



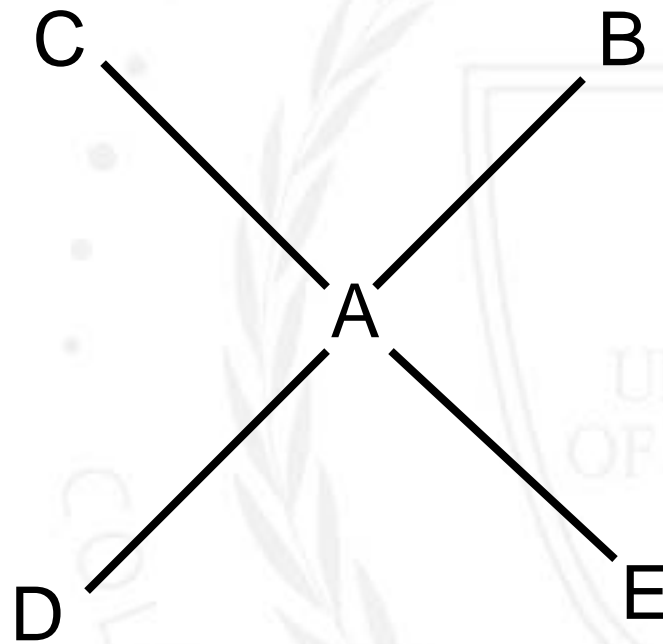
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UNIVERSITY OF KENTUCKY

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Do It Yourself: Social Network Analysis

Professor Dan Brass (J. Henning Hilliard Professor of Innovation Management at University of Kentucky) will describe how to do social network analysis in organizations. A social network is a set of actors (individuals, groups, organizations) and the relationships that connect them. Professor Brass will describe how to collect social network data, review the typically used network concepts and measures, and explain how to analyze the data. Concepts include centrality, density, cliques, structural equivalence, structural holes, centralization, and others. Information about software packages is also included. Prof. Brass will also review many of the research findings using social network analysis in organizations.

<http://linkscenter.org>



Social Network Perspective

- Actors are embedded within a web (network) of interrelationships with other actors.
- Network: set of nodes (actors) and ties representing some relationship, or lack of relationship, between the nodes.

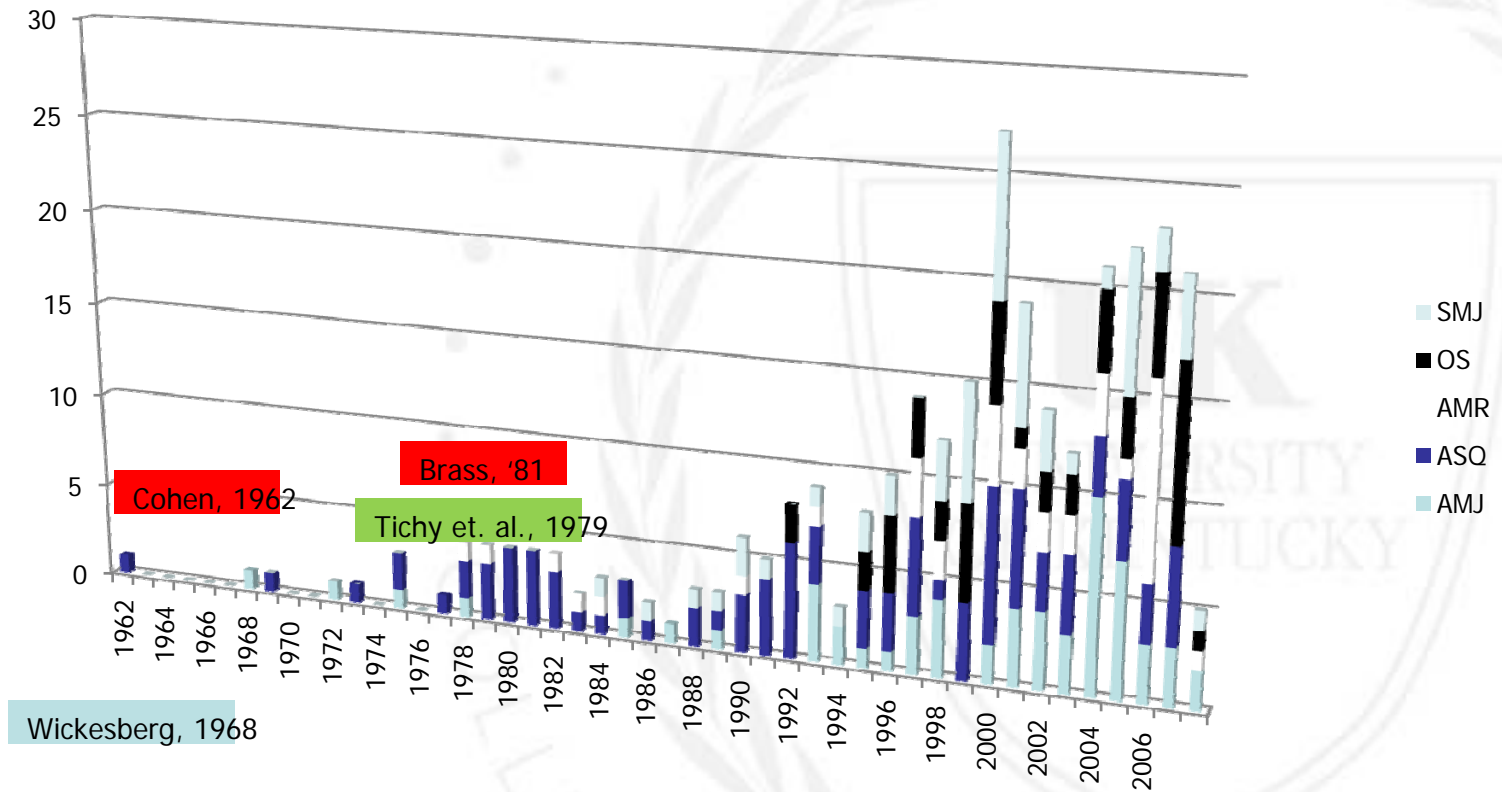
Social Network Perspective

- Focus is on relationships, and the structure of these relationships, rather than the attributes of the actors.
- Networks provide the opportunities and constraints – patterned relationships among multiple actors affect behaviors, attitudes, cognitions, etc.

