seeing Through Organization: Exploring the Constitutive Quality of Social Relations. *Administration and Society*. 28(2): 177-204.

This article reframes the relationship between people and organization to reveal the constitutive quality of social relations. Although agreeing with Karl Weick that organization emerges in interaction, the author theoretically integrates the work of Mary Parker Follett and Bowenian family systems theorists to go beyond Weick's focus on behaviors, examining instead the interpersonal dynamics that fuel behavior. According to this theoretical orientation, people exist in relationship to one another and are made different by their interdependence. The quality of their interaction thus determines the consciousness they bring to the organizing process, and with it, the nature of organization itself.

Whisman, Mark A. and Laura E. Allan. 1996. Attachment and Social Cognition Theories of Romantic Relationships: Convergent or Complimentary Perspectives? *Journal of Social and Personal Relationships*. 13(2): 263-278.

Adult attachment and social cognition perspectives of romantic relationships have developed relatively independently of one another, despite the fact that both stress the

importance of cognitive conceptual frameworks of relationship functioning. This study examines the strength of the association between constructs from the two perspectives and their associations with concurrent relationship adjustment and 6-month longitudinal relationship dissolution. Results from 68 dating couples suggested a modest degree of convergence between measures of attachment, relationship beliefs and relationship attributions. Measures of both adult attachment and relationship beliefs and attributions were uniquely related to concurrent relationship adjustment, although between-partner differences on attachment and social cognition measures were largely unrelated to relationship adjustment. The only relationship cognition variable that was predictive of subsequent relationship dissolution was stronger endorsement by women of partner responsibility attributions (i.e. viewing negative partner behavior as blameworthy, intentional and selfishly motivated). These results suggest that attachment and social cognition may offer complementary perspectives of romantic relationships.

White, Douglas R. and Paul Jorion. 1996. Kinship Networks and Discrete Structure Theory: Applications and Implications. *Social Networks*. 18:267-314.

Confusions between substantive and relational concepts of kinship as a social network have led to a number of problems that are clarified by a temporally ordered relational theory of network structure. The ordered-network approach gives rise to a novel means of graphing the social field of kinship relations, while allowing kinship to be locally defined in culturally relative terms. Its utility is exemplified in applications to kinships among US Presidents, Old Testament Canaanites, and native Australians of Groote Eylandt. The formal concepts treated in the mapping of kinship networks are: kinship axioms, parental graph structure, core, circuits of

consanguineally and affinally linked kin, sides and divides, homeomorphic mappings, homomorphisms as potentially simplifying mappings of kinship, elementary structure, and order-structure. Representational theorems are proven about homeomorphisms, cores and circuits, and the ambiguity of elementary structures. The last set of theorems leads to clarifying and redefining some of the basic concepts of elementary, semi-complex and complex structures of kinship in terms of properties of generationally ordered networks. The conclusions of the formal argument are 'post-structural' in the narrow sense of demonstrating the need for specifying contingent historical processes in the structural analysis of kinship as a social field. The open-ended approach to change, one that is implied by the study of ordered structures that unfold in a temporal succession, connects to issues of population variability, selection, and evolutionary processes. The kinship structures that are mapped in this approach are not intended as any sort of complete representations of kinship 'systems', but merely as scaffoldings that help to bring into view kinship as a social field, providing a baseline for other mappings (which may be superimposed) of social processes such as communicative fields, exchange processes, transmission of learned behaviors, social rights and inheritance, political and religious succession, and the like.

White, Douglas R. 1996. Statistical Entailments and the Galois Lattice. *Social Networks*. 18:201-215.

Statistical entailment analysis (White, 1984; White and McCann, 1988 *Social Structures: Form and Behaviour in Social Life*) (Cambridge University Press) pp. 380-404) aims first at a rigorous evaluation of null hypotheses of statistical independence as a potential source of binary data structure, and second at constructing a discrete structure (Boolean) model of those statistical interactions that remain when the null hypothesis is rejected for

particular subsets of variables. Signal detection theory, rather than a conventional significance level, is used to specify optimal cutoffs given an ordering of ratios of actual to expected across levels of exception and relevance. Bivariate entailment analysis is generalized here to improve its utility for use in lattice approximation. Generalized statistical entailment analysis describes Boolean patterns in a set of data in terms of those that occur with greater frequency than expected by chance according to a model of complete statistical independence (the specific model of independence derives from a distribution of randomly permuted entries in the columns of the data matrix marginals, i.e. keeping univariate marginals fixed). This expands on the initial design of entailment analysis (White, 1984) to deal with partial orders of quasi-implication in pairs or chains of dichotomous variables, supported by statistical evidence of departure from bivariate independence and conformity to the rules of transitivity. Statistical approximations simplify a lattice representation of discrete structure by forcing quasi-implications (ignoring exceptions), for example, but they also provide information about those implications in the lattice that represent statistically significant tendencies. Given a lattice representing the discrete structure of a raw data matrix, the findings of entailment analysis describe additional structural regularities (tendencies towards further statistical constraints on Boolean patterns that occur in the data) that can be used to simplify (by approximation) the lattice of empirical patterns. As demonstrated with studies of dual orderings of material possessions (possessions stratify people; people possessions), the statistical interpretability of discrete structure lattices is enhanced by using the results of entailment analysis for consensus-simplification of statistically strong or significant implicational relations.

Wilke, Henk, Heather Young, Ingeborg Mulders, and Dick de Gilder. 1995. Accep-

tance of Influence in Task Groups. *Social Psychology Quarterly*. 58(4):312-320.

Acceptance of influence in task groups was investigated by means of an experiment with a 2 (competence: advantage, disadvantage) × 2 (interdependence: competition, cooperation) between-subjects and a 2 (stimulus ambiguity: low, high) × 2 (discrepancy: large, small) within-subjects factorial design. Predictions were based on status generalization research and on theorizing by Festinger and Turner. Competence-advantaged subjects accepted less influence than competence-disadvantaged subjects accepted less influence than competence-disadvantaged subjects. Subjects in the competition condition accepted less influence than subjects in the cooperation condition. Acceptance of influence was greater when group members were less confident about their solution of the task and when discrepancies in judgments were larger. Three statistical interaction effects were found and are discussed.

Wilson, Francis. 1995. Managerial Control Strategies Within Networked Organization. *Information Technology and People*. 8(3):57-72.

Over the last decade, a pivotal theme within management and organizational research has been the identification of new industrial methodologies and technologies which focus on the generation of greater workforce commitment and flexibility. The hope is that the new information-based technologies will allow for the tenets and practices of Taylorism and Fordism, once the basis for industrial development, to be swept away, thus developing an environment of commitment and trust. This would be exemplified by "empowered" semi-

autonomous units of production, where a highly trained and skilled workforce could exercise freedom and authority within a decentralized mode of control and coordination. To support this perspective, a number of managerial techniques such as total quality management and business processes engineering have arisen, which claim to describe the ways in which organizations may provide this autonomy, while simultaneously increasing productivity. A parallel theme has been the development of critical approaches to these events, which suggests that the use of such techniques, rather than providing radical alternatives to the precepts of scientific management, merely reinforce it. Central to this perspective is the proposition that increasingly powerful computer-based systems (CBS) coupled with quality management (QM) methodologies provide enhanced control over workforce activities and provide management with improved surveillance and disciplinary mechanisms. This article contends that many of the new flexible forms of both production and organizational structure, which are exemplified by the concept of the decentralized "networked organization", may be shown to be dependent on both highly centralized systems and disciplinary mechanisms for their essentially integrated command, control and communications operations. Furthermore, it is suggested that, while many authors of the CBSIQM paradigm promote concepts of "empowerment" and freedom of individual decision making, these may be seen to rest on an increasing manipulation of the individual by centralized forms of managerial surveillance and cultural control.

Books

Agre, Philip E. and Stanley J. Rosenschein. Editors. 1996. *Computational Theories of Interaction and Agency*. Cambridge, MA: MIT Press.

This book includes seventeen papers, from a wide variety of disciplines, on the construction of principled characterizations of interactions between agents and their environments, as well as the use of these characterizations to support the explanation of existing agents and the synthesis of new ones. These papers originally appeared as articles in a special double volume of *Artificial Intelligence*. From the preface:

Early artificial intelligence research focused on thinking. This was understandable, given the poor state of robotics and the Cartesian intellectual inheritance of that day, as well as the promise of symbolic programming as a tool for simulating cognition. Over time, though, the field has returned to the agent perspective that first emerged with early robotic projects such as Shakey, expanding its focus from thought to action, from search spaces to physical environments, and from problem-solving to long-term activity. It has sought computational ways of understanding an agent's embodiment, as well as its embedding in its familiar world.

Above all, the concept of an agent points to the need for a developed conception of agency. The first steps in this direction have been difficult, as researchers have learned to untangle the web of assumptions that drove the field in its early days. Enough has been done, though, to identify some recurring themes and to paint a methodological picture that encourages cooperation among diverse disciplinary frameworks without imposing a premature unity upon them. Central to this picture is the principled characterization of agents' interactions with their environments. Building artificial agents that interact with environments is a good first step. Past a certain point, though, it becomes important to conceptualize the structures and attributes of the interactions themselves. Although

several existing fields offer useful concepts for this purpose, the computational research tradition provides the raw materials for powerful new frameworks for characterizing interactions. Full abstracts for the papers are available at:

<http://communication.ucsd.edu/page/aij-abstracts.html>

Contents: Computational research on interaction and agency, *Philip E. Agre* / Sensorimotor transformations in the worlds of frogs and robots, *Michael A. Arbib and Jim-Shih Liaw* / Learning to act using real-time dynamic programming, *Andrew G. Barto, Steven J. Bradtke, and Satinder P. Singh* / Learning dynamics: System identification for perceptually challenged agents, *Ken Basye, Tom Dean, and Leslie Pack Kaelbling* / A dynamical systems perspective on agent-environment interaction, *Randall D. Beer* / On information invariants in robotics, *Bruce R. Donald* / The stabilization of environments, *Kristian J. Hammond, Timothy M. Converse, and Joshua W. Grass* / An architecture for adaptive intelligent systems, *Barbara Hayes-Roth* / Analysis of adaptation and environment, *Ian Horswill* / The intelligent use of space, *David Kirsh* / Indexical knowledge and robot action: A logical account, *Yves Lesperance and Hector J. Levesque* / Exploiting patterns of interaction to achieve reactive behavior, *Damian M. Lyons and A.J. Hendriks* / A situated view of representation and control, *Stanley J. Rosenschein and Leslie Pack Kaelbling* / The use of dynamics in an intelligent controller for a space faring rescue robot, *Marcel Schoppers* / On social laws for artificial agent societies: Off-line design, *Yoav Shoham and Moshe Tennenholtz* / Instructions, intentions and expectations, *Bonnie Webber, Norman Badler, Barbara Di Eugenio, Chris Geib, Libby Levison, and Michael Moore* / Reinforcement learning of non-Markov decision processes, *Steven D. Whitehead and Long-Ji Lin*.

Arabie, P., L. J. Hubert and G. De Soete, editors. 1996. *Clustering and Classification*. Singapore: World Scientific.

