CONNECTIONS

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INSNA

International Network for Social Network Analysis

CONNECTIONS

CONTENTS

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 to host **univscvm.csd.scarolina.edu**) and on 3½" diskette. **INSNALIB** contains a directory of members, network datasets, software programs, and other items that lend themselves to electronic storage.

POLICY. *Connections* welcomes short articles, data, software, course materials, news and advertisements dealing with network. 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 (**cnnctns@univscvm.csd.scarolina.edu**), INSNALIB, or IBM-compatible diskettes. This includes all text, figures and tables in articles (files may be sent in any worprocessing and/or graphics format). Articles and other text materials should also be accompanied by printed versions (2 copies). Send contributions to John Skvoretz or Katherine Faust (editors), *Connections*, Dept. of Sociology, University of South Carolina, Columbia, SC 29208 USA. Telephone: (803) 777-3123. Fax: (803) 777-5251. Email address: **cnnctns@univscvm.csd.scarolina.edu**.

SUBSCRIPTION. The subscription fee is US$30 per volume, which applies to current as well as past volumes. Subscribing to the current volume is synonymous with current membership in INSNA. Send subscription requests to: INSNA, Sociology Dept., University of South Carolina, Columbia, SC 29208 USA. Telephone: (803) 777-3140. Email: **inetsna@univscvm.csd.scarolina.edu**. Checks must be made payable to "INSNA" and drawn on US bank. Wire transfers are not permitted, but Visa and Mastercard (or Eurocard) are accepted. Credit card orders should include card number and expiration date.

Thanks to ...

Alvin Wolfe

for his many years of extraordinary service editing and publishing *Connections* and coordinating INSNA,

Susan Greenbaum

for her work through the years, and

Barry Wellman

founder of *Connections* and an inspiration to our community.

We appreciate the dedication and commitment of all who have worked so hard to bring INSNA and *Connections* to their current stature. We will continue the tradition.

From the Publisher...

Connections is an official publication of INSNA, the International Network for Social Network Analysis. Its primary purpose is to support INSNA members by providing news, information and tools for teaching and researching social networks. I think *Connections* should do for network analysts what *Byte* magazine does for computer enthusiasts, and also what *The American Statistician* does for statisticians.

In accordance with this mission, *Connections* will continue to offer Barry Wellman's <u>Ties and Bonds</u> column, <u>abstracts</u> of articles/dissertations/books that are of special interest to network researchers, <u>announcements</u> of professional meetings and other events, and <u>scholarly papers</u>.

At the same time, this issue of *Connections* incorporates a number of changes. First of all, I have created an electronic library called INSNALIB, which is accessible via anonymous FTP. The library enables authors of articles in *Connections* to make data and software described in their articles immediately available to readers. In this sense, *Connections* becomes, in part, an electronic journal. Instructions for using the library are given in the last pages of this and all future issues. INSNALIB will also be used to exchange material not related to *Connections*. For example, Ron Burt has agreed to make his *Structure* program available, free of charge, on INSNALIB. If you have software or data that you would like to share with other networkers, please allow INSNA to put it up on INSNALIB. And if you publish a description of your (noncommercial) software in *Connections*, please expect to donate it to the library.

Second, this issue of *Connections* introduces three new regular columns. One, called *Network News*, is devoted to information from or about INSNA -- summaries of business meetings, changes in dues, new services, and so on. Another column, called *Teacher's Corner*, is devoted to the teaching of network analysis. It will offer course syllabi, summaries of theoretical arguments, and ways of explaining specific network concepts. Finally, a third column, called *Techniques*, is devoted to methodological tips and techniques in the areas of data collection, management, and analysis. All three columns accept and actively solicit contributions from readers. Suggestions for additional columns (perhaps something on software?) are welcome.

Finally, I would like to ask all authors to please **provide electronic versions (i.e. word-processing files) of their papers, in addition to paper versions**. This includes figures and tables whenever possible. There are several reasons for this. First, it will streamline production, which will reduce costs and might even make it possible to publish three issues a year instead of two. Second, it will allow us to make issues of *Connections* available on the Electronic Library. Third, it will allow us to reprint back issues as needed. Currently, we print more copies than we think we need in order to keep back issues available, but with fluctuations in demand we can easily end up with too many or too few of any given issue. Fourth, it will allow us to print all articles using a consistent set of fonts, which will look a lot nicer and make it easier to read. So please, if at all possible, submit disks in addition to paper!

Stephen P. Borgatti

From The Editors...

We are delighted to assume editorial responsibilities with this issue of Connections. As you surely know, the "Editorial Offices" have now moved from the University of South Florida — where the journal flourished under Alvin Wolfe's care for many years — to the University of South Carolina — where we hope to continue its high quality. The inevitable disruptions of such a move have been minimal, largely due to solid foundation built by Barry Wellman and Alvin Wolfe in their tenures as editors, and the help we have received from Al and Barry in getting up and running here at South Carolina.

Our editorial policy remains the same as previous editors. We welcome papers from network researchers from around the globe and from all disciplines. We are especially interested in representing the diversity of interests and approaches to network research. We have a procedure in place to review manuscripts, but we also intend to have quick turnaround time on reviews.

As we talk with people and encourage them to send their network papers to *Connections* for consideration, we are often confronted with the question "Why publish in *Connections*?" Granted, *Connections* is no *American Anthropologist, American Psychologist*, or *American Sociological Review*. We are a small, reader-friendly, journal devoted to disseminating information about social network research, to keeping people apprised of the latest research (through abstracts, short articles etc.), of the latest comings-and-goings of our network friends and colleagues (through "Ties and Bonds"), and of relevant meetings, new journals etc.

But, we believe there are many things that are exactly right for *Connections*, but which may not fit in other journals. Some of the things we have in mind are:

- short focused discussions of topics of interest to network researchers in all disciplines
- commentaries on books, articles, or controversial issues in social networks
- descriptions of new measures of network properties
- descriptions and/or examples of formats for collecting network data (questionnaires, computer assisted tasks, etc.)
- descriptions of network analysis computer programs
- book reviews targeting a network audience
- teaching materials (course syllabi, ideas for student projects etc.)

Connections (together with the electronic library) is also a way to make resources available to the network community. We can help distribute datasets, survey instruments (questionnaires, interview schedules etc), and computer programs. Finally, *Connections* can function as the network "want-ads" for you to solicit help from the network community, or simply advertise a network garage sale.

In conclusion, we need your help! Submit articles, comments etc. *Connections* is your publication. Its contents depends on your submissions. Now, we are not above a little cajoling and arm-twisting to encourage people to submit their papers to us. However, that personal touch works best with people in our graph-theoretic neighborhood. So, consider this an invitation to all ....

Call for Syllabi: As those of us who teach courses on social networks know, course syllabi from other people who have taught similar courses area wonderful resource — as a source of ideas for topics, organization, readings, and student projects. We intend to devote a portion of an up-coming issue of *Connections* to social networks course syllabi. Thus, we ask for your help. Please send us copies of your Social Networks course syllabi. We are interested in syllabi for courses on social networks and related topics (Small Groups, Community, Support Networks, Organizational Networks, Communication Networks, and so on), from all disciplines, and at both the undergraduate and graduate levels. Please submit syllabi via electronic media (e-mail or diskette).

Call for Abstracts: We believe that the abstracts in *Connections* are a wonderful way for us to keep abreast of the latest work in the field. We monitor journals in a number of disciplines, scan publishers' new-book lists, and generally keep our eyes open for papers of interest to the field.. We also rely heavily on CARE packages from Barry Wellman, who consistently manages to find tantalizing pieces from around the network world. However we need your help. PLEASE send us abstracts of your recent papers. We would love to include an abstract of your latest paper(s) in *Connections* — but that's hard for us to do unless we are aware of it.

Submissions of papers: Submit two or three paper copies for review. Accepted articles should be in electronic form.

John Skvoretz and Katie Faust.

Announcements

JOURNAL

Personal Relationships: Journal of the International Society for the Study of Personal Relationships. Patricia Noller, Editor. Published by Cambridge University Press.

The aim of this international, interdisciplinary journal is to promote scholarship in the field of personal relationships throughout a broad range of disciplines including psychology, psychiatry, communication studies, sociology, anthropology and family studies. Personal Relationships will cover topics such as equity, dealing with conflict, jealousy, attachment, love, costs and benefits of relationships, sibling rivalry, social support and loneliness. All personal relationships: romantic, marital, parent-child, and friendship will be explored. The subject matter and approach will be of interest to academics, researchers and practitioners alike.

Contributions of empirical research from scholars working in all aspects of personal relationships will be published. Scholarly review articles, descriptions of new research methods, debates over theoretical or empirical issues, and lead articles followed by commentary may be submitted from all relevant disciplines.

Contact Patricia Noller, Reader in Psychology, University of Queensland, Queensland, 4072, Australia. Fax (61-7)365 4466. Email: **pn@psych.psy.uq.oz.au**

BOOK SERIES

Metropolis and Region. Published by Sage Publications, Inc. under tete imprimatur of the Lewis Center for Regional Policy Studies at the University of California, Los Angeles.

Topics covered in this series include the internal organization of cities and regions, as well as national and global structures of urban and regional interaction. books in Metropolis and Region feature original statements which offer innovative and path-breaking perspectives on these topics. Manuscripts emphasizing policy questions are particularly solicited. The series is open to authors from all disciplines and theoretical persuasions.

Contact Allen J. Scott, Director, Lewis Center for Regional Policy Studies, University of California, Los Angeles, CA 90024, USA.

MEETINGS

Annual Meeting of the Canadian Sociology and Anthropology Association. A session on social networks is being organized at the Annual Meeting of the Canadian Sociology and Anthropology Association, in Calgary, Alberta, June 3-18, 1994. Contact Peter Carrington, Department of Sociology, University of Waterloo, Waterloo, Ontario, Canada N2L 3G1; Tel. 1 519 885 1211, ext. 3961; Fax 1 519 746 7326; Email: pjc@watdes.uwaterloo.ca

Theory and Research on Group Processes. This year's conference on Theory and Research on Group Processes will again be held in conjunction with the annual August meetings of the American Sociological Association. The conference will be held on Thursday August 4, 1994, one day before the beginning of the ASA meetings. This should not prove to be inconvenient for most social psychologists. Social psychology sessions of the ASA are scheduled early in the meetings.

The conference will be held in the same hotel as the ASA, the Bonaventure. We have been assured that conference rates will apply if you come a day early. The conference will run from 8 AM to 5 PM. The following social psychologists have organized panels.

I. Sheldon Stryker -- Identity. Peter Burke, Lynn Smith-Lovin, Peter Callero, Richard Serpe, Mathew Hunt, Sheldon Stryker

II. Martha Foschi -- Status Characteristics and Multiple Standards. Matha Foschi, Margaret Foddy, Dawn Robinson, Henry Walker

III. Geoffrey Tootell -- Networks and Status: Attempts at Integration. Guillermina Jasso, Katherine Faust, John Skvoretz, James Balkwell

IV. Noah Friedkin -- Network Exchange Theory. Elisa J. Bienenstock, David Willer and John Skvoretz, Barry Markovsky and Michael J. Lovaglia, Noah E. Friedkin

V. Murray Webster -- Gender and Status. Panel to be announced

VI. Steven Silver and Lisa Troyer -- Affect in Groups. Panel to be announced

Concluding Comments: Cecilia Ridgeway.

The cost per person, which includes a sumptuous breakfast and lunch, is $45. This is more than last year, but LA is more expensive than Miami. Please register before the conference by sending the following form and a check made out to "Phillip Bonacich, Group Processes Conference" to: Phillip Bonacich, Department of Sociology, University of California, Los Angeles, CA 90024

International Social Networks Conference. July 6-10 1995. London, U.K. The venue is the Britannia International Hotel which is situated in London's revitalised Docklands. The hotel has extensive conference and leisure facilities and can provide all needs under one roof. However more adventurous delegates can make use of the easy access to central London or nearby historic Greenwich. (Tower Bridge is 3 miles away, Greenwich 2 miles.)

The conference is being organised by the University of Greenwich and we would appreciate an early indication from likely participants. To be placed on the mailing list contact:

International Social Networks Conference
School of Mathematics, Statistics and Computing
The University of Greenwich
Wellington Street
London SE 18 6 PF
U.K.

Email: euronet@gre.ac.uk
Tel (+44) (0) 81 316 8706
Fax (+44) (0) 81 316 8665

Second International Conference on Social Science Information Technology. 7-8-9 December 1994, RAI International Congress Centre, Amsterdam, the Netherlands. Workshops: Wednesday 7 December 1994. Conference Sessions: Thursday and Friday 8-9 December 1994.

Aims. The number of computer applications for the social and behavioral sciences continues to increase at a rapid pace. To survey this abundance, and acquaint researchers and educators with current high-quality software, iec ProGAMMA organizes the second international SSIT Conference. Social Sciences and IT; disparate or synergetic entities, SSIT 94 will also take a closer look at the relationship between academic practice and software development.

Program. Preceding the actual conference, the *SSIT Seminar* features several parallel workshops that introduce prospective users to new computer

applications for the social and behavioral sciences. The *SSIT Conference* itself revolves around a number of symoposia chaired by leading experts in their field. These thematic sessions cover recent trends and developments in IT-related research and education, and give a balanced overview of the corresponding computer applications. Papers, posters, and a conference exhibit, covering the interconnected aspects of IT and the social and behavioral sciences, will give participants the opportunity to present and discuss their findings. Finally, SSIT 94 will also host the awards presentation of the *SSIT 94 Software Awards*.

SSIT 94 Seminar (workshops confirmed as of January 1994): *Structural Equation Modeling* (A. Boomsma, K.G. Joereskog); *Scaling* (E.E.C.I. Roskam, W.H. van Schuur); *Experimentation and Observation* (W. Schneider, M.J. van der Vlugt); *Content and Text Analysis* (R. Popping, C.W. Roberts).

SSIT 94 Symposia (Sessions confirmed as of January 1994): *Network Analysis* (S. Borgatti, USA); *Statistical Computer Applications* (J.A.P. Hagenaars, NL); *Innovative Educational Systems* (N. Hammond, UK); *Visualization*. (A.J.N. Judge, B); *Brain Research and Task Performance.* (W. Schneider, USA); *Psychological Assessment* (W.J. van der Linden, NL); Content and Text Analysis (P.PH. Mohler, D); Simulation (A. Nowak, PL); *Computer-Assisted Interviewing* (D. Sikkel, NL); *Neural and Self-Organizing Networks* (P.H. de Vries, NL).

Registration Fees:

SSIT 94 Seminar (Workshop program) US$ 130.--
SSIT 94 Conference (Sessions): US$ 235.--
SSIT 94 Seminar AND Conference: US$ 315.--

For information on how to submit papers, enter the software competition, and register for the conference, contact:

iec ProGAMMA
SSIT 94 Organizing Committee
P.O. Box 841
9700 AV Groningen
The Netherlands
Tel.: +31 50 636 900
Fax: +31 50 636 687
Email: gamma.post@gamma.rug.nl

Calendar

April 13-17, 1994. Society for Applied Anthropology Annual Meeting. Cancun, Mexico. Contact SfAA Business Office, P.O. Box 24083, Oklahoma, OK 73124-0083. (405) 843-5113.

April 14-17, 1994. North Central Sociological Association. Marriott Columbus North. Columbus, Ohio. Contact Mary French, Executive Officer, Department of Sociology, Wright State University, Dayton, OH 45435.

April 14-17, 1994. Pacific Sociological Association. Holiday Inn on the Bay. San Diego, California. Contact Francesca Cancian, President. Department of Sociology, University of California, Irvine, CA 92717. (714) 856-7637.

April 23-24, 1994. ORSA/TIMS workshop, Computational Organization Theory. Boston, MA. Contact Kathleen Carley, Department of Social and Decision Sciences, Carnegie Mellon University, Pittsburgh, PA 15213.

April 27-30, 1994. Southern Anthropological Society Annual Meeting. Atlanta, GA. Contact George Armelagos, Emory University, Atlanta, GA 30322.

May 26-30, 1994. International Network on Personal Relationships, Graduate Student & Professional Development Workshop. Iowa City, Iowa. Contact Steve Duck, Communication Studies Building (CSB), University of Iowa, Iowa City, IA 52242.

July 18-23, 1994. International Sociological Association. Bielefeld, Germany. Contact ISA at Faculty of Political Sciences and Sociology, Universidad Complutense, 28223, Madrid, Spain. Phone: (34-1) 352 76 50. Fax (34-1) 352 49 45.

August 5-9, 1994. American Sociological Association. Los Angeles, California. Contact American Sociological Association, 1722 N Street NW, Washington, DC 20036. Tel: (202) 833-3410.

October 26-29, 1994. Mid-South Sociological Association. Lafayette Hilton & Towers. Lafayette, Louisiana. Contact Stanford Lyman, Program Chair, College of Social Science, Florida Atlantic University, Boca Raton, FL 33431. (407) 367-3296.

November 30-December 2, 1994. American Anthropological Association Annual Meeting, Atlanta, GA. Contact American Anthropological Association, 4350 N. Fairfax Drive, Suite 640, Arlington, VA 22203.

July 6-10, 1995. International Social Networks Conference. London, U.K. Contact Martin Everett, International Social Networks Conference, School of Mathematics, Statistics and Computing, The University of Greenwich, Wellington Street, London SE18 6PF, U.K. E-mail euronet@gre.ac.uk Tel (+44) (0) 81 316 8706 Fax (+44) (0) 81 316 8665.

February 22-25, 1996. Sunbelt 15: International Social Network Conference. Charleston, S.C. Contact John Skvoretz, Department of Sociology, University of South Carolina, Columbia, SC 29208.

Ties and Bonds

WAS SIMMEL A BUNNY?

In a trip to visiting my mother in a Florida retirement colony, I whiled away the hours watching the Playboy channel. The pornographic movie started routinely enough with a naked man-woman couple having sex. "I have to leave," the man said. "Don't go," she replied. So the man stayed. Then another woman joined them to make a three-some. Interesting Simmelian combinations ensued. The man said again, "I have to leave." "OK," said the woman. At which point she devoted her full attention to the second woman.

In addition to pondering this illustration of coalitions and cleavages, some gerontologist should also study why the elderly put that channel on their pay-TV service.

BBS (Barry's Broadcasting System)

Kathleen Carley (CMU) chair-elect of Sociology & Computers section of the Am Soc Assoc... Leonard Pearlin (Cal-SF) chair-elect of ASA's Mental Health section.... Rutgers U has NIMH postdocs in mental health services, systems & disorders, & help-seeking (that's social support renamed) -- contact Allan Horwitz, Inst for Health, 30 College Ave, New Brunswick NJ 08903.... Chris Winship new head of ASA's Methods section.... Shin-Kap Han on the move: Completed PhD at Soc, Columbia; teaching at Soc, U South Carolina, 1-6/94; appointed Asst Prof. @ Soc, Cornell, starting 7/94. Han claims that he is (& probably will ever be) the only student of both Ron Burt & Harrison White.... Elisa Bienenstock appointed Asst Prof of Soc, U of No. Carolina, from 6/94... Davida Weinberg appointed Asst. Prof of Socy, U of South Carolina, starting 8/94.

Claire Bidart has earned her doctorate and is now at LASMAS/IRESCO, Caen... Sebastien Reichmann now at LASMAS/IRESCO, Paris.... Mary Ann Chalkey promoted to Assoc. Prof, U St. Thomas, St. Paul, MN.... Louise Tilly awarded the Michael Gellert endowed chair in history and sociology at New School for Soc Res, NYC.... Graham Allan now Head of Soc Dept, Southampton U, UK. His new e-mail address is g.a.allan@southampton.ac.uk.... Colin Bell now Provost @ Edinborough.... A.P.M. (Tony) Coxon now Research Prof. at Soc, Essex.... Shinsuke Ohtani is now at Soc, 237-1 Nishnio Sakai, Momyamagakuin (St. Andrew's) Univ, Osaka 593; tel: 0722-36-1181, fax: 0722-34-7276....

Sally Gallagher (PhD, Soc, U Mass) received the ASA Aging's section 1993 dissertation award for "Family and Community Caregiving by the Elderly: The New Volunteers".... Joanne Miller (Soc, Queens Col, NYC) has been nominated for Secretary of the AmSocAssoc, Janet Abu-Lughod (New Schl) has been nominated for Council, Ronald Aminzade (U Minn), John Hagan (U Toronto) & Sharon Zukin (CUNY Grad Ctr) have been nominated for Cttee on Pubs, and Rebecca Adams (UNC-Greensboro) & James House (Michigan) have been nominated for the Cttee on Cttees.... Former Connections typist Maria Jacobs is now head of Wolsack & Wynn, Canada's biggest publisher of poetry. "Big" is relative as the average poetry book sells 396 copies in Canada, 1,200 in the USA & 800 in the UK.

Lynn Smith-Lovin (Soc, U Ariz) & Charles Tilly (Ctr for Studs of Soc Change, New Schl) are now Deputy Eds. of the Am Soc Rev.... Alexis Ferrand (Soc, U des Sciences et Technologies de Lille) received his "Habilitation" as Director of Research,

21 Dec 93, for his work on the analysis of personal networks. The rapporteurs in this blessed event were **Alain Degenne, Michel Forse, Yves Grafmeyer, J.C. Rabier & F. de Singly**.... **Eric Olin Wright** (Soc) has received the U Wisc John D. MacArthur Endowed Chair for a 5-year term.... **Josh Gamson** now Asst Prof of Soc @ Yale, is the son of **Bill & Zelda Gamson**. Josh's new book on watching celebrities reviewed in NY Times 23 Feb 94.... And **Lila Abu-Lughod,** daughter of Janet, is Asst Prof of Anthro @ NYU. Her new book is: Writing Women's Worlds: Bedouin Stories.... While we're discussing the kindele, please note that **Patricia Turner** is now a grad stud in History @ U Mich: She and I had had a few e-mail exchanges on using network analysis in history before she said, "Maybe you know my father, **Jonathan** & my mother, **Alexandra Maryanski**"....

Norton Long, Emeritus Prof of Urban Politics (Missouri-St Louis) died 30/12/93. His 1960s article, "The Local Community as an Ecology of Games" helped shaped the thinking of myself and other network-y urbanists. Indeed, I almost became a junior member of his dept. in 1969.... **Leo Chall**, the Sociological Abstracts doyen, died 12/93. I always admired how he ran SocAbs as a personal calling, but he sure made my life miserable by refusing to let Connections use his abstracts & keeping Sociofile prices so high on CD-ROM that only libraries could afford it. "Think mass-market!" I used to urge him.

IPI

IPI stands for the Institute for Political Incorrectness. Its motto is "Words Will Never Harm Us" I am its founder and only member. Our patron anti-saints are Lenny Bruce, Noam Chomsky, Paul Krassner & Sandra Shamas — is it a coincidence that I have an ethnic, gender, generational & natal affinity with 3/4 of them. (And a moment of silence for John Candy, a kindred spirit & fellow Torontonian, who died as I was writing this.)

You can join too — just send me an item for this section. Here are the first contributions: "More Balls Than Most" is the name of a British juggling supplies company. [Source: The Economist, 20 Nov 93]

The politically correct definition of a nerd is: "Technically advantaged but socially challenged."

David Lawrason suggests that "hysterically correct" is a useful synonym for "politically correct' [Toronto Globe & Mail, 27 Nov 93].

The Ontario government has just announced that they are developing some programs only for the "specially advantaged" — that is, all but white males without physical disabilities. (I persist in trying to tell my university administration that "pushy New York Jew" has also been a visible minority in Canada.)

Note to 'Mericans: the Ontario government is now run by a bunch of former lefties whom US VP Al Gore untruthfully calls "socialist" but who actually like to cut workers' salaries (including my own). Welcome to the wonderful world of Free Trade where finance capital can roam freely while the rest of us wonder where the cutbacks will happen next. Funny thing: when the US imposed free trade (and unemployment) on Canada they kept telling us about the wonders of the global division of labor. Now that the Mexicans and Capital are doing it to them, the 'Mericans aren't so sure.

I do most of my thinking about paper-writing during my morning shower; cleanliness is only a nice byproduct. Martin Luther did most of his writing-thinking while sitting on the toilet — at least that's what Erik Erikson said when he poked his nose into the matter. My problem, and Marty's, has been that there's no good way in such situations to write down your deep thoughts. So here's my two niche market ideas for entrepreneurs: the Shower-PC and the Craptop computer. Both fill structural holes.

Others have different styles. Here's a radio ad I heard in New Orleans during the Sunbelt, 2/94: "It's a shoulder weapon. It weighs only 4.2 pounds. But it's the most powerful weapon he [sic] can use: It's the mind of a U.S. Marine."

SHORT SCHTICKS

NEW ESSAY CONTEST: The personalities and value systems of Ron Burt and Harrison White as revealed in their books, Structural Holes and Identity & Control. Extra credit: Compare & contrast. — 10 points if you do an essay on what T&B reveals about me.

STRUCTURAL QUOTES: (1) "Politicians who vote huge expenditures to alleviate problems get reelected. Those who propose structural changes to prevent problems get early retirement." [Contributed by John McClaughry to the BMW e-mail network, 2/94]. (2) "Tell me with whom you walk, and I'll tell you who you are." US Congressman Luis Guitterez's mother, as quoted and translated from Spanish by him on the 60 Minutes TV show, CBS-TV, 6 Feb 94.

SASQUATCH: Remember when SAS was a program for doing regressions and crosstabs. Their 2/94 ad in Info Canada now heralds them as "Enterprise Wide Information Delivery". No wonder SPSS is more usable on PCs than this bloated attempt to be all things to all users.

INTERLOCKS REVEALED: Jeb Bush, George's kid, is running for Florida governor. Here's the dialogue from a recent campaign stop [NY Times, 30 Nov 93]:

"You're familiar with the Skull and Bones society?", a secretary asked.
"Yeah, I've heard about," JB responded drily.
"And you're familiar with the Trilateral Commission and the Council on Foreign Relations?"
"Yeah."
"Well, can you tell the people here what your family membership in that is? Isn't your aim to take control of the United States?"

JOE SAYS IT ISN'T SO: Most North Americans have seen the Bud Lite beer commercial in which an airport greeter holds up a sign saying "Galaz-kiewicz". Joe says that it ain't him; his father changed their family name to "Galaskiewicz". Could this have been the first step to assimilation. Joe says that his cousins in Chicago and Milwaukee do spell it "Galaz" -- perhaps they'll get royalties.

PHIL GIVES THE WORD: In case you were wondering, Phil Bonacich says his last name "is pronounced "Bonasitch," with a slight accent on the first syllable. It's Croatian. All Bonacich's are from the island of Brac and the village of Milna. {BW's note: There's a nice nudist resort on a nearby island.} In Milna, Bonacich is the most common name, so much so that Bonacich's have 2 last names. There are Bonacich's in the San Francisco bay area and in San Pedro [near LA]. Those in the bay area either were in agriculture or, in the late 19th and early 20th centuries, they owned bars. In San Pedro, they were fishermen."

FOR MATH TYPES: John Angle (US Dept of Agric) is leading a drive to organize a mathematical sociology section of the AmSocAssoc. There'll be a get-together at the next annual meeting, Los Angeles, 8/94.

WORLD EMAIL SYSTEMS: You can subscribe to the world-systems email network by sending the message: **sub wsn "your personal name"** to **listserv@csf.colorado.edu**. Established in 1992, it has 100+ subscribers, with an archive (in Boulder, CO) edited by Chris Chase-Dunn & Peter Grimes.

SIGN IN MAKAWAO (the Sausalito of Maui, Hawaii): "Network chiropractic: Changing the World a Spine at a Time" [seen 9 Jan 94].

FOR ORG TYPES: (1) Tom Peters in the Toronto Globe and Mail's Report on Business Magazine (2/94) says that a book worth checking is Michael Malone and William Davidow, The Virtual Corporation. Peters suggests that the

ephemeral linkages of the network corporation, composed of ever-shifting alliances, will not pay off unless mutual respect and trust are the hallmarks of the organization. (2) Robert Freeland (Soc, Cal-Berkeley) won the AmSocAssoc's Org & Occ section award for the best grad student paper, "The Myth of the M-Form? Governance, Consent and Organizational Change." Freeland challenges the arguments of General Motors mavens that the decentralized, multidivisional enterprise that evolved 70 years ago was more efficient than its predecessors because it separated long-term strategic planning from short-term operational decisions. Freeland shows that GM violated this separation repeatedly. He argues that participative decentralization resulted when corporate managers needed to create consent for their policies or needed access to information. Administrative centralization occurred when corporate HQ had access to independent sources of information. [From ASA Newsletter].

EXCUSES FROM THE X-1 GENERATION: Most of us have had students tell us about deaths in their family -- they always happen around exam or term paper time. Five years ago, loss of computer files became the prevalent excuse: "Backup" is the first technical term my students learn. But now eldercare is in among my 50-ish contemporaries. Too frequently, when I call someone to inquire about a late paper for a book or conference, I'm told, "I was in the middle of doing it, but my father/mother/aunt/uncle (in-law) became ill and I had to go to Florida/Arizona/California to take care of them." Unfortunately, we're now at the age when it's true. At any given moment, 10% of my strong ties are actively engaged in eldercare (hurrah for frequent flier points), 80% are worrying about it, & 10% don't have anyone left to worry about.

INTIMACY DEFINED: Isabel Allende, author of The House of the Spirits (and niece of murdered Chilean prexy Salvadore), adored her grandfather, a partial model for Trueba in her novel. Although she disagreed with her grandfather about practically everything, "we loved each other so

much, it didn't matter. When I became involved with feminism, he was shocked. When I became involved with socialism that shocked him. Then I left the Catholic Church when I was 20 & that shocked him, but I loved every single wrinkle on his face." [Judy Stone, Toronto Globe & Mail, 4 March 94].