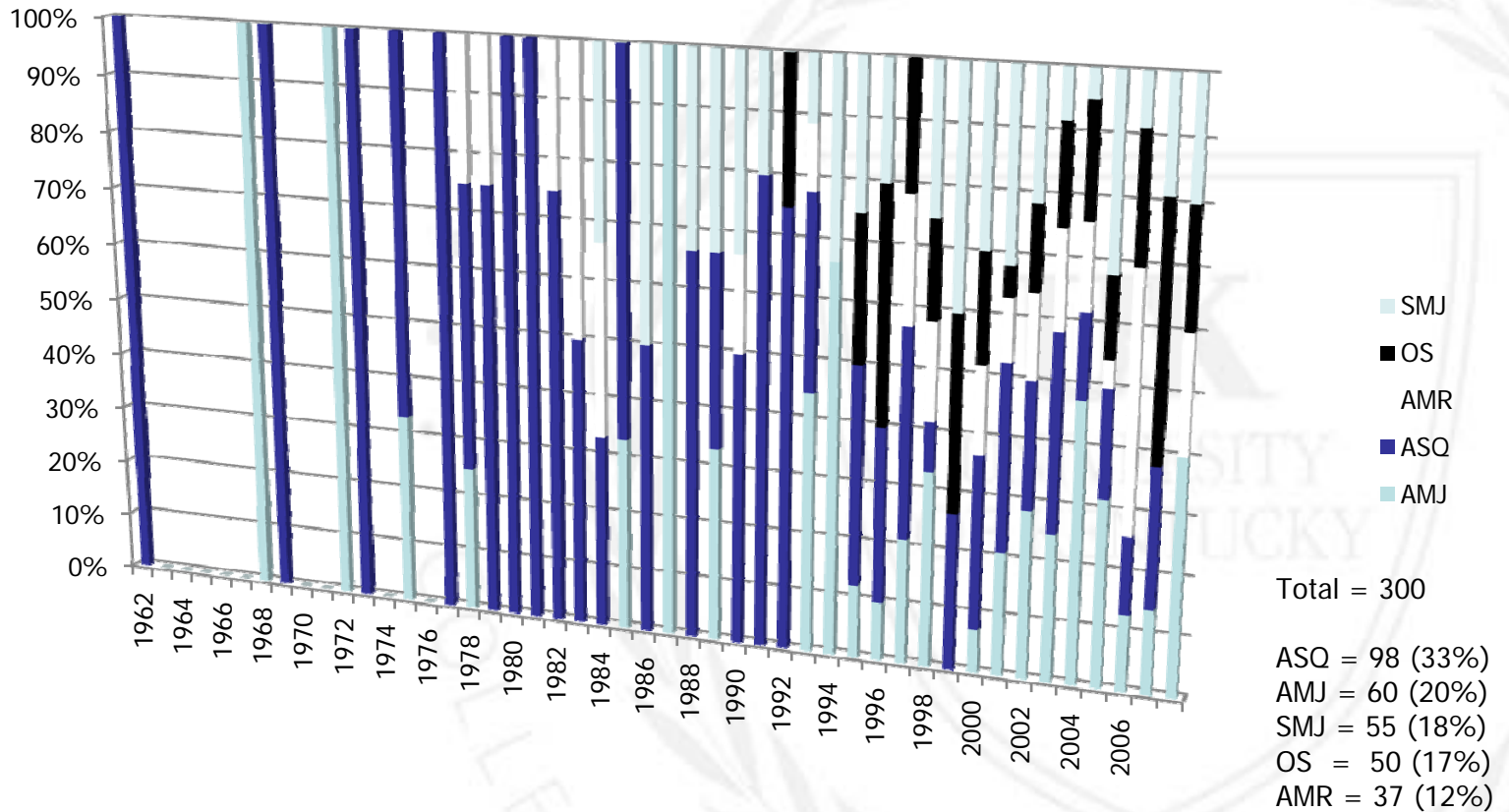
Social Capital

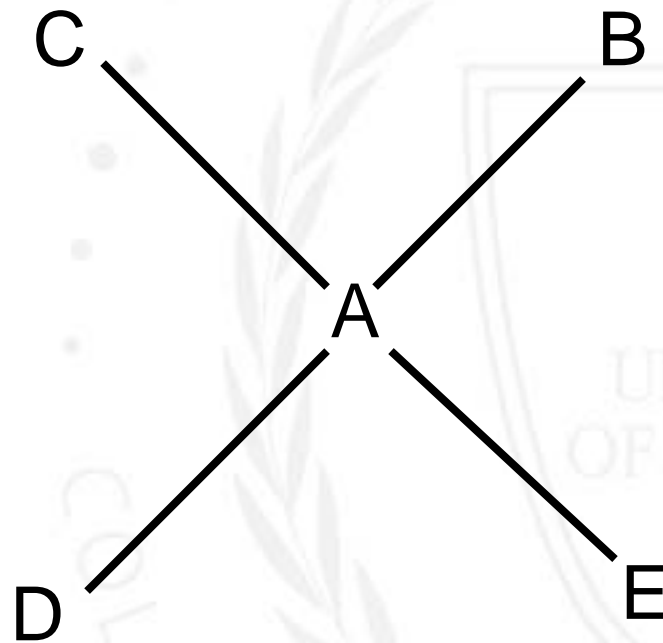
- The idea that one's social contacts convey benefits that create opportunities for competitive success for individuals and for the groups in which they are members.
(Bourdieu, 1972; Burt, 1992; Coleman, 1988; Fukuyama, 1995; Gabby, 1997; Putnam, 1995)
- "The sum of the actual and potential resources embedded within, available through, and derived from the network of relationships possessed by an individual or social unit."
(Nahapiet & Ghoshal, 2000: 243)

The Rise of Network Research In Organizational Studies



Network Research in Top Management Journals





Centrality

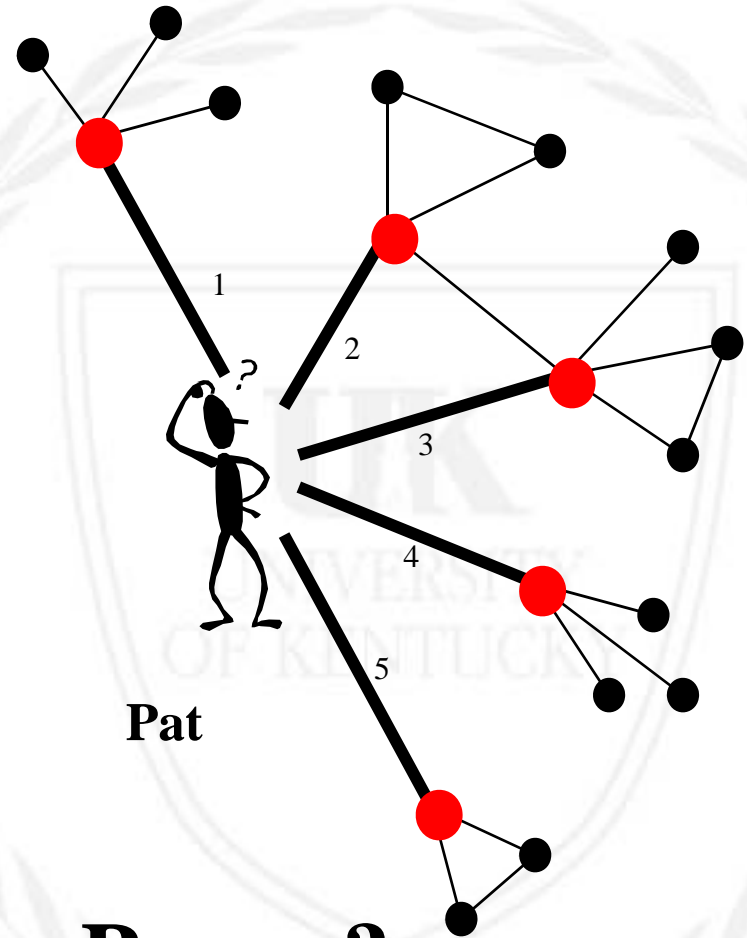
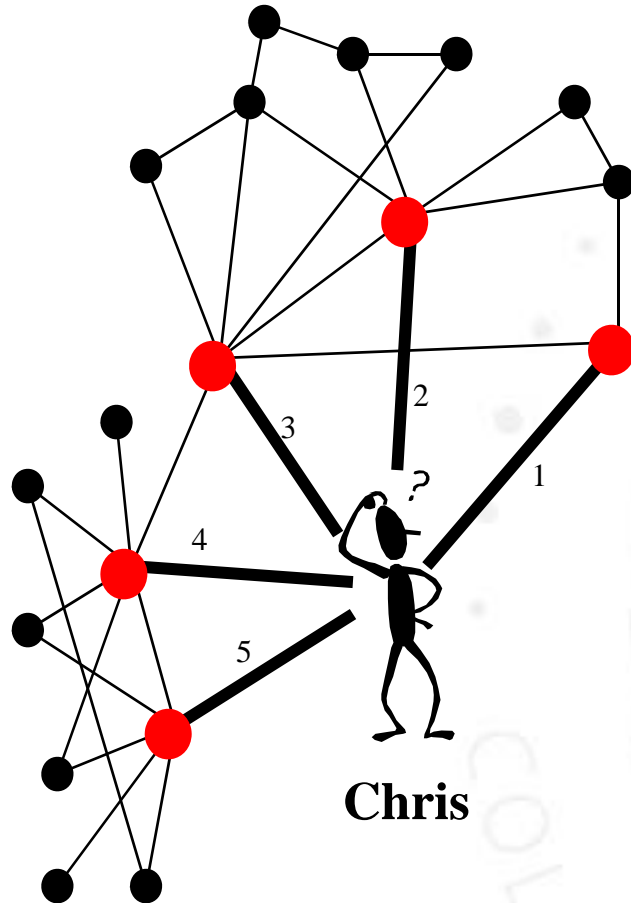
- Degree: number of ties
- Closeness: number of links it takes to reach everyone else in the network
- Betweenness: extent to which actor falls between any other two actors in the network (structural holes)

Closeness Centrality

Number of links it takes to reach every other actor in the network.

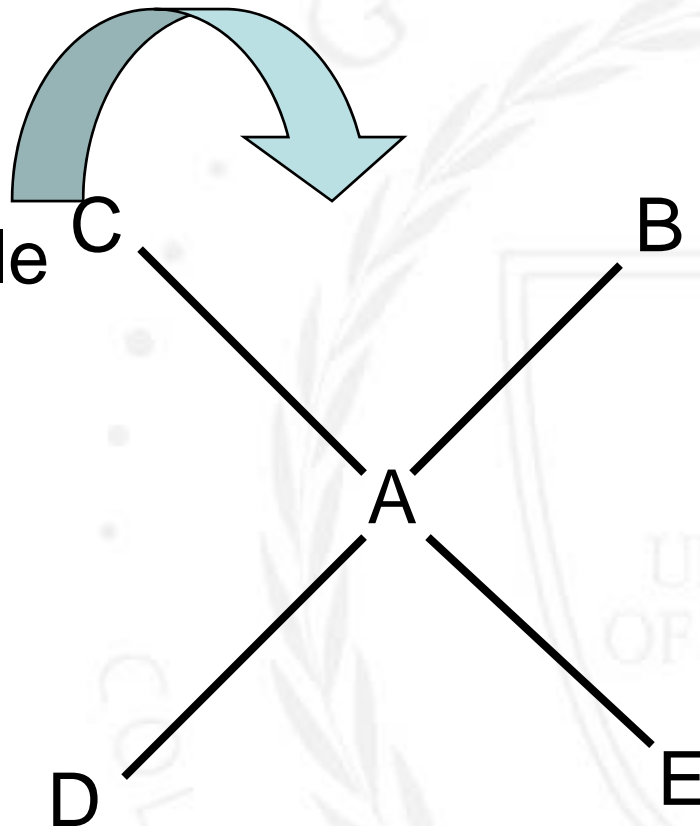
- Measure for the Kevin Bacon game.
- Measure for the “small world” phenomenon:
“6 degrees of separation”

Networks and Power:



Who has more Power?