Contents: Introduction, John A. Hartigan / An Overview of Combinatorial Data Analysis, Phipps Arabie and Lawrence J. Hubert / Hierarchical Classification, Allan D. Gordon / A Hierarchical Classes Model: Theory and Method with Applications in Psychology and Psychopathology, Seymour Rosenberg, Iven Van Mechelen, and Paul De Boeck / Tree and Other Network Models for Representing Proximity Data, Geert De Soete and J. Douglas Carroll / Complexity Theory: An Introduction for Practitioners of Classification, William H. E. Day / Neural Networks for Clustering, Fionn Murtgah / A Review of Cluster Analysis Research in Japan, Akinori Okada / Clustering and Multidimensional Scaling in Russia (1960-1990): A Review, Boris G. Mirkin and Ilya Muchnik / Clustering Validation: Results and Implications for Applied Analyses, Glenn W. Milligan / Probability Models and Hypotheses Testing in Partitioning Cluster Analysis, Hans-Hermann Bock.

Barkey, Karen. 1996. *Bandits and Bureaucrats: The Ottoman Route to State Centralization*. Ithica, NY: Cornell University Press.

Why did the main challenge to the Ottoman state come not in peasant or elite rebellions, but in endemic banditry? Karen Barkey shows how Turkish strategies of incorporating peasants and rotating elites kept both groups dependent on the state, unable and unwilling to rebel. Bandits, formerly mercenary soldiers, were not interested in rebellion but concentrated on trying to gain state resources, more as rogue clients than as primitive rebels. The state's ability to control and manipulate bandits-through deals, bargains, and patronage- suggests imperial strength rather than weakness, she maintains.

Bandits and Bureaucrats details, in a rich, archivally based analysis, state-society relations in the Ottoman Empire during the sixteenth and seventeenth centuries. Exploring current Eurocentric theories of state building, the author illuminates a period often mischaracterized as one in which the state declined in power.

Outlining the processes of imperial rule, Barkey relates the state's political and military institutions to their social foundations. She compares the Ottoman route with state centralization in the Chinese and Russian empires, and contrasts experiences of rebellion in France during the same period. *Bandits and Bureaucrats* thus develops a theoretical interpretation of imperial state centralization, through incorporation and bargaining with social groups, and at the same time enriches our understanding of the dynamics of Ottoman history.

Bigelow, Brian J. Geoffrey Tesson and John H. Lewko. 1996. *Learning the Rules: The Anatomy of Children's Relationships*. New York: Guilford Publications.

This unique and insightful volume is about childhood relationships — what they mean and how children manage them. Shedding light on how more mature and complex adult phenomena can be seen in their earlier nascent forms, the work also gives readers an understanding of the basic processes that govern relationships in general. The authors focus on what children themselves say, to illuminate the personal constructions they use to order their social reality, as well as to address the actual content and meaning of their relationships. In interpreting children's verbalized social rules with parents, siblings, peers, and teachers, the work provides a contextually informed framework from which to explore such issues as the impact of parental authority on child compliance, sibling rivalry, close friendships, and disclosure.

Contents: 1) Social Competency and Friendships in Middle Childhood: *Lord of the Flies* Revisited / 2) Social Rules and the Implicate Order: Toward a Sociology of Childhood / 3) Phenomenology and Relationships: The Birth of Social Rules / 4) The Rules and with Whom They Are Used: Compliance and Autonomy / 5) The Rules and with Whom They Are Used: Self-Control and Conflict Management / 6) The Rules and with Whom They Are Used: Mutual Activities and Obligation / 7) Social Competency and the Sorcerer's Apprentice: The Importance of Parents / 8) Siblings: The Relationship You Don't Have to Earn to Keep / 9) Social Rule Rationales: The Child as a Relationship Philosopher / 10) Concluding Remarks / Appendices.

Bloor, Michael. 1995. *A Sociology of HIV Transmission*. Thousand Oaks, CA: Sage Publications.

What contribution is sociology making in understanding the social and cultural context in which HIV transmission occurs? In this authoritative study, Michael Bloor provides a lucid overview of the vital contribution sociology has made and is making in the study of HIV transmission. He examines the epidemiology of the HIV epidemic in its different manifestations in the developing world and in the West, looking at tourism prostitution, intravenous drug users, hemophiliacs and transfusion recipients, and heterosexual and homosexual transmission.

Contents: 1) Introduction / 2) The Epidemic of HIV Infection in the Developing World / 3) The Epidemic of HIV Infection in the West / 4) Sociological Studies of Risk Behavior / 5) Theories of Risk Behavior / Conclusion / Index.

Canary, Daniel J, William R. Cupach and Susan J. Messman. 1995. *Relationship Conflict: Conflict in Parent-Child, Friendship, and*

***Romantic Relationships*. Thousand Oaks, CA: Sage Publications.**

Conflict is a natural, even inevitable, aspect of most ongoing close relationship -- a given. What distinguishes most successful relationships from unsuccessful ones is not the absence of conflict, but how conflict is managed. Relationship Conflict skillfully portrays the different types of conflict that we encounter in our most significant personal relationships: parent-child, friendship, and romantic relationships. The authors capture the essence of current research and theory to shed light on conflict's role in human interaction. Drawing from the findings of multiple disciplines, this volume takes a developmental look at childhood friendships through to dating and married relationships. The result is a richer understanding of interpersonal involvement accessible to close relationship researchers and professionals and students in many service-based fields.

Contents: 1) The Nature of Conflict in Close Relationships / 2) Methods for Studying Conflict in Close Relationships / 3) Parent-Child Conflict / 4) Conflict in Friendship / 5) Conflict in Dating and Marital Relationships / 6) Conclusions about Prospects for Research on Conflict in Close Relationships.

Colin, Virginia L. 1996. *Human Attachment*. Philadelphia: Temple University Press.

This brand new book is the first and only comprehensive introduction to attachment research and theory. It explains theory, research methodology, research results, and discusses both healthy and pathological development in infancy, childhood, adolescence and adulthood. The book is organized into four units. Unit I tells the story of the early history of attachment theory and research, then introduces the major propositions of attachment theory. Unit II describes the three major methods for studying attachment

in infancy, then discusses how infants form attachments. Unit III discusses representational models, methods for studying attachments in childhood, and the association between attachment patterns and aspects of personality and social behavior in childhood. Unit IV begins by describing hypotheses about what's happening with attachments and how attachment patterns affect feelings, thoughts, behavior, and intimate relationships in adolescence and in the adult years. Finally, it describes what data about personality, relationships, marriage, loneliness, separation, loss, and old age we can relate to attachment patterns.

Contents: 1) The Early History of Attachment Theory and Research / 2) Major Propositions of Attachment Theory / 3) Research Methods for Infancy / 4) Phases in the Development of Attachments in Infancy / 5) Sensitive Responsiveness / 6) More Influences on Attachment Patterns / 7) Early Correlates and Sequelae of Attachment Patterns / 8) Cultural Variations in Attachment Relationships / 9) Fathers / 10) Maternal Employment and Infant Day Care / 11) Attachment Hierarchies / 12) Early Intervention / 13) Representational Models / 14) Assessment in Childhood / 15) Childhood Correlates of Attachment Patterns / 16) Theoretical Speculations / 17) Assessing Adult Attachment / 18) Research about Adult Attachments.

Cutrona, Carolyn E. 1996. *Social Support in Couples: Marriage as a Resource in Times of Stress*. Thousand Oaks, CA: Sage Publications.

Expressions of support between partners may be more commonplace than heroic, but their cumulative effects on the growth of trust, enduring love, and commitment can be considerable even life-saving in the face of otherwise overwhelming tragedy. Skillfully weaving together the latest research with engaging case examples and practical applications, author Carolyn E. Cutrona offers an in-

depth analysis of how committed partners can serve as resources for each other in stressful scenarios. Beginning with a fresh overview of definitions and concepts, *Social Support in Couples* articulates the vital components of intimate support systems. This informative volume explores the phenomenon of marital communication through real-life interactions, focusing on gender-related differences, the interplay between supportive and destructive interactions, and stress experienced during chronic / disabling illness. In a concluding chapter, a research agenda for future study opens the topic up to additional serious consideration. A reader-friendly examination of the power of supportive acts, *Social Support in Couples* is recommended for a wide readership, including academics, practitioners, and students in family studies, social psychology, social work, and marriage and family counseling.

Contents: 1) What is Social Support and What Makes You Think You Have It? 2) Gender-Related Differences in Social Support and Coping / 3) Giving and Taking Support: A Complicated Process / 4) The Interplay Between Conflict and Social Support: Do Positive Behaviors Really Matter? 5) In Sickness and In Health: When One Partner Has a Serious Illness / 6) Social Support Therapy With Couples / 7) Future Research Directions.

Dearing, James W. 1995. *Growing in a Japanese Science City*. London: Routledge.

Contents: 1) Introduction / 2) Understanding a Science City / 3) History of the Science City Concept / 4) Implementing the Plan / 5) Research Communication in Tsukuba / 6) Collaboration Networks / 7) Lessons Learned about Growing Science.

Ebers, Mark. Editor. 1997. *The Formation of Inter-organizational Networks*. London: Oxford University Press.

Contents: The Inter-organizational Network as a Distinct Organizational Form, *Mark Ebers / Relationships as Activity Links, Anna Dubois and Høkan Høkansson / Interfirm Responses to Heterogeneity of Demand over Time, Geoff Easton and Luis Araujo / The Network Structure of Inter-firm Relationships in the Southern Italian Mechanical Industry, Alessandro Lomi and Alessandro Grandi / Processes Facilitating Reliance on Trust in Inter-organizational Networks, Peter Smith Ring / R&D Alliances: Ensuring Trust by Mutual Commitments, Paul de Laat / An Economic Model of Inter-firm Networks, Mark Casson and Howard Cox / Co-ordinating Multi-firm Innovative Processes: Entrepreneur as Catalyst in Small-firm Networks, Andrea Lipparini and Maurizio Sobrero / Learning through Intermediaries: The Case of Inter-firm Research Collaborations, Susanne Lutz / Mixed Mode Operation of Electronic Markets and Hierarchies, Christopher P. Holland and Geoff Lockett / The Formation of Inter-organizational Networks: Implications for Theory and Practice, Mark Ebers and Anna Grandori*

Elman, Jeffrey, Elizabeth A. Bates, Mark H. Johnson, Annette Karmiloff-Smith, Domenico Parisi, Kim Plunkett. 1996. *Rethinking Innateness: A Connectionist Perspective on Development*. Cambridge, Massachusetts: The MIT Press.

Rethinking Innateness asks the question, "What does it really mean to say that a behavior is innate?" The authors describe a new framework in which interactions, occurring at all levels, give rise to emergent forms and behaviors. These outcomes often may be highly constrained and universal, yet are not themselves directly contained in the genes in any domain-specific way.

One of the key contributions of *Rethinking Innateness* is a taxonomy of ways in which a behavior can be innate. These include constraints and the level of representation, archi-

ture, and timing / typically, behaviors arise through the interaction of constraints at several of these levels.

The ideas are explored through dynamic models inspired by a new kind of "developmental connectionism," a marriage of connectionist models and developmental neurobiology, forming a new theoretical framework for the study of behavioral development. While relying heavily on the conceptual and computational tools provided by connectionism, *Rethinking Innateness* also identifies ways in which these tools need to be enriched by closer attention to biology.

Harton, Helen C. and Bibb Latané, 1996. *The Social Self-Organization of Culture*. In F. Scheitzer, editor. *Self-Organization of Complex Structures: From Individual to Collective Dynamics, Vol. 2*. London: Gordon and Breach.

Suggesting that culture is a self-organizing system emerging from common, everyday communication between individuals, we review a theory of dynamic social impact, based on empirical principles and computer simulations, that predicts the emergence of four group-level phenomena — clustering (the spatial organization of attitudes), correlation (associations between attitudes), consolidation (the reduction of minority positions), and continuing diversity. An empirical study in which groups of students answered multiple choice questions before and after discussing them with their nearest neighbors demonstrates the evolution of these phenomena empirically.