SENSIBLE ECONOMIST: Joe Stiglitz, now a member of the US Council of Economic Advisers, is that rare thing, a sensible economist. "What I've tried to do for the first time [in government] is to shift the paradigm. The key to economics is problems of information — who knows what — and these problems of information are core to our understanding of all our institutions." [NY Times, 9 Feb 94]

THE COSTS OF STRONG TIES: "Although police have set up counselling centres nationwide for disgruntled gangsters thinking of getting out, gang membership in Japan involves a complex web of family-like relationships that are very hard to break off." Eric Talmadge, AP, 2/94.

FEARLESS PREDICTION EQUATION: BJs + 94 = WS x 3 @ sky.dome.toronto.ca. Get your tickets now. They're almost completely sold out.

IS THERE A BIBLIOGRAPHER IN THE NET? Wolfgang Sodeur and I have each compiled partial bibliographies of network analysis. Each has histories, as mine incorporates an effort by David Knoke a few years ago and Wolfgang's incorporates work by Linton Freeman and possibly others.

Our two bibliographies don't overlap much and together they probably contain 3K entries. Mine exists in Word Perfect and Endnote Plus. Wolfgang's is in some data-base format.

We desperately need someone with computer skills to combine these two lists. It will take some programming and sweat-work to transform Wolfgang's non-standard data-base format into a more

standard and mergeable format. This would be an excellent job for a work-study student this summer with the appropriate skills. If you'd like to head this project, please contact me at:

wellman@epas.utoronto.ca

CULTURAL NOTES

SMALL WORLDS: Ivan Chase and Mark Granovetter both contacted me to urge that I inform all readers that the movie "Six Degrees of Separation" is partially based on Stan Milgram's "small world" conjecture. Of course, loyal readers of this column will recall that some issues ago I informed them of this when discussing the same-named play on which the movie is based — so the current info. is only for the theatrically-challenged. Speaking of small worlds, Donald Sutherland, the movie's star, is the son-in-law of Tommy Douglas, one of Canada's leading socialist politicians — indeed, the man who led the fight for medicare.

NANCY MITFORD ON FRIENDSHIP: "Les gens du monde are the only possible ones for friends. You see, they have made a fine art of personal relationships and of all that pertains to them — manners, clothes, beautiful houses, good food, everything that makes life agreeable. It would be silly not to take advantage of that. Friendship is something to be built up carefully, by people with leisure, it is an art, nature does not enter into it. You should never despise social life — de la haute societe — I mean, it can be a very satisfying one, entirely artificial, of course, but absorbing. Apart from the life of the intellect and the contemplative religious life which few people are qualified to enjoy, what else is there to distinguish man from animals but his social life?" [from Love from Nancy: The Letters of Nancy Mitford, edited by Charlotte Mosley, Houghton Mifflin].

Gabriele Annan (in the NY Rev of Books, 17 Feb 94) comments that Mitford had concentric circles of friends: (1) her family, especially her lively sisters; (2) the "aesthetes" of the 1920s Oxford generation; (3) outer circles of (3) chic Anglophile French and Francophile British in Paris; (4) the European beau monde in general, from the high aristocracy to the intellectual and artistic fringe. Americans were excluded.

THE RECKONING, by Charles Nicholl (Harcourt, Brace), is a new network-ish account of Christopher Marlowe, focusing on the contentions & cleavages of Elizabethan spies & informers -- most of whom seemed to have been double or triple agents. The spies' patrons were contending to the "favourite" of Queen Elizabeth I & all those present at Marlowe's murder (including C.M. himself were working for 1 or more contenders. Marlowe's closest ties were to Sir Walter Raleigh, also known for being the founder of American imperialism (in Virginia). [Source: NY Times book review by Michiko Kakutani, 4 Mar 94].q

IT'S A DOG'S LIBERATED LIFE: "Thomas asks, `What do dogs want?' and answers, `They want each other.' Their relationships within the group, and to some extent with dogs outside the group are, she shows, the most important part of her dogs' experience. Thus, after long months spent following one of her dogs, on bicycle and on foot, as he purposefully roamed Cambridge and nearby towns, Thomas concluded that the goal of his wanderings was simply to establish relationships with other dogs — either in person, by sniffing and circling them, or symbolically, by urinating over marks they had left behind." [Harriet Ritvo's review of Elizabeth Marshall Thomas, The Hidden Life of Dogs, NY Rev of Books, 13 Jan 94].

VACANCY CHAINS: "In 1963, 10 years after having studied with Foucault, Jacques Derrida delivered the now famous lecture in Paris attacking Madness and Civilization. With Foucault in the audience, he argued that his former mentor had misread Descartes' Mediations and he ended by suggesting that there might be a 'structuralist totali-

tarianism' in Foucault's approach. Foucault sat impassively during the lecture, probably aware that the younger Derrida had done to him what Foucault had done to Sartre during the past decade — he had committed a `symbolic murder of the master' in order to challenge for the position of capo di tutti capi in Paris. Foucault brutally struck back seven years later with the essay `Mon coeur, ce papier, ce feu' [where] he accused Derrida of being the one who had misread Descartes and dismissed him as reducing all pedagogy to `textual traces'. The estrangement lasted 10 years until Foucault spoke up in Derrida's defence when the latter was arrested in Prague on trumped-up drug charges. Foucault died of AIDS in 1984. [excerpted from Sam Solecki's review of David Macey's The Lives of Michel Foucault (Hutchinson), Toronto Globe and Mail, 15 Jan 94.

RESEARCH NOTES

Claire Rualt, of GERDAL-CNRS (Paris) is studying the professional networks of agrobiologists: the friendship and information links that this diverse and dispersed group uses. Preliminary papers are available.

Andrea LaCroix, U Washington (at the 2/94 AAAS meetings, San Francisco) found in a sample of almost 10K people > 55 that a strong social network contributes to staying healthy long in life.

Here's a free idea for someone: Joel Garreau's The Nine Regions of North America engagingly argues for specialized regional economies that divide up the US, but also transcend the Canadian and Mexican borders. Why not do bloc models on Leontief-type input-output tables (or in this case, import-export tables) to see if such regionalization in fact exists. NAFTA makes the situation even more dynamically interesting. And speaking directly to this subject, the Mayor of Seattle said "Cascadia [Oregon, Washington, British Columbia] isn't a place. It's a way of thinking of our relationships." [Morningside, CBC-AM, 12 Jan 94].

HELP FOR THE SCARECROW: Greg Heil, the author of the world's first blockmodelling algorithm, is now working with the Biological Structure dept. of U Washington, importing an object oriented data base into a project funded by the National Brain Project to help neurosurgeons map speech areas in the brains of patients undergoing surgery. You can contact him by Email at gheil@cs.washington.edu or by telephone at 202-528-0059; .

NEW JOURNAL: The Int'l Sty for the Study of Personal Relationships has launched Personal Relationships, edited by Pat Noller (Psych, U Queensland, St Lucia, Queensland 4072, Australia; pn@psych.psy.uq.oz.au). It's a direct competitor of the Steve Duck edited, Journal of Social and Personal Relationships. Only time (& the forthcoming ISSPR meeting in Groningen, 7/94) will tell if the new journal's omission of "social" is significant (and ominous).

$$$ THIS JUST IN $$$$: Charles Kadushin & Paul Attewell are handing out NSF fellowships ($18K x 5 years) for new doctoral students in organizational studies at the CUNY Grad Ctr/ They're especially interested in "organizational effectiveness": public and non-profit as well as private organizations. Trainees will be involved in faculty research projects & industry/government internships. Trainees must be US citizens or permanent residents. ❑

NETWORK NEWS

Network News is a regular column which serves to disseminate news from or about INSNA business.

Sunbelt. This year's Sunbelt conference was held in New Orleans at the Maison Dupuy Hotel in the French Quarter. It was beautifully organized by Scott Feld and Jill Suitor. A record number of people were in attendance (about 280), probably reflecting the enormous appeal of the location, as well as a vastly larger list of people to whom announcements were mailed. Another first of this conference, particularly appreciated by attendees from outside the U.S., was the ability to pay the registration fee with a credit card.

At the INSNA business meeting following the conference, a number of important issues were decided. First, the suggestion by Alain Degenne and others that the annual Sunbelt conference and the semi-annual European network conference be combined into a single 3-year cycle (west coast U.S, east coast U.S., Europe) was approved. This means that (what would have been) Sunbelt '95 will be held in London, organized by Martin Everett. The '96 conference will be in Charleston, South Carolina (organized by John Skvoretz and Katie Faust), and the '97 conference will be on the west coast. The U.S. conferences will continue to be held in February, while the European conferences will be in June. The formal name for both conferences will now be the "International Conference for Network Analysis".

Second, the suggestion by Chris Winship that the meetings of the American Sociological Association Section for Methodology be concatenated with the Sunbelt meetings was also approved. Slated to begin in 1996 at Charleston, the idea is that the Methodology sessions would run just before or just after the network sessions. Details have yet to be worked out.

Third, it was announced at the meeting that INSNA will soon be incorporated as a not-for-profit association, in the same way that the American Sociological Association and the American Anthropological Association are. When this occurs, we will also formally make the network conference a part of INSNA. One of the key benefits of this will be that the conference organizer will no longer be personally liable to the hotel and other contractors for the cost of the conference.

SOCNET. At long last, the International Network for Social Network Analysis now has an email network to connect its members. A listserv called SOCNET has been created at the University of Florida. All email that is sent to the bitnet address SOCNET@NERVM is automatically resent to all subscribers of the list. The purpose of this electronic bulletin board is to allow INSNA members to discuss research and talk about INSNA business. I hope everyone that uses email will subscribe to SOCNET; it is an ideal way to rapidly communicate with the worldwide network community. Instructions for signing up and using SOCNET are given elsewhere in this issue.

INSNALIB. The INSNALIB Electronic Library is now fully operational. The Library is a repository for network-related software, data and text, which can be accessed electronically via Anonymous FTP. Currently, the Library contains classic network datasets, short papers from the last European Networks Conference (ECOSNA), abstracts from this year's Sunbelt conference, and software and data associated with two articles in this issue of *Connections*. For INSNA members who do not have INTERNET access, all materials on INSNALIB are also available on 3.5" diskette for US$5.

-- *Stephen P. Borgatti*

Situational Analysis and Network Analysis[1]

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The purpose of this paper is to argue for a closer linkage between the detailed observation of behaviour and the formal analysis of network data[2]. Situational analysis, as far as I am concerned, deals essentially with the analysis of behaviour occurring in everyday situations. Very often network data are collected by survey methods in which the location of the social action is unspecified. I shall try to argue that it is often difficult in these circumstances to interpret the data in terms which make the relationships immediately understandable.

A. Origin of Network Studies

I believe that network studies developed as a reaction to a heavily structural emphasis in sociological and anthropological analysis. Network studies are particularly appropriate in the study of complex societies. But we need to distinguish the abstract or formal aspects of social systems from the more changing and informal aspects. I have elsewhere distinguished these by referring on the one hand to the context of social action i.e. the overall political and economic framework within which social actions take place and the limited social environment within which social actions take place. These limited social environments are what I call social situations. Furthermore I have differentiated the context into the highly abstract and general context on the one hand and the setting on the other. For example from my point of view the wider economic and political framework of Europe and of Germany in particular would be the context for our meeting here, the Conference and the gathering of academics interested in social networks would be the setting but this session this afternoon and the specific linkages among us all would, in my opinion, constitute the social situation (*cf* Mitchell 1985).

But given this distinction there are two rather different ways of going about the study of social interaction and therefore of network data. These are the formal and the ethnographic approaches. Formal analysis had its origins in sociometry about 30 years ago when graph theory became the basis of analytical procedures. But the problems handled by the sociometrists were somewhat simplified as against what is frequently addressed in modern sociological or anthropological network analysis.

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[1]Keynote address given at the International Network Analysis Conference, June 1993, in München, Germany.

[2]I had approached this topic earlier at a Sunbelt Conference in Santa Barbara in 1983. That address was eventually published in *Connections* (Mitchell 1986).

In particular sociometrists were on the whole dealing essentially with uniplex networks the problems of which could fairly easily be construed in graph theoretical terms. When material coming from fieldwork observations came to be used however the complexity of the data called for a different approach. It was under these circumstances that procedures such as block modelling came to the fore. It is noteworthy that when Breiger, Boorman and Arabie (1975) looked for material with which to illustrate their CONCOR procedures they used data derived from an observational study of conflict within a religious institution in which Sampson, the observer, was able to watch the developments of quarrels and divisions among a set of monks and to trace the course of events in that monastery until finally the issue was resolved by the withdrawal of one of the monks.

While the structure of the monastery provided the basis for the line of authority in the monastery an analysis of the course of events in the end could only be understood by seeing what happened as a set of connected incidents in an ongoing interactional panorama. Clearly the flexible approach built into network analysis allowed Breiger *et al.* to abstract the relevant events during the conflict and so enable them to allow the latent pattern in the behaviour of the actors to become apparent. But the beauty of the approach that they adopted was to enable them to use formal procedures to make the pattern visible.

B. Example of Ethnographic Use of Network Ideas

One of the earliest uses of the idea of social networks was in the study by Elizabeth Bott (1967) of twenty families in London. At the time when she was making her study Bott was not aware of the need to collect detailed network data suitable for formal analysis. In fact she seemed ignorant of formal network analysis methods. She was aware of the work of Moreno since she quotes his work in a footnote but she did not attempt to use the techniques he and his colleagues had developed to analyse her data. She did not even produce a sociogram of the connections among the contacts of even one of her families. A sociogram is merely a graphic representation of the relationships and involves no analytical procedures at all. Instead she classified her 20 families qualitatively into those that were in her opinion 'close-knit', 'medium-knit' and 'loose-knit' or 'transitional' i.e. changing. In fact in Table 3 of her book she shows that there was only one family she could describe as close-knit, 9 as medium-knit, 5 which were loose-knit and 5 which were transitional. Three of the latter were changing from highly segregated to joint while the other two were planning to move. The information is a little unclear since we do not know whether 'move' refers to 'move' geographically or to move from close-knit to loose-knit or vice versa. Bott however did not subject her material to the sort of sociometric analysis which had been well established at the time. Today it would be unusual for a study of this kind to be made without making use of some of the formal methods of analysis which have been developed in recent years.

C. The Tie between Ethnographic and Formal Analysis

The point that I am making is that ideally there is no opposition between formal and ethnographic analyses. There should in fact be a dialectic relationship between the two rather different approaches. What appears to be the situation is that fieldwork studies seem to have

provided the initial stimulus for network analysis but network analysis does not yet seem to have provided the stimulus for more detailed ethnographic analyses.

An example of the use of ethnographic analysis providing the basis of formal network analysis is the material relating to tensions is a monastery collected by Sampson and then used by Breiger *et al.* in the paper in which they developed the notion of blockmodeling and the procedures to effect blockmodeling (*i.e.*, CONCOR).

The intriguing results they reached from their analysis led to a number of justifications of Sampson's original ethnographic analysis. Ideally I would have liked to have seen Sampson go back to his field notes to resolve any contradictions and variations thrown up by the formal analysis but I have no information about whether this was done or not.

D.1. More Illustrations

Another example of the use of formal analysis as applied to fieldwork data is provided by my reanalysis of Kapferer's data the events leading up to a strike in a clothing factory in Zambia (Mitchell 1989). Kapferer adopted anthropological methods to make his study of the development of a strike. In other words he sat in the clothing factory and kept a close watch on who talked to whom, what they said to one another and how they behaved towards one another. Note that he did not use formal data collection techniques. When he was analysing his material he went through his field notes and extracted the information he needed to construct four matrices of the relationships among the workers over a period of six months leading up to the strike (Kapferer 1972). At the time of writing his book the only formal technique he had available was a type of clique analysis procedure which in fact was not very helpful to him. In 1980 however I was able to reanalyse his material using a wide variant of different techniques which had become available since he did the analysis reported in his book. The reanalysis was rather complex and cannot of course be detailed here. But in general the formal analysis confirmed to a surprising degree the conclusion he had drawn from the situational analysis. But at the same time the reanalysis raised some problems which needed a detailed reexamination of Kapferer's field-notes to which, of course, I had no access.

D.2. Illustrations from the Manchester Homeless Women Study

In the early 1970's the local Social Welfare Department asked a colleague of mine in Manchester to make a study of women who had in one way or another become homeless. She asked me if I would be prepared to cooperate with her in this study. The sort of information the Social Welfare Department was anxious to know was how these women coped with the isolation they inevitably experienced when they lost their homes. It struck us that this seemed to need network procedures. We applied to a charitable organization for funds to help us mount this study and we were given a small amount. Some results from this study have already appeared in several publications (Mitchell 1986, 1989).

In this study we were mainly concerned as I have already hinted with the social support women who had been thrown out of their homes could get from other people. We classified the

In this study we were mainly concerned as I have already hinted with the social support women who had been thrown out of their homes could get from other people. We classified the links people had in six general types: (i) Links which had remained in existence at the time of study as against those that had lapsed; (ii) What the frequency of meeting with the other person was; (iii) The degree of closeness that the respondent felt the persons involved felt towards one another; (iv) Whether the link was mainly convivial or not , i.e. whether the people spent time together for the sheer pleasure of it or not; (v) Whether the link carried with it some practical assistance or not e.g whether the person was prepared to do shopping for the other or not; (vi) Whether the people concerned were emotionally involved with one another or not.

These links are by definition multiplex so the technique had to be able to handle relationships with more than one component. I therefore used CONCOR. Some results from this study have already been published, for example, in the book published by Thomas Schweizer (1989). As an illustration of the technique I use an example from my paper in that book. It refers to an Indian woman who was married to a man in the U.K. by arrangement with her parents. When she arrived in England she found that her husband had previously been married and that he was still responsible for his first wife's financial upkeep. The new wife and her husband initially settled in London but after a while they moved to Manchester. Her husband started becoming violent with her. Eventually her HZH arranged for the woman to be placed in a safe refuge and we interviewed her while she was there.

I find the dendrogram produced from the partitioning process incorporated in CONCOR useful in interpreting the pattern of social relationships in which this unfortunate woman found herself (see Figure 1). The separation of her H's kin is very clear. Also clear is the concentration of links within the Refuge. But the
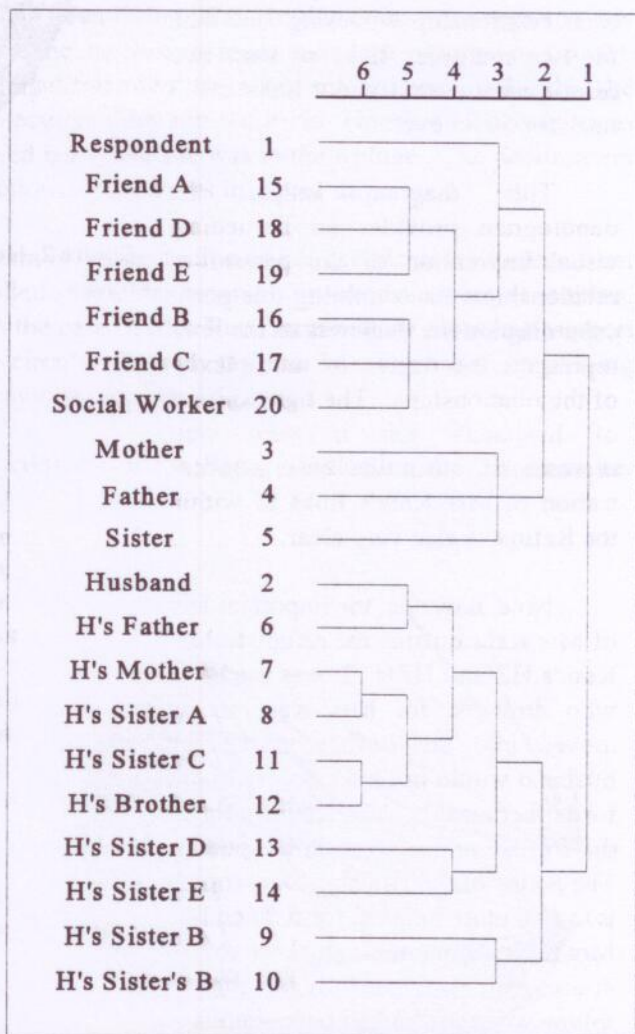
Figure 1. Homeless families, Kaur, Asian women's refuge

pattern of relationships is perhaps even more clear if we use a circular network diagram (see Figure 2).

Note, the computer program which produces this diagram adds an additional line for each additional multiplex link contained in the relationship between I and J. In order to simplify the diagram I have reduced the total number of multiplex links in each relationship by using one line for two multiplex links or less, two lines for between 3 and 4 links and 3 lines for 5 and over.

This diagram unlike the dendrogram provides an immediate visual impression of the pattern of relationships. In examining this particular diagram the thickness of the lines represents the degree of multiplexity of the relationships. The tight knit set of husband's kin is very well represented. But the clear concentration of Mrs Kaur's links to within the Refuge is also very clear.

Note, however, the important link of Mrs Kaur outside the refuge to Mrs Kaur's HZ and HZH. It was the latter who arranged for Mrs Kaur to be moved into the Refuge where her husband would not have access to her for further assaults. Mrs Kaur's links in the Refuge are, of course, temporary. The policy of the Housing Department is to find other housing for women like Mrs Kaur among their stock of vacant houses. We had originally intended to follow women who had been rehoused in this way to their new homes to study the way in which they built up new support networks in their new locations. But as is so often the case in studies of this kind which are
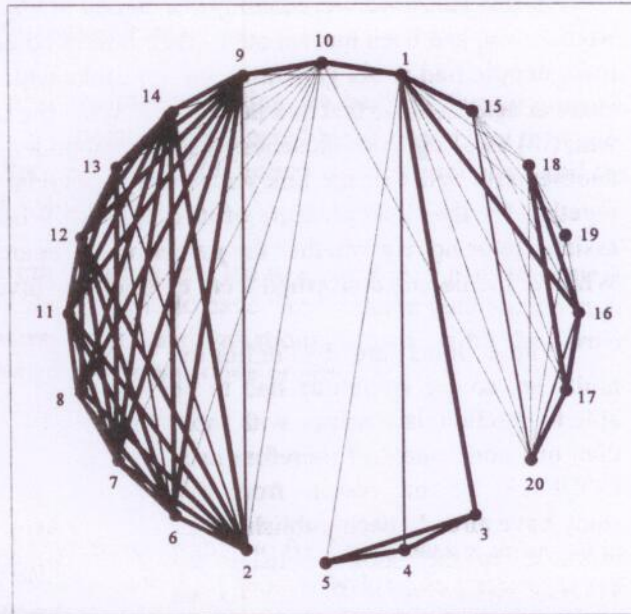
Figure 2. Homeless families, Kaur, Asian women's refuge
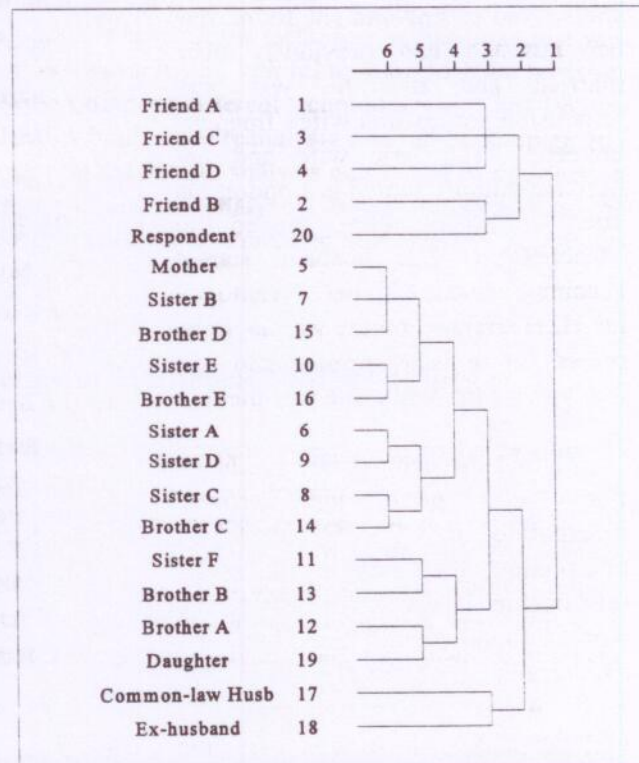
Figure 3. Homeless families, Kaur, Asian women's refuge

conducted on a shoe-string our funds ran out and we could not complete the study in the way in which we had planned it.

D.3. Mrs Hulston

A second example drawn from the same study is the case of Mrs Hulston. Mrs Hulston was in a Refuge different from the one that Mrs Kaur was in. She had been married previously but left her husband when he became very violent with her. She then struck up with another man with whom she lived in a 'common law' marriage. Her marriage had lasted for 10 years and her liaison with the man she had been living with for 7 years. She had borne 3 children by her husband and had a son by the man she had been living with. In due course her common law husband started to assault her. At the same time he became more and more addicted to alcohol. Eventually he had become very drunk and had fractured her jaw in an argument. After this she decided that she would have to find protection. She applied to the Housing Office and was found a place in a Refuge. We interviewed her while she was in the Refuge. The dendrogram in Figure 3 shows the structure of the relationships she was involved in.

The striking feature of this dendrogram is the separation of her friends in the Refuge from her own kin. Note that the two men called in the dendrogram 'husbands' appear as isolates. Note that her contacts in the Refuge as in the case of Mrs Kaur form a fairly close knit support set. This is shown more clearly in the circular diagram (Figure 4). The same simplifying procedure has been used here as in the previous network diagram.

Note the multiplex links with the contacts in the Refuge indicating the extent of her dependence on them. Note that her links outside the Refuge were with her Z(11), her B(13), and another B(12). Her links with her M(5) were not particularly multiplex possibly because the relationships with her mother cooled off as she kept quarrelling with the men she lived with. Her mother incidentally was a widow. But in general Mrs Hulston's kin group as a whole are a fairly close knit set. Mrs Hulston's daughter (19) was brought up by Mrs Hulston's mother (5), but Mrs Hulston still has quite close relationships with her daughter.

E. Conclusions

What I have been trying to emphasize is that we need formal
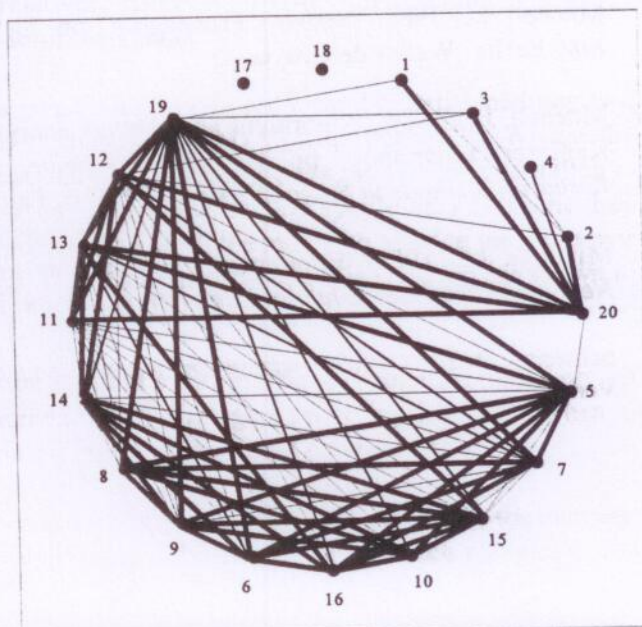
Figure 4. Homeless families, Hulston hostels..Battered wife ex women's aid

network analysis together with situation analysis to deepen our understanding of the dynamics of social relationships and that as yet social analysts have not derived as much benefit from network studies as they might. Note however that I am not arguing for the use of one interpretive procedure to the exclusion of the other. What I am arguing for, is a happy and fruitful combination of the two. It is obviously much easier to sit in front of a computer staring blankly at the monitor screen while network numbers are crunched mechanically for the amusement of the operator. Observational studies are always very difficult and need an enormous investment of time and effort. My feeling is that the investment of time in the process however is worth the effort to make network analysis more human and therefore more understandable.

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Sex in Bipartite Graphs

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Faust (1993) has shown that contrary to certain reports (cited in Wellman 1993) the average number of sexual partners of French women is exactly the same as that of French men (assuming that the men are not having sex in another country): if the two sexes are represented as the two node sets of a bigraph with edges connecting sexual partners, the average degree of each node set must be identical. Bipartite graphs are also central to another interesting problem related to sex and marriage.

In today's climate the idea of having multiple sexual partners is beginning to seem quaint as well as dangerous. Now the aim is to have safe sex with a single partner, a spouse even. The question arises: under what conditions can every man and every woman find a suitable sexual partner, i.e. someone they know and therefore trust. This problem can also be solved using the model of a bigraph. In fact, it is known in graph theory as the *marriage problem*. We note that the marriage problem can be stated more anthropologically as in Ore (1963:47): "In a small village there is the same number of boys and girls of marriage age. By taboos and custom the boys are not permitted to marry close relatives: sisters, half-sisters or cousins. When is it possible for all the boys to take a bride within the village?"

A *bipartite graph* or *bigraph* G is a graph whose node set V can be partitioned into two subsets V_1 and V_2 such that every edge of G joins (a node of) V_1 with (one in) V_2. We use the terminology of Harary (1969). Our applications assumes that the sex ratio of the population is even and that men (or women) will choose as a sexual partner and spouse only someone they know. Let V_1 represent the women in the population and V_2 the men with an edge joining a pair of nodes if the individuals know each other. Two bigraphs depicting this situation are shown in Fig. 1.