Structural hole

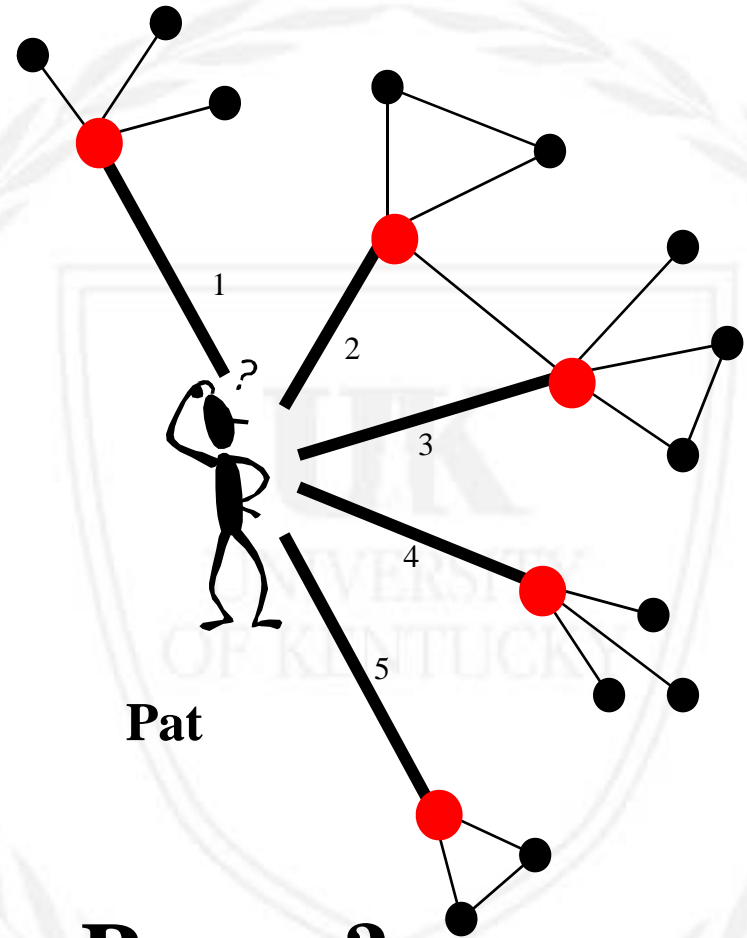
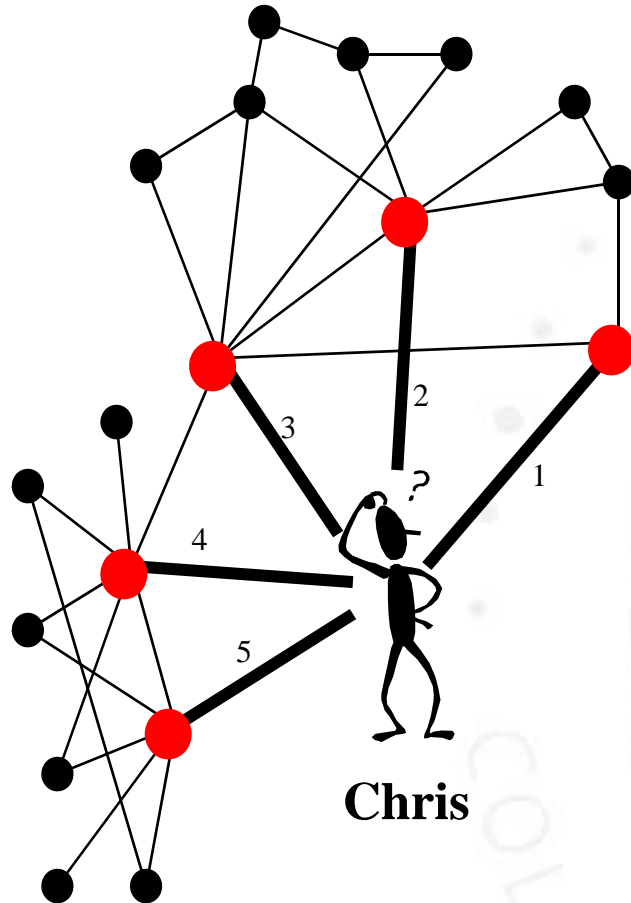


Debate: Structural holes vs. Closure (density)

- Dense networks (percentage of ties to all possible ties) do not allow for many structural holes.
- Density allows for development of shared norms, monitoring, sanctions, trust.
- Structural holes allow for diverse, non-redundant information.

Which is better?

Networks and Power:



Who has more Power?

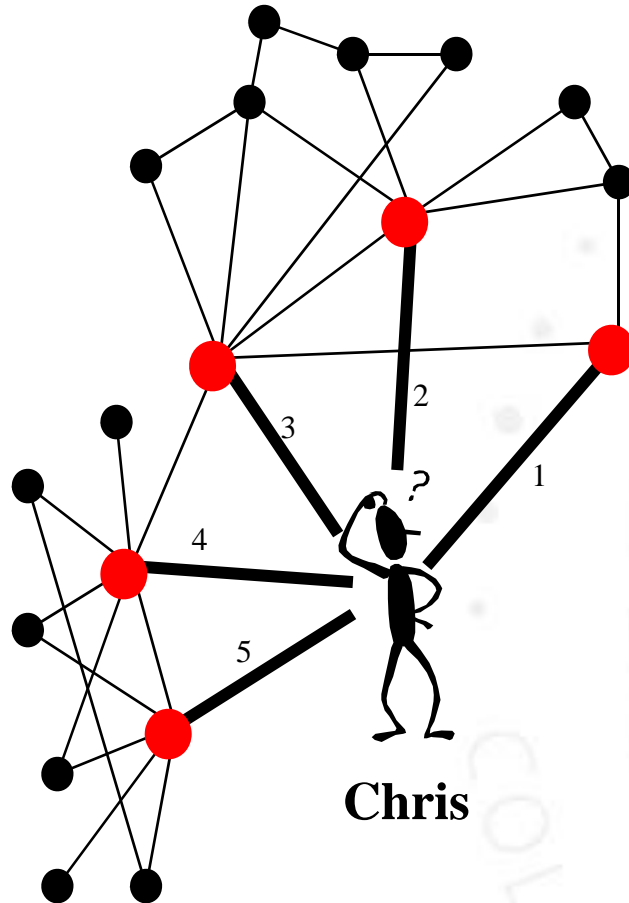
Grannovetter, 1973, 1982, "Strength of Weak Ties"

- Strong ties: time, emotional intensity, intimacy, and reciprocal services (friends)
- Weak ties: acquaintances
- Our strong ties are likely to be connected. Our weak ties are not. Thus, weak ties may be bridges between different, unconnected cliques and may provide non-redundant information.

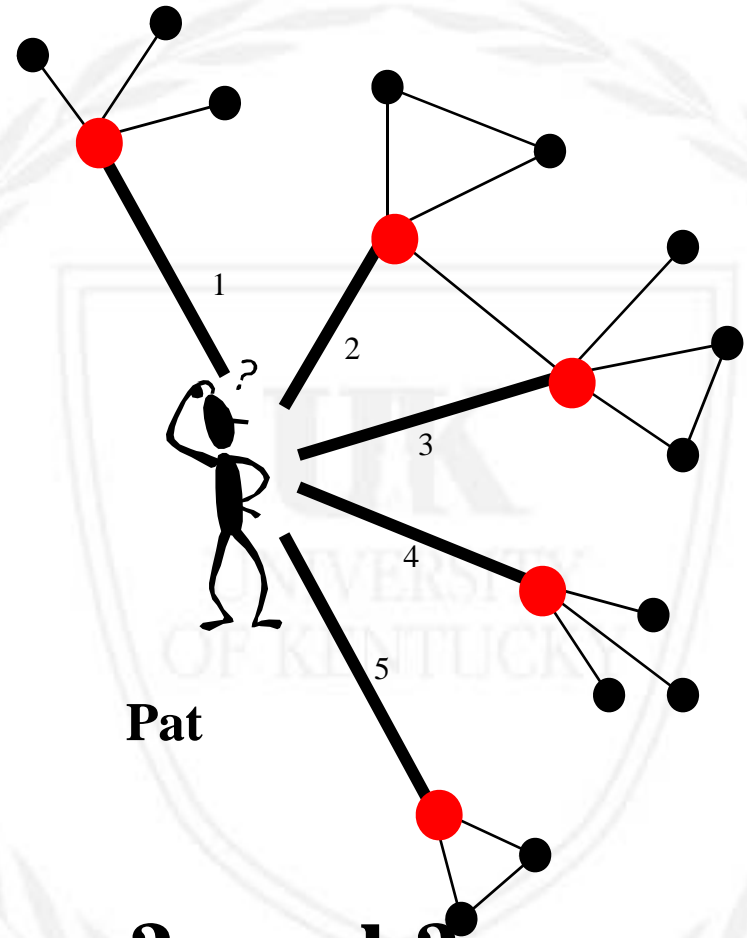
The background of the slide features a large, faint watermark of the University of Kentucky seal. The seal is circular, with a laurel wreath bordering a central shield. Inside the shield, the letters "UK" are prominently displayed above the words "UNIVERSITY OF KENTUCKY". The watermark is semi-transparent and serves as a background element for the text.