Kalleberg, Arne L., David Knoke, Peter V. Marsden, and Joe L. Spaeth, editors. 1996. *Organizations in America: Analyzing Their Structures and Human Resource Practices*. Thousand Oaks, CA: Sage Publications.

Based on the findings of the National Organi-

zations Study, *Organizations in America* provides a comprehensive review of the first national survey of organizations in the United States. Using a statistically representative sample, this work is the most authoritative database on the workings of organizations available. The principal investigators of the study use this data set to define what we know about the structures and human resource practices in U. S. organizations and describes:

- The National Organizations study and its implications
- Specific employment practices - hiring, training, promotion, performance measurement, benefit packages, contingent work - and how they compare between different businesses and business sectors.
- Differences between male & female employees

This Breakthrough publication is an indispensable reference tool for those in the areas of organizational studies, human resources, sociology of work, industrial psychology, social stratification, labor, and labor economics.

Contents: Part 1: The National Organizations Study. 1) Organizational Properties and Practices, *Arne L. Kalleberg, David Knoke, Peter V. Marsden, and Joe L. Spaeth* / 2) Design of the National Organizations Study, *Joe L. Spaeth and Diane P. O'Rourke* / 3) American Organizations and The Environments, *Peter V. Marsden, Cynthia R. Cook, and David Knoke* / Part 2: Organizational Structures. 4) Bureaucratic Structures for Coordination and Control, *Peter V. Marsden, Cynthia R. Cook, and Arne L. Kalleberg* / 5) Formalizing the Employment Relation, *Arne L. Kalleberg, Peter V. Marsden, David Knoke, and Joe L. Spaeth* / 6) Human Resource Management and Organizational Performance, *Arne L. Kalleberg and James W. Moody* / Part 3: Organizations' Human Resource Practices. 7) The Staffing Process, *Peter V. Marsden* / 8) Job Training in U. S. Organiza-

tions, *David Knoke and Arne L. Kalleberg* / 9) Training, Unions, and Internal Labor Markets, *David Knoke and Yoshito Ishio* / 10) Organizational Differences in Earnings, *Arne L. Kalleberg and Mark E. Van Buren* / 11) The Structure of Organizational Earnings Inequality, *Arne L. Kalleberg and Mark E. Van Buren* / 12) Cui Bono? Employee Benefit Packages, *David Knoke* / Part 4: Organizations and the Changing Workforce / 13) Contingent Employment in Organizations, *Arne L. Kalleberg and Kathryn Schmidt* / 14) Organizational Patterns of Gender Segregation, *Donald Tomaskovic-Devey, Arne L. Kalleberg, and Peter V. Marsden* / 15) Gender Differences and Organizational Commitment, *Peter V. Marsden, Arne L. Kalleberg, and Cynthia R. Cook* / 16) Conclusions and Prospects, *Arne L. Kalleberg, David Knoke, Peter V. Marsden, and Joe L. Spaeth.*

Kasabov, Nikola K. 1996. *Foundations of Neural Networks, Fuzzy Systems, and Knowledge Engineering*. Cambridge, Massachusetts: The MIT Press.

Neural networks and fuzzy systems are different approaches to introducing human-like reasoning into expert systems. This text is the first to combine the study of these two subjects, their basics and their use, along with symbolic AI methods to build comprehensive artificial intelligence systems.

In a clear and accessible style, Kasabov describes rule-based and connectionist techniques and then their combinations, with fuzzy logic included, showing the application of the different techniques to a set of simple prototype problems, which makes comparisons possible. A particularly strong feature of the text is that it filled with applications in engineering, business, and finance. AI problems that cover most of the application-oriented research in the field (pattern recognition, speech and image processing, classification, planning, optimization, prediction, control, decision making, and game simulations) are

discussed and illustrated with concrete examples. Intended both as a text for advanced undergraduate and postgraduate students as well as a reference for researchers in the field of knowledge engineering, *Foundations of Neural Networks, Fuzzy Systems, and Knowledge Engineering* has chapters structured for various levels of teaching and includes original work by the author along with the classic material.

Data sets for the examples in the book as well as an integrated software environment that can be used to solve the problems and do the exercises at the end of each chapter are available free through anonymous ftp.

Kling, Rob, editor. 1996. *Computerization and Controversy: Value Conflicts and Social Choices*. San Diego: Academic Press.

Contents: Part I: Heads Up! Mental Models for Traveling through the Computer World. A) Heads-Up versus Heads-In Views of Computer Systems, *Rob Kling* / B) A Reader's Guide to Computerization and Controversy, *Rob Kling* / C) Social Controversies about Computerization, *Rob Kling* / D) Computers as Tools and Social Systems: The Car-Computer Analogy, *Rob Kling* / E) The Seductive Equation of Technological Progress with Social Progress, *Rob Kling* / F) Learning about the Possible Futures of Computerization from the Present and the Past, *Rob Kling* / G) Information and Computer Scientists as Moral Philosophers and Social Analysts, *Rob Kling* / Part II: The Dreams of Technological Utopianism / A) Hopes and Horrors: Technological Utopianism and Anti-Utopianism in Narratives of Computerization, *Rob Kling* / B) 2001: A Meetings Odyssey, *Ross Weiland* / C) Boom Time on the New Frontier, *Thomas A. Stewart* / D) The Electronic Hive: Embrace It, *Kevin Kelly* / E) The Electronic Hive: Refuse It, *Sven Birkerts* / F) Electronic Office: Playpen or Prison, *Langdon Winner* / G) Computerization Movements and Tales of Technological Utopianism,

Suzanne Iacono and Rob Kling / Part III: The Economic, Cultural, and Organizational Dimensions of Computerization. A) The Centrality of Organizations in the Computerization of Society, *Rob Kling* / B) Israel: Of Swords and Software Plowshares, *Gad Ariav and Seymour Goodman* / C) Getting the Electronics Just Right: Wells Fargo Is a Case Study in How a Company Can Exploit the Information Revolution, *Barnaby J. Feder* / D) How Information Technologies Can Transform Organizations, *Michael Scott Morton* / E) B of A's Plans for Computer Don't Add Up, *Douglas Frantz* / F) Groupware Goes Boom, *David Kirkpatrick* / G) Learning from Notes: Organizational Issues in Groupware Implementation, *Wanda J. Orlinkowski* / H) How Much Will a Truly Empowering Technology-Rich Education Cost? *Henry Jay Becker* / I) Technology Refusal and the Organizational Culture of Schools, *Steven Hodas* / J) Great Expectations: PCs and Productivity, *Martin Neal Baily* / K) Information Technology and the Productivity Challenge, *Paul Attewell* / L) Where Are the Payoffs from Computerization? Technology, Learning, and Organizational Change, *John Leslie King* / M) Can Computer Science Solve Organizational Problems? The Case for Organizational Informatics, *Rob Kling and Jonathan P. Allen* / Part IV: Computerization and the Transformation of Work. A) Computerization at Work, *Rob Kling* / B) Computerization, Office Routines, and Changes in Clerical Work, *Suzanne Iacono and Rob Kling* / C) The Case of the Omniscient Organization, *Gary T. Marx* / D) Mr. Edens Profits from Watching His Workers' Every Move, *Tony Horowitz* / E) Interface Development in a Large Organization: An Observational Study, *Steven E. Poltrock and Jonathan Grudin* / F) Groupware in Practice: An Interpretation of Work Experiences, *Christine V. Bullen and John L. Bennett* / G) Computing at Work: Empowering Action by Low-Level Users, *Andrew Clement* / H) Supporting Articulation Work, *Lucy Suchman* / Part V: Social Relationships in Electronic Forums. A) Social Relationships in Electronic

- Forums: Hangouts, Salons, Workplaces, and Communities, *Rob Kling* / B) Increasing Personal Connections, *Lee Sproull and Sara Kiesler* / C) Gender and Democracy in Computer-Mediated Communication, *Susan C. Herring* / D) Finding a Happy Medium: Explaining the Negative Effects of Electronic Communication on Social Life at Work, *M. Lynne Markus* / E) They Call It Cyberlove, *Margo Kaufman* / F) The Strange Case of the Electronic Lover, *Lindsay Van Gelder* / G) Yakety-Yak, Do Talk Back!: PEN, the Nation's First Publicly Funded Electronic Network, Makes a Difference in Santa Monica, *Joan Van Tassel* / H) Taboo, Consensus, and the Challenge of Democracy in an Electronic Forum, *Julian Dibbell* / I) Applying Library Intellectual Freedom Principles to Public and Academic Computers, *Carl M. Kadie* / J) The Electronic Journal: What, Whence, and When?, *Ann Okerson* / K) I Heard It through the Internet, *Walt Crawford* / L) Technology, Scholarship, and the Humanities: The Implications of Electronic Information, *Vartan Gregorian* / M) On the Road Again? If Information Highways Are Anything like Interstate Highways-Watch Out!, *Richard Sclove and Jeffrey Scheuer* / Part VI: Privacy and Social Control. A) Information Technologies and the Shifting Balance between Privacy and Social Control, *Rob Kling* / B) Your Personal Information Has Gone Public, *David F. Linowes* / C) The Bill of Rights of the Constitution of the United States, *Prepared by Gerald Murphy* / D) Computer Matching Is a Serious Threat to Individual Rights, *John Shattuck* / E) The Government Needs Computer Matching to Root Out Waste and Fraud, *Richard P. Kusserow* / F) Clipper Chip Will Reinforce Privacy, *Dorothy E. Denning* / G) Wiretapping Bill: Costly and Intrusive, *Marc Rotenberg* / H) Privacy: How Much Data Do Direct Marketers Really Need? *Denison Hatch* / I) Direct Marketing Is Not a Significant Privacy Threat, *Robert Posch* / J) What to Do When They Ask for Your Social Security Number, *Chris Hibbert* / K) Markets and Privacy, *Kenneth Laudon* / L) Information Entrepreneurialism, Information Technologies, and the Continuing Vulnerability of Privacy, *Rob Kling, Mark S. Ackerman, and Jonathan P. Allen*. Part VII: System Safety and Social Vulnerability. A) Systems Safety, Normal Accidents, and Social Vulnerability, *Rob Kling* / B) RISKS-FORUM Digest Contributions, *R. Aminzade and Michael Slavitch* / C) Safety-Critical Computing: Hazards, Practices, Standards, and Regulation, *Jonathan Jacky* / D) Aging Airways, *Gary Stix* / E) Limits of Correctness in Computers, *Brian Cantwell Smith* / F) Caught in the Grip of RSI: A First-hand Account, *Evan Williamson* / G) Office Automation's Threat to Health and Productivity: A New Management Concern, *E. M. Omar Khalil and Jessie E. Melcher* / H) Ongoing Network Monitoring Attacks: CERT Advisory, February 3, 1994, *Computer Emergency Response Team* / I) Risks of Technology, *Peter G. Neumann*. Part VIII: Ethical Perspectives and Professional Responsibilities for Information and Computer Science Professionals. A) Beyond Outlaws, Hackers, and Pirates: Ethical Issues in the Work of Information and Computer Science Professionals, *Rob Kling* / B) All in a Day's Work: Nine Provocative Examples in the Practice of Computing Professionals, *Donn B. Parker, Susan Swope, Bruce N. Baker, and Eric A. Weiss* / C) Codes of Professional Ethics, *Ronald E. Anderson, Deborah G. Johnson, Donald Gotterbarn, and Judith Perrolle* / D) Code of Ethics and Professional Conduct (1992), *Association for Computing Machinery* / E) Confronting Ethical Issues of Systems Design in a Web of Social Relationships, *Ina Wagner* / F) Power in Systems Design, *Bo Dahlbom and Lars Mathiassen* / G) Considering Privacy in the Development of Multimedia Communications, *Andrew Clement* / H) New Principles for Engineering Ethics, *Edward Wenk, Jr.*
- Kramer, Roderick M. and Tom R. Tyler, editors. 1996. *Trust in Organizations: Frontiers of Theory and Research*. Thousand Oaks, CA: Sage Publications.**

Editors Roderick Kramer and Tom Tyler have assembled a cross-disciplinary group of scholars - from social psychology, behavioral economics, sociology, and organizational theory to bring together some of the newest and most exciting conceptual perspectives in this field. These contributions also reflect a variety of new methodological approaches to the study of organizational trust. This volume's broad coverage includes discussion of the psychological and social antecedents of trust, the effects of social and organizational structures on trust, and the broad effects on organizational functioning.