An obvious necessary condition for the solution of the marriage problem is that every set of k men collectively know at least k women for all k integers satisfying $1 \le k \le m$ when m denotes the total number of men. Surprisingly, this is a sufficient condition as well.

Theorem 1 (Hall, 1935). A necessary and sufficient condition for a solution to the marriage problem is that every set of k men collectively know at least k women for each value of k with $1 \le k \le m$.
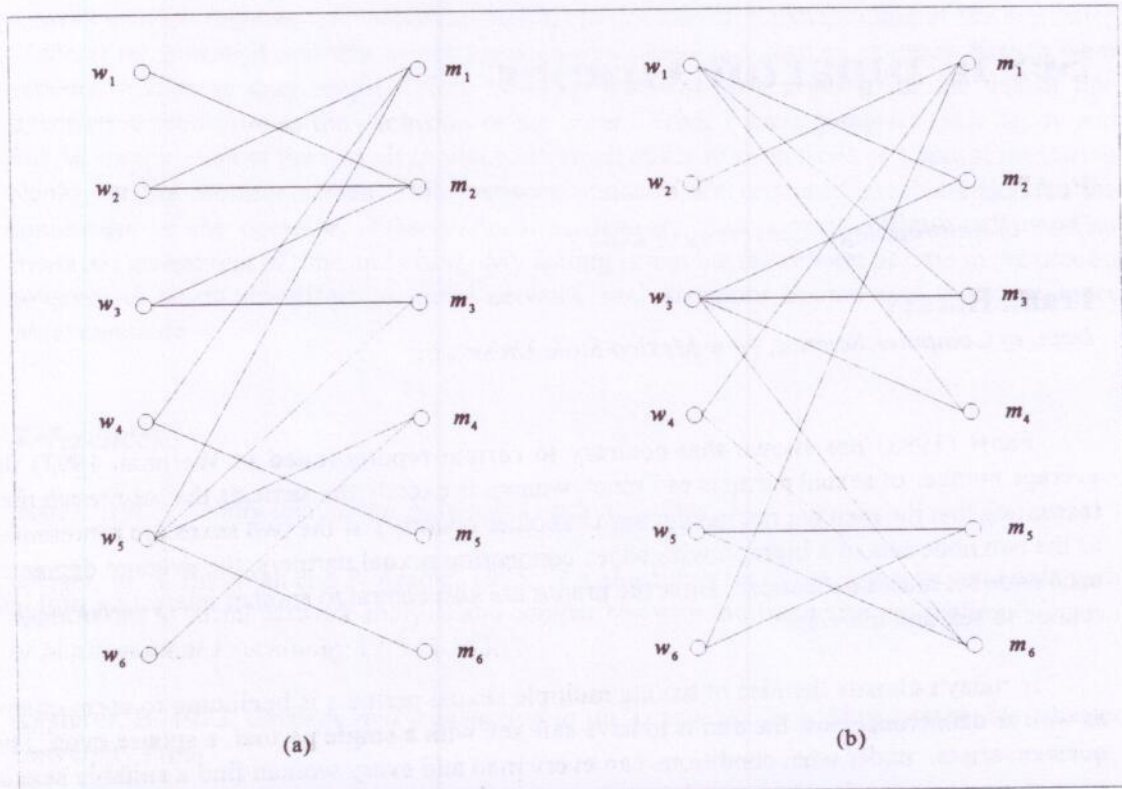
Figure 1. *Bigraph (a) satisfies the marriage condition, but bigraph (b) does not.*

The bigraph in Fig. 1a satisfies the condition of Theorem 1 while that in Fig. 1b does not. For instance, in Fig. 1b the subset of three men $\{m_2, m_3, m_4\}$ is connected to a subset of only two women $\{w_1, w_3\}$. (Both node sets in Fig. 1a satisfy Theorem 1, so all men can find a wife and all women a husband.)

There are societies in which Theorem 1 is not satisfied. In the Tuamotus in eastern Polynesia, for example, the populations of most islands are so small, and the extension of the incest taboo so broad that many individuals cannot find a spouse on their home island. The result is migration and the creation of inter-island marriage networks throughout the archipelago (Hage and Harary, to appear).

The marriage problem is one interpretation of a general type of graph theoretic problem known as matching. Theorems and algorithms concerning matching in graphs and maximum matching in weighted graphs are applicable to a variety of problems such as scheduling, storage and coding among many others. The exposition in Roberts' (1984) book, *Applied Combinatorics*, suggests interesting applications to social network analysis.

The marriage problem also exemplifies the general problem of determining when a collection of sets $\{S_1, S_2, ..., S_n\}$ can have a *system of distinct representatives* (SDR), that is, a sequence of elements $(u_1, u_2, ..., u_n)$ where each u_i is in Set S_i but not in any other set. Referring again to Fig. 1 the nodes on the left in each of these two bipartite graphs represent elements,

those on the right stand for sets, with each edge e meaning that the element on the left is in the set on the right. Thus Fig. la has an SDR. Fig. lb does not — m_2, m_3 and m_4, considered as sets, have two and only two elements in common w_1 and w_3 and so one of the three has no unique representative. The classic paper of Hall (1935) as reported in Harary (1969, p. 53) resolves the problem of determining when a collection of sets $\{S_1, S_2, ..., S_n\}$ can have an SDR.

Finally, as an historical observation we note that the pioneer Hungarian graph theorist Dénes König (1931) anticipated Hall's Theorem, expressing the result in terms of matrices.

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MAP: A Computer Program for Collecting Network Data

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Data on the social network linking individuals in a community have traditionally been collected by using Moreno's (1934) sociometric technique. Each subject simply reports the others with who he or she has a personal relationship of some sort. Then the overall structure is constructed by combining the individuals' responses.

Such a procedure is, of course, vulnerable to effects of individual variation in the tendency to generate names. If a subject reports many friends, we cannot judge whether that person is a community member who has many friends or is, as a subject, rather loose in the use of the word "friend." Similarly, one who reports very few friends may indeed be a community member who has few friends or she or he may be a subject who is reticent about the use of the term.

This problem led Krackhardt (1984) to introduce an alternative procedure for collecting data. In the Krackhardt procedure each subject is required to produce a Moreno-type list--not just for herself or himself--but for every member of the community. The analyst, then, is able to distinguish between differences between subject's tendencies to come up with names and community member's tendencies to be linked to others.

Downloading the Programs From INSNALIB

The **map.exe** program, together with BASIC source code and some accessory programs, are stored in a single, self-extracting archive file called **freemap.exe** in the **insnalib.192** directory. To download this file, follow this procedure (what you type is in **boldface**, what the computer responds is in *italics*):

ftp univscvm.csd.scarolina.edu
USER: **anonymous**
>**cd \insnalib.192**
>**binary**
>**get freemap.exe**
>**quit**

To unpack the archive, type **freemap** at your DOS prompt. This will release all the files in the archive.

Several investigators have come up with other procedures that are also able to sort out these two effects. Cairns, Perrin and Cairns (1985) asked subjects to produce free lists of the names of community members who "hang around together." Thus, as in the Krackhardt procedure, each subject produces a report on the whole community.

Freeman, Freeman and Michaelson (1988) generated the same sort of information about the total community by using a successive pile sort procedure. Subjects were provided with a deck of cards, each of which named a community member. Subjects were asked to sort the cards into piles within which everyone was "socially very close." Then, they were asked to relax the criterion of closeness and to merge piles. This merging was repeated until the subject was unwilling to go any further.

Boster (1986, 1987) used another form of the successive pile sort that generated a complete tree. Subjects began as in the Freeman, Freeman and Michaelson task. Then they were required to merge exactly two piles, and this merging is repeated again and again until all the cards are in a single pile. Then subjects return to their original split and they are required to split exactly one pile, and this is repeated again and again until each card is in a separate pile.

Each of these post-Moreno procedures undoubtedly has its own strengths and weaknesses. Comparative research on their properties is just beginning (Marsden, 1990). But, it is clear from the outset that all of them produce more and richer data than that produced by the original sociometric test.

```
This experiment is concerned with how individuals think about
social patterns.  You will be presented with a screen. Several
people you know will be listed on the right.  Each is
identified by a letter, like "F".  On the left, is a blank
screen. You use the arrow keys to move the cursor around.
First move to a person's letter, and hit G to grab it.  Then
move it to some spot on the screen and hit D to drop it.
Locate all the people anywhere you want on the screen--the
rule is simple.  If a bunch of people seem to be socially
close--if they appear to like one another--put them close
together on the screen; people who seem to be less close
socially should be located farther apart on the screen.  Once
you drop a person's letter, you can always go back and grab it
again using G.  Move it to where you want it then use D to
drop it.  When you are satisfied that all the people are
arranged in a pattern that reflects the patterning of who is
socially close to whom, just hit the key marked "ESC" to
finish.



Hit any key to continue...
```

Figure 1. *The Instructional Screen*

The present paper is designed to introduce still another alternative to the Moreno procedure--one that generates even richer and more detailed data than that produced by the other new techniques. This new procedure comes in the form of an interactive micro-computer program called MAP.[1]

MAP was developed from an idea originally proposed by David Morgan[2]. It is designed to collect subjects' perceptions of the total social network linking members of the community in which they are embedded. MAP performs three tasks: (1) it prepares the subject for the task, (2) it presents the names of community members as stimuli and (3) it records detailed data about subjects' responses to those stimuli.

When MAP is run, it seeks a file called "COUNT." COUNT contains a numeral, like 1 or 14. MAP reads that numeral, augments it by 1 and writes the result back in the COUNT file. Then the numeral read from COUNT is used as a name to identify the file of the subject being run.


```
                                                      A  PAT
                                                      B  BONNIE
                                                      C  BARRY
                                                      D  CHARLES
                                                      E  RON
                                                      F  STEVE
                                                      G  CHRIS
                                                      H  JOHN
                                                      I  ALAINA
                                                      J  DOUG
                                                      K  MARTIN
                            ■                         L  PIP
                                                      M  CLYDE
                                                      N  PHIPPS
                                                      O  PETER
                                                      P  DAVID
                                                      Q  ALDEN
                                                      R  ED
                                                      S  JIM

  MOVE = g h i j    GRAB = G    DROP = D    FINISHED = <ESC>
```
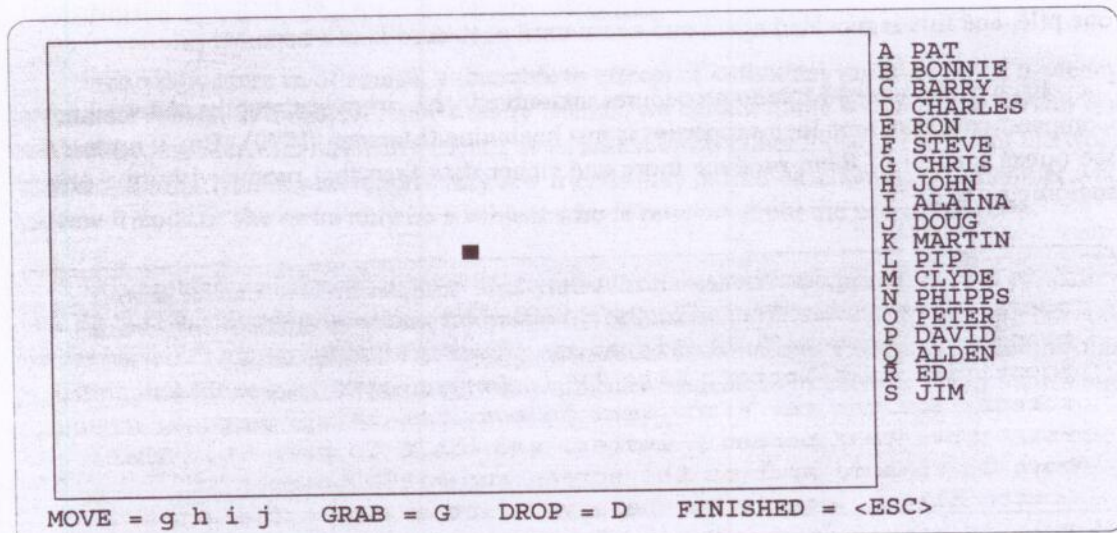
Figure 2. *Initial program screen.*

To prepare the subject, MAP reads a file called "INTRO." INTRO contains one or more pages of instructions that are presented to the subject. Figure 1 is an example of instructional material. Then, when the subject strikes any key, a file called "NAMES" containing a list of stimulus materials is read. That list is permuted into random order and presented to the subject

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[1]The MAP program was written in Q-Basic and compiled to run under DOS. It is available via anonymous FTP from the INSNALIB Electronic Library (see sidebar on previous page). For questions regarding use of the program, write the author directly at the School of Social Sciences, University of California, Irvine, CA 92717, phone at (714) 856-6698 or — best of all — send e-mail to lin@aris.ss.uci.edu.

[2]Personal communication.

on the right side of the screen. A square work area is framed on the left of the screen and the cursor is displayed prominently in the center of that area. All the keys except those listed at the bottom of the screen, g, h, i, j, G, D, and <ESC> are turned off. Striking any other key produces a BEEP sound but has no other effect. This working screen is shown in Figure 2.

Recording of data in the subject's file begins when the subject moves the cursor so that it covers the letter associated with a stimulus name and hits the G key. At that point, the label for the stimulus dims and a copy of that stimulus letter becomes locked to the cursor. The name chosen and the time at which the choice was made are both recorded in the subject's file.

The letter that is locked to the cursor is moved with each use of an arrow key. It will follow the cursor movement until it is dropped by pressing the D key. At that time, the cursor is freed, and the time and the location are recorded in the subject's file.

The most important feature of the MAP method is the detail of the data it records. When a subject completes the task, the result is a record of that subject's impression of the entire community. It comes in the form of a two dimensional Euclidean map that provides an index of that subject's judgments of the distances between each pair of people in the community. That map more or less automatically displays subgroups, cores and peripheries and bridging roles among community members. An example — involving hypothetical data — is shown in Figure 3.
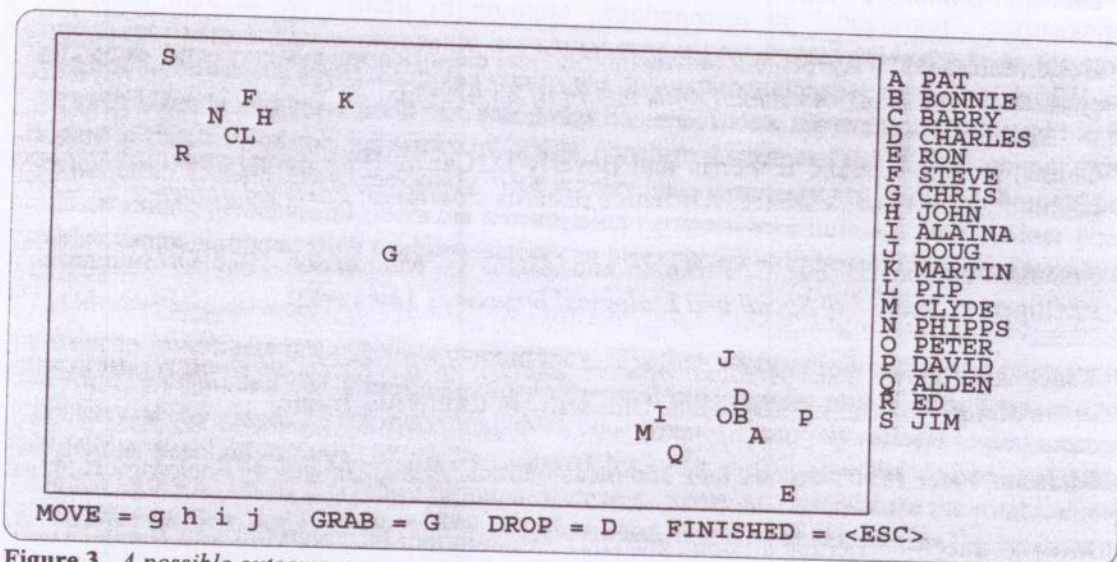
Figure 3. *A possible outcome screen.*

In addition to the Euclidean distances, the MAP procedure yields a great deal of information about timing and sequencing in the process of placing names on the screen. First of all, it provides a record of the order in which names are chosen by the subject. This permits analysis of a subject's tendency to pick up particular names early or late in the process and to pick up any particular collection of names close together in sequence or to space them further apart (Brewer, 1993).

Furthermore, MAP provides various indices to the ease or difficulty the subject has in handling any particular name. If a name was placed in one spot and never relocated it was probably easy to place. If, on the other hand, a name was moved again and again it was likely to have been difficult to place. MAP records information on when and the number of times each point was relocated. And it records where it was placed each time, so the analyst can determine its neighbors in each setting. In addition, MAP records precise information on the subject's timing in picking up each new name up as well as in placing that name down in its chosen location. If some names are placed quickly, while others require extended time, the analyst again has useful information on the ease or difficulty in placing particular names in the space.

Overall, then, as compared with other techniques of data collection, the MAP procedure produces richer and more detailed data about the subjects' behavior with respect to the full set of community members.

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Measuring Concurrency

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The structure of sexual networks is believed to play a critical role in the transmission dynamics of HIV/AIDS. The effort to understand and model this process is creating new links between sociology and epidemiology, but the issue is not really new for either field. From a sociological perspective, HIV transmission is an example of the more general issue of diffusion through networks. From an epidemiological perspective, transmission through networks is an extension of the study of spatial diffusion, where the dimensions of distance are now indexed by social characteristics rather than by geographic coordinates.

There are many aspects of network structure that influence transmission. The aspect considered here is the pattern of multiple simultaneous, or "concurrent", partnerships. Concurrent partnerships, in contrast to sequential monogamy, may provide the basis for rapid spread of an infectious agent through a connected population. The speed with which HIV has spread in Uganda and other parts of Central and Eastern Africa, for example, is thought to be in part a function of the networks of stable concurrent partnerships found among those populations. Concurrency, especially with stable, long-term partners, reduces the network distance among persons, and (from the transmission perspective) eliminates the time lost when people change partners. Both of these factors can be expected to increase the transmission rate of HIV.

In order to investigate the effects of concurrency, it is first necessary to define and measure it. We begin by restricting our definition of "concurrency" to a property of individuals, rather than a property of the graph. At the individual level, concurrency intuitively reflects some aspect of the degree distribution, and might be captured by some function of the degree mean and variance in the nodes of a graph. The mean is clearly important, but because the total number of links is itself a major contributor to epidemic spread, it is desirable to define the measure of concurrency to be independent of the total number of links. The measure will then represent the effects of concurrency alone. To isolate the effect of concurrency, one could restrict consideration to non-isolates, and standardize by the expected value of the mean degree under monogamy. Consider the following measure, denoted by κ_1:

$$\kappa_1 = \frac{2L}{N^+} = \begin{cases} 1 & , \ monogamy \\ >1 & , \ concurrency \end{cases} \qquad (1)$$

where N^+ denotes the number of non-isolates in the graph, and L denotes the number of links. The measure is simply the mean degree for all non-isolates. The numerator, 2L, will equal the number of non-isolates when all partnerships are monogamous. Under monogamy, then, this measure equals 1. When there are multiple partnerships per node, the number of non-isolated nodes declines relative to the number of links, and the measure is greater than 1.
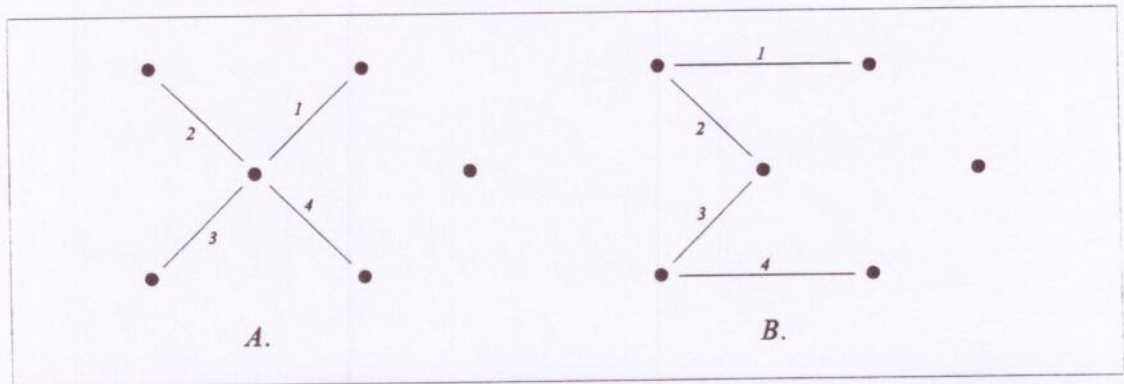
Figure 1. *Two graphs, both with 6 nodes and 4 links, so a measure of concurrency like κ_1 (defined in equation 1) is the same for both, yet the pattern of concurrency is different in the two graphs.*

While this measure is simple and interpretable, it is also insensitive to the shape of the degree distribution, and thus to the structure of concurrency in the network. For example, in Figure 1, both graphs have 5 non-single nodes and 4 links. Thus, κ_1 is the same for each. From a transmission perspective, however, the pattern of concurrency is critically different in the two graphs. In (A), transmission will be much more rapid, as the maximuen any two nodes in the network is 2, while in (B), the maximum distance is 4, so the speed of transmission will be slower and more variable.
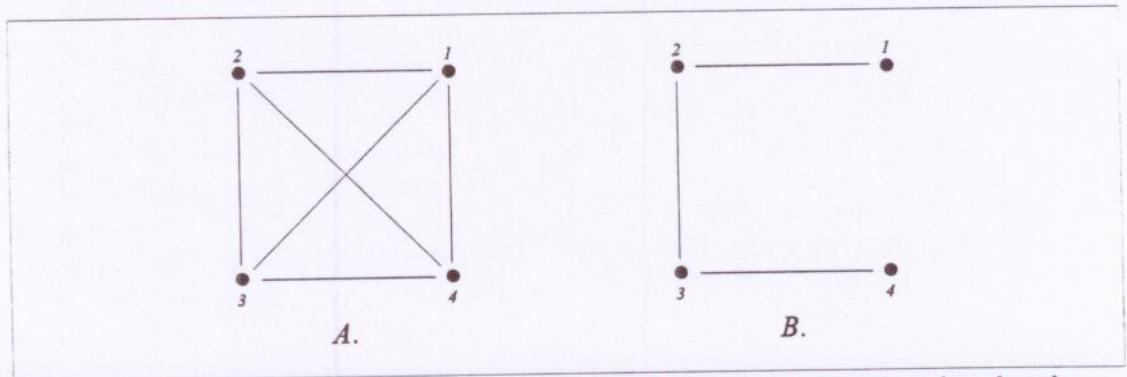
Figure 2. *The linegraphs of the graphs given in Figure 1. A measure of concurrency based on the linegraph, like κ_2, is more sensitive to the differences in the patterns of concurrency observed in Figure 1.*

In order to capture this difference, it is useful to move to the linegraph displayed in Figure 2. Here, the nodes represent the links of the original graphs. A link between nodes in the

linegraph signifies that the links in the original graph are adjacent -- that is, they share a common node.

The number of links in the linegraph is sensitive to the difference in concurrency between the two example networks here. In (A) the linegraph is completely connected, indicating that every dyad in the original graph is directly connected to every other dyad.[1] In (B) the linegraph has fewer links; every node is reachable, indicating that all dyads are connected either directly or indirectly, but the absence of some links indicates that not all dyads are adjacent.

By itself, the number of links in the linegraph is hard to interpret because it is dependent on the number of links in the original graph. One way to bound and standardize this number is to divide by the maximum value of links possible in the linegraph. As each link, L, in the original graph is represented by a node, N_d, in the dual, the maximum number of links possible in the linegraph is simply $\binom{N_d}{2}$. The standardized linegraph based measure of concurrency is then simply the density of the linegraph:

$$\kappa_2 = L_d \left(\frac{N_d(N_d - 1)}{2} \right)^{-1} = \begin{cases} 1 & , \text{ all pairs adjacent (max. effective concurrency)} \\ 0 < \kappa_2 < 1 & , \text{ some pairs adjacent (some concurrency)} \\ 0 & , \text{ no pairs adjacent (monogamy)} \end{cases} \quad (2)$$

where L_d and N_d are the number of links and nodes in the linegraph.

When no dyads are adjacent in the original graph, there is perfect monogamy, L_d equals 0 and the measure takes the value 0. As the number of adjacent dyads rises, indicating more concurrent partnerships, L_d increases and the measure also increases. When all dyads are adjacent in the original graph, L_d takes its maximum value (equalling the denominator), and the measure takes the value 1.

The maximum value used to standardize the measure can be interpreted as an index of centralization or distance. The maximum number of links on the linegraph will always imply the star shape observed in Figure 1A. One way to interpret this pattern is that it represents the maximum connectedness for the minimum distance between non-single nodes in the original graph, or "maximum effective concurrency". Thus as the measure falls below 1 (keeping the mean degree in the original graph constant), the average distance between non-single nodes increases. Standardized in this way, the measure can be interpreted as the percentage of the maximum effective concurrency present in the original graph.

The measure has two potential drawbacks that should be kept in mind. The first is that the addition of more links in Figure 1A will actually reduce the value of κ_2, so the measure does not monotonically increase with the density of the original graph. The decrement increases as the size of the star decreases, and as the number of links added to the star increases. For all stars,

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[1] The word "dyad" will always be used here to refer to a pair of nodes in the original graph, not the dual.

the decrement reaches its maximum value (about 0.8) when all possible links exist in the original graph. This non-linear property is due to the normalization chosen here, and suggests that alternative normalizations should be considered. As the non-linearity only emerges when the number of links equals or exceeds the number of nodes in the original graph, an adjustment sensitive to this feature may be possible. The second potential drawback is that κ_2 measures connectedness and distance only for non-single nodes. It is not sensitive to the proportion of non-single nodes in the graph, and should therefore not be used alone when the objective is to predict such things as the prevalence (rate per capita) of infection in the whole network. This drawback is relatively minor, as the proportion of single nodes can always be measured.

The measure turns out to have other interesting properties, however, that enhance both interpretation and empirical usefulness. With some (non-trivial) algebra, κ_2 can be shown to be a function of the mean and variance of the degree distribution. Specifically,

$$\kappa_2 = f\left(\mu + \frac{\sigma^2}{\mu}\right) \tag{3}$$

There are two remarkable features about this functional relation. The first is that while κ_2 is a graph-based measure, and thus would presumably require full sociometric information in order to be estimated, the functional relation indicates that almost all of the information necessary for estimation is found in data available from egocentric network methods: the degree mean and variance. This has tremendous implications for the usefulness of the measure, as egocentric data are both much simpler and less expensive to collect.

The second is that the argument to the function on the right-hand-side of the relation has been proposed as the deterministic approximation to use in place of the mean contact rate when there is significant contact rate variability in the population (May and Anderson 1987). The deterministic approximation was intended to apply to sequentially monogamous partnerships (to measure variability in partnerships per person per time unit rather than per person at a moment in time). The functional relation in equation 3, however, suggests that the approximation may also be interpreted as a measure of concurrency, and thus provide a simple method for capturing concurrency effects in standard, deterministic, compartmental models for disease (or other) transmission.

The work presented here is preliminary, and much remains to be done regarding alternative normalizations and the properties of these alternative measures, but we believe the findings suggest the potential for a rich return. Sociometric measures that can be estimated from egocentric data are a tantalizing idea, and one that could put social network analysis within reach of academics and practitioners in many settings.

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STOCENT and STOCENTD: Stochastic Centrality and Prestige for Actors in a Social Network[1]

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1 Introduction

Centrality and prestige are indices of how prominent, or important, an actor is within a network. Stochastic centrality and prestige measures are discussed at length by Faust and Wasserman (1992). The indices are calculated by assuming that some stochastic model is operating; usually, this means that one assumes that Holland and Leinhardt's (1981) p_1 is appropriate. The raw stochastic centrality and prestige parameters estimated from the p_1 model, though meaningful in their interpretation as log odds ratios, are not easily comparable to the traditional measures used to assess actor importance. Standardization of the model prominence parameters, so that the indices lie between 0 and 1, enables one to compare indices across data and methods. Furthermore, due to the statistical nature of the model-based centrality and prestige indices, standard errors can be calculated and parameter fit evaluated. This is a tremendous advantage of these measures.

The computer programs *STOCENT* and *STOCENTD*, described here, convert raw, p_1 estimates of centrality for nondirectional relations and estimates of centrality and prestige for directional relations, respectively, to standardized indices. The standardization preserves the relative ordering of the p_1 model estimates, but constrains them to lie between zero and one. The actor with the smallest parameter estimate will have a standardized index of zero, and the actor with the largest estimate will have a standardized index of unity. The computer programs also compute the estimated asymptotic standard errors for the normalized centrality and prestige indices.

Actor prestige and centrality indices for directional relations should be calculated and examined simultaneously. A measure of actor prominence, representing the sum of the stochastic centrality and prestige indices, can be evaluated. Actor prominence represents the overall importance of an actor in a network. This index combines both measures of prestige and

centrality. Thus, actor prominence can be considered compensatory in nature. An actor with high centrality and low prestige is just as important as one with low centrality, but high prestige. STOCENTD computes actor importance measures, standardizes these importance indices and computes the standard errors of the normalized importance measures.

2 Theory

We note that the major results presented here can be found in Faust and Wasserman (1992). New calculations, particularly those involving the standard errors, will be reported in future papers. The research described here is ongoing.