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Strength of Ties



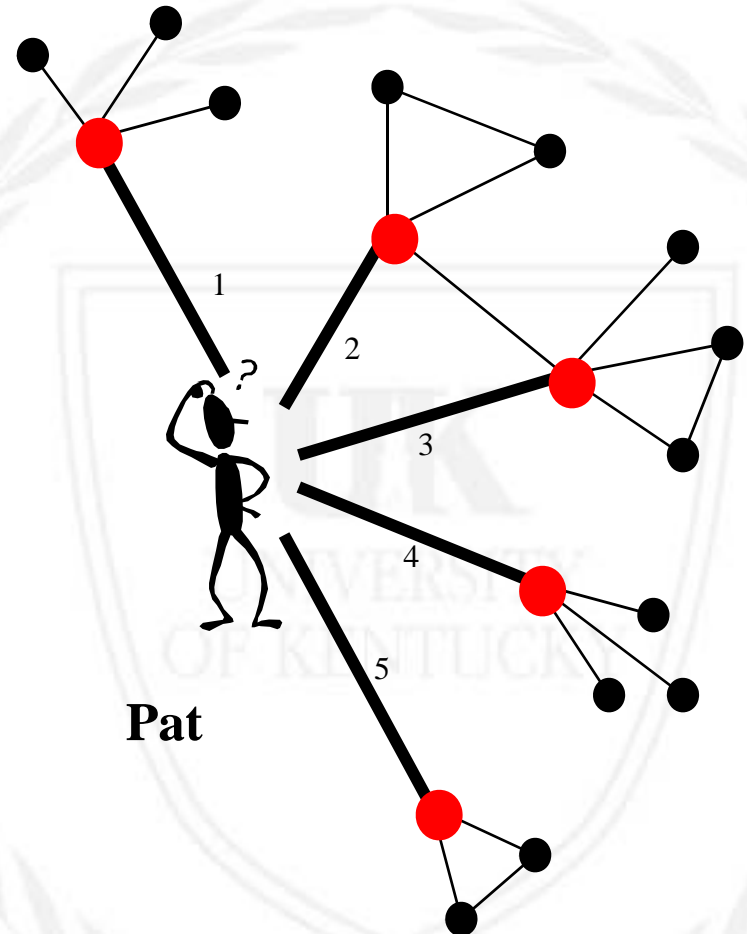
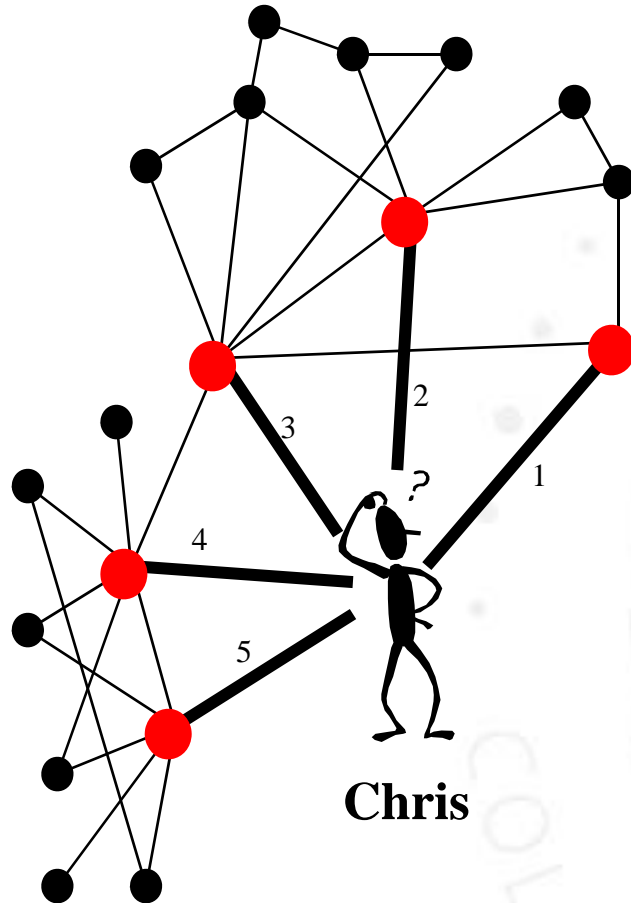
Chris



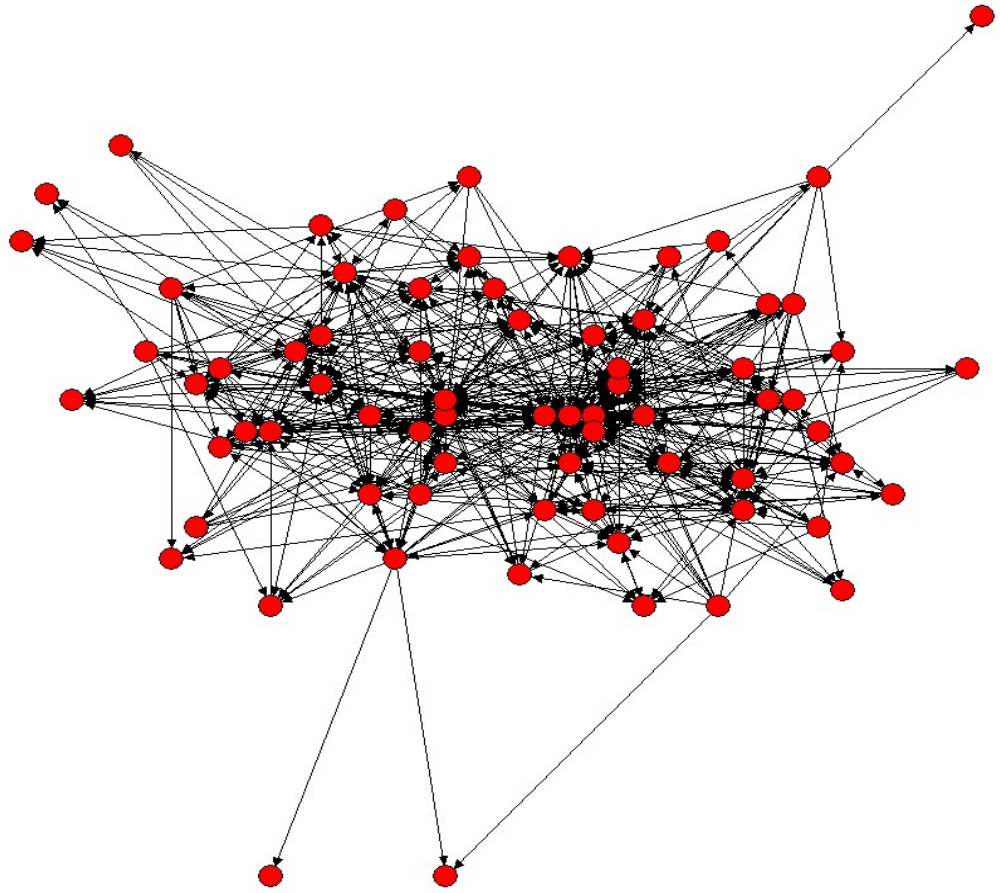
Pat

Which ties are strong? weak?

Networks and Unethical Behavior



Who is more likely to act unethically?



Social Network Software Program

- Borgatti, Everett, & Freeman 2002 UCINet 6 Network Analysis Software.
- AnalyticTechnologies, 11 Ohlin Ln., Harvard, MA 01451. (508) 647-1903, Fax (978) 456-7373.
- You can download UCINet 6 from:
www.analytictech.com/downloaduc6.htm.

Social Network Software Program

Huisman, M. & van Duijn, M. A. J. (2005). Software for Social Network Analysis.

In P. J. Carrington, J. Scott, & S. Wasserman (Eds.) Models and Methods in Social Network Analysis. Cambridge, UK: Cambridge University Press.

How to Collect Social Network Data

Collect relational as opposed to attribute data.

Ask people to:

- List names - open
- Circle names on a roster – bounded

Questions can be about any relationship:

- Who do you consider to be a friend?
- Who do you go to for advice?
- Who do you talk to frequently?

Between any set of actors

- Individual people
- Groups
- Organizations

Network Data Collection Worksheet

- What is my research question?

- Approach? Structural, Relational, Resource, Attributes?
- Unit of Analysis? Persons, Groups, Organizations? Affiliations?
- Boundary Specification? Network actors – how many links? _____
Network content - how many networks?

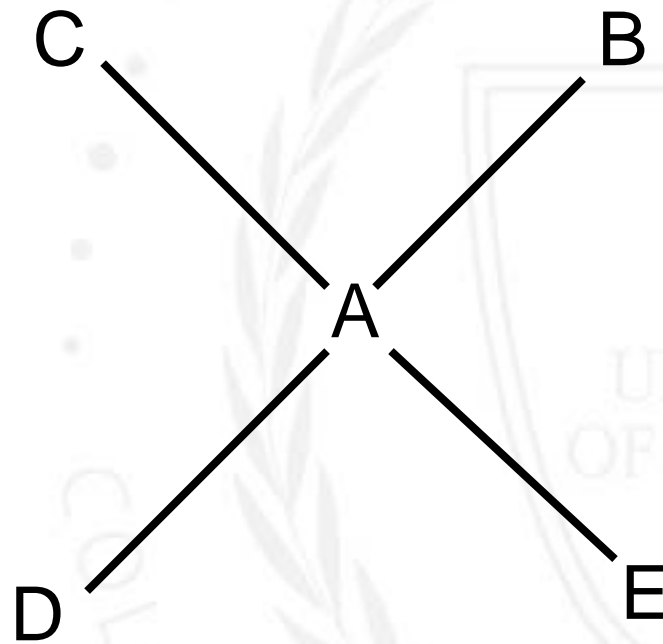
- Perceived network or actual network?
- Ego-network or whole network?
- Archival or perceptual - roster, name generator, snowball?
- Binary or valued? Positive and negative?
- Directional – symmetrize? Higher, lower, average?

What is the Research Question?

- What is the one research question?
- What is it that I hope to learn from this research?
- What do we know about this question from previous research?
- Are there inconsistent findings and what would account for them?
- What is missing from our understanding and why is it important? A lack of research is not a sufficient justification for doing research.
- Why is it important to ask this question?
- Question should be theory driven.
- Don't digress from research question. All your decisions about methods will be dependent on your research question.

Which approach?

- Structural – Focus on the pattern of relations among the actors – including the lack of relationships (e.g., Burt's structural holes).
- Relational – Focus on the ties – measure some aspect of the relationships themselves (e.g., Granovetter's weak/strong ties; Labianca & Brass, 2006, negative ties).
- Resource – Focus on the resources of the alters (Lin's resource approach).
- Attributes – Focus on the attributes of ego (traditional organizational research).
- All the above (e.g., Seibert, Kraimer, & Liden).
- Alternative explanations. #1 reason for rejecting papers.