Contents: 1) Whither Trust? *Tom R. Tyler and Roderick M. Kramer* / 2) Trust in Organizations: A Conceptual Framework Linking Organizational Forms, Managerial Philosophies, and the Opportunity Costs of Controls, *W. E. Douglas Creed and Raymond E. Miles* / 3) Trust and Technology, *David Kipnis* / 4) Trust-Based Forms of Governance, *Walter W. Powell* / 5) Trust and Third-Party Gossip, *Ronald S. Burt and Marc Knez* / 6) Collaboration Structure and Information Dilemmas in Biotechnology: Organizational Boundaries as Trust Production, *Lynne G. Zucker, Michael R. Darby, Marilyn B. Brewer, and Yusheng Peng* / 7) Developing and Maintaining Trust in Work Relationships, *Roy J. Lewicki and Barbara Benedict Bunker* / 8) Micro-OB and the Network Organization, *Blair H. Sheppard and Marla Tuchinsky* / 9) Swift Trust and Temporary Groups, *Debra Meyerson, Karl E. Weick, and Roderick M. Kramer* / 10) The Road to Hell: Dynamics of Distrust in an Era of Quality, *Sim B. Sitkin and Derryl Stickel* / 11) Divergent Realities and Convergent Disappointments in then Hierarchic Relation: Trust and the Intuitive Auditor at Work, *Roderick M. Kramer* / 12) Beyond Distrust: "Getting Even" and the Need for Revenge, *Robert J. Bies and Thomas M. Tripp* / 13) Organizational Responses to Crisis: The Centrality of Trust, *Aneil K. Mishra* / 14) Trust and Crisis, *Eugene J. Webb* / 15) The Organizational Trust Inventory (OTI): Development and Validation, *L. L.*

Cummings and Philip Bromiley / 16) Trust in Organizational Authorities: The Influence of Motive Attributions on Willingness to Accept Decisions, *Tom R. Tyler and Peter Degoey* / 17) Collective Trust and Collective Action: The Decision to Trust a Social Decision, *Roderick M. Kramer, Marilyn B. Brewer, and Benjamin A. Hanna* / 18) Understanding the Interaction Between Procedural and Distributive Justice: The Role of Trust, *Joel Brockner and Phyllis Siegel*.

Lehtimäki, Hanna. 1996. *Coordination Through Social Networks*. Tampere, Finland: University of Tampere School of Business Administration.

The purpose of the research was to examine what social networks are like within an organization and to discuss how they can increase an understanding of coordination within and organization. The theoretical background of the research was in organizational theory and network theory. First, according to Pfeffer and Salancik, it was assumed that coordination is needed to reduce the uncertainty arising from interdependence between two organizational units. Based on literature and the empirical data, it was concluded that the primary purpose of coordination should be to reduce uncertainty by ensuring the formation of commonly shared perceptions of positive interdependence across units

Second, the network theory provided a framework and tools for studying the interpersonal interaction within the case firm. Network theory argues that actors in any social system do not behave independent of others, but rather, ties to others either constrain or provide opportunities for behavior. The focus in network analysis is on the relations between actors and a central consideration is how the relationship, both pattern and content, affect network members' behavior.

The research was conducted in a medium-sized manufacturing company in North America. The company had production facilities in two locations: one in Canada and one in the USA. The research method was a qualitative case study method, and fifteen managers participated in the study.

Social networks were described and analyzed along six dimensions: workflow ties, communication ties on company matters, communication ties on personal matters as well as support, trust and friendship ties. The prescribed structure of the company was described along three dimensions: the hierarchical structure, the functional structure and the geographical structure. Social Network data was examined with centrality analysis as well as blockmodel analysis. Also, KrackPlot figures were drawn and analyzed on each network. Centrality analysis showed that there were very few organizational members who were central company-wide, *i.e.*, across units, and that all those central actors had not only power based on their positions in the social networks but also hierarchically based power. Blockmodel analysis showed that the social networks were determined in part by the prescribed structure. Especially the geographical structure along with hierarchical structure appeared to shape social interaction in the case firm.

Based on the results on network analysis, propositions were formed on the relation between social networks and coordination. This research provides evidence that utilizing network analysis in a study of coordination can increase our understanding of how does the behavior of organizational members, those who execute coordination on daily basis, relate to accomplishing coordination within organizations.

Rather than taking social networks as granted and using them as an independent variable in a causal model, this research sought to generate an understanding of social networks as the

exist in an empirical setting, which can be considered as a significant contribution of this study. Social networks were examined in their own context and they were compared to each other and to the prescribed structure, which increased an understanding of why networks were the way they were. Social network approach is fairly new in organizational research and it can be expected to be able to provide new ideas on developing organizational theories.

Lyons, Renee F., Michael J. L. Sullivan, and Paul G. Ritvo, with James C. Coyne. 1995. *Relationships in Chronic Illness and Disability*. Thousand Oaks, CA: Sage Publications.

How do relationships between friends, family, and couples change with chronic illness or disability? Adults face new relationship challenges when acquired health problems and disability begin to dominate their lives. Perceptive and thorough, *Relationships in Chronic Illness and Disability* explores the interpersonal issues that arise when relationships evolve under the challenges of chronic illness. The authors provide a sensitive yet practical examination of three interactive relationship-illness processes: relationship change, supports and stressors, and relationship-focused coping. Interventions for nurturing close relationships under these difficult circumstances as well as issues of theory and method round out this much-needed volume

This volume from the *Sage Series on Close Relationships* adds to our understanding of illness-relationship processes and provides new information, useful to professionals as well as researchers, students, and interns in social work, rehabilitation and occupational therapy, leisure studies and recreation, gerontology, psychology, nursing, and family studies.

Contents: 1) Relationship Processes in Chronic Illness and Disability / 2) The Stressors of

Illness and Disability / 3) The Impact of Chronic Illness and Disability on Relationships / 4) The Impact of Relationships on Coping and Adaptation / 5) Relationship-Focused Coping / 6) Intervention in Close Relationships to Improve Coping With Illness / 7) Close Relationships, Chronic Illness, and Research.

Mehrotra, Kishan, Chilukuri K. Mohan, and Sanjay Ranka. 1996. *Elements of Artificial Neural Networks*. Cambridge, Massachusetts: The MIT Press.

Elements of Artificial Neural Networks provides a clearly organized general introduction, focusing on a broad range of algorithms, for students and others who want to use neural networks rather than simply study them.

The authors, who have been developing and team teaching the material in a one-semester course over the past six years, describe most of the basic neural network models (with several detailed solved examples) and discuss the rationale and advantages of the models, as well as their limitations. The approach is practical and open-minded and requires very little mathematical or technical background. Written from a computer science and statistics point of view, the text stresses links to contiguous fields and can easily serve as a first course for students in economics and management.

The opening chapter sets the stage, presenting the basic concepts in a clear and objective way and tackling important - yet rarely addressed - questions related to the use of neural networks in practical situations. Subsequent chapters on supervised learning (single layer and multilayer networks), unsupervised learning, and associative models are structured around classes of problems to which networks can be applied. Applications are discussed along with the algorithms. A separate chapter takes up optimization methods.

The most frequently used algorithms, such as back-propagation, are introduced early on, right after perceptions, so that these can form the basis for initiating course projects. Algorithms published as late as 1995 are also included. All of the algorithms are presented using block-structured pseudo-code, and exercises are provided throughout. The book is accompanied by software implementing many commonly used neural network algorithms.

Meneley, Anne. 1996. *Tournaments of Value: Sociability and Hierarchy in a Yemeni Town*. Toronto: University of Toronto Press.

A significant addition to our understanding of the varied experience of Middle Eastern women, *Tournaments of Value* gives a careful description of a world of female socializing - the volume, velocity, energy, and elaborateness of this female social world is remarkable. This work represents a substantial and original contribution to our knowledge of women's social centrality in the Islamic Middle East. Most earlier studies have been written from the vantage point of men, confirming popular Western stereotypes of Muslim women's marginality to public life. Other works, concentrating on Islamic systems of 'honour' and 'shame,' have focused on women's ability to affect their families' status negatively. Meneley neatly supplies us with examples of the opposite - the deep reliance of men on their female kin to establish, maintain, and indeed increase the family's honour in the eyes of the wider community by engaging in the exchange of hospitality. Not only is visiting competitive, but social engagement with others is an essential part of moral personhood. Meneley's central thesis examines the associated construction of identity - their own, their men's, and their families' - by women, largely through the detailed style and comportment features of their complex social relations. This account of the refinement, cultivation, and sophistication of this feminine culture is extremely valuable.

Moreover, Anne Meneley's data challenges scholarly assumptions about the cross-cultural validity of a division between household and community, between domestic and public domains. She demonstrates the fluidity of social life, the shifting, processual nature of community organization, and in doing so provides a welcome counterpoint to more rigid formulations of Middle Eastern social structure expressed in other ethnographies. These aspects join Meneley's work to a growing body of anthropological scholarship in which fine-grained observation, with attention to language, comportment, and gesture, combines with astute contextual analysis to produce a sensitive portrait of a community.

Highly readable and accessible to a wide audience, Meneley incorporates vignettes to illustrate her more analytical points and to enliven the text, allowing the reader to enter fully into the rich world of Zabid. This work touches on many issues of current and enduring importance to both Middle Eastern ethnography and to women's studies.

Miell, Dorothy and Rudi Dallos, editors. 1996. *Social Interaction and Personal Relationships*. Thousand Oaks, CA: Sage Publications.

Relationships play a central part in people's lives, and a number of exciting interdisciplinary perspectives have recently emerged to shed new light on what it means to be in a relationship with another human being. *Social Interaction and Personal Relationships* offers an authoritative yet accessible examination of a wide variety of these perspectives, drawing from a broader than usual range of material and including considerable reference to clinical contexts and case-studies. Overall, this book provides an introduction to the cutting edge of research about human relationships and interactions, engaging readers in a debate central not only to academic researchers and clinicians but to their own lives.

Contents: 1) Introduction: Exploring Interactions and Relationships, *Dorothy Miell and Rudi Dallos* / 2) Relationships in Detail: The Study of Social Interaction, *Alan Radley* / 3) Creating Relationships, *Rudi Dallos* / 4) The Psychodynamics of Relating, *Kerry Thomas* / 5) Change and Transformations of Relationships, *Rudi Dallos* / 6) Examining the Wider Context of Social Relationships, *Dorothy Miell and Rosaleen Croghan* / Conclusions, *Dorothy Miell and Rudi Dallos* / Readings: A) Gender Differences in Close Relationships, *Robert Hinde*, B) A Gender Sensitive Perspective on Personal Relationships, *Arlene Vetere* / C) The Experimental Study of Relationships, *Michael Argyle* / D) A Humanistic Approach to Relationships, *Richard Stevens* / E) A Sociological Perspective, *Graham Allan*.