2.1 Nondirectional Relations

First, for nondirectional relations, we define

$$C_{min} = \min_i \{C_{1n}(n_i)\}$$

and

$$C_{max} = \max_i \{C_{1n}(n_i)\}$$

where $C_{1n}(n_i)$ is the raw centrality measure for actor i. We then calculate

$$C'_{1n}(n_i) = \frac{C_{1n}(n_i) - C_{min}}{C_{max} - C_{min}}$$

as a standardized index of the centrality of actor i. The standardized index simplifies to

$$C'_{1n}(n_i) = \frac{\hat{\gamma}_i - \hat{\gamma}_{min}}{\hat{\gamma}_{max} - \hat{\gamma}_{min}}$$

where $\hat{\gamma}_{min}$ is the smallest observed estimated gamma across all actors, and $\hat{\gamma}_{max}$ is the largest observed estimated gamma across all actors. These γ's are parameters from nondirectional p_1 (Wasserman and Faust, 1994; Chapter 15). Note that our standardization will make the smallest C'_{1n} equal to zero, and the largest, equal to unity (Faust and Wasserman, 1992).

Estimated asymptotic standard deviations (*EASD's*) for the standardized indices, $\{C'_{1n}(n_i)\}$, are calculated using the delta method (see Agresti, 1990; ch. 12). The *EASD's* are functions of the variances/covariances among the $\hat{\gamma}_i$. Since the $\hat{\gamma}_i$ are simple transformations of the model parameters estimated by fitting the no three factor interaction model to the **Y**-array, the variances and covariances among the $\hat{\gamma}_i$ are easily computed from the covariances of the estimated model parameters (Wasserman and Weaver, 1985). The asymptotic standard errors

can be calculated using formulas which arise from large sample, Taylor series approximations. Details will be given in future papers.

2.2 Directional Relations

For directional relations, the raw centrality and prestige measures are standardized just as we standardize centrality indices for nondirectional relations. Using the standardization based on the minimum and maximum raw index, we obtain

$$C'_{1d}(n_i) = \frac{\hat{\alpha}_i - \hat{\alpha}_{min}}{\hat{\alpha}_{max} - \hat{\alpha}_{min}}$$

as an index of the centrality of actor i, and

$$P'_{1d}(n_i) = \frac{\hat{\beta}_i - \hat{\beta}_{min}}{\hat{\beta}_{max} - \hat{\beta}_{min}}$$

as an index of the prestige of actor i (where the subscripts "*min*" and "*max*" refer to the smallest and largest estimated parameters). A measure of overall importance, $I_{1d}(n_i)$, can be computed as

$$I_{1d}(n_i) = \hat{\alpha}_i + \hat{\beta}_i$$

We will denote actor "importance" parameters as $\alpha_i + \beta_i = \eta_i$. This index of actor importance can also be standardized using the minimum and maximum of the set. The standardized importance index for actor i is

$$I'_{1d}(n_i) = \frac{\hat{\eta}_i - \hat{\eta}_{min}}{\hat{\eta}_{max} - \hat{\eta}_{min}}$$

where the subscripts "*min*" and "*max*" refer to the smallest and largest estimated parameters.

The *EASD's* for the standardized centrality, prestige and importance measures were calculated using the delta method. Wasserman and Weaver (1985) showed that $\hat{\alpha}_i$ and $_i\hat{\beta}$ are simple linear functions of the estimated loglinear model parameters to the **Y**-array. Therefore, $\hat{\eta}_i$ is a simple linear function of the estimated model parameters. This implies that the variances and covariances among the set of centrality, prestige and importance measures can easily be calculated. The asymptotic standard errors can be calculated using standard large sample statistical techniques; details will be given in forthcoming papers.

3 Calculations

We have written two computer programs to calculate the indices mentioned above. The program *STOCENT* is designed for nondirectional relations, while the program *STOCENTD* is for directional relations.

3.1 General Procedure

Both *STOCENT* and *STOCENTD* assume that the raw p_1 parameters yielding the centrality and prestige indices have *GLIM*-type constraints. *GLIM* (Numerical Algorithms Group 1992) constrains the first parameter in a set of parameters to be zero (rather than assuming that the entire set of parameters sums to zero). *STOCENT* and *STOCENTD* first reparameterize the p_1 parameter estimates to have ANOVA-type constraints, such that the estimated parameters yielding the centrality and prestige indices sum to zero. The parameter covariance matrix is transformed accordingly.

A problem with infinite parameters can arise when fitting the p_1 model. If an actor has a row or column sum equal to zero or g-1, then the associated parameter must be $-\infty$ and ∞, respectively (see Wasserman and Faust 1994, Chapter 15). These infinite parameters are not considered in the normalization process. *STOCENT* and *STOCENTD* expect a code of 99.99 to represent infinite parameters. Furthermore, both programs expect input for variances and covariances of these infinite parameters, even though these values will not be included in the reparameterization of the parameters or the calculation of the normalized parameter estimates and their standard errors. *UCINET* (Borgatti *et al,* 1992) can be used to fit the p_1 model; however, the program cannot handle infinite values. Thus, we recommend the use of *GLIM* for networks with infinite parameters.

STOCENTD calculates the importance indices, $I_{1d}(n_i)$, from the raw centrality and prestige indices and computes their associated variance/covariance matrix. When the raw parameter estimates have been transformed to ANOVA-type constraints, they are then normalized as described above. The asymptotic standard error for each normalized measure is computed.

3.2 Input

Input to *STOCENT* and *STOCENTD* consists of the following three ``cards":

1. Number of parameter estimates
2. p_1 parameter estimates
3. Variance/covariance matrix of the parameter estimates

Input and output files are entered interactively by the user. Examples are given shortly. The input file must consist of the information described below:

CARD 1 The number of parameter estimates to be entered into the program should be input in the first two columns of the first row of the input file. The number of parameter estimates is equal to g-1, where g is the total number of actors in the social network.

CARD 2 For nondirectional relations, the g-1 parameter estimates must be input in the following rows of the input file in the following list-directed format:

> 1.314 0.798 . . .
> 1.719 1.314.

Given the assumption that the first parameter estimate is constrained to be zero, there should be only $g - 1$ estimates in the input file. For infinite centrality scores, 99.99 should be input as the parameter estimate.

For directional relations, there will be two sets of parameter estimates in the input file. The first g-1 estimates should be the raw stochastic centrality measures. The prestige indices should immediately follow the centrality indices. So, *STOCENTD* expects CARD 2 to contain $2(g$-1$)$ prominence estimates; the first g-1 representing the centrality measures, $\hat{\alpha}_i$, and the next g-1 estimates are the prestige measures, $_i\hat{\beta}$. Again, infinite measures should be coded as 99.99 in the input file.

CARD 3 The variance/covariance matrix for the input estimates are contained in the remaining rows of the input file. The lower triangular variance/covariance matrix is input as a <u>column</u> vector. For example, the variance/covariance matrix

> 2.200
> 0.250   1.000
> 0.250   0.250   5.000

Downloading the Programs From INSNALIB

STOCENT and STOCENTD are available in both DOS and WINDOWS versions. The DOS versions are called **stocent.exe** and **stocentd.exe**. The WINDOWS versions are called **stocentw.exe** and **stocntdw.exe**. Sample input and output files, **marital.inp**, **marital.out**, **world.inp**, and **world.out** are also provided. All of these files are stored in a single, self-extracting archive file called **stocentz.exe** in the **insnalib.192** directory. To download this file, follow this procedure (what you type is in **boldface**, what the computer responds is in *italics*).

ftp univscvm.csd.scarolina.edu
USER: **anonymous**
>cd \insnalib.192
>binary
>get stocentz.exe
>quit

To unpack the archive, type **stocentz** at your DOS prompt. This will release all the files in the archive.

would be input as[2]

    2.200   0.250   1.000   0.250   0.250   5.000.

STOCENTD expects a lower triangular variance/covariance matrix which consists of the variances and covariances of the $\hat{\alpha}_i$, $\hat{\beta}_i$, and the covariances between the $\hat{\alpha}_i$, and $\hat{\beta}_i$. So, for nondirectional relations, there will be $g(g-1)/2$ variances and covariances. For directional relations, there will be $(g-1)(2g-1)$ variances and covariances.

3.3 Output

There are three types of information written to the output file. First, the input parameter estimates and the full variance/covariance matrix is provided. The reparameterized indices and their associated variance/covariance matrix is printed to the file. The normalized stochastic indices are then given, along with their asymptotic estimated standard errors.

4 Examples

The example input and output file for nondirectional relations is written for Padgett's (1987) network of Florentine families. The example is for the marital relation. Traditional measures of centrality for these data can be found in Faust and Wasserman (1992). The network consists of marriage ties for sixteen families in 15th century Florence, Italy. A marriage tie exists between two families if a member of one family is married to a member of the other. Stochastic centrality estimates were obtained by fitting the p_1 model using *GLIM*. The input file consists of 15 parameter estimates. The eleventh centrality estimate is coded as 99.99. This is because the Pucci family (actor #12) has no marital ties to any other family in the network. Thus, the stochastic centrality measure for the Pucci family is $-\infty$ and cannot be included in the calculation of the normalized centrality estimates and their asymptotic standard errors. The variances and covariances associated with the Pucci family are input into the program. These values are not considered in the calculations; however, *STOCENT* expects them to be in the input file.

For directional relations, the sample input and output files are based on the countries trade data representing trading relations among twenty-four countries. Trade relations, for these data, refer to the export and import of basic manufactured goods. If country *i* exports to country *j*, then the entry in cell *(i,j)* is unity. These data are clearly directional, with the row entries representing export relations between countries and the column entries representing import ties between the twenty-four nations. Chapter 2 of Wasserman and Faust (1994) discusses these data in greater detail. Traditional indices of centrality and prestige for these data can be found in Faust and Wasserman (1992). As in the nondirectional example, there are infinite centrality indices for some of the countries in this example. In fact, four of the twenty-four countries have

---

[2]*Publisher's note:* To save space, this <u>column</u> vector is shown as a <u>row</u> vector. Actual input to the program should have just one number per line.

centrality measures of either $-\infty$ or ∞. Thus, only nineteen raw, stochastic centrality estimates will be input into *STOCENTD*, the infinite values will be coded as 99.99. However, all twenty-four countries will have prestige indices. Thus, twenty-three prestige estimates will be contained in the input file.

4.1 Example Input File: Padgett's Florentine Families

Note: actual input must be formatted as column vector (one number per line).

```
15
1.314   0.7984   1.314   1.314   0.000   1.719   0.000   2.387   0.000   1.314   99.99   1.314
0.7984      1.719   1.314
1.551   1.104   1.711   1.104   1.104   1.551   1.104   1.104   1.104   1.551   1.103   1.103   1.103
        1.103   2.206   1.105   1.104   1.105   1.105   1.103   1.477   1.103   1.103   1.103   1.103
        1.103   1.103   2.206   1.106   1.105   1.106   1.106   1.103   1.107   1.103   1.419   1.103
        1.103   1.103   1.103   1.103   1.103   1.103   1.103   2.206   1.104   1.104   1.104   1.104
        1.103   1.105   1.103   1.106   1.103   1.551   1.102   1.102   1.102   1.102   1.103   1.102
        1.103   1.101   1.103   1.102   342.3   1.104   1.104   1.104   1.104   1.103   1.105   1.103
        1.106   1.103   1.104   1.102   1.551   1.104   1.103   1.104   1.104   1.103   1.104   1.103
        1.105   1.103   1.104   1.102   1.104   1.711   1.105   1.104   1.105   1.105   1.103   1.106
        1.103   1.107   1.103   1.105   1.102   1.105   1.104   1.477   1.104   1.104   1.104   1.104
        1.103   1.105   1.103   1.106   1.103   1.104   1.102   1.104   1.104   1.105   1.551
```

4.2 Example Output File: Padgett's Florentine Families

```
Gamma:

    1.31400   0.79840   1.31400   1.31400   0.00000   1.71900   0.00000   2.38700
    0.00000   1.31400  99.99000   1.31400   0.79840   1.71900   1.31400

Sigma:

    1.5510    1.1040    1.1040    1.1040    1.1030    1.1050    1.1030    1.1060
    1.1030    1.1040
    1.1020    1.1040    1.1040    1.1050    1.1040
    1.1040    1.7110    1.1040    1.1040    1.1030    1.1040    1.1030    1.1050
    1.1030    1.1040
    1.1020    1.1040    1.1030    1.1040    1.1040
    1.1040    1.1040    1.5510    1.1040    1.1030    1.1050    1.1030    1.1060
    1.1030    1.1040
    1.1020    1.1040    1.1040    1.1050    1.1040
    1.1040    1.1040    1.1040    1.5510    1.1030    1.1050    1.1030    1.1060
    1.1030    1.1040
    1.1020    1.1040    1.1040    1.1050    1.1040
    1.1030    1.1030    1.1030    1.1030    2.2060    1.1030    1.1030    1.1030
    1.1030    1.1030
    1.1030    1.1030    1.1030    1.1030    1.1030
    1.1050    1.1040    1.1050    1.1050    1.1030    1.4770    1.1030    1.1070
    1.1030    1.1050
    1.1020    1.1050    1.1040    1.1060    1.1050
    1.1030    1.1030    1.1030    1.1030    1.1030    1.1030    2.2060    1.1030
    1.1030    1.1030
    1.1030    1.1030    1.1030    1.1030    1.1030
    1.1060    1.1050    1.1060    1.1060    1.1030    1.1070    1.1030    1.4190
    1.1030    1.1060
    1.1010    1.1060    1.1050    1.1070    1.1060
    1.1030    1.1030    1.1030    1.1030    1.1030    1.1030    1.1030    1.1030
    2.2060    1.1030
    1.1030    1.1030    1.1030    1.1030    1.1030
    1.1040    1.1040    1.1040    1.1040    1.1030    1.1050    1.1030    1.1060
    1.1030    1.5510
```

```
  1.1020      1.1040      1.1040      1.1050      1.1040
  1.1020      1.1020      1.1020      1.1020      1.1030      1.1020      1.1030      1.1010
  1.1030      1.1020
342.3000      1.1020      1.1020      1.1020      1.1020
  1.1040      1.1040      1.1040      1.1040      1.1030      1.1050      1.1030      1.1060
  1.1030      1.1040
  1.1020      1.5510      1.1040      1.1050      1.1040
  1.1040      1.1030      1.1040      1.1040      1.1030      1.1040      1.1030      1.1050
  1.1030      1.1040
  1.1020      1.1040      1.7110      1.1040      1.1040
  1.1050      1.1040      1.1050      1.1050      1.1030      1.1060      1.1030      1.1070
  1.1030      1.1050
  1.1020      1.1050      1.1040      1.4770      1.1050
  1.1040      1.1040      1.1040      1.1040      1.1030      1.1050      1.1030      1.1060
  1.1030      1.1040
  1.1020      1.1040      1.1040      1.1050      1.5510
```

Parameter estimates:

Transformed:

```
Gamma  1 = -1.020
Gamma  2 =  0.294
Gamma  3 = -0.222
Gamma  4 =  0.294
Gamma  5 =  0.294
Gamma  6 = -1.020
Gamma  7 =  0.699
Gamma  8 = -1.020
Gamma  9 =  1.367
Gamma 10 = -1.020
Gamma 11 =  0.294
Gamma 12 = 99.990
Gamma 13 =  0.294
Gamma 14 = -0.222
Gamma 15 =  0.699
Gamma 16 =  0.294
```

Transformed Sigma:

```
  0.9984     -0.0619     -0.0723     -0.0619     -0.0619     -0.1046     -0.0574     -0.1046
 -0.0541     -0.1046
 -0.0619      0.0000     -0.0619     -0.0723     -0.0574     -0.0619
 -0.0619      0.4289     -0.0285     -0.0181     -0.0181     -0.0619     -0.0127     -0.0619
 -0.0084     -0.0619
 -0.0181      0.0000     -0.0181     -0.0285     -0.0127     -0.0181
 -0.0723     -0.0285      0.5681     -0.0285     -0.0285     -0.0723     -0.0241     -0.0723
 -0.0198     -0.0723
 -0.0285      0.0000     -0.0285     -0.0399     -0.0241     -0.0285
 -0.0619     -0.0181     -0.0285      0.4289     -0.0181     -0.0619     -0.0127     -0.0619
 -0.0084     -0.0619
 -0.0181      0.0000     -0.0181     -0.0285     -0.0127     -0.0181
 -0.0619     -0.0181     -0.0285     -0.0181      0.4289     -0.0619     -0.0127     -0.0619
 -0.0084     -0.0619
 -0.0181      0.0000     -0.0181     -0.0285     -0.0127     -0.0181
 -0.1046     -0.0619     -0.0723     -0.0619     -0.0619      0.9984     -0.0574     -0.1046
 -0.0541     -0.1046
 -0.0619      0.0000     -0.0619     -0.0723     -0.0574     -0.0619
 -0.0574     -0.0127     -0.0241     -0.0127     -0.0127     -0.0574      0.3638     -0.0574
 -0.0029     -0.0574
 -0.0127      0.0000     -0.0127     -0.0241     -0.0072     -0.0127
 -0.1046     -0.0619     -0.0723     -0.0619     -0.0619     -0.1046     -0.0574      0.9984
 -0.0541     -0.1046
 -0.0619      0.0000     -0.0619     -0.0723     -0.0574     -0.0619
```

```
-0.0541   -0.0084   -0.0198   -0.0084   -0.0084   -0.0541   -0.0029   -0.0541
 0.3123   -0.0541
-0.0084    0.0000   -0.0084   -0.0198   -0.0029   -0.0084
-0.1046   -0.0619   -0.0723   -0.0619   -0.0619   -0.1046   -0.0574   -0.1046
-0.0541    0.9984
-0.0619    0.0000   -0.0619   -0.0723   -0.0574   -0.0619
-0.0619   -0.0181   -0.0285   -0.0181   -0.0181   -0.0619   -0.0127   -0.0619
-0.0084   -0.0619
 0.4289    0.0000   -0.0181   -0.0285   -0.0127   -0.0181
 0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000
 0.0000    0.0000
 0.0000    0.0000    0.0000    0.0000    0.0000    0.0000
-0.0619   -0.0181   -0.0285   -0.0181   -0.0181   -0.0619   -0.0127   -0.0619
-0.0084   -0.0619
-0.0181    0.0000    0.4289   -0.0285   -0.0127   -0.0181
-0.0723   -0.0285   -0.0399   -0.0285   -0.0285   -0.0723   -0.0241   -0.0723
-0.0198   -0.0723
-0.0285    0.0000   -0.0285    0.5681   -0.0241   -0.0285
-0.0574   -0.0127   -0.0241   -0.0127   -0.0127   -0.0574   -0.0072   -0.0574
-0.0029   -0.0574
-0.0127    0.0000   -0.0127   -0.0241    0.3638   -0.0127
-0.0619   -0.0181   -0.0285   -0.0181   -0.0181   -0.0619   -0.0127   -0.0619
-0.0084   -0.0619
-0.0181    0.0000   -0.0181   -0.0285   -0.0127    0.4289
```

Normalized Gammas:

```
Centrality  1 =   0.000   Standard Error =      0.22
Centrality  2 =   0.550   Standard Error =      0.19
Centrality  3 =   0.334   Standard Error =      0.23
Centrality  4 =   0.550   Standard Error =      0.19
Centrality  5 =   0.550   Standard Error =      0.19
Centrality  6 =   0.000   Standard Error =      0.31
Centrality  7 =   0.720   Standard Error =      0.17
Centrality  8 =   0.000   Standard Error =      0.31
Centrality  9 =   1.000   Standard Error =      0.21
Centrality 10 =   0.000   Standard Error =      0.31
Centrality 11 =   0.550   Standard Error =      0.19
Centrality 12 =  99.990   Standard Error =     99.99
Centrality 13 =   0.550   Standard Error =      0.19
Centrality 14 =   0.334   Standard Error =      0.23
Centrality 15 =   0.720   Standard Error =      0.17
Centrality 16 =   0.550   Standard Error =      0.19
```

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How To Test the Strength of Weak Ties Theory

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Techniques is a regular column edited by Stephen P. Borgatti. Contributions to the column are appreciated. Contributions should be short (normally 2 pages or less), and should consist of tips on how to do things — ways of collecting data, methods of analysis, data management tricks, and so on.

One component of Granovetter's (1973) Strength of Weak Ties (SWT) theory is the proposition that the stronger the tie between two people, the more their social neighborhoods overlap. In this article, we show how to test this proposition using QAP correlation (Hubert & Schultz 1976).

The basic strategy is as follows. First, obtain the strength of ties among all pairs of actors, and arrange these data as an actor-by-actor matrix called STRENGTH. Second, obtain a measure of the extent to which the neighborhoods of each pair of actors overlap. In other words, for each pair, count the number of people that both actors are connected to. Arrange these data as an actor-by-actor matrix as well, taking care that the order of actors is the same as in the STRENGTH matrix. Call this matrix OVERLAP. Third, compute the pearson correlation between the two matrices, using an appropriate randomization test (such as QAP) to assess the significance of the observed correlation.

Data. Typically, the STRENGTH matrix is obtained directly from respondents. An example is given by Zachary (1977) who collected strength of ties among members of a Karate club. These data are available on INSNALIB (described elsewhere this issue), and as part of the UCINET IV (Borgatti, Everett and Freeman 1992) software package.

The OVERLAP matrix requires some processing. Let us assume that in the Zachary data, a tie strength of zero indicates the lack of a tie. We could then create a dichotomized version (call it A) of the STRENGTH matrix such that $A(i,j) = 1$ if $STRENGTH(i,j) > 0$ and $A(i,j) = 0$ otherwise. The matrix A, then, is a simple adjacency matrix. Now, to compute OVERLAP, postmultiply A by its transpose as follows:

$$OVERLAP = AA'$$

The effect of this matrix multiplication is to count the number of times that each pair of rows in A has a 1 in the same column, indicating that the two actors are connected to the same third party. We're assuming here that the matrix A is symmetric: otherwise, AA' only gives the overlap in the out-neighborhoods of each pair of actors.[2]

Analysis. Now we use the QAP technique to (a) compute the pearson correlation between the elements of STRENGTH and the corresponding elements of OVERLAP, and (b) assess the significance of the correlation. If we were only interested in (a), we could compute the correlation using any statistical package by stringing out the elements of each matrix into a long vector with

---

[2] A'A gives the overlap in in-neighborhoods. Since both AA' and A'A are symmetric, they could be combined by taking the values in AA' for the area below the main diagonal, and A'A for the area above the main diagonal.

stringing out the elements of each matrix into a long vector with $N*(N-1)/2$ elements (again assuming symmetric data). In other words, we create a dataset with two variables (STRENGTH and OVERLAP) in which the cases are dyads. Then we correlate the variables.

If, however, we are also interested in assessing the significance of the correlation, we cannot use the significance test computed by standard statistical packages, since these assume that the observations (which in this case would appear to be dyads) are independently sampled from a population, which is clearly not the case here. Our dyads comprise a census of all dyads given the actors sampled, and furthermore, dyads located in the same row or column of the data matrices are not independent since they share the same actors as endpoints.

So we use the QAP procedure which, in essence, compares the observed correlation with a distribution of random correlations generated according to the null hypothesis of no relationship between the matrices. The *p*-value is given by the proportion of random correlations that are as large or larger than the observed correlation.

The QAP procedure works by permuting the rows and columns (together) of one of the input matrices, and then correlating the permuted matrix with the other data matrix. This process is repeated hundreds of times to build up a distribution of correlations under the null hypothesis.

In the Zachary data, the correlation between strength of tie and neighborhood overlap is 0.416, $p < 0.001$, indicating strong support for the theory.

Extension. Another interpretation of the sense of the SWT theory is that the stronger the tie between two people, the less their tie serves as a connection between their non-overlapping social connections to others. The SWT hypothesis as applied to non-overlap is only equivalent to its application to overlap under the unlikely condition that overlap is perfectly negatively correlated with non-overlap (i.e. only when there is no variation in acquaintance volume). In general, it may be useful to separately explore the implications of strength of ties for non-overlap as well as for overlap.

To extend the previous technique for application to non-overlap, we need to construct a NONOVERLAP matrix that can be correlated with STRENGTH. Recall the dichotomized matrix, A, and its transpose, A'. We can construct a new matrix, B, which is the complement of A, so that B has 1's where A has 0's and has 0's where A has 1's. One way to do this is to subtract A from a matrix full of 1's. Alternatively, we can go back to the dichotomization step and set $B(i,j) = 1$ if STRENGTH = 0 and $B(i,j) = 0$ otherwise. In either case, though, we must be sure to put zeros down the main diagonal. Then compute $C = AB'$ and, NONOVERLAP = $C + C'$.

Once the NONOVERLAP matrix is obtained, we can correlate it with the STRENGTH matrix in the same way that we did with the OVERLAP matrix, except this time we expect a negative correlation, and the *p*-value is given by the proportion of random correlations that are as <u>small</u> or smaller than the observed.

Applying this technique to the Zachary data, we observe a <u>positive</u> correlation of 0.2 between strength of tie and <u>non</u>overlap. These results do not support the theory, and instead suggest that strong ties tend to occur between actors who have many ties in general, so that their neighborhoods both overlap and do not overlap a great deal. ❑

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A Quorum of Graph Theoretic Concepts

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Teacher's Corner is a regular column edited by Stephen P. Borgatti. The objective of the column is to share material helpful to the teaching of network analysis. Contributions to the column are appreciated. Contributions should be short (normally 2 pages or less), and should consist of explanations of network concepts, course syllabi, synopses of famous works, and anything else appropriate to the main objective.

One of the mathematical underpinnings of network analysis is graph theory. In this column I present a kind of glossary of what I would consider to be a minimum working vocabulary of graph-theoretic terms and notation. The reader should be aware, however, that "...uniformity in graphical terminology will never be attained, and is not necessarily desirable." (Harary 1969, p.8).

A *graph* (which represents an observed social relation such as "is friends with") is denoted G(V,E) and consists of a set of *points* V(G) together with a set of *lines* E(G) that connect the points. Points (which represent social *actors*) are also known as *vertices* and *nodes*. Lines (which represent social *ties*) are also known as *edges*, and *links*. Each line connects two points, which are its *endpoints.* The points connected by a line are said to be *adjacent.* In contrast, a <u>line</u> that has a given point as an endpoint is said to be *incident* upon that point. Two lines that share an endpoint are also said to be incident.

An example of a graph is given in Figure 1. It is important to note that the placing of points in the two-dimensional plane of the figure is arbitrary and conveys no information: the only meaningful property preserved by the pictorial representation is which node is linked to which other. Of course, the artist is free to locate points in accordance with some additional criteria, such as placing more central nodes towards the middle, but such a choice is no more valid than any other.
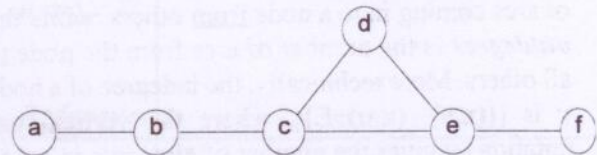
Figure 1. *A graph.*

Graphs may be *directed* or *undirected.* A directed graph, or *digraph*, is one in which the lines have direction (represented iconically with arrow-heads). Directed edges are often referred to as *arcs.* These are used to represent potentially non-symmetric social relations, such as "is the boss of" and "likes". An undirected graph is one in which the lines do not have direction. These are used to represent logically symmetric social relations, such as "is married to" or "had sex with". Often, the term "graph" is used in contrast to "digraph" to refer specifically to undirected graphs. The *underlying graph* of a digraph is the graph one obtains if one removes all direction from the arcs. That is, in the underlying graph, nodes *u* and *v* are tied if and only if *u-->v* or *u<--v.*

Graphs may be *reflexive* or *non-reflexive*. In reflexive graphs, it is possible for a node to have a tie with itself, which is called a *loop* or,

redundantly, a *self-loop*. In non-reflexive graphs, such links are excluded. Reflexive graphs are most commonly used to represent networks of collectivities, such as phone calls among cities.

Graphs may be *valued* or *non-valued*. A valued graph has numbers attached to the edges, which may be used to indicate the strength, capacity, frequency, duration or other quantitative measurement of the link.

The *degree* of a node is the number of nodes it is adjacent to; or, equivalently, it is the number of edges that are incident upon it. A node with no degree (degree 0) is an *isolate*. A node with degree 1 is called a *pendant*. The graph in Figure 1 contains two pendants and no isolates.

In a digraph, the *indegree* of a node is the number of arcs coming in to a node <u>from</u> others, while the *outdegree* is the number of arcs from the node <u>to</u> all others. More technically, the indegree of a node u is $|\{(x,u): (x,u) \in E\}|$, where the vertical bar notation $|S|$ gives the number of elements in set S. Similarly, the outdegree of u is given by $|\{(u,x): (u,x) \in E\}|$. A node with positive outdegree but no indegree is called a *source*. A node with positive indegree but no outdegree is called a *sink*.

A *subgraph* H of a graph G is a graph whose points and lines are also in G, so that $V(H) \subset V(G)$ and $E(H) \subset E(G)$. If we select a set of nodes S from a graph G, and then select <u>all</u> the lines that connect members of S, the resulting subgraph H is called an *induced subgraph* of G based on S. Two points are adjacent in H if and only if they are adjacent in G.

A *walk* is a sequence of adjacent points, together with the lines that connect them. In other words, a walk is an alternating sequence of points and lines, beginning and ending with a point, in which each line is incident on the points immediately preceding and following it. The points and lines in a walk need not be distinct. For example, in Figure 1, the sequence a-b-c-b-c-d is a walk. A *path* is a walk in which no node is visited more than once.