How to Collect Social Network Data

We can also collect attribute data.

Enter it as a one column vector; transform it to similarity/dissimilarity matrix.

Units of Analysis

- Persons, Groups, Organizations?
- Duality of persons and groups. Any time two persons interact, they represent both themselves and groups they are members of. Does interpersonal interaction represent inter-group interaction? Ask question about persons or groups?
- Affiliations. Does affiliation with a group represent interpersonal interaction? Inter-group interaction? (e.g., boards of directors).
- Cross-level research. E.g., What is the effect of a central actor in a centralized network? Many opportunities here.

Boundary Specification

- “It’s a small world.” Many possible relationships. Thus, network boundary is practically endless. For practical purposes, we need to limit it.
- 1) Selection of actors
- 2) Selection of relational content – types of social relationships.
- Lauman, Marsden, & Prensky. 1983. The boundary specification problem in network analysis. In Burt & Minor, *Applied Network Analysis, A Methodological Introduction*, 18-34. Beverly Hills, Sage.

Boundary Specification: Selection of Actors

- In organizational research, we have some formal boundaries: work groups, departments, organizations, industries. Thus, we include all actors in a group. Need to justify in terms of your research question.
- Question of “entitativity.” How do we identify a “group”?
- Actors themselves: collectively shared, consciously experienced by the actors involved.
- Researcher: delineate the relevant network based on the research question.

Boundary Specification: Selection of Actors

- How many links? Direct links only? Indirect links? How many indirect links?
- Burt, R.S. 2007. Second-hand brokerage: Evidence on the importance of local structure on managers, bankers, and analysts. Academy of Management Journal, 50:110-145.
- Bian, 1997; Labianca, Brass & Gray, 1998. Third-party important in finding good jobs and perceptions of conflict, respectively.

Boundary Specification: Selection of Relational Content

- What types of relationships should I measure?
- Typical organizational relational content: friendship, communication, advice, alliances/joint ventures, boards of directors.
- What relationships do people identify? (e.g., Burt, 1983 – Friendship, acquaintance, work, and kinship).
- Instrumental/expressive (e.g., Ibarra, 1992).
- Appropriability? Overlap? Combine across networks or treat separately?

Measurement: Actual or Perceived

- Actual networks or perceptions of networks? (e.g., Kilduff, M., & Krackhardt, D. 1994. Bringing the individual back in: A structural analysis of the internal market for reputation in organizations. Academy of Management Journal, 37: 87-108.)
- Potential or actual? (e.g., affiliations or diffusion?)

Measurement: Ego or Whole Network

- Ego networks: centered around a particular actor. Includes the “ego” and direct tie “alters,” and, in some cases, ties among the alters. One actor’s network.

Advantage: can sample across groups, easy to collect.

Disadvantage: limited to direct ties, limited number of SNA measures.

- Whole networks: attempt to get data from all members of a bounded network.

Advantage: can assess reciprocation, can assess effects of indirect ties, more SNA measures.

Disadvantage: need high response rate, boundary may be wrong.

Measurement: Archival, Observational, or Perceptual?

- Archival Data (alliances, e-mail, affiliations)
Advantage: not dependent on personal perceptions.
Disadvantage: not clear what it represents.
- Observational.
Dependent on your perceptions. May not see it all, or may misinterpret.
Very time consuming.
- Perceptual Data (questionnaires, interviews).
Actors are not very good about remembering specific interactions.
Bernard et al. 1984
But they are good about remembering recurrent, repeated interactions or on-going relationships.
Freeman et al. 1987

Measurement: Perceptual methods

- Roster: present people with list of all members of the network
Advantage: not dependent on person's recall of names; all actors considered, probably more complete in terms of weak ties.
Disadvantage: may have incomplete list (specified wrong boundary).
- Name generator: ask people to generate names based on questions about relationships.
Advantage: no boundary specified.
Disadvantage: dependent on person's ability to recall, may be biased toward strong ties.
- Snowball (type of name generator): start with one person then continue contacting all alters and alters of alters
Advantage: no boundary; may eventually identify boundary, diffusion studies.
Disadvantage: doesn't tap lack of relationships – everyone well integrated.

Name generators: Examples

- “Over the last six months, are there any work related contacts from whom you regularly sought information and advice to enhance your effectiveness on the job?”
- Suppose you were moving to a new job and wanted to leave behind the best network advice that you could for the person moving into your current job. Are there any individuals whom you would name to your replacement whose “buy-in” is essential for your office or department?
- Think back over the past six months, are there individuals on whom you have relied on as sources for general information on the “goings on” at [company] – perhaps who have given you special insight into the goals and strategies of important individuals, divisions, or perhaps even the firm as a whole?

Name generators: Examples

- Are there any individuals whom you regard as a mentor – that is, someone who has taken a strong interest in your professional development over the last six months by providing you with opportunities and/or access to facilitate your career advancement?
- Is there anyone in your work environment over the last six months whom you regard as a source of social support – that is, someone with whom you are comfortable discussing sensitive matters?”
- (Podolny & Baron, 1997)
- “Consider the people with whom you like to spend your free time. Over the last six months, who are the three people you have been with most often for informal social activities such as going out to lunch, dinner, drinks, films, visiting one another’s homes, and so on?

Name generators: Examples

- “Consider the people with whom you like to spend your free time. Over the last six months, who are the three people you have been with most often for informal social activities such as going out to lunch, dinner, drinks, films, visiting one another’s homes, and so on?”
- From time to time, most people discuss important matters with other people, people they trust. The range of important matters varies from person to person across work, leisure, family, politics, whatever. The range of relations varies across work, family, friends, and advisors. If you look back over the last six months, who are the four or five people with whom you discussed matters important to you?”

(Burt, 1992, p. 123)

Name generators and ego-networks

- Name generators can be used for both ego-network or whole network.
- If ego-network, you will then need to ask the respondent to provide information about the links between alters.
- For an example of how to do this, go to <http://faculty.chicagogsb.edu/ronald.burt/research/GSBAS1.pdf>
- Is ego's perception of links between alters accurate? See Krackhardt & Kilduff, 1999, JPSP

Age: _____ years

How long have you worked for UHS? _____ years

How long have you worked in your present job? _____ years

Please check those that apply:

- High school diploma Bachelor's M.D. Physician's Assistant
 Associate's Master's R.N. Nurse Practitioner

Other (please specify) _____

Please check the shift during which you normally work:

- Day Night Swing Rotate shifts

For each person below, please check the boxes that apply (check as many as are applicable).

	Consider a friend	Consider an acquaintance	Go to for advice	Go to for support	Are required to interact with because of the nature of your work	Prefer to avoid	Usually communicate with (please rate on the scale below)					Has the following amount of influence in UHS (please rate on the scale below)				
							Seldom (less than once a week)	Often (many times a day)			Very little influence	A great deal of influence				
BUSINESS OFFICE							1	2	3	4	5	1	2	3	4	5
Joslyn Armstrong	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	2	3	4	5	1	2	3	4	5
Staci-Jo Bruce	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	2	3	4	5	1	2	3	4	5
Myrna Covington	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	2	3	4	5	1	2	3	4	5
Donna Decker	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	2	3	4	5	1	2	3	4	5
Donna Gibboney	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	2	3	4	5	1	2	3	4	5
Lorraine Hazel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	2	3	4	5	1	2	3	4	5
Debra Hoover	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	2	3	4	5	1	2	3	4	5
Kim Johnson	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	2	3	4	5	1	2	3	4	5
Tom Lawton	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	2	3	4	5	1	2	3	4	5
Connie Mann	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	2	3	4	5	1	2	3	4	5
Joe Reilly	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	2	3	4	5	1	2	3	4	5
Pat Robinson	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	2	3	4	5	1	2	3	4	5
Carolyn Schenk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	2	3	4	5	1	2	3	4	5

Measurement: Binary or Valued?

- Binary – yes or no, 1 or 0. Only the presence or absence of the relationship is important.
- Valued – example: on a scale from 1-7. Particularly important if adopting the relational approach. Measure frequency, intensity (closeness), duration.
- Valued data take longer for the respondent, but valued data can always be converted to binary data.

Measurement: Directional?

- Most network data is directional – at least in the sense that ego chooses alter. Allows for measure like in-degree and out-degree. Some relational network content is directional by nature – advice network. In diffusion studies, direction is important.
- Directional data can always be treated as nondirectional – symmetrized. Higher, lower, or average? When collecting whole network data, what to do if respondents don't agree? Does link exist?
- How to treat valued data?

What Article Should I Write?

1. The article I planned to write when I designed the study?
2. The article that makes the most sense now that I have seen the results?
 - Rarely the same
 - Correct answer is 2.

-
- Bem: “the best journal articles are informed by the actual empirical findings from the opening sentence”
 - Scientific integrity does not require you to lead the readers through all your blind paths that led nowhere. You are not writing a personal journey of discovery.

Beat the data until they confess!

- Examine data from every angle.
- Fish until you find something interesting.
- Only one strategy for discovery – explore the data.
- Frame the paper around the interesting findings.
- Chances are much better if you have have considered the issues before collecting data.

Issues in Collecting Social Network Data

- Many issues – from approach to boundary specification to measurement choices.
- What is my research question?

How to Handle Social Network Data

Because the data are relational, we enter them in a matrix.

- Actor by actor square “adjacency” matrix (one mode)
- Actor by affiliation rectangular “affiliation” matrix (two mode).

UCInet has several ways to enter data, spreadsheet may be most simple.

Each cell in the matrix indicates if the actors are related (1,0) or the extent of the relationship (1-7).