Palriwala, Rajni and Carla Risseuw, editors. 1996. *Shifting Circles of Support: Contextualising Kinship and Gender in South Asia and Sub-Saharan Africa*. Thousand Oaks, CA: Alta Mira Press.

The habit of studying gender, kinship, economics, and politics as separate entities has led to a static view of culture, community, and the meaning of family. *Shifting Circles of Support* breaks this practice, integrating these disciplines so that different dimensions of changing kinship and gender relations may be better understood. Each chapter provides a case study which highlights different aspects of this theme. Focusing on South Asia and Sub-Saharan Africa, this analysis provides significant cross-national detail, making it valuable to scholars of gender studies, political sociology, family sociology, and comparative sociology.

Pattison, Philippa. 1996. *Algebraic Models for Social Networks*. Cambridge: Cambridge University Press.

As the analysis of social networks, or networks

of interpersonal and social relationships among social groups, has become an increasingly important method of research in several of the social and behavioral sciences, the gathering of network data has outpaced the development of new methods for its analysis. Addressing the need for new analytic tools, Philippa Pattison presents a number of new algebraic models for the analysis of network data, explaining in the process the rationale for an algebraic approach. Models are developed for both complete networks, meaning those representing the social ties between all pairs of members in a given group, and local networks, meaning those structured around the social ties of one particular group member. Many applications are presented and the ways that these methods can address a number of important issues confronting network analysis are explained.

Portes, Alejandro, editor. 1996. *The Economic Sociology of Immigration: Essays on Networks, Ethnicity, and Entrepreneurship*. New York: Russell Sage Foundation.

The editor's lucid overview of sociological approaches to economic phenomena provides the framework for six thoughtful, wide-ranging investigations into ethnic and immigrant labor networks and social resources, entrepreneurship, and cultural assimilation.

Schuler, Douglas. 1996. *New Community Networks: Wired for Change*. New York: ACM Press.

In an era of declining communities, grassroots activists all over the world are building community networks designed to reinvigorate communities by encouraging dialogue and providing a forum for voices that too often go unheard. Via new computer networking technology, new communities can now connect electronically to pursue activities such as community and public health projects, long-distance learning, performances, and "virtual

spaces."

New Community Networks is a unique contribution to the literature on social issues of technology. It provides practical how-to advice and discusses the rationale, concerns, and directions of socially-directed technology. This book should be read by government officials, librarians, policy analysts, educators, journalists, social service administrators, students social and political activists, and - in fact - by anyone concerned about our communities and the uses of technology in our society.

Contents: 1) Community and Technology - A Marriage of Necessity / 2) Conviviality and Culture / 3) Education / 4) Strong Democracy / 5) Health and Well-Being / 6) Economic Equity, Opportunity, and Sustainability / 7) Information and Communication / 8) Social Architecture / 9) Technological Architecture / 10) Developing and Sustaining Community Network.

Singerman, Diane. 1995. *Avenues of Participation: Family, Politics, and Networks in Urban Quarters of Cairo*. Princeton, NJ: Princeton University Press.

Intentionally excluded from formal politics in authoritarian states by reigning elites, do the common people have concrete ways of achieving community objectives? Contrary to conventional wisdom, this book demonstrates that they do. Focusing on the political life of the *sha'b* (or popular classes) in Cairo, Diane Singerman shows how men and women develop creative and effective strategies to accomplish shared goals, despite the dominant forces ranged against them. Starting at the household level in one densely populated neighborhood of Cairo, Singerman examines communal patterns of allocation, distribution, and decisionmaking. Combining the institutional focus of political science with the sensitivities of anthropology, she uncovers a system of informal networks that constitutes

another layer of collective institutions within Egypt and allows excluded groups to pursue their interests. She documents the extensive presence of the informal economy and argues that these financial resources further enhance the informal and invisible organizational grid of the *sha'b*.

Avenues of Participation traces this informal system from its grounding in the family to its influence on the larger polity. Discussing the role of these networks in meeting fundamental needs in the community - such as earning a living, reproducing the family, saving and investing money, and coping with the bureaucracy - Singerman demonstrates the surprising power these "excluded" people wield. While the government has reduced politics to the realm of distribution to protect itself from challenges she argues that the popular classes in Cairo, as consumers of goods and services, have turned exploiting the government into a fine art. Singerman reveals an unexplored but critical dimension of collective life in the Middle East and her richly detailed book gives ample testimony that politics from below as well as policies from above shape the nature and consequences of the most critical struggles in Egypt today.

Contents: Introduction / 1) The Family, Politics, and the Familial Ethos / 2) Reproducing the Family / 3) Networks: The Political Lifeline of Community / 4) Informality: Politics and Economics in Tandem / 5) Politics as Distribution / Conclusions.

Vanzetti, Nelly and Steve Duck, editors. 1996. *A Lifetime of Relationships*. Pacific Grove, CA: Brooks / Cole Publishing Company.

Contents: Part 1: Fundamentals of Human Relationships / 1) An Introduction to Personal Relationships, *Steve Duck and Nelly Vanzetti* / 2) Some Interpersonal Processes of Relationships, *Steve Duck* / 3) Social Support: Will You Be There When I Need You? *Steven E. Hobfoll* / Part 2: Relationships Across the Life Span / 4) Infant-Parent Relationships, *Douglas M, Teti and Laureen O. Teti* / 5) Siblings: The First Society, *Judy Dunn* / 6) Pathways to Interpersonal Competence: Parenting and Children's Peer Relations, *Gregory S. Pettit and Mellisa A. Clawson* / 7) Peer Relations During Middle Childhood, *Doran C. French and Marion K. Underwood* / 8) Friendships in Adolescence, *Thomas J. Berndt* / 9) Adolescent Sexuality: Trying to Explain the Magic and Mystery, *F. Scott Christopher* / 10) Courtship and Marriage: Choosing a Primary Relationship, *Tamara Goldman Sher* / 11) Marriage: Will I Be Happy or Will I Be Sad, *Clifford I. Notarius* / 12) The Transition to Parenthood: Is Having Children Hazardous to Marriage? *Mari Clements and Howard J. Markman* / 13) The Family and the Individual: Reciprocal Influences, *Susan Witenberg Fisher* / 14) Midlife Friendship Patterns, *Rebecca G. Adams and Rosemary Blieszner* / 15) Adults and Their Midlife Parents, *Robert A. Lewis and Li-Wen Lin* / 16) Forty-Forever Years? Primary Relationships and Senior Citizens, *Judy C. Pearson* / 17) Friendships in Old Age, *Sarah H. Matthews* / 18) Interpersonal Relationships in Multi-Generational Families, *Mary Ann Parriss Stephens and Sarah L. Clark* / 19) The Caregiving Relationship, *Jim L. Query, Jr. and Lyle J. Flint* / Part 3: The Next Millennium / 20) The Future of Interpersonal Relationships, *Nelly Vanzetti and Steve Duck*.

Dissertations

Haythornthwaite, Caroline Alison. 1996. *Media Use in Support of Communication Networks in an Academic Research Environment. Doctoral Dissertation, Information Studies, University of Toronto.*

This research examines communication among members of an academic research group, placing their information exchange and media use in the context of their work requirements and work habits. In contrast to earlier CMC studies, this research uses a social network approach, which asks about specific kinds of interactions between people, such as giving work or giving emotional support, and its exchange by pairs. The research examines what types of information are exchanged to support the work function in this group, how group members make use of the available media to exchange these kinds of information, and how differences in work relations, friendship relations, and organizational status affect the types of information exchanged by pairs and the media used.

While past research has emphasized media attributes and group communication norms as distinguishing patterns of media use, this research found that interpersonal work and friendship ties play a large role in media use. Pairs in more well-developed work and social relations (those in formal work ties, closer friendship ties, and pairs that include a faculty member, especially as a respondent), maintain a wider range of information exchange relationships, communicate more frequently as pairs and per relationship, use more media, and communicate more frequently per medium. Pairs are also found to communicate more frequently and to use more media for relationships important to the pair tie.

Previous research suggests that a medium will

be chosen because of the type of information to be conveyed. Results here suggest instead that across ties and across relationships media use differs more in number than in type, and what differences are observed are attributable to the pair tie. The more pairs communicate, whether because of their work tie, their friendship tie, or their status, the more media they use to communicate.

Ki, Woon Yuen-Tsang, Angelina. 1995. *Towards A Chinese Conception of Social Support: A Study on the Social Support Networks of Chinese Working Mothers in Beijing. Doctoral Dissertation, Department of Social Work and Social Administration, University of Hong Kong.*

This thesis is an attempt to study the patterns of social support among Chinese working mothers in a Beijing neighbourhood with the aim of developing a beginning understanding of the Chinese conception of social support. The grounded theory method was used to guide the research process since the researcher is more interested in the discovery and generation of a theory on social support in the Chinese context rather than on the verification of theories already developed in the West.

The data indicated that there were great variations in the support relationships experienced by the 27 Chinese working mothers interviewed. The forms of support received and their intensity vary throughout the life course of the Chinese working mothers. While the majority of the interviewees had adopted a "family-network support strategy" which stressed heavily on social support from close kin, some had adopted the "self-support strategy," and some others had developed a "diversified support strategy."

To the Chinese women, support was perceived as a source of refuge, strength, protection, and security. Support was expected to be continuous, unlimited, and unconditional and support was rendered primarily because of the blood ties that had knitted them together. Support was mutually shared and was provided in a natural and spontaneous manner, though there were often differentiations because of the relative closeness of the relationships. Support was also reciprocal in nature and would be reciprocated throughout the life course of the Chinese working mothers.

The support networks of the Chinese working mothers were conceptualized as the "Chinese communal support networks" by the researcher. Salient features of the "Chinese communal support networks" include their communal nature; their holistic provision of network resources; the rigid boundary between "insiders" and "outsiders; the "absorption" of non-kin members into the networks; reciprocity throughout the life course; distinctive gender divisions among network members; and the emphasis on harmony as the integrative thread for the networks.

However, the "Chinese communal support networks" are facing increasing challenges from the external environment. The economic recession of state-owned enterprises; escalating inflation; diminishing role of the *danweis* in welfare provisions; rising expectations and aspirations; growing inequalities; as well as shifting value orientations are interplaying to undermine the support capacities of the "Chinese communal support networks." In order that the "Chinese communal support networks" could continue to provide needed support for their members, it is proposed that social work interventions have to be developed at the network, the neighbourhood, and the policy levels to strengthen the existing networks and to fill the gaps in which the networks have found to be inadequate. The

introduction of formal social work interventions to supplement the informal networks is therefore envisaged to be a necessary and inevitable trend of development in the PRC.

Wortley, N. Scott. 1996. *Social Networks, Social Support and Substance Abuse: testing Social Ability and Disability Theories of Deviance.* Doctoral Dissertation, Department of Sociology, University of Toronto.

Previous research has revealed a strong relationship between deviant peers and deviant behaviour. However, little is known about the quality and structure of deviant social networks. This lack of information has contributed to a debate in the criminological literature between those who believe in a social ability model of deviance and those who believe in a social disability model. My thesis uses a social network approach to address this debate.

Analyses are based on data from a national telephone survey and the Social Networks and Substance Abuse Project (SNSA). The SNSA involves intensive network interviews with 175 substance abusers and a matched control group of 169 individuals without histories of drug or alcohol abuse. The objectives of this thesis are to: 1) identify network predictors of substance abuse; and 2) compare the social networks of substance abusers and controls with respect to network structure, relationship quality, and social support.