The sequence a-b-c-d is a path. A *cycle* is like a path except that it begins and ends with the same node (*e.g.* c-d-e-c).

A set of walks that share no points is called *vertex-disjoint*. A set of walks that share no edges is called *edge-disjoint*. Obviously, vertex-disjoint paths are also edge-disjoint. If a pair of nodes are connected by three vertex-disjoint paths, this means that there are three, completely independent ways of getting from one point to the other. In Figure 1, there is only one edge-disjoint path from a to f, but two edge disjoint-paths from c to d.

The *length* of a walk is given by the number of lines it contains. A *geodesic* path is a shortest path between two points. There can be more than one geodesic path joining a given pair of points. The *graph-theoretic distance* or *geodesic distance* between two points is the length of a shortest path between them. In a diffusion process, one expects faster diffusion among nodes that are close together than among nodes that are far apart.

A graph is *connected* if there exists a path from every node to every other. A maximal connected subgraph is called a *component*. A *maximal subgraph* is a subgraph that satisfies some specified property (such as being connected) and to which no node can be added without violating the property. For example, in Figure 1, the subgraph induced by {a,b,c} is connected, but is not a component because it is not maximal: we could add node d and the subgraph induced would still be connected. The graph in Figure 1 has just one component, which is the whole graph.

A <u>digraph</u> that satisfies the connectedness definition given above (*i.e.* there exists a path from every node to every other) is called *strongly connected*. That is, for any pair of nodes a and b, there exists both a path from a to b and from b to a. A digraph is *unilaterally connected* if between every <u>unordered</u> pair of nodes there is at least one path that connects them. That is, for any pair of nodes a and b (and $a \neq b$), there exists a path from either a to b or from b to a. A digraph whose

underlying graph is connected is called *weakly connected*.

A maximal strongly connected subgraph is a *strong component*. A maximal weakly connected subgraph is a *weak component*. A maximal unilaterally connected subgraph is a *unilateral component*.

A *cutpoint* is a node whose removal would disconnect the graph. Alternatively, we could define a cutpoint as a node whose removal would increase the number of components of the graph. In the figure, nodes *b*, *c*, and *e* are cutpoints, while *a*, *d*, and *f* are not. A network that contains a cutpoint will break apart if the person who occupies the cutpoint leaves. A *block* is a subgraph which contains no cutpoints. A *cutset* is a set of points whose removal would disconnect a graph. A *minimal cutset* is a cutset that contains the minimum possible number of nodes that disconnect the graph. The size of a minimal cutset is called the *vertex connectivity* of the graph, and is denoted κ. The smaller the value of κ, the greater the vulnerability of the network to disconnection. We can also define a pairwise version of vertex connectivity, $\kappa(u,v)$, which gives the minimum number of nodes that must be removed in order to disconnect vertex *u* from vertex *v*.

A *bridge* is a line whose removal disconnects the graph. An *edge cutset* is a set of lines whose removal disconnects the graph. A *minimum weight cutset* is an edge cutset which, for non-valued graphs, contains the fewest possible number of edges or, for valued-graphs, contains edges whose values add to the smallest possible value. The size of a minimum weight cutset is called the *edge connectivity* of the graph, and is denoted λ. As with point connectivity, we can also define a pairwise version of vertex connectivity, $\lambda(u,v)$, which gives the minimum number of edges that must be removed in order to disconnect vertex *u* from vertex *v*.

Menger's theorem states that the minimum number of nodes that must be removed to disconnect node *u* from node *v*, (i.e. $\kappa(u,v)$) is equal to the maximum number of vertex-disjoint paths that join *u* and *v*. This also works for lines: the edge-connectivity $\lambda(u,v)$ is equal to the maximum number of edge-disjoint paths that join *u* and *v*. ❑

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Abstracts: ARTICLES

Acock, Alan C. 1993. Social Networks, Marital Status, and Well-Being. *Social Networks* 15: 309-334.

Recent research demonstrates both the role social networks play in well-being through the provision of social support and the connection between marital status and well-being. Research has also demonstrated that networks serve as resources through the provision of instrumental aid. In this paper, we build upon these literatures by asking whether the form and composition of social networks affect well-being and whether these effects vary contextually by marital status. Using multiple indicators of life satisfaction and anomia, we find that social networks do affect both aspects of well-being, and that the effects of network structure on life satisfaction differ across marital status. The pattern of these effects suggests that different structural positions (e.g. marital statuses) produce a need for different types of resources. We find no contextual effects on the relationship between network structure and anomia, however.

Altmann, Michael. 1993. Reinterpreting Network Measures For Models of Disease Transmission. *Social Networks* 15: 1-17.

Several network measures have been defined elsewhere that quantify the distance between two nodes, and the centrality of a node, in a network. Recently, Stephenson and Zelen have presented a new measure based on statistical estimation theory and applied it to a network of AIDS cases. We show that their measure can be reinterpreted as the electrical conductance in an electrical network and compare it with three other closeness measures: maximal flow, first passage time, and random hitting time. An improved algorithm for calculating the Stephenson and Zelen measure is also presented.

Anderson, William P. and Yorgos Y. Papageorgiou. 1993. An Analysis of Migration Streams for the Canadian Regional System, 1952-1983 1. Migration Probabilities. *Geographical Analysis* 26: 15-36.

This is part one of a two-part series that seeks to specify the factors and processes contributing to aggregate change in the Canadian population distribution over the recent past. In part one, we use a model of migration probabilities to identify socioeconomic factors that explain the observed interregional migration flows. In part two, we use an adjustment process for our regional population system to calculate equilibrium population distributions. The estimated migration probabilities of part one are essential for this calculation, thus linking equilibria with the socioeconomic factors previously identified. Disequilibrium, defined as the difference between observed and equilibrium population distributions, is then used to infer relative growth and decline tendencies it the system. We examine and justify our results in the larger context of contemporary Canadian history.

Baker, Wayne E. and Robert R. Faulkner. 1993. The Social Organization Of Conspiracy: Illegal Networks In The Heavy Electrical Equipment Industry. *American Sociological Review* 58: 837-860.

We analyze the social organization of three well-known price-fixing conspiracies in the heavy electrical equipment industry. Although aspects of collusion have been studied by industrial organization economists and organizational criminologists, the organization of conspiracies has remained virtually unexplored. Using archival data, we reconstruct the actual communication networks involved in conspiracies in switchgear, transformers, and turbines. We find that the structure of illegal networks is driven primarily by the need to maximize concealment, rather than the

need to maximize efficiency. However, network structure is also contingent on information-processing requirements imposed by product and market characteristics. Our individual-level model predicts verdict (guilt or innocence), sentence, and fine as functions of personal centrality in the illegal network, network structure, management level, and company size.

Baron, S.W. and D.B. Tindall. 1993. Network Structure and Delinquent Attitudes Within a Juvenile Gang. *Social Networks* 15: 255-273.

The literature reveals that delinquency is a group phenomenon. However, there is controversy regarding the explanation of this finding. Subcultural theorists argue that youths become delinquent through peer socialization in youth gangs. Control theorists, by contrast, argue that adolescents become delinquent and associate with delinquent others because they have weakened bonds to the conventional order. Our paper examines the role of social bonds and group structure in the generation of delinquency through the application of social network analysis. Our findings support the control explanation; those members who have the weakest bonds, regardless of gang participation, are the most delinquent (as measured by delinquent attitudes). While our results indicate that companionship (by itself) does not lead youths to become delinquent, we argue that it is still important in the explanation of delinquency.

Bearman, Peter S. and Kevin D. Everett. 1993. The Structure of Social Protest. *Social Networks* 15: 171-200

The inherent duality of protests--the fact that groups protest on issues--is exploited to model the social structure of group to group relations for all groups which protested in Washington DC over five periods, 1961-63, 1967-68, 1971-73, 1976-78, and 1981-83. The structural positions of groups are identified over time, and we show that a group's position influences the protest repertoire

employed. Central groups in all periods define which repertoires are most dominant, and more peripheral groups appear as innovators. Using the structural positions of groups as a test of their salience, some of the predictions of the new social movement theory--that identity has replaced interest as the determinant of social protest, and that organized labor's role has declined--are tested. We find support for the first claim, and falsify the second. While new social movement groups have become more central in the world of social protest, the role of labor has not changed relative to its position in the early 1960s. Finally we develop some of the implications of the modeling strategy employed. Basic is the recognition that movement scholars be more sensitive to the context in which protests occur. This context is the structure of social protest.

Blau, Peter M. 1993. Multilevel Structural Analysis. *Social Networks* 15: 201-215.

Multilevel structural analysis links the macrostructures of large populations in successive steps to the network structures in face-to-face groups. Macrostructure is conceptualized as a multidimensional space of positions among which people are distributed. Three generic dimensions of social structure are heterogeneity, inequality, and intersecting social differences (in various respects). All three promote intergroup relations. Any one of them can be decomposed into the part resulting from its equivalent differences within and that resulting from those among substructures. The further any differentiation penetrates into substructures, the more probable are intergroup relations.

Boots, Barry and Christian Dufouraud. 1993. A Programming Approach to Minimizing and Maximizing Spatial Autocorrelation Statistics. *Geographical Analysis*. 26: 54-66.

A programming approach is presented for identifying the form of the weights matrix W which either minimizes or maximizes the value of

Moran's spatial autocorrelation statistic for a specified vector of data values. Both nonlinear and linear programming solutions are presented. The former are necessary when the sum of the links in W is unspecified while the latter can be used if this sum is fixed. The approach is illustrated using data examined in previous studies for two variables measured for the counties of Eire. While programming solutions involving different sets of constraints are derived, all yield solutions in which the number of nonzero elements in W is considerably smaller than that in W defined using the contiguity relationships between the counties. In graph theory terms, all of the Ws derived define multicomponent graphs. Other characteristics of the derived Ws are also presented.

Borgatti, Stephen P. and Martin G. Everett. 1993. Two Algorithms for Computing Regular Equivalence. *Social Networks* **15: 361-376.**

In this paper we present two algorithms for computing the extent of regular equivalence among pairs of nodes in a network. The first algorithm, REGE, is well known, but has not previously been described in the literature. The second algorithm, CATREGE, is new. Whereas REGE is applicable to quantitative data, CAT-REGE is used for categorical data. For binary data, either algorithm may be used, though the CATREGE algorithm is significantly faster and its output similarity coefficients have better metric properties. The CATREGE algorithm is also useful pedagogically, because it is easier to grasp.

Borgatti, Stephen P. and Martin G. Everett. 1994. Ecological and Perfect Colorings. *Social Networks* **16: 43-55.**

A recent study (Hummon and Carley 1992) has indicated that one of the main research paths in the discipline of social networks is the study of roles and positions. Several key positional concepts have been elucidated, including regular colorings (White and Reitz 1983), automorphic colorings (Everett 1985), and structural colorings (Lorrain

and White 1971). Regular colorings in particular have been seen as formalizations of the intuitive concept of social role. However, in this paper we suggest that regular colorings only incorporate one half of the intuitive role concept. The other half, which we formalize as ecological colorings, is equally important. We therefore introduce perfect colorings, which are both regular and ecological, and are consequently more complete models of the role concept. Perfect colorings have a number of interesting mathematical properties, which we describe briefly.

Bradshaw, York W., Young-Jeong Kim, and Bruce London. Transnational Economic Linkages, the State, and Dependent Development in South Korea, 1966-1988: A Time-Series Analysis. *Social Forces* **72: 315-345.**

This article uses time-series analysis to examine development patterns in South Korea, a country that has realized dramatic economic growth over the last several decades. We show that (1) arguments associated with classical dependency and dependent development theory must be modified substantially when applied to Korea; (2) the Korean state has been an important actor in the country's economic success, closely regulating direct foreign investment but strongly encouraging foreign trade; and (3) foreign trade and foreign loans have facilitated economic growth throughout the Korean economy, whereas the capital outflow associated with direct foreign investment continues to impede expansion. Overall, we conclude that Korea has experienced a form of "dependent development" that relies heavily on international trade (especially exports), a strong national state, and local business. This pattern is in contrast to Latin American dependent development, which places a heavy emphasis on direct foreign investment.

Brewer, Devon D. 1993. Patterns in the Recall of Persons in a Student Community. *Social Networks* **15: 335-359.**

This paper reports on the patterns in the recall of persons in a contemporary, socially bounded community. The associative, serial order, and frequency response patterns in the free recall of persons' names among students in a graduate academic program were found to be based on the program's cohort structure. Several observations on patterns in the recall of persons' names in this community paralleled findings from research on the recall of lexical items. The results suggested that individual informants' different positions in the cohort structure produced systematic variation in social knowledge of fellow students.

Burt, Ronald S. and Ilan Talmund. 1993. Market Niche. *Social Networks* 15: 133-149.

Our purpose in this note is to make explicit how two lines of work in sociology - the population ecology of organizations and the structural hole theory behind network studies of markets - are based on the same unit of analysis. The unit is a set of structurally equivalent producers; termed a niche in population ecology and a market in structural hole theory. Making the market niche analogy explicit puts a bridge in place for what we believe, and begin to explain here, should be productive exchange between the two lines of work

Calloway, Michael, Joseph P. Morrissey, and Robert I. Paulson. 1993. Accuracy and Reliability of Self-Reported Data in Interorganizational Networks. *Social Networks* 15: 377-398.

Although network analysis is becoming a more viable and informative methodology for the study of interorganizational behavior, issues involving the accuracy and reliability of self-reported or 'cognitive' network data are still unresolved. Two networks based on information and coordination relationships in each of four major cities are examined. Reliability of responses is assessed as the percent of confirmed relationships between agency respondents and by correlating the extent of agreement in each network. In addition, two possible measurement errors are examined: systematic errors which are network-independent and idiosyncratic errors which are network-dependent. These errors are assessed through correlational analyses of the intensity of an organization's relationships with the number of its relationships that are confirmed in each network. Also systematic errors are accounted for by calculating the proportion of confirmed relationships within the different response categories used to judge the strength of relationship between ego organizations in the network It is concluded that boundary spanning personnel of organizations can provide fairly reliable responses to network generated questions, but that errors in the data tend to be systematic in the way that prior studies of interpersonal cognitive networks report.

Cooper, Eugene. 1993. Cousin Marriage in Rural China: More and Less Than Generalized Exchange. *American Ethnologist* 20: 758-780.

In a field study of Dongyang County, Zhejiang Province, undertaken during the spring seasons of 1988 and 1989, it became clear to me that various forms of cousin marriage had been fairly common there before the People's Republic of China was established in 1949. My research in Dongyang focused on three single-surname villages in the county, Li Tang, Hu Shan, and Xia Qi Tan, chosen because expatriate branch families from these villages had figured prominently in my earlier work on Hong Kong artisans (Cooper 1980).

The choice of these villages as objects of study had nothing whatever to do with the expectation that their investigation might shed light on the practice of cousin marriage. More significant was their connection to county traditions of craftsmanship dating back to the Tang dynasty (.A.D. 618-907) and their link to the expatriate families of my acquaintance in Hong Kong. I was therefore somewhat surprised to discover at least several cases of cousin marriage, principally

cross-cousin marriage (both mother's brother's daughter [MBD] marriage and father's sister's daughter [FZD] marriage), in the genealogical materials of each village.

The practice of cousin marriage in rural China, although regionally variable, has attracted the attention of sinological anthropologists since the publication of Kulp's study of Phenix village in Guangdong Province (1925:168). Since then, Fei (1939), Hsu (1945), Lin (1948), Freedman (1958), and Gallin (1963) have addressed themselves to the custom and have sought to explain its currency in terms of the various structural features and patterns generated by its repeated practice. More broadly, of course, Levi-Strauss has characterized cousin marriage in China as a key link in constituting an "axis of generalized exchange" stretching from western Burma to eastern Siberia in his Elementary Structures of Kinship (1949:460-461). Elsewhere, I have questioned Levi-Strauss's grand theorizing about generalized exchange in ancient China (Cooper 1983:335). In this article, my examination of the practice of cousin marriage in Dongyang County in the late premodern and modern period suggests further revisions of Levi-Strauss's formulations.

Doorn, Peter. 1993. Geographical Location and Interaction Models and the Reconstruction of Historical Settlement and Communication: The Example of Aetolia, Central Greece. *Historical Social Research* 18: 35-77.

This paper attempts to demonstrate how geographical information and spatial models can be used for the reconstruction of settlement patterns and the communication between settlements in the past. Location models and quadrat analysis offer many opportunities for a detailed analysis of changing settlement patterns over time. The shifts in these patterns reflect the transformation of historical conditions and the changing relevance of location factors over time. Gravity and potential models and the application of intramax analysis offer tools to study patterns

of communication in historical societies. Finally, the reconstruction of trade routes can be undertaken with the help of a geographic version of the model of conservation of energy.

Duncan, Terry E., Edward McAuley, Mike Stoolmiller, Susan C. Duncan. 1993. Serial Fluctuations in Exercise Behavior as a Function of Social Support and Efficacy Cognitions. *Journal of Applied Social Psychology* 23: 1498-1522.

The present study investigated the role of social support provisions and efficacy cognitions in adherence to a prescribed exercise regimen. A generalized estimating equations approach was employed to estimate regression coefficients via an iterative weighted least squares algorithm. Findings indicated that when employed as time-varying covariates, the social provisions of reassurance of worth, attachment, and, to a lesser extent, guidance were significantly associated with intraindividual fluctuations in program adherence. Specifically, individuals with a greater sense of self-worth were more likely to adhere throughout the program, whereas the effects of subject's perceptions of greater attachment, although generally related to sustained adherence, fluctuated over time. Findings also suggest that individuals perceiving higher levels of guidance were less likely to adhere during the early and concluding stages of the exercise program. Although synchronous covariation existed between efficacy cognitions and attendance, self-efficacy was not predictive of intraindividual change in attendance over time. Results are discussed in regard to the importance of self-referent processes and social provisions in exercise adherence, and the utility of the proposed generalized estimating equations approach to the analysis of longitudinal data.

Everett, James E. 1994. The Journal Relations of Human Relations. *Human Relations* 47: 1-12.

This paper uses a method of citation analysis to examine the flow of knowledge between Human Relations and its most closely neighboring journals. Loglinear analysis of the citations for the period 1986-1990 is used to model the asymmetric citation matrix as a product of "importance" and "receptivity" vectors and a symmetric "similarity" matrix. The similarities are investigated by cluster analysis and multidimensional scaling is used to produce a map of the journals. The results provide objective evidence about the sources and destinations of developments in the academic fields with which Human Relations is concerned. Potential applications of the method to the study of other human and organizational inter-relationships are also discussed.

Everett, Martin, G. and Stephen P. Borgatti. 1993. An Extension of Regular Colouring of Graphs to Digraphs, Networks, and Hypergraphs. *Social Networks* 15: 237-254.

The use of regular graph colouring as an equivalent simple definition for regular equivalence is extended from graphs to digraphs and networks. In addition new concepts of regular equivalence for edges and hypergraphs are presented using the new terminology.

Faust, Katherine and Stanley Wasserman. 1992. Centrality and Prestige: A Review and Synthesis. *Journal of Quantitative Anthropology* 4: 23-78.

One of the primary uses of graph theory in social network analysis, as applied to anthropology and the other social and behavioral sciences, is the identification of the "most important" actors in a social network. Such actors are usually termed "central" or "prestigious". Such identifications can be used by researchers to place the actors into distinct subgroups. In this paper, we present and discuss a variety of centrality and prestige measures, designed to highlight the differences between important and nonimportant actors. This paper reviews the existing literature on centrality

and prestige, and at the same time, presents a synthesis of this methodology using an increasingly-known statistical model for social network data. Many of these methods might be new to social and behavioral scientists. Further, the review aspects of this paper are novel--no research has attempted to put centrality and prestige indices into a single framework. Further, the synthesis we present is new to the social network literature.

Flannery, Daniel, Raymond Montemayor, Mary Eberly, and Julie Torquati. 1993. Unraveling The Ties That Bind: Affective Expression and Perceived Conflict in Parent-Adolescent Interactions. *Journal of Social and Personal Relationships* 10:495-509.

The purpose of this observational study was 1) to examine the process of parent-adolescent relationship change across puberty, and 2) to examine the relationship between affective expression in interactions and perceived relationship conflict. Data were collected on 85 intact families with adolescents in grades S to 9 (N = 44 males, 41 females). Each parent and adolescent took part in two eight-minute conversations--one about an activity they reported enjoying together and one about a disagreement or area of conflict. Conversations were coded by speaker turn for positive, negative, neutral, mixed, and altered affect (kappa = .76). Regression analyses indicated that parents and adolescents expressed more negative and less positive affect in interactions as adolescents physically matured. In addition, adolescents' perceptions of relationship conflict were consistently related to parents' expressed emotions in interactions and paralleled trends for positive and negative affect across puberty. Findings are discussed in terms of understanding of the process of transforming parent-adolescent relations and family communication patterns across puberty.

Forster, M. and P. Mevert. 1994. A Tool for Network Modeling. *European Journal of Operational Research* 72: 287-299.

Many planning problems from industry and government can be represented graphically as network or network related models. The graphical representation yields very compact and easy-to-understand models, facilitates the modeling process, and improves model fidelity. The system GNGEN was developed at the Freie Universitat Berlin as a tool for network modeling. It enables the user to define an arbitrary network related problem directly from the graph using a very simple nonprocedural modeling language. The algebraic model formulation can be eliminated.

Freeman, Linton C. and Vincent Duquenne. 1993. A Note on Regular Colorings of Two Mode Data. *Social Networks* 15: 437-441.

This note follows an earlier suggestion by Borgatti (1989), and Everett and Borgatti (1992a). Here, we extend their notion of regular colorings to bipartite graphs.

Friedkin, Noah E. 1993. Structural Bases Of Interpersonal Influence In Groups: A Longitudinal Case Study. *American Sociological Review* 58: 861-872.

I examine the relationship between interpersonal power and influence during the resolution of an issue in an organization. Controlling for elementary bases of power (rewards, coercion, authority, identification, and expertise), I investigate three bases of power that arise from the structure of social networks (cohesion, similarity, and centrality). An analysis of longitudinal data on actors' bases of social power, frequency of interpersonal communications, and interpersonal influences indicates that cohesion, similarity, and centrality have significant effects on. issue-related influence net of the elementary power bases. The effects of the structural bases are mediated by the frequency of issue-related communication. The primary structural determinant of the frequency of issue-related communication is network cohesion.

Gaines, Stanley O. 1994. Exchange Of Respect-Denying Behaviors Among Male-Female Friendships. *Journal of Social and Personal Relationships* 11: 5-24.

The present study was designed to test the hypothesis that between gender friendships are characterized primarily by behavioral exchanges involving respect but not affection (i.e. correlations between men's and women's behaviors would reach significance only for respect-related behavior). A total of 62 pairs of male-female pairs completed a 12-item version of the Role Behavior Test (Foa & Foa 1974), designed to measure partners' frequency of affection-giving, affection-denying, respect-giving and respect-denying behaviors; individuals reported the extent to which partners enacted each of the behaviors during the two weeks prior to participation in the study. Canonical correlation analyses of the behavioral data revealed that, as expected, no consistent pattern emerged regarding reciprocity of affection-giving or affection-denying behavior (i.e. males' and females' affection-related behaviors were not correlated significantly). In contrast, as expected, a clear pattern of reciprocity of respect-related exchange did emerge (i.e. males' and females' respect--related behaviors were correlated significantly). However, behavioral exchanges relevant to respect appeared to be limited to respect-denying (and not respect-giving) actions. Comparisons with male--male (n = 62 pairs) and female-female (n = 65 pairs) friendships indicated that only among the male-female pairs did any consistent pattern of resource exchange occur. Implications for the study of male-female friendships are discussed.

Guinta, Carole T. and Bruce E. Compas. Coping in Marital Dyads: Patterns and Association with Psychological Symptoms. *Journal of Marriage and Family* 55: 1011-1017.

This study examined data from 153 married couples to determine their patterns of coping with stress and the association between couples' coping and psychological symptoms in each spouse. We investigated whether information about the dyadic pattern of coping added to the understanding of psychological symptoms in husbands and wives beyond that gleaned from examining each partner's coping. Cluster analysis yielded eight distinguishable patterns of dyadic coping. Two of these patterns were associated with high levels of psychological symptoms in one or both spouses. Most notably, a pattern of dyadic coping marked by strong reliance on escape-avoidance coping by both husband and wife was associated with high levels of symptoms in both spouses. In regression analyses, wives' escape-avoidance coping predicted both their own and their husbands' psychological symptoms. Husbands' escape-avoidance coping predicted only their own symptoms.

Hawkes, Kristen. 1993. Why Hunter-Gatherers Work: An Ancient Version of the Problem of Public Goods. *Current Anthropology* 34: 341-361.

People who hunt and gather for a living share some resources more widely than others. A favored hypothesis to explain the differential sharing is that giving up portions of large, unpredictable resources obligates others to return shares of them later, reducing everyone's variance in consumption. I show that this insurance argument is not empirically supported for !Kung, Ache, and Hadza foragers. An alternative hypothesis is that the cost of not sharing these resources is too high to pay. If exclusion costs are high, then these resources are like public goods. If so, why does anyone provide them? I briefly review treatments of the problem of public goods by economists and use a simple model to show why self-interested actors will rarely find the consumption value they place on collective goods sufficient reason to supply them. The model underlines the obvious corollary that individuals get more to consume if others provide collective goods. This is a reason to prefer neighbors and associates who are suppliers. Such a preference may itself be a benefit worth seeking. I construct another simple model to explore this. Taken together the models suggest two competing foraging goals: feeding one's family and gaining social benefits instead. This highlights conflicts of economic interest among family members. It is a direct challenge to influential scenarios of human evolution built on the assumption that men are primarily paternal investors who hunt to support their spouses and offspring.

Haythornthwaite, Caroline, Barry Wellman, and Marilyn Mantei. 1994. Media Use and Work Relationships in a Research Group. Pp. 44-1 in *Proceedings of the 27th Annual Hawaii International Conference on System Sciences*, Vol. 4, Information Systems edited by Jay Nunamker, Jr. and Ralph Sprague, Jr. Los Alamitos, CA: IEEE Computer Society Press.

We analyzed the choices made between alternative communication media in different work relationships by 25 university researchers using unscheduled and scheduled face-to-face contact, e-mail, telephone, fax, and desktop videoconferencing. A social network survey provided info about what they communicated, how they communicated, and with whom they communicated. Communication was predominantly through unscheduled encounters, e-mail, and scheduled meetings; people rarely videoconferenced, telephone or faxed. Factor analysis reduced the 24 work relationships to 6 dimensions: Receiving Work, Giving Work, Collaborative Writing, Emotional Support, Sociability, and Computer Programming.

Hogan, Dennis P., David J. Eggebeen, and Clifford C. Clogg. 1993. The Structure of Intergenerational Exchanges in American Families. *American Journal of Sociology* 98: 1428-1458.

Intergenerational support is analyzed using data from the National Survey of Families and Households. The authors find evidence that a systematic latent structure of intergenerational exchange characterizes the giving and receiving of support. Overall, one-half of Americans do not routinely engage in giving or receiving relationships with their parents and only about one in 10 are engaged in extensive exchange relationships. Parents are assisted more often in situations of poor health, and more often receive assistance when they have young children. Assistance in time of need is not uniform and is rarely extensive. Intergenerational assistance is constrained by family structure and the needs and resources of each generation. African-Americans are consistently less likely than whites to be involved in intergenerational assistance. In each generation, men receive as much altruistic support as women; higher levels of giving and receiving of aid among American women are due to their greater involvement in exchange.

Hummon, Norman P. and Kathleen Carley. 1993. Social Networks as Normal Science. *Social Networks* **15: 71-106.**

Social network analysis has emerged as an integrated scientific specialty concerned with the structural analysis of social interaction. Historical evidence suggests that members of this specialty are connected by an invisible college, a shared paradigm and a primary journal. The journal Social Networks is a primary outlet for researchers in this specialty, particularly those concerned with methodological issues. By examining the pattern of citations within this journal we are able to confirm this historical evidence and gain insight into how science is being conducted by members of this specialty.

Iacobucci, Dawn and Nigel Hopkins. 1994. Detection of Experimental Effects in Social Network Analysis. *Social Networks* **16: 1-41.**

Descriptive and inferential statistical techniques exist for the analysis of social networks, but to date the inferential methods have been limited to the comparison of one network to its hypothesized population parameters (analogous to a one-sample t-test), or the comparison of multiple relational structures measured on the same group of actors (analogous to a correlation coefficient). In this paper, we explore techniques for comparing network structures when each network comprised an entirely different set of actors (analogous to a two-sample t-test or a between-subjects analysis of variance). Such methods for between-group comparisons are critical in theory testing, where a researcher varies an experimental factor for the purposes of studying its impact on some dependent variable (e.g. the resulting network structure). This ability to test the significance of manipulated factors (like ANOVA) would provide another important means by which social network analyses would be an aid to researchers. We propose several such statistical methods for comparing network interactions.

Kakola, Timo. 1993. Using Role Interaction Nets in Designing Embedded Systems for Supporting Coordinated Work. *Proceedings of the Twenty-Seventh Annual hawaii International Conference on System Sciences, 1993.*

Organizations need to cope with rapid changes in their environment. This creates increasing pressures on agents' competence. Drawing upon structuration theory we argue that the agents must understand work as a whole, including computerized tasks, if they are to effectively manage and transform complex work practices. We claim based on our experiences with a prototype system that developing such understanding is arduous until radical changes are made in the structure as well as the components of software systems. Specifically, we maintain that applications should be embedded in extended support systems making the organization of work and the coordinating role of information systems explicit. We call the resulting systems Embedded

Systems. As a step towards realizing them, we propose using organizational models constructed with the help of Role Interaction Nets as (1) the structural basis of Embedded Systems and (2) the new metaphor for human-computer interface design.