Data are “directional” from rows to columns (i to j).
(Down left side, across columns)

Cells are also referred to by row and column (cell 3,4 is row 3, column 4)

How to Handle Social Network Data

Directional data provides measures such as:

- in-degree: number of links coming in to the actor
- out-degree: number of links going out from the actor

Directional data can be symmetrized.

Valued data can be converted to binary.

How to Analyze Social Network Data

Make decisions about symmetry (binary and valued). Can symmetrize on higher value, lower value or average value.

- Advice network is directional – do not symmetrize.
- Communication network is non-directional – symmetrize.
- Others – check reciprocation rate. Follow up to resolve discrepancies.

Save matrix in UCINET – give it a name.

All UCINET procedures ask for matrix input. Just input matrix and it will print out values for the measure.

You can enter values (e.g., centrality) into SPSS or SAS programs and correlate or regress like normal (e.g., centrality with power scores)

How to Analyze Social Network Data

Some network measures identify an actor's position in the network. Although these measures are assigned to individual actors, they are a result of the relationships within the network. Example: centrality.

We can also look at measures that describe the entire network. Example: density – actual number of ties that exist divided by the total number of possible ties ($n(n-1)$).

We can also use network measures to identify groups within the network. Example: cliques – a subset of nodes in which every possible pair of nodes is directly connected and the clique is not contained in any other clique. Cliques can be of any size.

How to Analyze Social Network Data

If you do matrix by matrix correlation or regression, you must use UCInet procedure called QAP (Quadratic Assignment Procedure) because observations are not independent.

QAP generates 1000-2000 random permutations of the independent matrix, then computes the correlations with the dependent matrix. The procedure computes the proportion of coefficients generated from the random permutations that are as extreme as the coefficient between your two matrices.

Enter two or more matrices and it will give you correlation or regression results and significance levels.



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Social Networks in Organizations: Antecedents and Consequences

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Antecedents of Social Networks In Organizations

Physical and Temporal Proximity

- Festinger, Schacter, & Back, 1950 - physically close neighbors became friends.
- Monge & Eisenberg, 1987 - telephone, e-mail may moderate, but proximate ties are easier to maintain and more likely to be strong, stable, positive.
- Borgatti & Cross, 2003 – proximity mediated the relationship between knowing what the person knows, valuing it, and timely access with information seeking.

Workflow and Hierarch

- Lincoln & Miller, 1979 - hierarchy related to closeness centrality in both friendship and work-related communication networks.
- Tichy & Fombrun, 1979 - informal networks overlapped more closely in mechanistic than organic organizations
- Brass, 1981 - Informal networks tend to "shadow" formal required interactions.
- Sharder, Lincoln, & Hoffman, 1989 - 36 agencies; organic organizations characterized by high density, connectivity, multiplexity, and symmetry, low number of clusters (work-related communication).
- Burkhardt & Brass, 1990 – change in technology led to change in network. Early adopters gained centrality and power.

Actor Similarity (Homophily)

- Brass, 1985; McPherson & Smith-Lovin, 1987; Ibarra, 1992; many others

Evidence for homophily (interaction with similar others) on age, sex, education, prestige, social class, tenure, function, religion, professional affiliation, and occupation.

- Mehra, Kilduff, & Brass, 1998 - minorities are marginalized.
- Feld, 1981- activities are organized around "social foci" - actors with similar demographics, attitudes, and behaviors will meet in similar settings, interact with each other, and enhance that similarity.
- Gibbons & Olk, 2003 – similar ethnic identification led to friendship and similar centrality; structural similarity led to friendship. Initial conditions have impact on network formation.

Actor Similarity (Homophily)

- Similarity matrix – cell indicates if two actors are similar on some characteristic (binary or valued).
- Enter vector (one column) of attribute data and input into UCInet “similarity” procedure. Result is actor by actor square matrix.
- You can then QAP correlate similarity matrix with interaction matrix.

Personality

- Mehra, Kilduff, & Brass, 2001 - self-monitoring related to betweenness centrality.
- Klein, Lim, Saltz, & Mayer, 2004 – variety of personality factors related to in-degree centrality in advice, friendship and adversarial networks.

Consequences of Social Networks in Organizations

Attitude Similarity

- Erickson, 1988 - theory on "relational basis of attitudes"
- Walker, 1985 - structural equivalents had similar cognitive maps of means-ends regarding product success
- Kilduff, 1990 - MBA's made similar decision as friends regarding job interviews.
- Rice & Aydin, 1991 - attitudes about new technology similar to those with whom you communicate frequently and supervisors. Estimates of others' attitudes NOT correlated with actual attitudes of others.

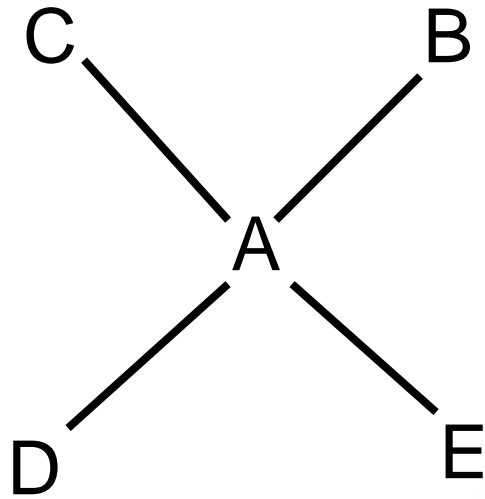
Attitude Similarity (cont)

- Galaskiewicz & Burt, 1991 - structural equivalents had similar evaluations of non-profit organizations.
- Burkhardt, 1994 - longitudinal study, cohesive and structurally equivalent actors had similar personal and task-related attitudes respectively.
- Pastor, Meindl & Mayo, 2002 – reciprocated dyadic ties in communication and friendship networks had similar attributions of charisma of leader.
- Umphress et al. 2003 - affective networks related to similarity in perceptions of distributive and interactional justice, but not procedural justice

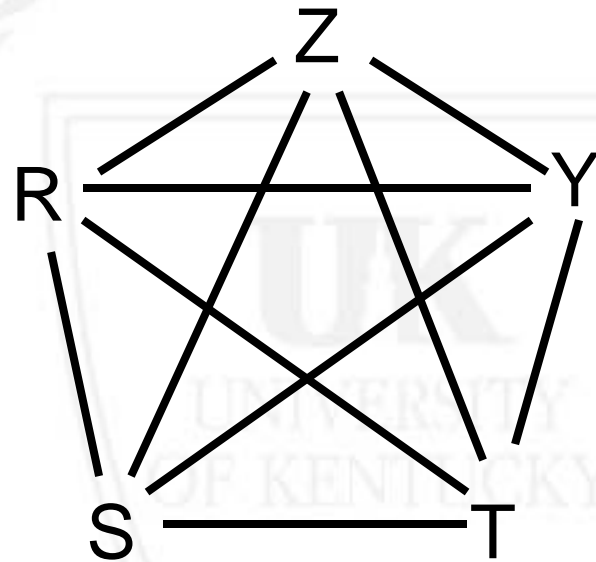
Structural Equivalence

- Actors are structurally equivalent to the extent that they have similar patterns of interaction with other actors, even if they are not connected to each other. (Concor)
- Regular Equivalence: actors have same patterns of relationships even if connections are not to the same others. (ExcatRege)

1a



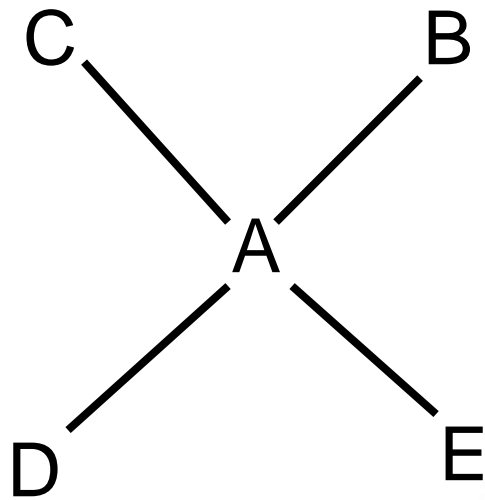
1b



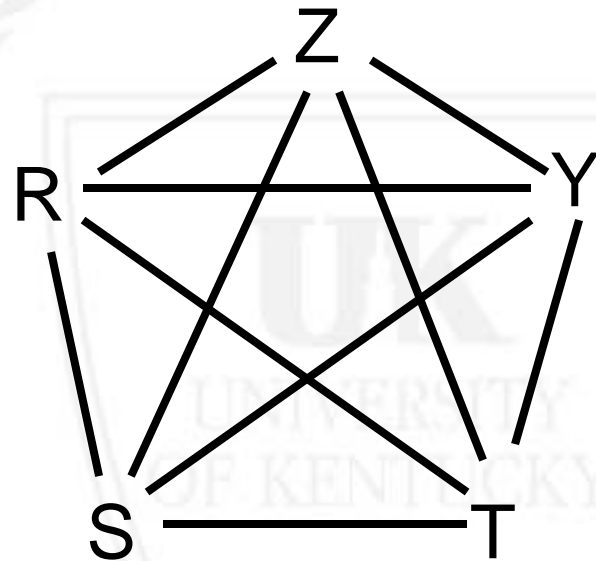
Job Satisfaction and Commitment

- Roberts & O'Reilly, 1979 - peripheral actors (zero or one link) less satisfied than those with two or more links.
- Shaw, 1964 - review of '50s small-group lab studies – central actors in centralized networks; all actors in decentralized networks
- Brass, 1981 - No relationship, but job characteristics (autonomy, variety, etc.) mediated the relationship between workflow centrality and satisfaction.
- Baldwin, Bedell, & Johnson, 1997 – 304 MBA students, Stephenson & Zalen centrality in communication (advice), friendship, and adversarial (“difficult relationship”) networks related to satisfaction with program and team-based learning.
- Morrison, 2002 – commitment related to range (industry groups), status (hierarchy), and strength (closeness) of friendship ties.