The thesis first demonstrates that even rudimentary measures of peer drug and alcohol use predict substance use in the general population. I then use the SNSA data to identify more specific network predictors of substance abuse. The findings suggest that number of ties to drug and alcohol users, frequency of contact with users, and the density of user ties, are positively related to respondent substance abuse. Furthermore, although absolute exposure to users is related

to respondent substance abuse, ratio variables, which examine exposure to users compared to exposure to non-users, emerge as even stronger predictors. I argue that such ratio measures represent an improved operationalization of differential association theory.

Finally, the networks of substance abusers and controls are compared with respect to network structure and relationship quality. The findings suggest that the networks of substance abusers are just as large, as dense, as multiplex, and as durable as the networks of the control group. Furthermore, the networks of drug abusers are important sources of social

support and companionship. However, compared to the controls, substance abusers' networks are marked by higher levels of conflict and lower levels of tie strength and mutual admiration. The theoretical implications of these findings are discussed.

Conference Papers

The American Sociological Association.
August 16-20, 1996. New York, NY

Amick, Daniel J. and Judith A. Levy. Department of Sociology, University of Illinois, Chicago 60607-7140. "Community-Based Management for Active Injecting Drug-Users."

Andrej, Rus. Center for Social Sciences, Columbia University, New York 10027. "Access and Mobilization-Dual Character of Social Capital: Managerial Networks and Privatization in Eastern Europe."

Beilharz, Peter. Department of Sociology, La Trobe University, Bundoora Victoria 3083 Australia. "Globalizing the Antipodes? Australia in the World System, Then and Now."

Bian, Yanjie and Ang Soon, Sociology Department, University of Minnesota, Minneapolis 55455. "Guanxi Networks and Job Mobility in China and Singapore."

Carley, Kathleen M. Carnegie Mellon University, Pittsburgh, Pennsylvania 15213. "The Distribution and Evolution of Culture."

Carley, Kathleen M. and David Svoboda. Carnegie Mellon University, Pittsburgh, Pennsylvania 15213. "Can Organizations Learn if they Restructure: Complexity in Complexity."

Cross, John C. American University 11511 Cairo Egypt. "Breaking Down Clientelism: The Formalization of Street Vending in Mexico City."

Cross, John C. and Harry Miller. American University 11511 Cairo Egypt. "Informal Leverage and Informal Subsidies: Strategies for NGOs Working in the Informal Economy."

De Vos, Henk and Evelien Zeggelink. Department of Sociology, University of Groningen, NL- 9712 TG Netherlands. "Reciprocal Altruism in Human Social Evolution: The Viability of Reciprocal Altruism with a Preference for 'Old Helping-Partners'."

Dickinson, Torry D. and Schaeffer, Robert K. Fernand Braudel Center, State University of New York, Binghamton 13901. "The Workers' World: Changing Global Connections Between Wage and Non-Wage Work."

Dignard, Louise and José Havet. Department of Sociology, University of Ottawa, Ontario K1N 6N5. "Women in the Informal Sector of Less Developed Countries: A Middleman Minority Perspective."

Erickson, Bonnie H. University of Toronto, Ontario M5T 1P9. "Networks, Success, and Class Structure: A Total View."

Felmlee, Diane H. and David F. Greenberg. Department of Sociology, University of California, Davis 95616. "The Couple as a Dynamic System: A Formal Model."

Hanson, Barbara G. and Carla S. Lewis. Atkinson College, York University, North York, Ontario M3J 1P3. "40-Year Old White Female: Questioning Age, Sex, and Race Assumptions About Health."

Haythornthwaite, Caroline and Barry Well-

- man. Faculty Information Studies, University of Toronto, Ontario M5S 3G6. "Which Kinds of Network Members Communicate by E-Mail or Face-to-Face for What Kinds of Work?"
- Ishio, Yoshito. University of Tsukuba, Ibaraki 305 Japan. "When Do Interest Groups Participate in Coalitions?: An Analysis of Event and Organizational Characteristics."
- Jones, Lynn C. Department of Sociology, University of Arizona, Tucson 85721. "Rape Crisis Work and the Unpersonal Relationship: The Delicate Balance of Intimacy and Social Distance."
- Levitt, Melissa. Graduate Center, City University of New York, New York 10036. "To Be or Not to Be a Community: The Dilemma of Israelis in New York City."
- Manjivar, Cecilia. School of Justice Studies, Arizona State University, Tempe 85287-0403. "Class, Context, and Culture: Women's Networks in Two Guatemalan Towns."
- Marger, Martin N. and Constance A. Hoffman. Michigan State University, East Lansing 48824-1032. "Patterns of Assimilation among Canadian Business Immigrants."
- McEntee, Shawn. Department of Sociology, Ohio State University, Columbus 43212. "World-System Role and Economic Development Status = World Order Position: Intergovernmental Organizations as a Global Network."
- McGovern, Ligaya L. Indiana University, Kokomo. "The Global Political Economy of Domestic Service Work: The Experience of Filipino 'Caregivers' of Illinois."
- McKeever, Matthew R. University of California, Los Angeles 90095-1551. "Labor Market Change in the South Africa Informal Economy."
- Menjívar, Cecilia. School of Justice Studies, Arizona State University, Tempe 85287-0403. "Class, Context, and Culture: Women's Networks in Two Guatemalan Towns."
- Patchen, Martin. Purdue University, West Lafayette, Indiana 47907. "Contact Between Ethnic Groups: When and How Does It Lead to More Positive Relations?"
- Pavalko, Eliza K. and Julie E. Artis. Indiana University, Bloomington 47405. "Caregiving and Paid Work in Women's Lives."
- Post, Charles. Department of Social Science Borough Manhattan Community College, City University of New York, New York 10007. "Corporate Policy Planning Network: In the Welfare Reform Debate, 1992-1996."
- Ruan, Danching. University of California, Irvine 92717-5150. "Gender Differences in Personal Networks: A Comparative Analysis."
- Schmitz, Mark F. Iowa State University, Ames 50011. "Trajectories of Stress, Social Support, and Well-Being Among the Elderly: A Dynamic Modeling Approach."
- Scott, Denise Benoit. Department of Sociology, University of Massachusetts, Amherst 01003. "How Constraining Are Women's Family Ties? Family and Work Connections in Corporate-Government Affairs Management."
- Szmatka, Jacek, Joanna Mazur and Brent Simpson. Jagiellonian University PL-31044 Crakow Poland. "Networks, Structures, and Explanation: Historical and Institutional Applications of Elementary Theory."
- Takenaka, Ayumi. Department of Sociology, Columbia University, New York, New York 10027. "Limits of Ethnicity and Culture: Ethnicity-Based Transnational Migration and Networks of Japanese-Peruvian 'Sojourners.'"

- Talmud, Ilan and Dafna N. Izraeli. University of Haifa, Mount Carmel IL-31905 Israel. "Gender Effects on Self-Perceived Role Performances among Directors: Correlates or Institutions?"
- Talmud, Ilan and Gustavo Mesch. University of Haifa, Mount Carmel IL-31905 Israel. "Market Organization, Political Embeddedness, and Corporate Volatility: The Ecology of Inter-Industrial Networks."
- Thye, Shane and Barry Markovsky. Department of Sociology, University of Iowa, Iowa City 52242. "Responses to Social Exchange and Social Exclusion in Networks."
- Umberson, Debra. Department of Sociology, University of Texas, Austin 78712-1088. "A Death in the Family: Effects on the Quality of Intergenerational Relationships."
- Wallace, Jean E. and Charles W. Mueller. Department of Sociology, University of Calgary, Alberta T2N 1N4. "Explaining Nested Commitments: An Integration of Choice-Making and Exchange Arguments."
- Westfried, Alex Huxley and Marilyn Kuruz. PO Box 97, 289-B Heritage Village Southbury Connecticut 06488. "Innovative Middle-Class Urban Women in the Context of Changing Relations between Men and Women in Brazil in the 1980s-Case Studies."
- Whitmeyer, Joseph M. Department of Sociology, University of North Carolina, Charlotte 28223. "Interest Structures in Exchange Networks."
- Willer, David and Richard Bell. University of South Carolina, Columbia 29208. "Power Influence and Legitimacy: Implications of Three Theoretical Research Programs for Organizations."
- Willer, David and John Skvoretz. University of South Carolina, Columbia 29208. "Games and Structures."
- Wolff, Marie E., Ronald Pirrallo, Stephen Hargarten, and Thomas Rice. Department of Family and Community Medicine, Medical College of Wisconsin, Milwaukee 53226-0509.
- Wu, Chyi-in. Institute Sociology Academia Sinca, Nankang Taipei, Taiwan 11529. "Social Support as Moderator of the Impact of Stress on Mental Health."
- Yoo, Jin-Kyung. Department of Sociology, University of Georgia, Athens 30602-1611. "Immigrants' Entrepreneurship and Network Establishment: A Case Study of Korean Immigrants in the Atlanta Metropolitan Area."
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- International Communication Association Conference. May 22-26, 1996. Chicago, Illinois.** *The 1996 International Communication Association was held May 22-26 at the Sheraton Towers, Chicago, Illinois, USA*
- Barnett, George A., and Joseph G.T. Salisbury. "The International Telecommunication Network 1978-1992: A Longitudinal Analysis."
- Doerfel, Marya L. "Network Structure as an Indicator of System Fairness."
- Ethington, Caroline T., J. David Johnson, Alicia A. Marshall, Marcy Meyer, and Hui Jung Chang. "Gender Ratios in Organizations: A Comparative Study of Two Organizations."
- Feeley, Thomas H., and George A. Barnett. "Predicting Employee turnover from Communication Networks."
- Kim, Kyungmo, and George A. Barnett. "The Structure of International Telecommunications Regime: A Network Analysis of International Organizations."

Lind, Rebecca Ann, and James A. Danowski. "Sexualization of Relationships and Norms of Conduct." Suzanne B. Kurth and Bethany Spiller, University of Tennessee. "A Semantic Network Analysis of Male and Female Afro-American and Euro-American assessments of Television News Stories."

International Conference on Personal Relationships. August 4-8, 1996. Banff, Canada.

"Exploring Vertical Webs: Family Ties in Aging Societies." Gunhild Hagestad, University of Oslo.

Session 4: Studying Relationships Using Intensive Repeated-Measures Designs

"Methodological Overview." Niall Bolger, New York University and Deborah Kashy, Texas A&M University.

"Does Relatedness Contribute to Daily Well-Being?" Harry T. Reis, Kennon Sheldon, Joseph Roscoe, and Richard Ryan, University of Rochester.

Session 5: Quality of Marital Relationships

"Social Support and Marital Quality in a British-Asian Community." Robin Goodwin and Hemlata Sinhal, Bristol University, Duncan Cramer, Loughborough University, Kamal Adatia, Bristol University.

Session 6: Dark Side of Social Interaction

"Obsessive Relational Intrusion." Brian H. Spitzberg, San Diego State University, and William R. Cupach, Illinois State University.

"The Meaning of 'Relationship' in Sexual Harassment." Renee Melancon, Maureen O'Connor, Barbara A. Gutek, and Christine Myhre, University of Arizona.

"The Relationship Between Perceived Risk in Intimacy and Life-Satisfaction." Samantha Walker, Laura R. Green and Deborah R. Richardson, Florida Atlantic University.