Kamo, Yoshinori. 1993. Determinants Of Marital Satisfaction: A Comparison Of The United States And Japan. *Journal of Social and Personal Relationships* **10: 551-568.**

Past literature, mostly based on US data, indicates that satisfaction with marriage is determined by each spouse's rewards from marital interactions but not by socioeconomic characteristics. To examine the differences and similarities between American and Japanese spouses in the determinants of marital satisfaction, comparative survey data are analyzed in this study. It was expected that expressive (interaction) aspects of marriage are more important in the United States and instrumental (socioeconomic) aspects more in Japan. Results indicate that determinants are similar between husbands and wives within each country and somewhat different between the two countries, largely in the expected way. The husband's income is important for Japanese spouses but not for the American. Age has a negative relationship to marital satisfaction in the United States but not in Japan. Rewards from marital interactions are equally important in these two countries, contrary to the expectation. Different ideals and conceptions about marriage in each country partly explain these differences.

Kim, Young Yun. 1994. Interethnic Communication: The context and the behavior. In Stanley A. Deetz (Ed.) *Communication Yearbook 17* **(pp. 511-538). Newbury Park, CA: Sage.**

Issues of ethnicity and interethnic interaction have been extensively investigated across social science disciplines for several decades. This essay presents an overview of some of the concepts that are prominent in the literature and proposes a conceptual framework in which many of the existing concepts can be integrated from a communication viewpoint. The current description of interethnic communication is grounded in some of the metatheoretical assumptions of pragmatism and systems theory, which emphasize the inseparability and interdependence of the context and the behavior of communication in any given interethnic encounter. Based on this perspective, interethnic communication is conceptualized in the form of a transactional matrix that consists of the behavior (encoding and decoding) and three layers of the context the communicator, the situation, and the environment.

Kovchegov, Vladislav B. 1994. A Model of Dynamics of Group Structures of Human Institutions. *Journal of Mathematical Sociology* **18: 315-332.**

Given is a review of the substantial theories of cognitivist's trend and also of static and dynamic models of group structures that are based on them. A model of human institutions is constructed that explains the origin of balanced structures. This model is realized by a system of locally interacting automatons which are connected by a system of relations and endowed with the ability to react.

Ku, Leighton, Freya L. Sonenstein, and Joseph H. Pleck. Neighborhood, Family, and Work: Influences on the Premarital Behaviors of Adolescent Males. *Social Forces* **72: 479-503.**

The article examines the effects of neighborhood, family, and individual characteristics on teenage males' premarital sexual and contraceptive behaviors and on their experiences with pregnancy or fatherhood, using data from the 1988 National Survey of Adolescent Males and the 1980 census. It also systematically compares the effects of related personal and neighborhood traits in multilevel analysis, including employment, income, education, welfare receipt, family composition, and race/ethnicity. Young men who

worked more hours were more sexually active and also were more likely to have made someone pregnant. However, higher neighborhood unemployment rates were also independently associated with greater risk of impregnation. Thus, greater financial resources at the personal level may enable teenage males to attract more partners and therefore, may heighten their risk of impregnating someone, while more limited economic opportunities at the community level may also heighten the risks of paternity.

Lahlou, Saadi. 1993. A Method For Measuring Network Effects In Scientific Cooperation. *Bulletin de Methodologie Sociologique* **40: 64-89.**

A method for quantitative assessment of the evolution of scientific networks with a light-and-fast mailed questionnaire is presented through its use in the evaluation of the Science/Stimulation programmes of the European Community (EC) Framework programme The methodology is based on the behavioral description of relationships between labs sharing an EC contract before and after the programme Networks are described a "mean value" of relationships between pairs within the network Quantitative Indicators obtained through monovariate and multivariate statistical methods, allow comparing the situation before and after the programme, and therefore yield clues for programme impact assessment. An attempt to visualize network evolution with multivariate analysis is presented.

Latane, Bibb, Andrzej Nowak, and James H. Liu. 1994. Measuring Emergent Social Phenomena: Dynamism, Polarization, and Clustering as Order Parameters of Social Systems. *Behavioral Science* **39: 1-24.**

We derive three system order parameters: dynamism, polarization, and clustering, to describe global states of attitude distribution and change for human social systems. Dynamism (f)

captures the rate of change in a system, while polarization (Pt) refers to the increase or decrease of a minority position over time. Clustering (e) defines the spatial segregation of opinion based on system topography. These measures suggest a conception of human systems looted in time and space that is distinct from other approaches. Their utility is illustrated through computer simulations showing that under a wide variety of circumstances, social influence models incorporating spatial distributions lead to unexpected outcomes of incomplete polarization and clustering, with alternative theories of how individuals encode information leading to quantitatively distinct results. A second set of simulations describes the intrusion of temperature, or unexplained randomness into these systems. Surprisingly, the self-organizational tendencies emerging from the iteration of simple laws of individual attitude change derived from Latane's (1981) metatheory of social impact appear to increase with moderate levels of randomness. We consider other approaches for measuring group level processes, among them network analysis-inspired indices and spatial autocorrelation, and suggest how our system order parameters could be used to predict political elections.

Lawler, Edward J. and Jeongkoo Yoo. 1993. Power and The Emergence of Commitment Behavior in Negotiate Exchange. *American Sociological Review* **58: 465-481.**

We examine the impact of power on the development of affective commitment in dyadic relations within a minimal exchange network. Theory stipulates that in repeated negotiated exchange (1) equal power and integrative bargaining issues increase the frequency of exchange between actors, (2) frequent exchange generates positive emotions that are attributed to the focal relation, and (3) positive emotion increases the propensity to form an affective commitment to the relation. When commitment develops, actors tend to remain in a relation

despite alternatives and to provide benefits beyond those necessary to maintain the relationship. An experimental test supports the theory and suggests the conditions under which instrumental exchange relations become expressive. We discuss implications for the role of dyads in exchange networks.

Levesque, Maurice J. and David A. Kenny. 1993. Accuracy of Behavioral Predictions at Zero Acquaintance: A Social Relations Analysis. *Journal of Personality and Social Psychology.* 6:1178-1187.

The accuracy of behavioral predictions based on minimal information was assessed using the Social Relations Model (D. A. Kenny & L. Albright 1987). Eighty women in unacquainted groups of 4 completed round robin trait ratings and predictions about extraversion-related behaviors. Each S then had a 5-min videotaped 1-on-1 interaction with each of the other group members. Behaviors corresponding to those predicted were coded from the videotapes. Significant consensus was obtained for ratings of Extraversion and for behavioral predictions. Cross-partner consistency emerged for all coded behaviors. Although predictions of behavior were not accurate at the dyadic level, significant generalized accuracy did emerge. Thus, if a person was consensually predicted to be talkative, for example, that person tended to be talkative across partners. Results are discussed in relation to the accuracy of interpersonal perception and Swann's (1984) theory of pragmatic accuracy.

Loscocco, Karyn A. and Kevin T. Leicht. Gender, Work-Family Linkages, and Economic Success Among Small Business Owner. *Journal of Marriage and the Family* 55: 875-887.

This study investigates work-family connections and economic success among women and men small business owners. We use what we term gender similarity and gender difference models to frame this investigation. The first model empha-

sizes the similarities between women and men in the processes through which work outcomes are determined. In contrast, the gender difference model assumes deeply rooted institutional and individual bases of gender difference. Analyses of data from a 3-year panel survey of 99 women and 312 men owners show more support for the gender similarity than the gender difference model. There is considerable gender similarity in the processes through which business and individual characteristics affect personal earnings, although women owners are disadvantaged in some characteristics critical to business success. Family situation has a direct impact on these owners' business success and indirectly affects personal earnings. We uncover vestiges of traditional gender roles consistent with the gender difference model, but primarily in the context of marriage. Thus, children are experienced as an incentive to fulfill the good provider role not only among married men but also by single women. The event history analyses show that these effects persist over time.

Mantovani, Guiseppe. 1994. Is Computer-Mediated Communication Intrinsically Apt to Enhance Democracy in Organizations? *Human Relations* 47: 45-62.

Recent studies on social and organizational processes involved in computer-mediated communication (CMC) are discussed. A technological deterministic approach which views CMC as inherently apt to support democracy in organizations is challenged. Claims about equal access overcoming social barriers openness and de-individuation are critically examined with reference to up-to-date literature. Our point consistent with sociotechnical theory is that CMC especially in E-mail use can alter rhythms and patterns of social interactions in ways both powerful and pervasive neither positive nor negative in themselves but shaped by local contexts of use. Stress on social identity processes involved in CMC is suggested as relevant to further research.

Marsden, Peter V. 1993. The Reliability of Network Density and Composition Measures. *Social Networks* **15: 399-421.**

Many measures based on egocentric network data, such as age composition or (local) network density, can be viewed as 'aggregate' measures: they are mean values of the alter attributes or the dyadic attributes that fall within a given respondent's egocentric network. Internal consistency methods of classical test theory are not suitable for assessing the reliability of such measures: such methods presume a 'crossed' design for data collection in which each respondent is scored on the same set of indicators. In designs for gathering egocentric network data, alters are instead 'nested' within respondents; moreover the number of alters may differ across respondents. This paper evaluates the reliability of composition and density measures via analysis-of-variance approaches to reliability known as generalizability theory. Reliability estimates are presented for egocentric measures based on the 1985, 1987, and 1988 General Social Surveys and for the 1977-1978 Northern California Community Study. Ethnoreligious composition, political composition, density, and composition of a network by 'friends' or co-members of organizations are measured with relatively high reliability, even for a relatively small number of alters. Other measures require more alters to attain adequate reliability, and some, such as sex composition, remain problematic even when the number of alters grows quite large. The sensitivity of reliability estimates to differences in instrument design is examined using design variations in the surveys studied.

McGuire, Jacqueline and Felton Earls. Exploring the Reliability of Measures of Family Relations, Parental Attitudes, and Parent-Child Relations in a Disadvantaged Minority Population. *Journal of Marriage and the Family* **55:1042-1046.**

A review of parenting questionnaires showed that a number did not have published test-retest reliability, and had not been developed with minority or disadvantaged parents. Four measures were selected for further study: Parental Attitudes to Childrearing, the Parental Acceptance Rejection Questionnaire, Raising Children, and the Conflict Tactics Scale. Forty mothers, living in economically disadvantaged inner-city locations, completed the measures twice, from 2 to 4 weeks apart. Significant test-retest reliability was established for all four measures and internal consistency was similar to published reports. Some reservations were noted about the relevance of certain questions for parents living in stressful conditions.

Michaelson, Alaina G. 1993. The Development of a Scientific Specialty As Diffusion Through Social Relations: The Case of Role Analysis. *Social Networks* **15: 217-236.**

This research considers whether the development of a scientific specialty can be understood as a diffusion process in which social relations and mass media are alternative sources of information and influence. The kinds of modifying adoptions of innovations observed during the development of a scientific specialty are compared with the straightforward adoptions that occur during ordinary diffusion processes. The developments of two innovations in role analysis, a specialty of social network analysis, are examined as a case study. It is shown that these adoptions are, in some ways, similar to the straightforward adoptions occurring in ordinary diffusion. Specifically, social relations were sources of information and influence, and qualities of the innovations affected the rates of adoption. Differences between the development of role analysis and ordinary diffusion processes also are illustrated. The availability of mass media sources of information and influence depends on the number of adopters during the development of a scientific specialty, but not during ordinary diffusion processes. This difference has further implications for the effect of

qualities of the innovation on the development of scientific specialties.

Mizruchi, Mark S. 1993. Cohesion, Equivalence, And Similarity of Behavior: A Theoretical and Empirical Assessment. *Social Networks* 15: 275-307.

Network analysts have debated the extent to which cohesion versus structural equivalence serves as a source of similar behavior among actors. More recently, role equivalence has emerged as an alternative to structural equivalence. Using data on the contribution patterns of corporate political action committees, I examine the effect of various indicators of cohesion, structural equivalence, and role equivalence on the extent to which firms behave similarly. Although various operationalizations of all three concepts are correlated with similar behavior, the most consistent predictor is the joint prominence of two firms in the network. I argue that this common location in central positions is a form of role equivalence, but one that is distinct from conventional definitions of the concept. I then suggest a distinction between what I term 'central' and 'peripheral' role equivalence.

Morris, Martina. 1993. Telling tails explain the discrepancy in sexual partner reports. *Nature* 365(300):437-440.

An anomaly often noted in surveys of sexual behaviour is that the number of female sexual partners reported by men exceeds the number of male partners reported by women. This discrepancy is sometimes interpreted as evidence that surveys produce unreliable data due to sex-linked response and sampling bias. We report here that among the 90% of respondents reporting fewer than 20 lifetime partners, however, the ratio of male to female reports drops from 3.2:1 to 1.2:1. The anomaly thus appears to be driven by the upper tail of the contact distribution, an example of the general principle of outlier influence in data analysis. The implication is that

the sexual behaviour surveys provide reliable data in the main, and that simple improvements can increase precision in the upper tail to make these data more useful for modelling the spread of AIDS and other sexual transmitted diseases.

Nakao, Keiko and A. Kimball Romney. 1993. Longitudinal Approach to Subgroup Formation: Re-Analysis of Newcomb's Fraternity Data. *Social Networks* 15: 109-131.

Though longitudinal research is infrequent in the social sciences, information obtained through longitudinal investigation provides knowledge which cannot be acquired through cross-sectional research. In this paper we demonstrate how a longitudinal measure (i.e., positional stability) provides a new perspective in understanding small group structures and the individual characteristics of group members. We analyzed the classic longitudinal sociometric data collected by T. Newcomb on college students in the 1950s. The measure of positional stability of individuals over time is shown to correspond to the resulting subgroups as well as an individual's popularity, knowledge of others, and agreement with the group consensus.

Opp, Karl-Dieter. and Christiane Gern. 1993. Dissident Groups, Personal Networks, And Spontaneous Cooperation: The East German Revolution of 1989. *American Sociological Review.* 58: 659-680.

We focus on the roles of groups and personal networks in demonstrations in the repressive setting of East Germany between May and October 1989. We first propose a micromodel specifying a broad set of individual incentives to participate; then we contend that political events and changes in the social context together with existing coordinating mechanisms produced the large-scale demonstrations in 1989. Most of our hypotheses are tested using a representative survey of Leipzig's population in the fall of 1990 that focuses on the 1989 protests. Among the

incentives, only political discontent, weighted by perceived personal political influence, has a major impact on participation in the demonstrations. The expectation of repression was irrelevant. Opposition groups were unable to shape the incentives of the population, and incentives for their members to participate were weak, whereas negative incentives prevailed for members of the Socialist Party. Incentives to participate were concentrated in personal networks of friends. Thus, personal networks were the most important contexts for mobilizing citizens. A "spontaneous coordination model" explains how discontented citizens met at particular times and places, and why few incentives were necessary to prompt participation in the demonstrations.

Padgett, John F. and Christoper K. Ansell. 1993. Robust Action and the Rise of the Medici, 1400-1434. *American Journal of Sociology* **98 12259-1319.**

We analyze the centralization of political parties and elite networks that underlay the birth of the Renaissance state in Florence. Class revolt and fiscal crisis were the ultimate causes of elite consolidation, but Medicean political control was produced by means of network disjunctures within the elite, which the Medici alone spanned. Cosimo de' Medici's multivocal identity as sphinx harnessed the power available in these network holes and resolved the contradiction between judge and boss inherent in all organizations. Methodologically, we argue that to understand state formation one must penetrate beneath the veneer of formal institutions, groups, and goals down to the relational substrata of peoples' actual lives. Ambiguity and heterogeneity, not planning and self-interest, are the raw materials of which powerful states and persons are constructed.

Parker, Sandra and Brian de Vries. 1993. Patterns of Friendship for Women and Men in Same and Cross-Sex Relationships. *Journal of Social and Personal Relationships* **10:617-626**

Ninety-five women and 95 men undergraduates rated each of their closest friends, and rated themselves with each of those friends on a Relationship Grid evaluating both "structural" dimensions (i.e., age, sex, duration of friendship and frequency of contact) and "affective" dimensions (i.e., self-disclosure, appreciation, assistance, empathic understanding, deepening others' self-awareness, shared activity, authenticity, trust, control, responsibility, connectedness, empowerment of others and satisfaction). Results indicated similarity in the rankings of the importance of those dimensions in the friendships of men and women, and that same-sex friendships were more common and of longer duration than cross-sex friendships. Two broad patterns of differences emerged on the "affective" dimensions: 1) relationships with men friends were less reciprocal than relationships with women friends; and 2) men's same-sex relationships were characterized by less giving and receiving. This study suggests similarities and differences in the nature, meaning, and perceived function of friendship for women and men, and illustrates the importance of studying people's conceptions of themselves and their friendships in the context of their specific real-life relationships.

Peterson, Nicolas. Demand Sharing: Reciprocity and the Pressure for Generosity Among Foragers. *American Anthropologist* **95: 860-874.**

Despite the prevalence of an ethic of generosity among foragers, much sharing is by demand rather than by unsolicited giving. Although a behavioristic model of demand sharing can be seen as matching sociobiological expectations, the emphasis here is on the social and symbolic significance of the practice. It is argued that demand sharing involves testing, assertive, and/or substantiating behavior and is important in the constitution of social relations in egalitarian societies.

Schweizer, Thomas, Elmar Klemm and Margarete Schweizer. Ritual as Action in a Javanese Community: A Network Perspective on Ritual and Social Structure. *Social Networks* 15: 19-48.

This social network study of ritual celebrations in a Javanese village analyzes the organizational pattern inherent in the ritual activities. In the network perspective repeated participation in rituals creates order among actors fusing them into subsets by way of joint involvement in the same events. Quantitative analysis revealed that basically neighborhood units are established. Religious factions are mapped onto these fundamental structures. Social class does not influence participation in rituals, although it is at work in the size and performance of celebrations. Participation in rituals can be interpreted as the establishment of implicit contracts for support in a social security network.

Skvoretz, John and David Willer. 1993. Exclusion And Power: A Test Of Four Theories Of Power In Exchange Networks. *American Sociological Review* 58: 801-818.

We evaluate four theories that predict the distribution of power in exchange networks. All four theories--core theory, equidependence theory, exchange-resistance theory, and expected value theory-assume actors rationally pursue self-interests. Three of the theories add social psychological assumptions that place the pursuit of self interest in an interactive context. Predictions of exchange earnings by the four theories are evaluated against data from eight experimental networks, including types of networks not previously studied. These networks vary conditions that affect the chances that a position can be excluded from exchange. We find that when the theories base predictions on a network position's structural potential for exclusion, exchange-resistance theory provides the best fit, but when predictions are based on actual experiences of exclusion, expected value theory

fits best. Our discussion focuses on the distinction between the a priori potential for exclusion versus experienced exclusion as factors in the genesis of power.

Sparrow, Malcolm K. 1993. A Linear Algorithm For Computing Automorphic Equivalence Classes: The Numerical Signatures Approach. *Social Networks* 15: 151-170.

An efficient method for computing role (automorphic) equivalences in large networks is described. Numerical signatures (real numbers) are generated for each node. Role-identical nodes share common numerical signatures. The decomposition of the node set into classes by reference to the numerical signatures helps determine the automorphic equivalence classes of a network. The technique is applicable to symmetric and directed networks, and to graphs with multiple link types. The algorithm is linear with respect to the number of links in the network. Its theoretical foundation exploits properties of transcendental numbers.

Trobst, Krista K., Rebecca L. Collins, and Jayne M. Embree. 1994. The Role Of Emotion In Social Support Provision: Gender, Empathy And Expressions Of Distress. *Journal of Social and Personal Relationships* 11: 45-62.

Two studies examined the association between emotion-related factors and intentions to provide social support to a distressed peer. In both studies, providers' gender and their level of dispositional empathy were related to anticipated support provision, Women and persons high in trait empathy were more supportive than men and persons low in trait empathy. Consistent with predictions, the gender effect was largely mediated by that of empathy. Study Two extended these findings by demonstrating that state empathic responses are also substantially associated with support provision, and by exploring the impact of recipients' expression of emotion on empathy and support. As a whole, the

studies indicate that emotion plays an important role in support provision in that providers' feelings of concern are a strong determinant of their supportive responses.

Villar, Maria de Lourdes. 1992. Changes in Employment Networks Among Undocumented Mexican Migrants in Chicago. *Urban Anthropology* **21: 385-397.**

Current studies have suggested that employment opportunities in sending and receiving countries are crucial to understanding transnational labor flows. However, they have had little to say about the networks that facilitate the finding of employment for the newly arrived migrant, or how these networks have responded to the changing macroeconomic and microsocial environment. This article examines the development of employment networks among undocumented Mexican migrants in Chicago. It is found that, from the perspective of those seeking employment in the broader economic sphere of the city, recruitment networks have gone beyond the personal, socially bound sphere. With time, and under sustained pressure from the continuing influx of undocumented migrants, the principal characters of the recruitment play have shifted-- from government, to employers, to households and informal cliques, to workers. The transactions between employers and workers has also changed-- from legal contracts to reciprocal exchanges to negative reciprocity or illegitimate dealings. For the undocumented, unskilled migrant facing increased difficulties in finding work, money offers the means to purchase "weak ties" leading to new jobs.

Wallace, Rodrick. 1993. Social Disintegration and the Spread of AIDS--II: Meltdown of Sociogeographic Structure in Urban Minority Neighborhoods. *Social Science Medicine* **37: 887-896.**

An elementary model of sociogeographic network structure in an urban minority community suggests

external applied stress, particularly that which triggers frequent individual or family moves of increasing distance, may cause a sudden 'phase change' resulting in disconnection of previously integrated subgroups from the community. Such 'community meltdown' would seriously disrupt mechanisms for social control, economic opportunity and socialization of youth, while intensifying substance abuse and indiscriminate and frequent sexual activity, particularly among the very young. 'Phase change' of this nature would seem to preclude success of programs to control spread or HIV infection, particularly in heterosexual populations.

The possibility is explored that programs of 'community recrystalization' in disintegrated urban area might likewise need to exceed some threshold of investment and organizing activity before becoming effective. However, if supported to levels above threshold, this work implies such programs might have very great impact in a very short time.

The possibility of interaction between behavioral pathologies resulting from the initial meltdown and further consequent deterioration in socio-geographic network structure leads to speculation that the threshold for recrystalization may become significantly and progressively greater than for meltdown.

Implications of these matters for diffusion of HIV into the general population are discussed.

Wayne, Sandy J. and Shawn A. Green. The Effects of Leader-Member Exchange on Employee Citizenship and Impression Management Behavior. *Human Relations* **46: 1431-1440.**

A field study was conducted to examine the relationship between leader-member exchange (LMX) and two types of employee behavior: citizenship behavior and impression management. One form of citizenship behavior, altruism, and

one form of impression management, other--focused were significantly related to LMX. Implications of the results are discussed.

Wellman, Barry. 1993. An Egocentric Network Tale: Comment on Bien et al. (1991). *Social Networks* **15: 423-436.**

The record is set straight as to who did what in the earlier days of egocentric network analysis - Toronto style.

Whitebeck, Les B., Danny R. Hoyt, and Shirley M. Huck. Family Relationship History, Contemporary Parent-Grandparent Relationship Quality, and the Grandparent-Grandchild Relationship. *Journal of Marriage and the Family* **55:1025-1035.**

The purpose of this research is to investigate the effects of early family experiences on the mediating role of parents for the grandparent-grandchild relationship. The analysis was based on parents and ninth graders reports regarding 1,138 grandparents. Panel data were used to reduce method effects attributable to transient mood states. Adolescents reports of frequency of contact with grandparents and of quality of the grandparent-grandchild relationship and parents reports of contemporary parent-grandparent relationship quality and of the parent-grandparent relationship history were used to minimalize the potential of single reporter bias. Results indicate that recalled nonoptimal parent-child relationships between parents and grandparents negatively affected the contemporary parent-grandparent relationship and subsequently affected contact and relationship quality for grandchildren and their grandparents.

Willer, David and Jacek Szmatka. 1993. Cross-National Experimental Investigations of Elementary Theory: Implications for the Generality of the Theory and the Autonomy of Social Structure. *Advances in Group Processes* **10:37-81.**

This paper examines the methodology of cross-cultural experiments and presents extensive experimental results on variety of small social structures which were studied in the U.S. and Poland. Results for exchange, coercive and profit point structures in both settings are reported. These were cross-national replications and, as explained in the methodological discussion, since the results from the two settings are similar, the generality of Elementary Theory is supported. Beyond supporting the theory, these results suggest that social structures investigated were autonomous from particular variations of time and place. Further implications of this autonomy are considered.

Yamagishi, Toshio and Karen S. Cook. 1993. Generalized Exchange and Social Dilemmas. *Social Psychology Quarterly* **56: 235-248.**

In generalized exchange the rewards that an actor receives usually are not directly contingent on the resources provided by that actor, therefore free riding can occur. The actor can receive benefit without contributing. Scholars interested in generalized exchange systems have often overlooked this inherent free-riding problem and thus have been overoptimistic in concluding that generalized exchange promotes mutual trust and solidarity among the participants. A more complete understanding of generalized exchange requires that the underlying social dilemma in such situations be appreciated fully. This paper represents our initial efforts to bridge two research traditions--research on social exchange and research on social dilemmas. This synthesis also may be of value to scholars interested in social dilemmas. With few exceptions, research in this tradition often ignores the internal structure of the social contexts in which such dilemmas arise. We present the results of a series of experimental studies. The findings suggest that "network-generalized" exchange systems promote

higher levels of participation (or cooperation) than do "group generalized" exchange systems regardless of the size of the network or group. In addition, mutual trust promotes a higher level of participation especially in network-generalized exchange systems.

Yamaguchi, Kazuo. The Flow of Information Through Social Networks: Diagonal-Free Measures of Inefficiency and the Structural Determinants of Inefficiency. *Social Networks* **16: 57-86.**

The aim of this paper is to (1) propose specific diagonal-free measures of the inefficiency of information flow through social networks and (2) present an analysis of the structural determinants of inefficiency. We employ a formal model of collective action developed by Coleman (1973, 1990); link it to the Markov model of interpersonal influence developed by among others French (1956), Harary (1959), and Friedkin (1991; Friedkin and Johnsen 1990); and extend it to measure inefficiency in information flow based on the concept of mean first passage times. It is shown that structural characteristics of social networks--such as global density, local density, diameter, number of bridges, and inequality in centrality, and certain interactions among these variables - strongly affect inefficiency. Theoretical implications of the results are discussed.

Yamaguchi, Kazuo and Denise Kandel. Marital Homophily on Illicit Drug Use among Young Adults: Assortative Mating or Marital Influence? *Social Forces* **72: 505-528.**

We assess the similarity between marital partners on the use of illegal drugs prior to marriage and within the most recent year of marriage, and the dynamic processes underlying observed similarity. Similarity after marriage may result from assortative mating or socialization or both. Concordant and discordant patterns of drug use at each time between spouses/partners in a sample of 545 pairs (X age husbands - 30, X age wives = 28) are cross-tabulated to generate a 16-fold table. Similarity at one point in time and selection and socialization effects underlying change over time are estimated without controls for population heterogeneity through loglinear models, and with controls for heterogeneity through latent trait models. While there is evidence for assortative mating, the socialization effect documented by the loglinear models disappears in the latent trait models.

Abstracts: BOOKS

Baker, Wayne E. 1993. *Networking Smart: How to Build Relationships for Personal and Organizational Success.* **New York: McGraw-Hill.**

A major secret to getting ahead in business today lies in the art of developing, maintaining, and using the people networks. Indeed, it's no exaggeration that the ability to build strong personal relationships and effectively manage networks of people can both make your career and enable you to assure the success of your organization. Professor Baker observes that far too many otherwise savvy business people fail to recognize, much less take advantage of, all the networking opportunities that are open to them. This book provides sophisticated information and practical techniques managers need to create powerful networks both inside and outside of your own company.

Contents: Introduction; The Cult of the Deal: Old Attitudes in a New Business World; The Networking Leader; Building Intelligence Networks; Manging Up, Down, and Sideways; Bottlenecks and Bridges; Managing Serendipty; Tapping the Power of Diversity; Networking through the Oganizational Life Cycle; Finding Good People (or Changing Jobs); Building Relationships with Customers and Clients; Word-of-Mouth Marketing; Building Supplier Partnerships; Networking Clubs; Cooperating with Competitors; The Boundaryless Organization: Role Model for the 1990s and Beyond.

Burt, Ronald S. 1992. *Structural Holes: The Social Structure of Competition.* **Cambridge: Harvard University Press.**

Professor Burt's theory highlights the importance of structural holes in relation to competition between individuals and corporate actors.

Structural holes are created in a network by the absence of ties between actors, or in Burt's terms, "players." Burt argues that competitive advantage is determined by a player's access to structural holes. For instance, the absence of ties between alternative suppliers of a resource enables the purchaser to play off one supplier against another and thereby obtain the resource on more favorable terms. Access to structural holes also affects exposure to opportunities -- the nonredundancy of one's contacts provides access to nonredundant information pools. Early chapters elucidate the concept and the modes by which structural holes impact outcomes experienced by players. Other chapters show that access to structural holes conditions profit margins of corporations and promotion rates of managers. Concluding chapters build integrative links to other important lines of research in economic sociology, namely, Harrison White's market models, Michael Hannan and John Freeman's population ecology models of firm survival and, by emphasizing players' strategic action to create and maintain structural holes, offer perspectives on firm structure via differential embeddedness in economic transaction networks and on personality structure via differential embeddness in social transaction networks.