1a



1b



Citizenship Behavior

- Settoon & Mossholder, 2002 – In-degree centrality related to supervisors' ratings of person- and task-focused interpersonal citizenship behavior.
- Bowler & Brass, 2006 – people performed interpersonal citizenship behavior for friends, powerful others, and friends of powerful others.



Power

- Brass, 1984 - degree, closeness, and betweenness centrality in workflow, communication, and friendship networks related to power; distance to dominant coalition and departmental centrality most strongly related to power.
- Burkhardt & Brass, 1990 - longitudinal study – centrality preceded power, early adopters of new technology gained in-degree centrality and power.
- Knoke & Burt, 1983 – asymmetric, directional "prestige" measures of centrality related to power.

Power (cont)

- Brass & Burkhardt, 1993 - centrality and influence strategies each mediated the other in relation to power.
- Krackhardt, 1990 - knowledge of network related to power.
- Sparrowe & Liden, 2005 – centrality related to power; 3-way interaction between LMX, leader centrality, and subordinate overlap with leader's network.

Leadership

- Leavitt, 1951 (see Shaw, 1964 for review) – central actors in centralized structures chosen as leaders.
- Sparrowe & Liden, 1997 – theory - extend LMX theory to social networks, how social structure facilitates the exchange.
- Brass & Krackhardt, 1999 - theory of leadership and networks.
- Pastor, Meindl & Mayo, 2002 - attributions of charisma related to network proximity in communication and friendship networks.
- Meehra, Dixon, Brass, & Robertson, 2006. centrality in friendship network of supervisors, peers, and subordinates related to objective group performance and reputation for leadership.

Getting a Job

Grannovetter, 1973, 1982, "Strength of Weak Ties"

- Strong ties: time, emotional intensity, intimacy, and reciprocal services (friends)
- Weak ties: acquaintances
- Our strong ties are likely to be connected. Our weak ties are not. Thus, weak ties may be bridges between different, unconnected cliques and may provide non-redundant information.

Getting a Job

- Grannovetter, 1973, 1982, 1995; De Graff & Flap, 1988; Marsden & Hurlbert, 1988; Wegener, 1991; many others.

Weak ties instrumental in finding jobs; mixed results, several contingencies.

High status persons gain from both strong and weak ties, low status persons gain from weak ties.

- Bian, 1997 – strong ties and both direct and indirect ties used in finding jobs in China. Job seeker strongly tied to intermediaries who are strongly tied to those who provide jobs. Indirect ties led to better jobs than direct ties
- See Lin, 1999 for review.
- Fernandez, Castilla, & Moore, 2000 - network referrals and turnover, "richer pool, better match, social enrichment." Economic benefits for the organization.

Getting Ahead

- Brass, 1984, 1985 - central (closeness & betweenness) actors in departments promoted during following three years.
- Boxman, De Graaf, & Flap, 1991 - 1359 Dutch managers, external work contacts and memberships related to income attainment and level of position (number of subordinates) controlling for human capital (education and experience). Return on human capital decreases as social capital increases. No difference for men and women.
- Burt, 1992 - White males who were promoted quickly had structural holes in their personal networks; women and new hires did not benefit from structural holes.

Getting Ahead (cont)

- Burt, 1997 - bridging structural holes most valuable for managers with few peers.
- Podolny & Baron, 1997 – mobility enhanced by having a large, sparse informal network
- Seidel, Polzer & Stewart, 2000 – social ties to the organization increased salary negotiation outcomes.
- Seibert, Kraimer & Liden, 2001 – weak ties and structural holes in career advice network related to social resources which in turn was related to salary, promotions over career, and career satisfaction.

Getting Ahead (cont)

- Xiao & Tsui, 2007 – “a foot in each boat” structural holes have negative effect in high-commitment cultures in Chinese organizations.

Individual Performance

- Roberts & O'Reilly, 1979 - participants (two or more ties) better performers than isolates (one or less ties).
- Brass, 1981; 1985 - workflow centrality and performance mediated by job characteristics (autonomy, variety); performance varied by combination of technological uncertainty, job characteristics, and interaction patterns.
- Kilduff & Krackhardt, 1994 – being perceived as having a powerful friend related to reputation for good performance (actually having a powerful friend not related).

Individual Performance (cont)

- Mizruchi & Stearns, 2001 – density and hierarchy (dominated by one or a few persons) in approval network negatively related to closing bank deals, size was positive, strength was
- Lazega, 2001 – constraint (lack of structural holes) positively related to performance (billing) in a US law firm.
- Sparrowe, Liden, Wayne & Kraimer, 2001 – in-degree centrality in advice network related to supervisors' ratings of performance. Hindrance network (“difficult to carry out your job”) density negatively related to group performance.
- Mehra, Kilduff, & Brass, 2001 – betweenness centrality related to supervisors' ratings of performance.
- Cross & Cummings, 2004 – ties to diverse others related to performance in knowledge intensive work.

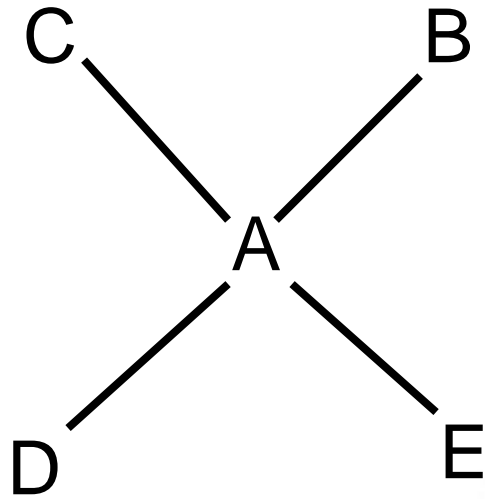
Individual Performance (cont)

- Burt, 2007 – second-hand brokerage (average constraint of alters, betweenness centrality) did not add variance to direct-tie brokerage (constraint in ego-network) relationships to performance in three samples.

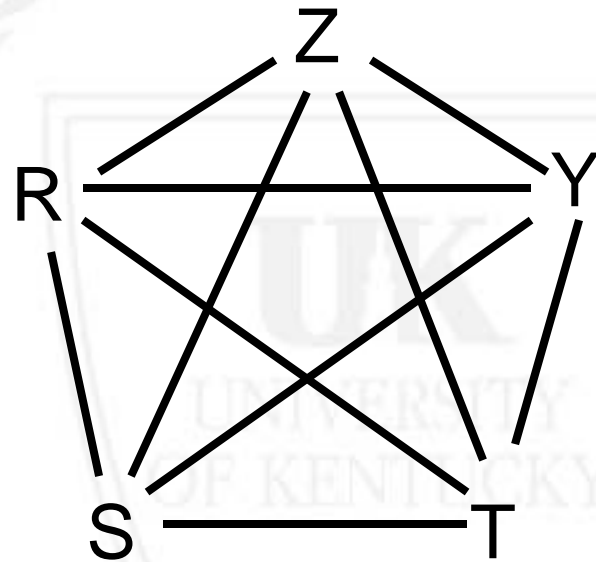
Group Performance

- Shaw, 1964 - review of small group lab studies –
Centralized networks efficient for simple tasks;
decentralized networks efficient for complex,
uncertain tasks.
- Uzzi, 1997 - embedded relationships (trust, fine-grain
information, joint problem solving) can have
both positive and negative economic outcomes
(small firms in garment industry).

1a



1b



Group Performance (cont)

- Hansen, 1999 - weak interunit ties speed up group project completion times when needed information is simple, but slows them down when knowledge to be transferred is complex.
Weak ties help search activities; strong ties help knowledge transfer.
- Tsai, 2001 – in-degree centrality in knowledge transfer network (among units) interacted with absorptive capacity to predict business unit innovation and performance.
- Reagans, Zuckerman, & McEvily, 2004 – internal density and external range related to group performance (as measured by project duration).

Group Performance (cont)

- Oh, Chung, & Labianca, 2004 – internal density (inverted U relationship) and number of bridging relationships to external groups in informal socializing network related to group performance (as rated by executives).
- Balkundi & Harrison, 2005 – meta-analysis; density within teams, leader centrality in team, and team centrality in intergroup network related to various performance measures.

Debate: Structural holes vs. Closure (density)

- Dense networks (percentage of ties to all possible ties) do not allow for many structural holes.
- Density allows for development of shared norms, monitoring, sanctions, trust.
- Structural holes allow for diverse, non-redundant information.

Which is better?

Turnover

-
- Krackhardt & Porter, 1985, 1986 - turnover did not occur randomly, but in structurally equivalent clusters. Turnover of friends affected attitudes of stayers (more committed).

Conflict

- Nelson, 1989 - overall level of conflict in 20 organizations, strong ties across groups negatively related to conflict.
- Labianca, Brass, & Gray, 1998 - friendships across groups not related to perceptions of intergroup conflict, but negative relationships (prefer to avoid) were related to higher perceived conflict. Indirect relationships also related to perceptions of intergroup conflict.

Negative Asymmetry

Negative events and relationships may have more impact than positive events and relationships.

Negative events are rare. Thus, we pay more attention to them, view them as more diagnostic (“true nature shows”).

Unethical Behavior

- Granovetter, 1985 - effects of social structure on trust, malfeasance (critique of Williamson economics).
- Baker & Faulkner, 1993 - study of price fixing conspiracies (illegal networks) in heavy electrical equipment industry; convictions, sentences, and fines related to personal centrality, network structure (decentralized), and management level (middle).