Session 8: (Panel)

"Relationships Between Service Providers and Recipients: Why Researchers Interested in Personal Relationships Should Care About Changes in Commercial Transactions." Barbara Gutek, University of Arizona, Virginia O'Leary, Auburn University, and Daniel Perlman, University of British Columbia.

Session 10: Cognitive Processes in Close Relationships

"Social Comparisons in Relationships: Feeling of Control as Mediator." Feng-Fang Tsai and Yi-Cheng Lin, National Taiwan University.

"I Really Didn't Think You'd Do That': The Valence of Expectation Violations in Relationships and Their Effect on Uncertainty." Sandra Metts, Illinois State University, and Walid Afifi, University of Delaware.

Session 11: Attachment in the Family

"The Relationship Between Adults' Attachment Hierarchies and Their Attachment Patterns." Shanna J. Trinke and Kim Bartholomew, Simon Fraser University.

Session 13: Coping as a Communal Process

"Perspectives on Communal Coping." Renee Lyons, Dalhousie University.

"Culture, Gender and Other Factors in Commu-

nal Coping." Kristin D. Mickelson, University of Michigan.

"Support, Autonomy, Resiliency, and Coercion in Families of Women at High Risk for Early Onset of Breast Cancer." Nili Benazon, Clark Institute of Psychiatry / University of Ottawa, James C. Coyne, University of Michigan Medical School, Katherine Calzone, the Cancer Center of the University of Pennsylvania Medical Center, Katherine Singer, The University of Michigan Department of Family Practice.

Session 14: Interpersonal Resource Exchange in Personal Relationships: Conceptual and Empirical Advances

"Positive Instrumentality, Positive Expressivity, and Gender-Role Compliance as Predictors of Resource Exchange among Brother-Sister Pairs." Stanley O. Gaines, Jr., Pomona College, Marlana A. Rugg, Nova Southeastern University, Sarah E. Zemore, Pomona College, Janeen L. Armm, Vassar College, Nancy Yum and Andy Law, Pomona College, John M. Underhill and Karen Feldman, Harvy Mudd College.

"Social Exchange and Psychological Well-Being in Late Life." Rosemary Blieszner and Paula M. Usita, Virginia Polytechnic Institute and State University.

"Do Imbalanced Supportive Relationships of Older Adults Continue?" Karen Klein Ikkink and Theo van Tilburg, Vrije University.

"Resource Theory and Relational Models Theory: A Comparison." Nick Haslam, The New School for Social Research.

Session 15: Well-Being in the Elderly

"Stress, Social Support, and Depression Among the Elderly." Kimberly A. Tyler, Iowa State University.

"Toward a Biopsychosocial Understanding of the Association Between Social Network Participation, Psychological Well-Being, and Longevity." Heidi S. Skolnik, Tonya Schuster, and Karen S. Rook, University of California at Irvine.

Session 16: Effects of Divorce

"Intergenerational Obligations to Older Family Members Following Divorce and Remarriage." Lawrence Ganong and Marilyn Coleman, University of Missouri-Columbia.

"Formal and Informal Sources of Help of Elderly Divorces." Jenny de Jong Gierveld, Netherlands Interdisciplinary Demographic Institute / Vrije Universiteit and Pearl A. Dykstra, Netherlands Interdisciplinary Demographic Institute.

Session 17: (Special Session)

"The Fragile Community: Living Together with AIDS." Lawrence R. Frey, Loyola University, Chicago and Mara Adelman, Seattle University.

Session 18: The Use of Individual Versus Couple Data in Close Relationships Research: Theoretical and Methodological Issues.

"Assessing Power Over Behaviors Using Individual and Couple-Derived Data." Christopher R. Agnew, Purdue University.

"Estimating Mutual Influence in Couples Research: An Extension of the Kraemer-Jacklin Method." David A. Kenny, University of Connecticut and William L. Cook, Maine Medical Center.

“Relationship Health?: The Investment Model and Predictions of Self-Report Versus Couple Interaction Relationship.” Stephen M. Drigotas, Cinzia Pacione, and Robert B. Hampson, Southern Methodist University.

Session 19: Attachment and Quality of Interaction in Intimate Relationships.

Attachment Styles as Predictors of Social Support: A Diary Study.” Valerie Cole, University of Iowa.

Session 21: Social Exchange Theories

“Do Relationship Costs Predict Lower Satisfaction? Not Necessarily.” Margaret S. Clark and Nancy Grote, Carnegie Mellon University.

“Desire for Caring Relationships: Communal or Affective-Exchange Orientation?” Robert Eisenberger, Hilda Speicher, Allison Leeds, Patrick Lynch and Lisa Banicky, University of Delaware.

“Endorsing Distributive Justice Norms for Friendships and Marriage.” Margaret S. Clark and Nancy Grote, Carnegie Mellon University.

Session 22: Stress and Coping

“Personal Relationships and Social Change.” Robin Goodwin, Bristol University.

“A Cross-Sectional Survey of Adult Friendships in the U. S.” Roger Baumgarte, Winthrop University and Elisabeth Gareis, Baruch College/CUNY.

“Power and the Quality of Same-Sex Friendships.” Letitia Anne Peplau and Rose Veniegas, University of California, Los Angeles.

“Conflict in Parental Support Networks:

Comparisons of Mothers and Fathers.” Anupama A. Joshi and Gail F. Melson, Perdue University.

Session 26: Similarity and Attraction

“The Role of Comforting Skill in Same-Sex Friendships: Do We Really Know What We’re Getting?” Wendy Samter and Walid A. Afifi, University of Delaware, and Michelle Johnson, University of Arizona.

Session 27: The Negative Side of Social Support

“Why is the Recipient of Social Support Associated with Increased Psychological Distress? A Test of Three Hypotheses.” Martin Dunbar, Graeme Ford, and Katie Hunt, Medical Research Council, Scotland.

“Caregiver Burnout Among the Partners of Cancer Patients.” Jan F. Ybema, Roeline G. Kuijer, Bram P. Buunk, Majella de Jong and Robbert Sanderman, University of Groningen.

Session 29: Analyzing Data From Couples: Techniques for Preserving Interdependence.

“The Dangers of Difference Scores in Dyadic Data.” Dale Griffin, University of Sussex.

“Correlational Methods for Distinguishable Dyads.” Richard Gonzalez, University of Washington.

“Using Structural Equation Modeling to Examine Sex Differences in Relationship Processes.” Sandra Murray, University of Michigan.

Session 30: Positive and Negative Aspects of Relationships

- “Integrating the Positive/Negative Distinction in Adult Parent/Child Relationships” Karen Fingerman, Pennsylvania State University.
- “Positive and Negative Feelings About Siblings.” Victoria Hilkevitch Bedford, University of Indianapolis and Paula Smith Avioli, Kean College.
- “Structural Predictors of Problematic Friendships in Later Life.” Rebecca G. Adams, University of North Carolina and Rosemary Blieszner, Virginia Polytechnic Institute and State University.
- “Sharing Our Lives Together: Gay Men Report Positive and Negative Features of Primary Relationships in Face of the HIV/AIDS Epidemic.” Kerth O’Brian, Portland State University.
- “Perceptions of the Positive and Negative Aspects of Relationships.” David L. Morgan, Portland State University and Karen S. Rook, University of California, Irvine.
- Session 32: Close Relationships and Depression*
- “Depression and Reactions to Social Interaction in a Community Sample.” Christianne P. Hampton, John B. Nezek, and Glenn D. Shean, College of William and Mary.
- “Friendships, School Relationships and Depressed Mood in Early Adolescence.” Serdar M. Degirmencioglu, Northwestern University.
- Session 33: Effects of Different Kinds of Social Support*
- “Getting Good Grades and Staying in School: The Role of Social Support in the Success of African-American Students at a Predominantly White University.” Calvin Graham, Virginia Consortium for Professional Psychology and Barbara A. Winstead, Old Dominion University.
- “Social Support Providers for Post-Partum Women.” M. Cynthia Logsdon, Spading University, Anita Barbee and John C. Birkimer, University of Louisville.
- “Changes in Support Networks of Older Adults.” Marjolein Broese van Groenou and Theo van Tilburg, Vrije Universiteit.
- “Are the Representations of Social Relationships Dimensional or Categorical: The Chinese Case.” Zhang Zhixue, University of Hong Kong.
- “Interest in Time Spent Selecting a Gift For You and Whether an Identical Gift was Bought for Someone Else in Communal and Exchange Relationships.” Judson Mills, University of Maryland, Margaret S. Clark, Carnegie Mellon University.
- “Sex, Gender Role Orientation, and the Impact of Inequality in Social Exchange: Some Unexpected Findings.” Martin Dunbar, Kate Hunt, and Graeme Ford, Medical Research Council, Scotland.
- Section 35: European Perspectives on Family Conflict and Domestic Violence: Part I*
- “Family Conflicts in France.” Didier Le Gall, University of Caen Basse-Normandie.
- Section 37: Relationship Cognitions, Social Support and Self-Evaluation.*
- “Relational Schemas, Stress Appraisal and Social Support.” Tamahra Pierce and John Lydon, McGill University.

“A Social-Cognitive Perspective on Social Support.” Brian Lakey and Catherine J. Lutz, Wayne State University.

Session 38: Social Networks

“Racial and Ethnic Variations in Social Network Support for Premarital Relationship.” Chalandra M. Bryant, Catherine A. Surra, and Misty Francis, University of Texas at Austin.

“A Decade of Network Change: Turnover, Persistence and Stability in Intimate Personal Relationships” Barry Wellman, Renita Yuk-lin Wong, David Tindall and Nancy Nazer, Uni-

versity of Toronto.

“Relationships and Help: The Strength of Rather Strong Ties.” Bonnie H. Erickson, University of Toronto.

“Losing and Gaining Relationships in Old Age: Changes of Personal Network Size in a Four-Year Longitudinal Study.” Theo van Tilburg, Vrije Universiteit.

How to use...

SOCNET

Electronic Discussion Forum

SOCNET is a LISTSERV list. A LISTSERV list is essentially an automated mail forwarding system in which subscribers send mail to a central address and it is automatically rebroadcast to all other subscribers. The purpose of SOCNET is to allow network researchers worldwide to discuss research and professional issues, make announcements, and request help from each other. Membership in SOCNET costs nothing and is available to all members of INSNA.

Joining SOCNET

To join SOCNET, send an email message to **listserv@nervm.nerdc.ufl.edu** that says the following in the first line of the body of the message: SUBSCRIBE SOCNET <your name>. For example:

SUBSCRIBE SOCNET Steve Borgatti

The LISTSERV software at NERVM will then add your name and email address to the list, and send you back a message confirming your membership. If you do not receive a confirmation message back, contact Steve Borgatti (Steve.Borgatti@scarolina.edu) or Russ Bernard (ufruss@nervm.nerdc.ufl.edu).

If you are at a BITNET site, there is an even easier way to sign up. Type the following at your CMS command prompt: TELL LISTSERV AT NERVM SUB SOCNET <your name>. For example:

TELL LISTSERV AT NERVM SUB SOCNET Gery Ryan

A minute or so later, you should receive a confirmation in response.

Using SOCNET

Once you are subscriber, to send a message to all SOCNET subscribers, just send email to the internet address

socnet@nervm.nerdc.ufl.edu

or to the bitnet address **socnet@nervm**. Your message will automatically be broadcast to all SOCNET subscribers.

Options

To permanently remove yourself from SOCNET, send a message to **listserv@nervm.nerdc.ufl.edu** with the following command in the body of the message:

SIGNOFF SOCNET

Important note: this message, like all LISTSERV commands, should be sent to the LISTSERV (address **listserv@nervm.nerdc.ufl.edu**) and not to SOCNET. If you send it to SOCNET, it will not sign you off, and everyone on SOCNET will get a message from you that says "SIGNOFF SOCNET".