Contents: Introduction; The Social Structure of Competition; Formalizing the Argument; Turning a Profit; Getting Ahead; Player-Structure Duality; Commit and Survive; Strategic Embedding and Institutional Residue.

Cecora, J. Editor. 1993. *Economic Behaviour of Family Households in an International Context: Resource Income and Allocation in Urban and Rural, in Farm and Nonfarm Households.* **Bonn, Germany: Forschungsgesellschaft.**

Contents: 0. Resource income and allocation. A topic for economic and sociological research. (Cecora); 1. Basic methodological considerations in surveying and evaluating household economic behaviour on an international level (Goldschmidt--Clermont); 2.1 An example of household economic behaviour in developing countries: Evolution of the form and economic functions of rural households in Western Samoa (Mohlendick); 2.2 Household economic behaviour in highly developed European society: Geographical and sectoral aspects of rural household strategies for resource income and allocation in Western Germany (Cecora); 3.1 The economic context for Spanish rural households: Evolution and perspectives (Garcia Alvarez-Coque and Garcia Molla); 3.2 Sources of income in French agricultural households (Brangeon and Jegouzo); 3.3 Reconstitution of private farm family households in the Czech republic (Majerova); 3.4 Household food supply in Eastern Europe (Rose and Tikhomirov); 3.5 Decreasing importance of monetary work income and official consumer markets for household resource economy in Eastern Germany between 1949 and 1989 (Lippold); 3.6 Non-market household production of housing and habitat in France (Bonnin); 3.7 Use of time as a resource in coping strategies of Eastern German households (Neef); 3.8 Living conditions and sources of income in Czech rural households (Hudeckova and Lostak); 3.9 Self-defence reflexes in household economic behaviour in Hungarian socialism (Harcsa); 3.10 Income and allocation of resources by Polish farm family households under socialism (Milic-Czerniak); 3.11 Non-market household production and support by social networks in Hungarian socialism (Speder); 3.12 Informal economic activity of rural households in Austria (Pevetz); 3.13 Structural situations and dispositions-to-act of farm households in Upland Scotland (Shucksmith); 3.14 Income of farm family households in differing Italian rural contexts (Eboli); 3.15 Life-cycle and labour allocation in Spanish farm family households: Empirical results for Mediterranean areas (Arnalte

et al.); 3.16 Resource allocation in Italian farm households (Marini and Mantino); 3.17 Personal choice of livelihood by members of farm family households in rural Portugal. (Rodrigo); 3.18 Impact of industrialisation and urbanisation on women's role in Spanish farming households. A case study in Horta de Valencia (Mohlendick and Munoz Torres); 4.1 Time-use for gainful activity in farming households in Finistere and Lower Saxony. (Cecora and Gunther); 4.2 Rural households non-market production and social networks in three European countries with differing institutional backgrounds (Lorenz et al.); 5. Concluding remarks and outlook.

Eckenrode, John. Editor. 1991. *The Social Context of Coping.* **New York: Plenum Press.**

Contents: Chapter 1. Introduction and Overview (John Eckenrode); Chapter 2. Situations and Processes of Coping (Elaine Wethington and Ronald C. Kessler); Chapter 3. Children and Divorce: Stress and Coping in Developmental Perspective (Donald Wertlieb); Chapter 4. Development, Stress, and Role Restructuring: Social Transitions of Adolescence (Carol S. Aneshensel and Susan Gore); Chapter 5. Age Differences in Workers' Efforts to Cope with Economic Distress (Karen Rooh, David Dooley, and Ralph Catalano); Chapter 6. Gender Differences in Coping with Emotional Distress (Peggy A. Thoits); Chapter 7. Gender, Stress, and Distress: Social-Relational Influences (Susan Gore and Mary Ellen Colten); Chapter 8. Stress and Support Processes in Close Relationships (Benjamin H. Gottlieb and Fred Wagner); Chapter 9. Effects of Depression on Social Support in a Community Sample of Women (Mary Amanda Dew and Evelyn J. Bromet); Chapter 10. Marital Engagement/Disengagement, Social Networks, and Mental Health (Nan Lin and Jeanne Westcott); Chapter 11. Translating Coping Theory into an Intervention (Susan Folkman, Margaret Chesney, Leon McKusick, Gail Ironson, David S. Johnson, and Thomas J. Coates); Chapter 12. The Study of

Coping: An Overview of Problems and Directions (Leonard 1. Pearlin).

Gereffi, Gary and Miguel Korzeniewicz. 1993. *Commodity Chains and Global Capitalism.* **Praeger: Westport, CT.**

In the past two decades, industrialization on a world scale has undergone significant shifts. This volume develops a new set of conceptual categories for analyzing new patterns of global economic organization. The contributors to this volume explore and elaborate the global commodity chains (GCCs) approach, which reformulates the basic conceptual categories for analyzing new patterns of global organization and change. The GCC framework allows the authors to pose questions about contemporary development issues that are not easily handled by previous paradigms and to more adequately forge the macro-micro links between processes that are generally assumed to be discretely contained within global, national, and local units of analysis. The paradigm that GCCs embody is a network-centered, historical approach that probes above and below the level of the nation-state to better analyze structure and change in the contemporary world.

Greenacre, Michael J. 1993. *Correspondence Analysis In Practice.* **London, UK: Academic Press.**

This manual teaches students and researchers how to translate complex tabular data Into more readable graphical form through the use of simple, relatively non-mathematical, techniques. It provides a sound practical knowledge of correspondence analysis using a course format, heavily illustrated by tables and diagrams. Divided into 20 modules or chapters, each module lists the essential items which will be taught in that module, dealing with the material step by step. Each module concludes with a summary of the main points.

Contents: Scatterplots and Maps; Profiles and the Profile Space, Masses and Centroids; Inertia and the Chi-squared Distance; Plotting Chi-squared Distances; Reduction of Dimensionality; Optimal Scaling; Symmetry of Row and Column Analyses; Two-dimensional Displays; More examples; Row and Column Contributions; Supplementary Points, Biplot Interpretation, Clustering Rows and Columns; Analysing Multiway Tables; Joint Correspondence Analysis; Multiple Correspondence Analysis; Homogeneity Analysis; Ratings and Doubling; Stability of Maps.

Hatfield, Elaine, John T. Cacioppo, Richard L. Rapson. 1994. *Emotional Contagion.* **New York: Cambridge University Press.**

Contents: Introduction and overview; Chapter 1. Mechanisms of emotional contagion: I. Emotional mimicry/synchrony; Chapter 2. Mechanisms of emotional contagion: II. Emotional experience and facial, vocal, and postural feedback; Chapter 3. Evidence that emotional contagion exists; Chapter 4. The ability to infect others with emotion; Chapter 5. Susceptibility to emotional contagion; Chapter 6. Current implications and suggestions for future research.

Historical Atlas of Canada. **3 volumes. Toronto: University of Toronto Press. 1988-1993.**

Don't use this to find your way to Flin Flon or Moose Jaw, but these beautiful, coffee-table sized books are a network analyst's delight. They're all about connectivity. Take Vol. 2 (1800-1891) for example. Plate 23 maps a Tilly-esque analysis of the 1837 uprisings, Plate 27 informs community-liberated discourse by showing changes in continental travel time, while Plate 45 shows the speed by which information spread. Each 2-page plate is the product of years of scholarship.

Jones, Warren H. and Daniel Perlman. Editors. 1991. *Advances In Personal Relationships: A Research Annual.* **London, UK: Jessica Kingsley Publishers.**

Contents: Preface (Warren H. Jones and Daniel Perlmam); The social psychological context of developing relationships: interactive and psychological networks (Catherine A. Surra and Robert M. Milardo); Studying communication in marriage: an integration and critical evaluation (Patricia Noller and Diane Guthrie); Dispositional empathy and social relationships (Mark H. Davis and Linda A. Kraus); Commitment to personal relationships (Michael P. Johnson); Commitment vs. cohesiveness: Two complementary views (George Levinger); Commentary on Johnson's 'Commitment to personal relationships: What's interesting and what's new? (Caryl E. Rusbult); Reply to Levinger and Rusbult (Michael P. Johnson); The interpersonal context of divorce: Implications for theory and research (Ian H. Gotlib and Valerie E. Whiffen); Close relationships in the epidemiology of cardiovascular disease (Catherine J. Atkins, Robert M. Kaplan, and Michelle T. Toshima); The effects of acquired illness and disability on friendship (Renee F. Lyons).

Kaufer, David S. and Kathleen M. Carley. 1993. *Communication at a Distance: The Influence of Print on Sociocultural Organization and Change*. Hillsdale, NJ: Lawrence Erlbaum Associates.

Professors Kaufer and Carley explore the sociocultural impact of print and the mechanization of print during the Industrial Revolution. Simulations based on Professor Carley's constructual model, which intertwines interaction and the social distribution of knowledge, are used to gain insight into the impacts of the new communication technology represented by print. Historical analysis of specific events, such as the founding and development of the Royal Society, also uncovers mechanisms by which print industrialization contributed to social change. The first part of the book places the development of print technology in historical and theoretical context and covers such topics as the contexts and social formations sustaining print, the ecology of communicative transactions, conceptual networks

as text representations and the formal dynamics of the constructuralism model. In the second part of the book, four distinct settings are examined with simulations and historical discussions: societies with few printing presses; societies with professions made possible by a fully industrialized print marker; societies with academic groups dedicated to the development and diffusion of new knowledge and societies with relative high fluidity in terms of migration patterns between intellectual communities. In all settings, a major concern of the analysis is the time to diffusion of a single idea and its dependence on variable aspects of the setting.

Contents: Approaches to Communication Research; Written Content as Emergent Phenomena; Contexts Sustaining Print Transactions; Communicative Transactions and Their Ecology; The Role of Language in the Communicative Transaction; The Dynamics of the Communicative Transaction; Print; Professions; Academia; Migration and Authority; Afterword; Appendices.

Levine, Joel H. 1993. *Exceptions Are the Rule: An Inquiry into Methods in the Social Sciences*. Boulder, CO: Westview Press.

Professor Levine discusses the use of various quantitative methods, sharpens some, and suggests alternatives to others. His wide-ranging discussions lead through data anaiysis, statistics, philosophy, and close analysis of well-known examples to a clearer understanding of social science. Levine shows why quantitative sociai science must develop by its own rules, distinct from those that govern the disciplines of mathematics and statistics. Throughout, he emphasizes the use, misuse, and meaning of common techniques and the extension of basic tools to new problems. For students, the book shows the practical consequences of sometimes-hidden links between theory and metbod. It explain show to let measurements emerge during the analysis of data in ways that

minimize a priori assumptions while maximizing the information extracted. For scholars, the book joins the debate between methodologists and theoreticians about the future of social science. It presents a unified analysis of diverse empirical problems in economic time series, political identity, small-group sociometry, and occupational stratification.

Contents: SUMMARY NUMBERS. Introduction: Numbers for Religion and Politics. Lines, Damned Lines, and Statistics. Calculus and Correlation: A Calculus for the Social Sciences. The Rule of Safety: Gamma Is Wrong. SCATTER ANALYSIS. Introduction: The Strength of Weak Data. Big Folks and Small Folks: The Relation Between Height and Weight. Democrats, Republicans, and Independents: What Is Party Identification? Friends and Relations. Time and Money: The Course of Human Events. Real Social Distance. EPILOGUE. Theory.

Mizruchi, Mark S. 1992. *The Structure of Corporate Political Action: Interfirm Relations and Their Consequences.* **Cambridge: Harvard University Press.**

Professor Mizruchi presents and tests an original model of corporate political behavior. He argues that because the business community is characterized by both unity and conflict, the key issue is not whether business is unified but the conditions under which unity or conflict occurs. Adopting a structural model of social action, Mizruchi examines the effects of factors such as geographic proximity, common industry membership, stock ownership, interlocking directorates, and interfirm market relations on the extent to which firms behave similarly. The model is tested with data on the campaign contributions of corporate political action committees and corporate testimony before Congress. Mizruchi finds that both organizational and social network factors contribute to similar behavior and that similar behavior increases a group's likelihood of political success. This study demonstrates that

firms are influenced by the social structures within which they are embedded and that the nature of relations between firms has real political consequences.

Contents: Introduction; Pluralism and Its Discontents; What Is Business Unity? A Structural Model of Corporate Political Behavior; Political Action Committees and Corporate Political Behavior; Political Campaign Contributions: Unity and Conflict; Business Testimony before Congress: Unity and Conflict; Differentiation across Industries: Within-industry Integration and Political Success; From Dyad to System: Multiple Networks of Organizational and Political Relations; The Conditional Nature of Business Unity.

Namboodiri, Krishnan and Ronald G. Corwin. 1993. *The Logic and Method of Macrosociology: An Input-Output Approach to Organizational Networks.* **Westport, CT: Praeger.**

Namboodiri and Corwin make a strong case for adopting a macro perspective in sociological investigations. They begin with an analysis of the micro perspective, with emphasis on the so-called individual as the unit of observation and analysis. They then proceed to a general discussion of the macro perspective, with particular emphasis on organizational networks as study objects. Rival paradigms for the analysis of organizations are reviewed. The study of interdependence among entities such as organizations is discussed and the use of input-output framework for such studies is expounded.

Contents: Foreword by William Form; The Limits of Micro Sociology: Are Individual Level Explanations Possible?; In Search of Macro Sociology; Rival Paradigms of Organizations; Organizational Networks; Individualistic Theories of Earnings; Structural and Network Theories of Earnings; Structural Equivalence and Clique Analysis; The Input-Output Framework.

Pillemer, Karl and Kathleen McCartney. Editors. 1991. *Parent-Child Relations Throughout Life*. Hillsdale, NJ: Lawrence Erlbaum Associates.

Contents: Foreword (Sandra Scarr); The Parental Side of Attachment (Inge Bretherton, Zeynep Biringen, and Doreen Ridgeway); Attachment Theory in Old Age: Protection of the Attached Figure (Victor C. Cicirelli); Variability in the Transition to Parenthood Experience (Carolyn J. Mebert); Double Jeopardy: Identity Transitions and Parent-Child Relations Among Gay and Lesbian Youth (Andrew M. Boxer, Judith A. Cook, and Gilbert Herdt; The Development of Paternal and Filial Maturity (Corinne N. Nydegger); The Developmental Importance of Differences in Siblings' Experiences Within the Family (Judy Dunn); Mothers' Language With First- and Second-Born Children: A Within-Family Study (Kathleen McCartney, Wendy Wagner Robeson, Elizabeth Jordan, and Vera Mouradian); Adolescent Happiness and Family Interaction (Kevin Rathunde and Mihaly Csikszentmihalyi); Relationships With Children and Distress in the Elderly (Karl Pillemer and J. Jill Suitor); Family Conflict When Adult Children and Elderly Parents Share a Home (J. Jill Suitor and Karl Pillemer); Normative Obligations and Parent-Child Help Exchange Across the Life Course (Alice S. Rossi and Peter H. Rossi); Transitions in Work and Family Arrangements: Mothers' Employment Conditions, Children's Experiences, and Child Outcomes (Elizabeth G. Menaghan and Toby L. Parcel); Age-Group Relationships: Generational Equity and Inequity (Vern L. Bengston, Gerardo Marti, and Robert E. L. Roberts).

Richards, William D., Jr. and George A. Barnett. Editors. 1993. *Progress in Communication Sciences XII*. Norwood, NJ: Ablex.

Contents: Communication Networks and Network Analysis: A Current Assessment (George A. Barnett, James A. Danowski, and William D. Richards, Jr.); Cognitive Processes and Communication Networks: A General Theory (Joseph Woelfel); Using Network Concepts to Clarify Sources and Mechanisms of Social Influence (Ronald E. Rice); How Telephone Networks Connect Social Networks (Barry Wellman and David Tindall); Statistical Comparison of Communication Networks (Frank Tutzauer); Communication Network Dynamics: Cohesion, Centrality, and Cultural Evolution (D. Lawrence Kincaid); Correspondence Analysis: A Method For the Description of Communication Networks (George A. Barnett); Communication/Information Networks, Strange Complexity, and Parallel Topological Dynamics (William D. Richards, Jr.); Network Analysis of Message Content (James A. Danowski); Conversational Networks (Joseph Woelfel, William D. Richards, Jr., and N.J. Stoyanoff); Oscillation in Beliefs and Cognitive Networks (Edward L. Fink and Stan Kaplowitz).

Spira, Alfred, Nathalie Bajos et le groupe ACSF. 1993. *Les comportements sexuels en France*. Rapport au ministre de la Recherche et de l'Espace. Paris, France: La documentation Francaise.

Le Sida est essentiellement, en France, une maladie transmise sexuellement. Depuis le rapport Simon, réalisé il y a vingt ans, les études sur les comportements sexuels avaient été négligées. C'est pour permettre de fonder une politique sanitaire et de prévention sur des connaissances précises et actualisées que l'Agence nationale de recherches sure le Sida a réuni plus vaste enquête sur les comportements sexuels existant à ce jour. Les résultats permettent de mettre en lumière comment la sexualité a évolué depuis vingt ans et de mesurer l'impact du Sida et des campagnes de prévention sur les changements récents de comportements sexuels, en particulier l'utilisation du préservatif qui a été la mesure la plus fortement promue.

Par ailleurs, de numbreuses caractéristiques psychologiques et sociologiques des personnes interrogées sont analysées, apportant des informations utiles à la prévention en identifiant notamment les canaux de communication sur la sexualité, les normes qu'il convient de valoriser et le type d'information qu'il faut privilégier.

Ces données sont également utiles pour prévoir, à partir de la connaissance effective des comportements sexuels, l'évolution probable de l'épidémie dans notre pays.

Ce bilan complet des comportements sexuels en France en 1992 sert de base pour une analyse scientifique de la sexualité humaine en cette fin du XXe siècle.

Van der Poel, Mart. 1993. *Personal Networks: A Rational-Choice Explanation of Their Size and Composition.* **Berwyn, PA: Swets and Zeitlinger.**

Contents: 1. Personal relationships: introducing tbe research problem; 2. Theoretical issues and previous empirical results; 3 A rational choice approach to personal networks; 4 Design, operationalization and measurement; 5 Socio-structural differences in personal network size and proportion of kin; 6. Socio-structural differences in personal network composition; 7 A rational choice explanation of subnetwork sizes; 8 Evaluation and discussion; Appendices (A. Value and attitude seales; B. Methodological appendix; C Additional analyses).

Veiel, Hans O.F. and Baumann, Urs. 1992. *The Meaning And Measurement Of Social Support.* **New York: Hemisphere Publishing Corporation.**

Contents: The Many Meanings of Social Support (Hans O. F. Veiel and Urs Baumann); Benefits Produced by Supportive Social Relationships (Michael Argyle); Network Structures and Support Functions — Theoretical and Empirical Analyses (Anton Laireiter and Urs Baumann); Social Support Functions and Network Structures: A Supplemental View (Peggy A Thoits); Possible Impact of Social Ties and Support on Morbidity and Mortality (Ralf Schwarzer and Anja Leppin); Social Support and Depression (A. S. Henderson); Social Support, Depression, and Other Mental Disorders: In Retrospect and Toward Future Prospects (Scott M. Monroe and Sheri L Johnson); Stress, Social Support, and Disorder (Sheldon Cohen); Conservation of Social Resources and the Self (Steven E Hobfoll, Roy S. Lilly, and Anita P Jackson); Three Contexts of Social Support (Irwin G. Sarason, Barbara R. Sarason, and Gregory R. Pierce); Detrimental Aspects of Social Relationships: Taking Stock of an Emerging Literature (Karen S. Rook); Some Reflections on the Process of Social Support and Nature of Unsupportive Behaviors (Tirril O. Harris); Assessment of Social Support (Alan Vaux); Measuring Social Support: Issues of Concept and Method (R. Jay Turner); Social Support: An Investigator-Based Approach (George W. Brown); Perceived Support and Adjustment to Stress: Methodological Considerations (Ronald C. Kessler); Some Cautionary Notes on Buffer Effects (Hans O. E Veiel); Quandaries in Translating Support Concepts to Intervention (Benjamin H. Gottlieb); Comments on Concepts and Methods (Hans O. E Veiel and Urs Baumann).

Abstracts: DISSERTATIONS

Han, Shin-Kap 1994 *Claiming Status: Making of Intercorporate Behavioral Homogeneity in the Audit Services Market.* **Ph.D. Dissertation, Department of Sociology, Columbia University. Degree Date: February 15, 1994**

Bringing reference group and status dimensions to bear upon a large scale phenomenon, this study extends social structural models explaining social influence. Its theoretical focus is on two key concepts, mimetic isomorphism and social position. The empirical focus is on a phenomenon we observe in the audit services market, the excessively high level of market share concentration. The argument I make is that the behavior of corporate actors is conditioned by the position they occupy in their social setting, which, in the aggregate, produces isomorphism in the corporate practice of auditor choice. More specifically, the dissertation relates interorganizational mimicry, i.e., the extent to which a firm is likely to choose the same auditor as that used by other firms, to the relative standing of the corporation among its peers and the degree of inequality among them.

With data on the auditor choices of more than 2,000 public firms in the U. S. manufacturing sectors, I ask the question "Why do so many client firms choose from so few CPA firms to audit their books?" In the study, I first substantiate the existence and considerable extent of isomorphism in the audit services market as a whole. Next, I show that social structure among competing actors induces a distinctive behavioral pattern that systematically varies depending upon an actor's position. Finding a substantial effect of status process within the context of reference groups, I propose a model of interorganizational behavior that describes the ways in which this social mechanism operates. The relative standing of a firm within the industry is ascertained to be an important parameter of imitation. I then demonstrate that the shape of the relation between the two is a curvilinear one with imitation most intense in the middle. The effect holds both at the individual organizational level and at the aggregate industry level. I provide a field-level predictor for aggregate homogeneity, showing that the more hierarchically stratified an industry, the more likely it is to have homogeneous practice in auditor selection among the firms within it. Inequality leads to behavioral homogeneity.

Through empirical specifications and tests, this study describes the socio-cultural processes at work among corporate actors in a market setting. Not only do the findings of this study illustrate the critical importance of underlying social dimensions in understanding economic action, they also unpack a dynamic of competition and market that changes its form as the structural contexts change.

Tijhuis, Maria Antonia Rengerlina. 1994. *Social Networks and Health.* **Dissertation, Universiteit Utrecht. February 1994.**

This study concerns the mutual relationships between a person's social network and his or her health. We investigate whether it is true that the people around a person influence his health, and the reverse, whether it is true that health influences the (number and kind of) people he is (still) in contact with. The next question is, provided that such relationships do exist, why these relationships exist. What is it about the social network that influences the health of people, and in what way does health status influence social contacts? Although quite a large amount of research has been done on the relationships between characteristics of personal social networks and health, our study contributes to a greater understanding of these relationships because of two important characteristics: 1) the diversity of our data, 2) the integration of three

different explanatory mechanisms for the relationships between social networks and health with the help of one key idea.

Tindall, David B. 1994. *Collective Action in the Rainforest: Personal Networks, Collective Identity, and Participation in the Vancouver Island Wilderness Preservation Movement.* **Dissertation. University of Toronto.**

My thesis examines participation amongst individuals in the wilderness preservation movement on Vancouver Island. I utilize survey data collected from members of three environmental organizations to test the relative strength of "new social movement" versus "network-based" explanations for social movement participation.

New social movement theorists argue that there has been a qualitative shift in the nature of socio-political action in the West. This shift finds its expression in the rise of "new social movements". Support for "post-materialist" values underlies these new movements, which are comprised largely of the "new middle class". By contrast, "network-based" explanations (e.g., resource mobilization theory) assert that ideological support of a movement is not a sufficient condition for participation. Rather, individuals have to be motivated to participate and have network connections to other movement participants.

New social movement theorists also argue that social (or collective) identity is a key network-based cognitive variable explaining social movement participation. However, the role played by identity in the causal sequence is ambiguous. Resource mobilization theorists consider collective identity to be as a necessary condition for collective action to occur. My thesis argues that identity provides a point of convergence between these two theoretical perspectives. In particular, it is in the context of network-based interactions that collective identity is formed.

I examine both the composition of these movement organizations and factors explaining differential levels of individual participation. Results show that both people from upper middle class backgrounds, and those who are supportive of "post-materialist" values are more likely to join movement organizations. However, once they join, these factors are poor predictors of their ongoing level of participation in movement activities. The strongest predictors of ongoing social movement participation are level of identification with the movement, how often individuals receive requests to participate, their number of organization strong ties, their range of ties to people from other movement organizations, the number of organization memberships they hold, and their age. Identity mediates the relationship between ego-network structure, level of communication and level of participation. I discuss the implications these of findings for movement organization strategizing.

Zeggelink, Evelien. 1993. Strangers into Friends: The Evolution of Friendship Networks Using an Individual Oriented Modeling Approach. Amsterdam: Thesis Publishers.

Utterances like "Oh, we're just a group of friends" and "We don't have a leader, we're all equals" are often heard among members of friendship network, but usually do not reflect reality. In general, friendship networks do show recognizable structures, but how these structures emerge is a question seldom addressed. This dissertation presents a dynamic individual oriented model that explains how a heterogeneous population of initially unrelated individuals (mutual strangers) can develop a friendship network. The general elements of the model are developed on the basis of correspondences between the principles of object oriented modeling, automata networks, and methodological individualism in a graph theoretical representation. Predictions of these models are compared with data that contain information about the development of friendship networks in classrooms.

Titles: 1994 Sunbelt Social Networks Conference

The 1994 Sunbelt International Social Networks Conference was held February 17 through 20th at the Maison Dupuy Hotel in New Orleans.