Unethical Behavior (cont)

- Burt & Knez, 1995 - third parties strengthened and confirmed existing attitudes (trust and distrust) through positive and negative gossip; amplification effect, particularly for negative gossip.
- Brass, Butterfield, & Skaggs, 1998 - the effects of the constraints of types of relationships (strength, status, multiplexity, asymmetry) and structure of relationships (density, cliques, structural holes, centrality) on unethical behavior will increase as the constraints of characteristics of individuals, organizations, and issues decrease, and vice versa.

Creativity/Innovation

- Ibarra, 1993a – centrality (asymmetric Bonacich measure) across five networks related to involvement in technical and administrative innovations.

Brass, 1995 – essay on weak ties and creativity.

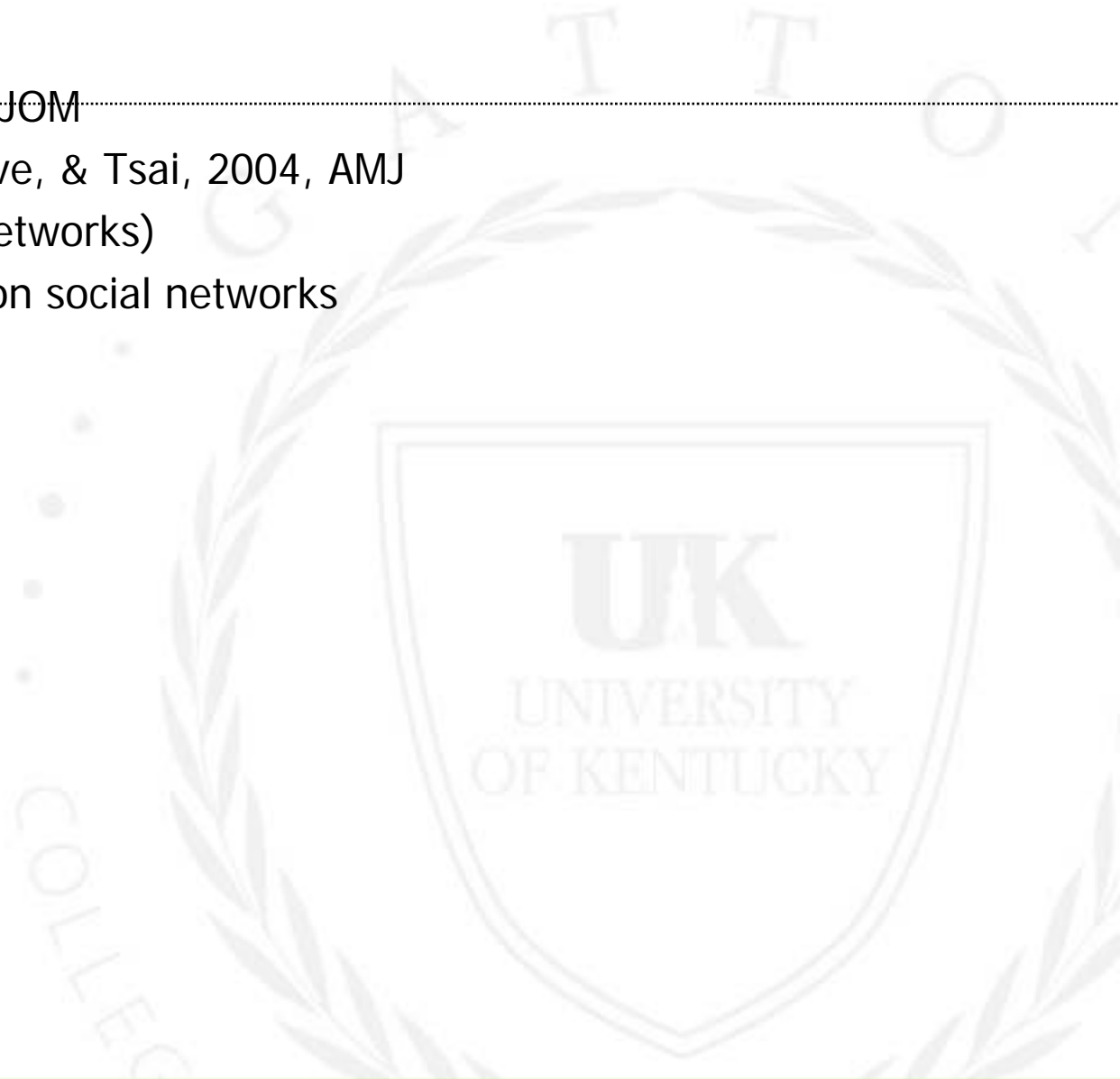
- Perry-Smith & Shalley, 2003 – theory of creative life cycle in terms of network position.
- Burt, R. 2004 – ideas from managers with structural holes judged to be more creative.
- Obstfeld, 2005 – tertius iugens orientation (tendency to close structural holes), social knowledge (ease in getting information), and density among ego's contacts (combined across several networks) related to involvement in innovation. Density positively related to structural holes suggesting that closing holes may lead to reciprocation.

Creativity/Innovation (con't)

- Perry-Smith, 2006 – weak ties related to creativity but not betweenness centrality (structural holes).

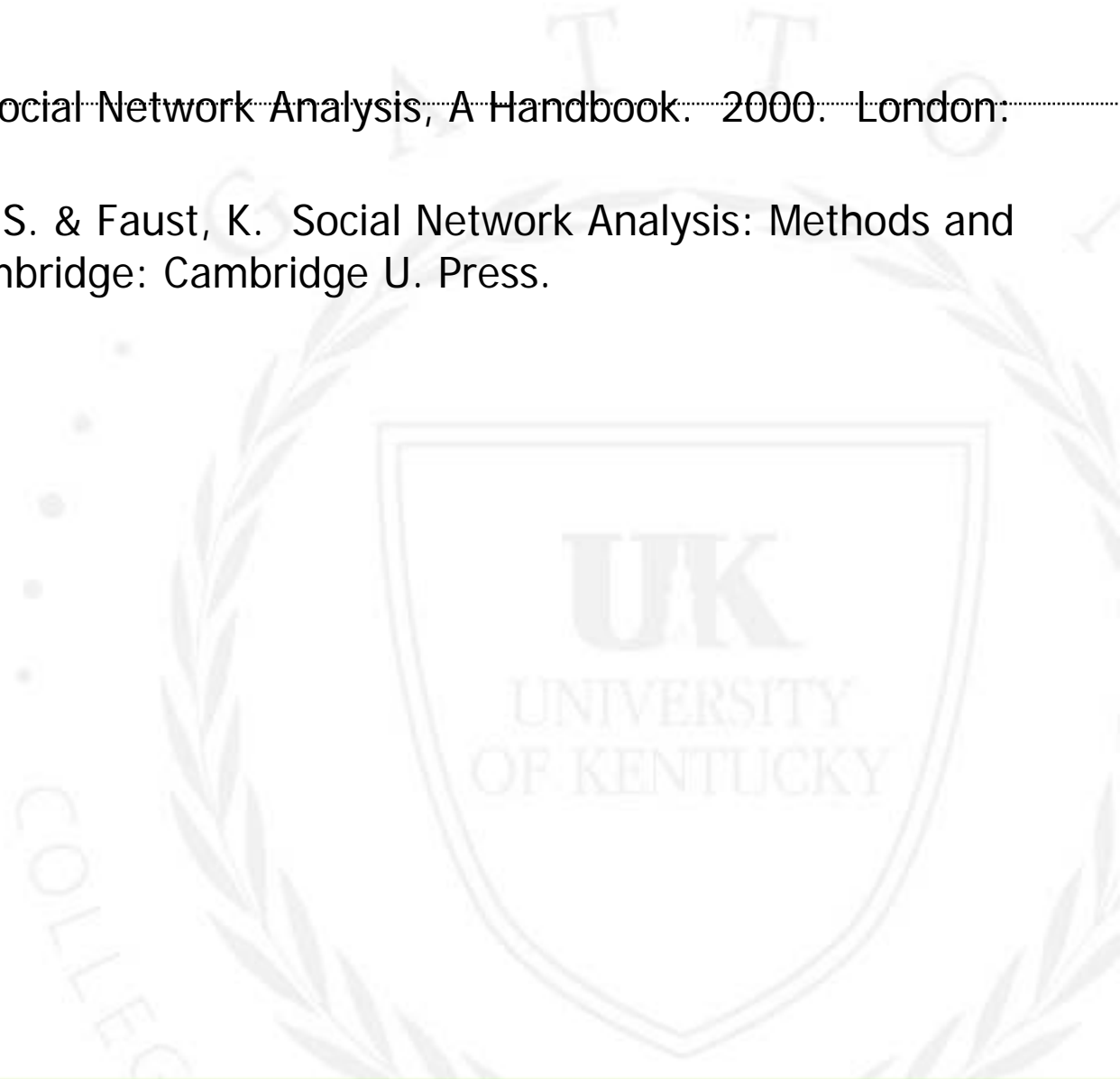
Recent Reviews

- Borgatti & Foster, 2003, JOM
- Brass, Galaskiewicz, Greve, & Tsai, 2004, AMJ
(special issue on social networks)
- AMR 2006 special issue on social networks



Recommended Texts

- **Introductory:** Scott, J. *Social Network Analysis, A Handbook*. 2000. London: Sage.
- **Advanced:** Wasserman, S. & Faust, K. *Social Network Analysis: Methods and Applications*. 1994. Cambridge: Cambridge U. Press.





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