To see who else is subscribed to SOCNET, send the REVIEW SOCNET command to the LISTSERV. You can have the list sorted by country, last name, node id and user id, if you like, by sending a command of the form REVIEW SOCNET (BY <fieldname> as follows:

**REVIEW SOCNET (BY COUNTRY
REVIEW SOCNET (BY NAME
REVIEW SOCNET (BY NODE**

How to use...

INSNALIB

Electronic Library

The purpose of INSNALIB is to enable network researchers to conveniently exchange data, software and articles. INSNALIB is a collection of computer files accessible via Web browsers like MOSAIC and NETSCAPE, or via anonymous **ftp**. Most computers that have email capability also have **ftp** capability. **Ftp** provides a way to log on to a remote computer and transfer files to or from that computer. An important feature of **ftp** is the ability to transfer files in **binary** format, which means that the transferring software does not try to translate the contents of the file into a format appropriate for the destination computer. Consequently, we can use a mainframe (or any other computer) as a storage area for all kinds of files including wordprocessing documents, spreadsheets, databases, etc.

World Wide Web Access

Just point your browser to the following address: <http://thecore.socy.scarolina.edu/insna.html>

Quick Example of Downloading a File From INSNALIB

Suppose we want to copy a file called **freemap.exe** from the library. To download this file, follow this procedure (what you type is in **boldface**, what the computer responds is in *italics*):

```
ftp thecore.socy.scarolina.edu           {start ftp and connect to INSNALIB computer}
USER: anonymous                         {when asked for user or account name, type "anonymous"}
>cd /pub                                 {change directory to the INSNALIB reading area where all files are kept}
>binary                                   {tell ftp that you are downloading a binary file rather than a simple text file}
>get freemap.exe                          {copy the "freemap.exe" file to your account}
>quit                                     {exit ftp}
```

As explained below, the file **freemap.exe** is a self-extracting zip file. This means that it is basically an archive that contains a number of separate files, including executable programs, source code, sample inputs and outputs, and documentation. To unpack the archive, make a new directory for the material (e.g., at your DOS prompt type **cd \mapstuff**), copy the archive to that directory (**copy freemap.exe \mapstuff**), change to that directory, (**cd \mapstuff**), and execute the file (type **freemap** at the DOS prompt). The result will be the creation of a series of files.

Quick Example of Uploading a File to INSNALIB

Suppose we want to copy a file from your computer called **mypaper.wp** to the library, for submission to *CONNECTIONS*. Follow this procedure (what you type is in **boldface**, what the computer responds is in *italics*):

```

ftp thecore.socy.scarolina.edu           {start ftp and connect to INSNALIB computer}
USER: anonymous                           {when asked for user or account name, type "anonymous"}
>cd /incoming                            {change directory to the INSNALIB writing area}
>binary                                  {tell ftp that you are uploading a binary file rather than a simple text file}
>put mypaper.wp                          {copy the "mypaper.wp" file from your computer to the library}
>quit                                     {exit ftp}

```

Please note that since files are uploaded to the `/incoming` directory, but are downloaded from the `/pub` directory, any files that you upload are not immediately available for downloading to others. This is appropriate since many files that you may upload, like submissions to *CONNECTIONS*, are not meant to be made available to everyone. After uploading a file to the library, you should send a note to `insna@scarolina.edu` to announce its arrival.

Also, do not include the `binary` keyword if you are uploading an ASCII text file.

Structure of INSNALIB

Most of the files on INSNALIB are self-extracting zip files. This permits us to collect together a series of related files into one downloadable package and at the same time compresses the files so that they occupy less space. Self-extracting zip files are binary files that must be transferred using the `binary` option in `ftp`. If you omit the `binary` command, `ftp` will try to translate the file into ASCII characters, which will completely destroy it. Self-extracting archives are recognizable by the ".exe" extension.

A few other files are binary as well. Wordprocessing documents, such as those created by WordPerfect or Microsoft Word, are binary. So are spreadsheets and all executable programs. In fact, the only files that are not binary are text files, which in INSNALIB are normally identified by a ".txt" extension.

One key file in the library that is not binary is `contents.txt`, which provides a table of contents for all files in the library. `Contents.txt` gives the name of each file, a short description of its contents, and an indication of whether it is binary or not.

Some Notes on FTP

Once you have established an `ftp` connection to a computer, you can get a listing of files in the current directory by typing "dir" at the `ftp` prompt, as in the following example:

```

ftp thecore.socy.scarolina.edu
USER: anonymous
>cd /pub
>dir
contents.txt          freemap.exe          stocentz.exe
ecosna.exe           sun94.exe
>get contents.txt
>quit

```

Note that in this example, we did not use the `binary` keyword since the file being downloaded was an ASCII text file.

When copying a file from the library, you can rename it at the same time by giving a second argument in the GET command. In the following example, the file **sun94.exe** is renamed **sunbelt.exe** as it is copied:

```
ftp thecore.socy.scarolina.edu
USER: anonymous
>cd /pub
>dir
contents.txt          freemap.exe          stocentz.exe
ecosna.exe            sun94.exe
>binary
>get sun94.exe sunbelt.exe
>quit
```

To copy a file to the library from your computer, use the **put** command instead of **get**. **IMPORTANT NOTE:** the **\pub** directory is write-protected. You cannot **put** any files there. Instead, you must change to the **\incoming** directory, as follows:

```
ftp thecore.socy.scarolina.edu
USER: anonymous
>cd /incoming
>binary
>put c:\ucinet\ucinet.exe ucinet.exe
>quit
```

Note the (optional) use of a full pathname to identify the source file.

Online help on using **ftp** may be obtained by typing **help** from the **ftp** command line to get a list of topics, followed by **help <topic>** to get help on a specific topic.

```
ftp thecore.socy.scarolina.edu
USER: anonymous
>help
.....list of topics appears here.....
>help dir
.....information on the dir command appears here.....
>quit
```

WANTED:

Material for the social networks web page. For example:

- course syllabi
- software
- data
- material to supplement a journal article
- links to other web pages

Send to Mark Dawson at dawsonm@sc.edu or Computer Services Division, University of South Carolina, Columbia, SC 29208 USA

Social Networks Web Page

To access the INSNA world wide page, just point your net browser to:

<http://thecore.socy.sc.edu/insna.html>

Place Your Ad Here!

To Contact INSNA or CONNECTIONS

Membership/subscriptions: Contact Steve Borgatti at 617 552-0452 or steve_borgatti@msn.com

Manuscript submissions: Call John Skvoretz (803 777-4968) or email him at Skvoretz-John@sc.edu, or email Katie Faust at Katie-Faust@sc.edu.

SOCNET/Web page: Send email to Mark Dawson at dawsonm@sc.edu.

Outstanding Web Bookstore!

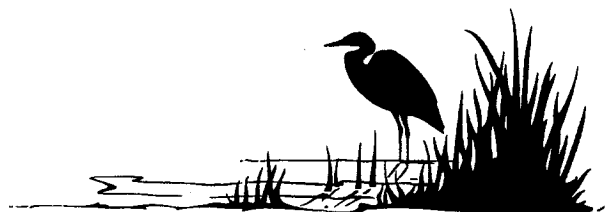
Russ Bernard recommends **Amazon.Com**, an outstanding bookstore you can access via the world wide web. It has a huge selection of books, it's searchable by keywords, and you can read and submit your own reviews. They can also email you when new books appear that match your search criteria. Catch it at:

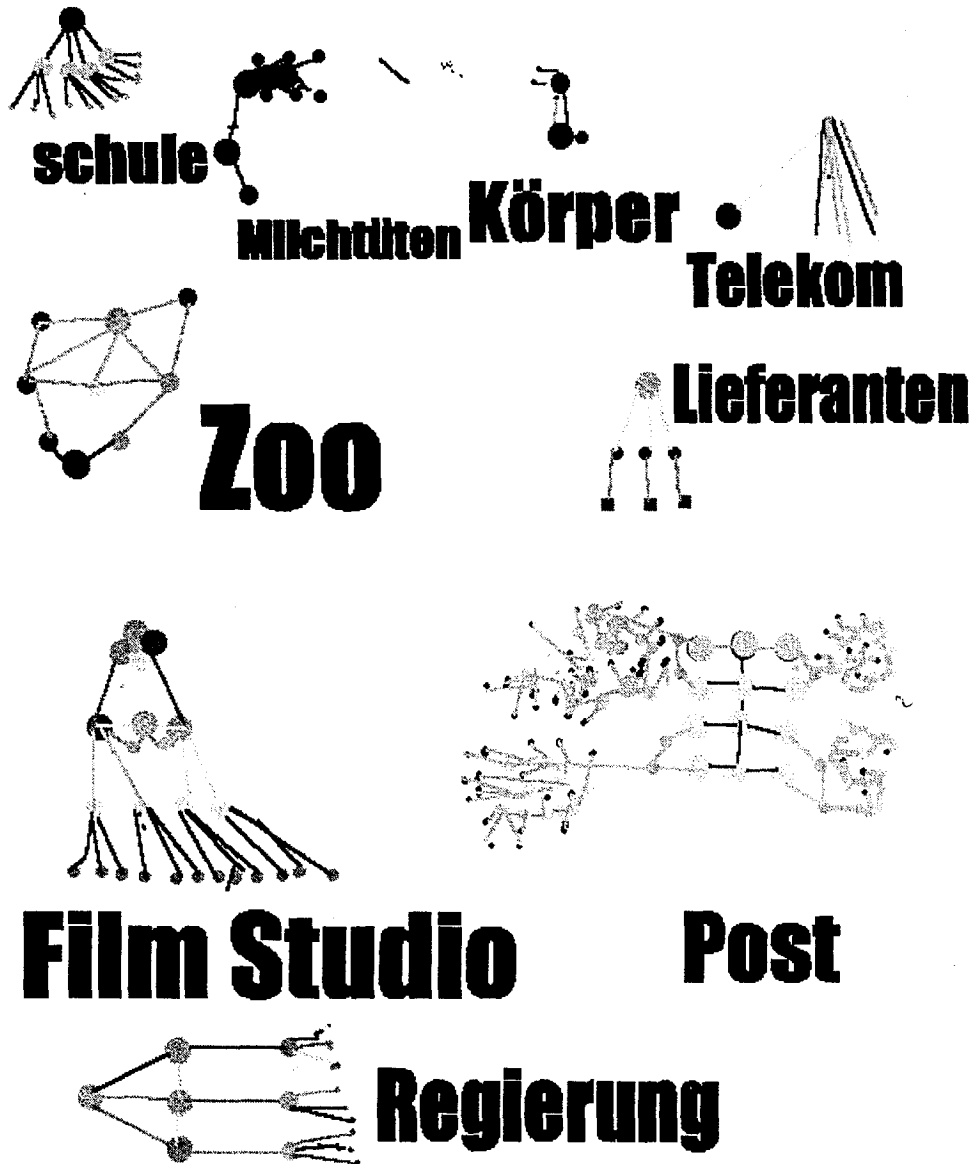
<http://www.amazon.com>

Gateway to Network Analysis On the World Wide Web

Visit Lin Freeman's website

<http://eclectic.ss.uci.edu/~lin/lin.html>





Network diagrams by Mischa Krempel, age 8, son of Lothar Krempel. Catch his work on the internet at <http://www.mpi-fg-koeln.mpg.de/~lk/mischa.html>

INSNA

International Network for Social Network Analysis

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