SESSION 1A: MODELS AND STATISTICS

Models for Network Dynamics: A Markovian Framework. Roger Leenders, University of Groningen

Statistical Distribution of Q-Analytic Eccentricities. Frank Tutzauer, SUNY, Buffalo

On the Stochastically Ultrametric Structure of Human Social Groups. Linton C. Freeman, University of California, Irvine

A Structuralist Looks at Crosstabs: Redefining Survey Data. Joel Levine, Dartmouth College

SESSION 1B: HIV/AIDS AND SOCIAL NETWORKS

A Social Network Approach to Corroborating the Number of AIDS/HIV+ Victims in the U.S. Eugene C. Johnsen, University of California, Santa Barbara; H. Russell Bernard, University of Florida; Peter D. Killworth, Hooke Institute/Clarendon Laboratory; Gene A. Shelley, Georgia State University; Christopher Topher, University of Florida

Who Knows Your HIV Status? What HIV+ Patients and Their Network Members Know About Each Other. Gene A. Shelley, Georgia State University; H. Russell Bernard, University of Florida; Peter Killworth, Hooke Institute/Clarendon Laboratory; Eugene Johnsen, University of California, Santa Barbara; Christopher McCarty, University of Florida

The Structure of Sexual Networks. Edward O. Laumann, University of Chicago; L. Philip Schumm, University of Chicago

Concurrent Partnerships and Transmission Dynamics in Networks. Martina Morris, Columbia University;

Mirjam Kretzchmar, National Institute for Public Policy and Enviromental Protection, The Netherlands

Epidemiological Correlates of Measures of Centrality in a Social Network. R. Rothenberg, J. Potterat, D. Woodhouse, S. Muth, W. Darrow, Alden S. Klovdahl, The Australian National University

SESSION 1C: SOCIAL COGNITION AND NETWORKS, PART 1

Constancy in Clustering over the Course of Recall: Evidence from the Recall of Persons. Devon Brewer, University of California, Irvine

Networks of Meaning in Contemporary American Art: Structures of Relations Among Museums, Galleries, Publications, Schools and Artists. Leah A. Lievrouw, University of Alabama

An Examination of the Robustness of Structural Grouping Algorithms. Dean M. Behrens, Carnegie Mellon University

Is Who We Know What We Know? Medical Knowledge and Social Networks in a Rural Cameroon Village. Gery Ryan, University of Florida; George Mbeh, University of Florida

SESSION 1D: POLICY NETWORKS

Mobility in the World System, 1970-1985: A Network Approach. Ronan Van Rossem, Columbia University

The Social Construction of Organizational Identity: Social Contagion in the Health Policy Domain. Ezra W. Zuckerman, University of Chicago

Coalition Formation in Dynamic Political Networks. Peter van Roozendaal, Utrecht University; Evelien Zeggelink, University of Groningen

Object-Oriented Modeling of Policy Networks. Reinier van Oosten, Frans N. Stokman, University of Groningen

Social Networks in Politics: The Mexican Political Elite. Samuel Schmidt, University of Texas, El Paso; Joreg Gil, Instituto de Investigaci en Matem Tisas Aplicadas y Sistemas

SESSION 2A: MODELS AND STATISTICS

Social Positions in Influence Networks. Noah E. Friedkin, University of California, Santa Barbara; Eugene C. Johnsen, University of California, Santa Barbara

Dual Aggregation on the Basis of Relational Homogeneity. Ronald Breiger, Cornell University

Consensus Analysis of Krackhardt Data. William H. Batchelder, University of California, Irvine

Multinomial Modeling of Cognitive Network Data. Ece Kumbasar, University of California, Irvine

SESSION 2B: MENTAL HEALTH AND SOCIAL NETWORKS

Personal Networks of Community-Living Mentally Ill. John J. Beggs, Louisiana State University; Jeanne S. Hurlbert, Louisiana State University; Valerie A. Haines, University of Calgary; Tony Speier, Office of Mental Health, State of Louisiana; Paul Balson, Office of Mental Health, State of Louisiana

A Network Approach to HIV/AIDS Services Integration in the Mental Health Care Sector. Janet Myers, Indiana University; Eric Wright, Indiana University

Strategies for Assessing Change in Children's Mental Health Service Networks. Matthew Johnsen, University of North Carolina, Chapel Hill; Joseph P. Morrissey, University of North Carolina, Chapel Hill; Michael O. Calloway, University of North Carolina, Chapel Hill

Discussion: Some Issues in the Study of Social Networks and Mental Health. Bernice A. Pescosolido, Indiana University

SESSION 2C: SOCIAL COGNITION AND NETWORKS, PART 2

The Further You Look the More Balanced It Seems: Perceptions Transitivity and Symmetry in

Organizational Networks; Martin Kilduff, Pennsylvania State University

Strategies for Creating Cognitive and Social Relevance: The Lincoln-Douglas Debate. Kathleen Carley, Carnegie Mellon University

Informal Group Structure and Cooperation in a Social Dilemma. Andreas Flache, University of Groningen; Frans Stokman, University of Groningen; Wim Liebreand, University of Groningen; Werner Raub, University of Utrecht

Antarctica: Tale of Two Years at the South Pole. James Boster, University of California, Irvine; Jeffrey Johnson, East Carolina University

SESSION 2D: INTERVENTIONS, FIELD STUDIES, AND APPLICATIONS

Coalitions, Conflict and Violence in the Family. Cynthia Webster, University of California, Los Angeles; Oscar Grusky, University of California, Los Angeles; Phillip Bonacich, University of California, Los Angeles

Hot Shot Roles: Social Structure of Forest Fire Fighters. Ted Lowe, University of California, Irvine

Broadcasting into the Web: Communication Networks as Conduits for Media Programming. Thomas W. Valente, John Hopkins University; Patricia R. Poppe, John Hopkins University; Rasure Vera de Briceno, Apoyo a Programas de Poblacion; Danielle Cases, Apoyo a Programas de Poblacion; Rafael Leon, Apoyo a Programas de Poblacion

Poverty Ideas and Poverty Solutions: Mapping their Duality. John Mohr, University of California, Santa Barbara

SESSION 3A: METHODOLOGY FOR EGO-CENTERED NETWORKS

Application of Social Network Map Technique to the Portrayal of College Student Networks. John L. Cottrell, University of Queensland

A Methodology to Measure Social Network Characteristics Adopting a "Full" Network Approach in Survey Research. Theo van Tilburg, Vrije Universiteit

First Names as an Alter Selection Cue in a Large and Representative Sample. Christopher McCarty, University of Florida; H. Russell Bernard, University of Florida; Eugene C.Johnsen, University of California, Santa Barbara; Peter D. Killworth, Hooke Institute/Clarendon Laboratory; Gene A. Shelley, Georgia State University

Constructing Algebraic Models for Local Social Networks Using Statistical Methods. Philippa Pattison, University of Melbourne; Stanley Wasserman, University of Illinois

SESSION 3C: ORGANIZATIONS

Managerial Networks and Strategies of Privatization in Eastern Europe: The Case of Slovenia. Andrej Rus, Columbia University

Gaining and Losing Power in the Organization: A Study of Internal Organizational Networks at Two Points in Time. William B. Stevenson, Boston College; Jean M. Bartunek, Boston College

Title Wave: The Fad of the CEO and its Spread through the Corporate Network. David W. Allison, Blyden B. Potts,

The Social and Organizational Networks of Men and Women Nonprofit Trustees. Gwen Moore, State University of New York, Albany; J. Allen Whitt, University of Louisville

SESSION 3D: SOCIAL SUPPORT

Support and Stress in the "Sandwich Situation." Andreas Borchers, Institut fuer Entwicklungsplanung und Strukturforschung

Kids, Kin and Networks: The Gender-Specific Effects of a Life Event. Allison Munch, University of Arizona; Miller McPherson, University of Arizona; Thomas Rotolo, University of Arizona; Lynn Smith-Lovin, University of Arizona

Social Networks for the Aged--From Home to District to Community. Zarina Lam, Hong Kong Polytechnic

Friendship Networks in a Post-Communist Society: Social Networks in East Germany Four Years After the Turnover. Beate Volker, University of Utrecht

SESSION 4A: NETWORK AUTOCORRELATION MODELS

Linking Service Systems and Client Outcomes: A Network Autocorrelation Approach. Michael Calloway, University of North Carolina, Chapel Hill; Richard Smith, University of North Carolina, Chapel Hill; Joel Morrissey, University of North Carolina, Chapel Hill

Autocorrelation Problems and MRQAP Solutions. David Krackhardt, Carnegie Mellon University

Network Autocorrelation Models with Multiple Regimes. Patrick Doreian, University of Pittsburgh; John Mellott, University of Pittsburgh

A Dynamic Model of Network Effects on Quantitative Outcomes. Joel M. Podolny, Stanford University; Toby E. Stuart, Stanford University; Michael T. Hannan, Stanford University

SESSION 4B: HIV/AIDS AND SOCIAL NETWORKS

Using Social Network Analysis to Study Patterns of Drug Use among Urban Drug Users at High Risk for HIV/AIDS. Carl Latkin, Johns Hopkins University; Wallace Mandell, Johns Hopkins University; Maria Oziemkowaska, Johns Hopkins University; David Celentano, Johns Hopkins University; David Vlahov, Johns Hopkins University; Margaret Ensminger, Johns Hopkins University

HIV Infection and High-Risk Behaviors among Drug Injectors As Functions of Social Networks. Samuel R. Friedman, National Development and Research Institutes; Alan Neaigus, National Development and Research Institutes; Benny Jose, National Development and Research Institutes; Marjorie Goldstein, National Development and Research Institutes; Richard Curtis, National Development and Research Institutes

Conceptualizing Health Promotion in Ethnic Youth: Focus on Social Ecology and Network Properties. Richard H. Lovely, Battelle, Seattle; M. Alegria, University of Puerto Rico; K. Branch, Battelle, Seattle; S.R. Friedman, NDRI; A.J. Fortin, University of Hawaii; Alden S. Klovdahl, Australian National U.; E.B. Liebow, Battelle, Seattle; G.A. McGrady, Morehouse School Medicine; E. Mann, University of

Hawaii; Charles Mueller, University of Hawaii; Mildred Vera, University of Puerto Rico

Survey Instrument Development in Eliciting Social Network Data and Ecological Model-Building. Edward Liebow, Battelle Mem Inst; Gene McGrady, Morehouse School of Medicine; Kristi Branch, Battelle Mem Inst; Mildred Vera, University of Puerto Rico; Alden Klovdahl, Australian Natlional University; Richard H. Lovely, Battelle Mem Institute; Charles Mueller, University of Hawaii

Social Network Size of Migrants and Non-Migrants Who Are HIV-Positive and How Their Network Size Affects Their Health. Howard Kress, Georgia State University

SESSION 4C: ORGANIZATIONS

Networks as Tools of Organizational Controls: Some Preliminary Results. Peter Birkeland, University of Chicago

The Relationship Between Organizational Network Structures and Advancement Rates Among Female and Male Managers. Julie T. Elworth, Stanford University

Partitioning Firms in Interlocking Directorates Among Publicly Held U.S. Firms. Jonathan L. Johnson, Indiana University; Alan Ellstrand, Indiana University; William H. Bommer, Indiana University; Karen M. Byers, Indiana University

Degree and Power in Inclusively Connected Networks. John Skvoretz, University of South Carolina; David Willer, University of South Carolina

SESSION 4D: PERSONAL AND COMMUNITY NETWORKS

Community, Networks and Locality: What Difference does a Concept Make? Graham Allan, University of Southampton

The Web of Group Affiliations Revisited. Bernice Pescosolido, Indiana University; Beth Rubin, Tulane University

Network Interpreted in a Theatrical Perspective: A Brief Outline of a Goffmanian Scene Analysis. Niels Arvid Sletterod, North Trondelag Research Foundation

Binding, Balance and Depression. Detelina Radoeva, University of Toronto; A.R. Gillis, University of Toronto

Social Networks of Former Psychiatric Patients: A Descriptive Analysis. Jane Holschuh, University of Wisconsin, Madison; Steven P. Segal, University of California, Berkeley

SESSION 5A: ORGANIZATIONS

Describing Jobs in Network Terms. Shin-Kap Han, University of South Carolina

Social Interaction, Cross-Functional Integration and Project Team Performance in the R&D Context. Scott Seibert, University of Notre Dame

Network Dynamics of Market Transition: The Founding of Post-Soviet Commodity Exchanges. Judith Sedaitis, Columbia University

Power Among Peers: Individual Strategies of Indirect Control Among Partners in a New England Law Firm. Emmanuel Lazega, LASMAS and University of Versailles

Vertical and Neo-Horizontal Integration in the Canadian Economy, 1972 and 1987: A Preliminary Analysis. S. D. Berkowitz, University of Vermont; William Fitzgerald, University of California, Irvine

SESSION 5B: HIV/AIDS AND SOCIAL NETWORKS

Specifying the Integration of Mental Health and Primary Health Care Services for Persons with HIV/AIDS. Eric R. Wright, Indiana University; I. Michael Snuff, Indiana State University

The Relationships Between Sexual Behavior, Alcohol Use and Social Network Characteristics among Injecting Drug Users in Baltimore, Maryland. Carl Latkin, Johns Hopkins University; Wallace Mandell, Johns Hopkins University; Maria Oziemkowska, Johns Hopkins University; David Vlahov, Johns Hopkins University; David Celentano, Johns Hopkins University

Researching Ego-Centered Sexual Networks and HIV-Related Practices in Male Prostitution: The Case of a Moroccan Street Boy. Paul van Gelder, University of

Amsterdam; Charles Kaplan, Institute for Psycho-social and Socio-ecological Research (IPSER)

A Neural Model with a Function of Preference: A Model of Choice on Medical Channel for Sick Person (HIV-AIDS). C. Petit, University of Lyon; Z. Razafijaonimanana, University of Lyon

Implementation of a Random-Walk Survey in a Minority Adolescent Population: Process and Preliminary Results. Gene McGrady, Morehouse School of Medicine; Mildred Vera, University of Puerto Rico; Clementine Marrow, Morehouse School of Medicine; Gail. Myers, Georgia State University; Charles Mueller, University of Hawaii; E. Liebow, Battelle Mem Institute; Richard H. Lovely, Battelle Mem Institute

SESSION 5C: SOCIAL RESOURCES AND SOCIAL NETWORKS, PART 1

Bringing Close Friends Back In: Interpersonal Trust, Bridging Strong Ties, and Status Attainment. Yanjie Bian, University of Minnesota

The Influence of Organizational Structure and Tie Strength on Influence and Collaboration among State Legislators. Tracy Burkett, University of South Carolina

The Informality of Formal Intermediaries: Headhunters as Professional Personal Contacts. James E. Coverdill, University of Georgia; William Finlay, University of Georgia

Social and Cultural Resources. Bonnie H. Erickson, University of Toronto

Discussion. William P. Bridges, University of Illinois, Chicago

SESSION 5D: COLLECTIVE ACTION AND NETWORKS

Relations as Resources: Protect Networks in Minneapolis and Atlanta. Kevin Everett, Radford University

Networks and Collective Action. Susan A. Murty, George Warren Brown School of Social Work

Where Did All That Time Go? Competition and Collective Action in Voluntary Groups. Miller McPherson, University of Arizona; David A. Richmond, University of Arizona

Network Analysis and the Problem of Agency. Mustafa Emirbayer, New School for Social Research; Jeff Goodwin, New York University

SESSION 6A: ORGANIZATIONS

Assessing Organization Integration: Integrator Role Profiles. Malcolm Dow, Northwestern University; Thomas Flannery, The Hay Group

Interlocking Directorate Research and Network Analysis: An Assessment. Mark S. Mizruchi, University of Michigan

The Network Origins of the French Socialist Party. Christopher K. Ansell, University of California, Berkeley

The Side-Kick Effect: Mentoring Relationships and the Development of Social Capital. Monica Higgins, Harvard Business School; Nitin Nohria, Harvard Business School

SESSION 6B: PERSONAL AND COMMUNITY NETWORKS

The Necessary Upgrading of Relationships in Hungary Following the Change of System. Agnes Utasi, Hungarian Institute for Political Science

The Transformation of Personal Relationships in the Process of Modernization: An Example of Ego-centered Networks In Former Yugoslavia. Hajdeja Iglic, Columbia University

The Contexual Meaning of Social Support: Beyond the Opposition Between Structural and Relational Explanations. Sebastian Reichmann, LASMAS/Iresco, Paris

The Factors Affecting Differential Support Ties. Ray-May Hsung, Tunghai University

SESSION 6C: SOCIAL RESOURCES AND SOCIAL NETWORKS, PART 2

The Dynamics of Organizational Ties During Crisis: Theory and Practice. Zhiang Lin, Carnegie Mellon University; David H. Krackhardt, Carnegie Mellon University

Access to Occupations Through Social Ties: Data from China. Nan Lin, Duke University; Yanjie Bian, University of Minnesota; Gina Lai, State Universith of New York, Albany

Do Weaker Bridges Span Longer Distances? Pamela A. Popielarz, University of Illinois, Chicago

Discussion. William P. Bridges, University of Illinois, Chicago

SESSION 6D: ETHNIC NETWORKS

The Role of Social Networks in Salvadorean Migration to the U.S. Cecilia Menjivar, University of California, Berkeley

Coethnic Labor Market Concentration: Evaluating the Effect of Network Density on Immigrant Employment Opportunity. Vince Salazar Thomas, Duke University

Vietnamese Secondary School Students. Carl L. Bankston III, Louisiana State University.

Personal Support Networks in Urban China. Xinyuan Dai, University of Chicago; Linton C. Freeman, University of California, Irvine; Danching Ruan, University of California, Irvine; Yunkang Pan, Tianjin Academy of Social Sciences; Wehnong Zhang, Tianjin Academy of Social Sciences

Discussion. Danching Ruan, University of California, Irvine

SESSION 6E: STATISTICAL MODELS

Identifying Cohesive Subgroups: Logit Models, Clustering Algorithm, and Results From Simulations. Ken Frank, Michigan State University

Relations, Residuals, and Regular Interiors. John P. Boyd, University of California, Irvine; Martin G. Everett, University of Greenwich

Exact Regular Colouration of Networks. Martin G. Everett, University of Greenwich; Stephen P. Borgatti, University of South Carolina

SESSION 7A: CHANGE IN SOCIAL NETWORKS, PART 1

Algebraic Treatment of Life Sequences. Alain Degenne, LASMAS-CNRS; Marie-Odile Lebeaux, LASMAS-CNRS; Lise Mounier, LASMAS-CNRS

Gift Exchanges Across the Lifecycle: The Development of Support Networks Among !Kung San Foragers. Thomas Schweizer, University of Cologne

Stochastic Actor-Oriented Dynamic Network Models. Tom A.B. Snijders, University of Groningen

Asymmetric Conflict Ties and the "Social Contagion" of the Affective Consequences of Conflict. Kim Helt, Compusa; H. Thomas Hurt, Universidad Autonoma de Chihuahua; Robert N. Bostrom, University of Kentucky; Diane McFarland, Youngstown University

SESSION 7B: EMERGENCE IN NETWORKS

A Formal Procedure for Testing Expectation-States Hypotheses. James W. Balkwell, University of Georgia

Random Graph Theoretic Models for the Emergence of Cooperation and Dominance. Carl Hirschman, University of California, Irvine

Network Conflict Theory: Setting A Theoretical Framework. Jacek Szmatka, Jagiellonian University, Krakow, Poland and University of South Carolina; Tad Sozanski, Jagiellonian University, Krakow, Poland

Coalitions Within Exchange Networks: Bringing in Collusion. Phillip Bonacich, University of California, Los Angeles; Elisa Bienenstock, University of California, Los Angeles

SESSION 7C: COMPUTER NETWORKS AND SOCIAL NETWORKS

The Role of `Help Networks' in Facilitating Use of New Computer Tools. J.D. Eveland, Claremont Graduate School; Anita Blanchard, Claremont Graduate School

Social Networks and Anonymous Group Interaction Using Group Support Systems. Stephen Hayne, University of Calgary; Ronald Rice, Rutgers University; Paul Licker, University of Calgary

Discovering Shared Interests and Small Worlds Through Analyzing Computer Networks. Michael Schwartz, University of Colorado, Boulder

Fear, Autonomy, Control, and Empowerment: How Social Organization Affects the Use of Computer-Mediated Communication. Dimitrina Dimitrova, University of Toronto; Laura Garton, University of Toronto; Gale Moore, University of Toronto; Janet Salaff, University of Toronto; Barry Wellman, University of Toronto

SESSION 7D: DEVIANCE & NETWORKS

An Empirical Descriptive Analysis of Drinking Networks. Andree Demers, Universite de Montreal; Jocelyn Bisson, Universite de Montreal; Natalie Kishchuk, Hopital General de Montreal

Social Networks and Substance Abuse: Testing Competing Theories of Deviance. Scot Wortley, University of Toronto; Stephanie Potter, University of Toronto; Milena Gulia, University of Toronto

Establishing Leadership in the Correctional Environment: An Application of Social Network Analysis. Kimberly A. McCabe, University of South Carolina; Stephen P. Borgatti, University of South Carolina

Social Tie Strength Among Urban Street Criminals: Evidence from A Long-Term Ethnographic Study. Mark Fliesher, Illinois State University

SESSION 7E: WORLD NETWORKS

The International Telecommunication Network, 1980-1991: A Longitudinal Analysis. George A. Barnett, SUNY, Buffalo; Su-Lien Sun, SUNY, Buffalo

The International Student Exchange Network, 1972-1991. Reggie Yingli Wu, State University of New York, Buffalo; George A. Barnett, State University of New York, Buffalo

Specialization and Division of Labor: Networkish Conception and Application to Invention. Thomas Schott, University of Pittsburgh

Projects, Identities, and Social Networks: Brazilian Youth Organization and the Making of Civic Culture. Ann Mische, New School for Social Research

SESSION 8A: CHANGES IN SOCIAL NETWORKS, PART 2

Comparative Structural Analysis of Social Change: A Method and A Case Study. Simon Langlois, Laval University; Michel Forse, Universite de Lille 1

Dynamics in the Structuration of Friendship Networks. Claire Bidart, LASMAS-CNRS

The Development of Confrontational Conflicts and Network Type: A Case Study. Hartmut Lang, Universität Köln

Social Capital: Rivalry and Cooperation from Network to Culture. Peter Abell, London School of Economics

SESSION 8B: FAMILY AND EXCHANGE NETWORKS

Family Networks and Social Exchange. Jan H. Marbach, Deutsches Jugendinstitut

Stability and Change of Family Network Configurations Over the Family Life Cycle. Walter Bien, Deutsches Jugendinstitut

Social Networks and Expectations of Marital Separation. Kara Joyner, NORC and the University of Chicago

Consensus Among Recovering Alcoholics on Cognitive Tests of Depression and Anxiety. Pat Skyhorse, University of California, Irvine

Attributing Motive to Favor-Givers: The Salience of Reciprocity for Kin, Friends, Neighbors, Coworkers, and "Others". Davida Weinberg, University of California, Berkeley

SESSION 8C: SOCIAL STRATIFICATION AND SOCIAL NETWORKS

Network Structures of Migrations Ties Among Local Labor Markets and Local Earnings Determination. Lisa A. Eargle, University of South Carolina

Network Ties as Information Sources for Adolescent Plans. John L. Cotterell, University of Queensland; Theresa Davern, University of Queensland; Marilyn Pemberton, University of Queensland

Job Matching and Occupational Segregation: The Effects of Informal Recruiting on Gender Composition of Jobs. F. Carson Mencken, Louisiana State University; Idee C. Winfield, Louisiana State University

Distinctiveness, Diversity, and Resources in the Networks of Nonmetropolitan Residents. John J. Beggs, Louisiana State University; Valerie A. Haines, University of Calgary; Jeanne S. Hurlbert, Louisiana State University

Discussion. Karen E. Campbell, Vanderbilt University

SESSION 8D: PERSONAL AND COMMUNITY NETWORKS

Regional Context and Patterns of Children's Social Contacts. Wolfgang Sodeur, University of Essen

The Role of Academic and Social Integration in the Persistence and Attrition Decisions of College Freshmen. Scott Thomas, University of California, Santa Barbara

Just like Romeo and Juliet? How Family Members, Friends and Acquaintances Influence the Formation, Duration and Level of Commitment of Sexual Relationships between Men and Women. Kristen Olson, University of Chicago

Realizing the Potential of Women's Friendships. Juliet Kemble, Simon Fraser University

Macro-Structural Constraints and Personal Networks. Danching Ruan, University of California, Irvine; Linton C. Freeman University of California, Irvine; Xinyuan Dai, University of Chicago; Yunkang Pan, Wehnong Zhang Tianjin Academy of Social Sciences

SESSION 8E: WORLD NETWORKS

World-System Networks, Deforestation and National Development. Thomas Burns, University of Utah; David Murray, University of Utah; Edward L. Kick, University of Utah; Byron L. Davis, University of Utah; Holly Bruce, University of Utah

Cross-National Differences in Social Networks: European Experiences. Stefan Immerfall, Universitat Passau

A Social Network Approach to Law: International Applications. Tom Durkin, University of Florida

The First Six Layers of Isnad: A Structural Analysis of the Formation of the Hadith Transmission Network of the Prophet Muhammad (622-800 AD). Recep Senturk, Columbia University; Jay Cross, Columbia University

Conceptual and Historical Foundations of Isnad, The Hadith Transmission Network of the Prophet Muhammad (622 AD-Present). Recep Senturk, Columbia University

SESSION 9A: ORGANIZATIONS

Cultural Differences in Organizational Communication: A Semantic Network Analysis. George A. Barnett, SUNY, Buffalo; Ha-Yong Jang, SUNY, Buffalo

Organizational Restructuring and Changes in Semantic Networks in Messages Directed to External Audiences. James A. Danowski, University of Illinois, Chicago; Hui-Lin Huang

Identity Construction through Collective Affiliation: An Examination of Status Enhancement in the California Wine Industry. Beth Benjamin, Stanford University; Joel M. Podolny, Stanford University

Interorganizational Networks and the Division of Labor Among Organizations: Preliminary Evidence From a Study of the Southern Italian Mechanical Industry. Allessandro Lomi, London Business School

Networks and Hierarchies: Network Approach to the Study of Levels of Integration. Alvin W. Wolfe, University of South Florida

SESSION 9B: SOCIAL SUPPORT

Mistaking Structure for Function: The Misuse of Network Data to Measure Support. Laurie J. Bauman, Albert Einstein College of Medicine; Elisa S. Weiss, Columbia University

Major Life Events and Their Impact on Social Relationships. Elaine Wethington, Cornell University

Determinants of Social Support for HIV-Positive Individuals. Rebecca L. Davis, University of California, Los Angeles

Toward a Socially Dynamic Model of Coping. P. Brad Smith, Indiana University

Social Support Networks of Women with Eating Disorders. Karen Tomblin; Chad Galitzky

SESSION 9C: ART/SCIENCE

Networks and Fraud--- Using Objects in Network Research. Elisa Jayne Bienenstock, University of California, Los Angeles

The Wisconsin Collaborative Project: Network within the PBS Network. Lew Friedland, University of Wisconsin, Madison

Artists, Galleries, and Dual Prestige Markets: Contemporary American Photographers 1982-1992. Katherine Giuffre, University of North Carolina, Chapel Hill

Industrial Designers: Careers and Events. Monique Vervaeke, LASMAS-CNRS

SESSION 9D: STATISTICAL MODELS

KinEntry: A Database Program for Kinship Network Collectors. Jeffrey Stern, University of California, Irvine

Some Stochastic Social Networks: Sampling and Parameter Estimation. Keith Rennolls, University of Greenwich

Random Effects Models for Directed Graphs. Marijtje A. J. van Duijn, University of Groningen; Tom A.B. Snijders, University of Groningen

A Generalized Approach to Partitioning Networks Based on Direct Models of Equivalency. Robert T Olszewski, Carnegie Mellon University; Dean M. Behrens, Carnegie Mellon University

SESSION 10A: ORGANIZATIONS

The Emergence of Shared Interpretations in Organizations: Results from a Self-Organizing Networks Model. Noshir Contractor, University of Illinois, Urbana

Overlapping Social Circles or Structural Holes? A Network Perspective on Mentor-Protege Relationships. Hermi Ibarra, Harvard Business School

A New Network Approach to Understanding Social Structure. Brian J. Jones, Villanova University

Network Analysis of Regional Industrial Dynamics and Local Economic Policies. Mario A. Maggioni, IDSE-CNR and University of Warwick

SESSION 10B: CHANGES IN INTERPERSONAL NETWORKS ACROSS TIME

On the Stability of Network Relations Under Stress. Robert L. Leik, University of Minnesota; Mary Anne Chalkley, University of St. Thomas

Changes in Ego-centered Networks Over a Decade. Barry Wellman, University of Toronto; Renita Wong, University of Toronto

Changes in Core and Extended Networks Following a Major Life Event. David L. Morgan, Portland State University; Margaret B. Neal, Portland State University; Paula Carder, Portland State University

Assessing Potential for Neighborhood Action: The Fragile Links Between Informal Networks and Institutional Behavior. Susan Hart, Georgia State University

The Role of Communication Networks in Innovation Adoption. Kwasi Boahene, University of Utrecht

SESSION 10C: NETWORKS IN SCIENCE

Centrality in International R&D Networks: The Case of Esprit. Pepin G. Cabo, University of Groningen; Wouter van Rossum, University of Groningen

Social Science Fields: Explaining Differential Structures in Economics, Sociology and Political Science. James G. Ennis, Tufts University

The Social Structure of Sociology in Spain. Joseph A. Rodriguez, Universidad de Barcelona

Scientific Productivity and Collaboration Structure in Invisible Colleges. Hildrun Kretschmer

SESSION 10D: MEASUREMENT AND METHODS

A Comparison of Several Methods for Accessing the Judged Similarity of Items in a Semantic Domain. Timothy J. Brazill, University of California, Irvine

A Technique for Estimating the Reliability of "Key Informant" Data in Social Contagion Research.

Thomas H. Hurt, Universidad Autonoma de Chihuahua; Jose Luis Ibave, Universidad Autonoma de Chihuahua

How to Draw a Network: Who Shall Surround? William Richards, Simon Fraser University; Andrew Seary, Simon Fraser University

A Genetic Algorithm for Drawing Graphs and Lattices. Chang Young Chung, University of South Carolina; Stephen P. Borgatti, University of South Carolina

SESSION 11X: PAPERS NOT PRESENTED

Contextual Analysis and Network Centrality. Antero Kiianmaa, Helsinki University of Technology

How to use...

SOCNET

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 (n040016@univscvm.csd.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 Steve Borgatti

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 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 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.

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 univscvm.csd.scarolina.edu	{start ftp and connect to INSNALIB computer}
USER: **anonymous**	{when asked for user or account name, type "anonymous"}
>**cd \insnalib.192**	{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., **md \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 univscvm.csd.scarolina.edu          {start ftp and connect to INSNALIB computer}
USER: anonymous                          {when asked for user or account name, type "anonymous"}
>cd \insnalib.193                        {change directory to the INSNALIB writing area, called 193}
>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 193 area, but downloaded from the 192 area, 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 Steve Borgatti (inetsna@univscvm.csd.scarolina.edu) alerting him of 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 univscvm.csd.scarolina.edu
USER: anonymous
>cd \insnalib.192
>dir
contents.txt        freemap.exe         stocentz.exe
ecosna.exe          sum94.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 univscvm.csd.scarolina.edu
USER: anonymous
>cd \insnalib.192
>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 **insnalib.192** directory is write-protected. You cannot **put** any files there. Instead, you must change to the **insnalib.193** directory, as follows:

```
ftp univscvm.csd.scarolina.edu
USER: anonymous
>cd \insnalib.193
>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 univscvm.csd.scarolina.edu
USER: anonymous
>help
...........list of topics appears here............
>help dir
...........information on the dir command appears here...........
>quit
```

Post It!

CALL FOR SYLLABI

If you teach a course on social networks or related topic (graduate or undergraduate), please share your syllabus and other course materials with us, to be made available to all networkers. If possible, please use electronic media (email, diskette). Send to *Connections*.

ELECTRONIC ARTWORK

We need artwork, preferably related to networks, to use in future covers of *Connections*. Must be in the form of a computer graphics file, or embedded in wordprocessing document. Send disk to:

> INSNA
> Dept. of Sociology
> University of South Carolina
> Columbia, SC 29208

or upload graphics file to INSNALIB.

IS THERE A BIBLIOGRAPHER IN THE NETWORK?

Wolfgang Sodeur and I have each compiled partial bibliographies of network analysis. Each has histories, as mine incorporates an effort by David Knoke a few years ago and Wolfgang's incorporates work by Linton Freeman and possibly others.

Our two bibliographies don't overlap much and together they probably contain 3K entries. Mine exists in Word Perfect and Endnote Plus. Wolfgang's is in some database format.

We desperately need someone with computer skills to combine these two lists. It will take some programming and sweat-work to transform Wolfgang's non-standard data-base format into a more standard and mergeable format. This would be an excellent job for a work-study student this summer with the appropriate skills. If you'd like to head this project, please contact me via email at the address below.

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