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 Hierarchy

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, 1993b; 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.

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.

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.

Gibbons, 2004 – longitudinal study, advice network functions as stabilizer of values, friendship network functions as a catalyst for change (more willing to share new ideas with friends).
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.

Kilduff & Krackhardt, 1993 - betweenness centrality in friendship network negatively related to satisfaction.

Baldwin, Bedell, & Johnson, 1997 – 304 MBA students, Stephenson & Zalen centrality in communication (advice), friendship, and adversarial (“or 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.
Power

Knoke & Burt, 1983 - asymmetric "prestige" measures of centrality related to 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.

Brass, 1985 – women rated less influential, but few difference in network predictors of influence (centrality, integration into men’s and dominant coalition’s networks). Integration into women’s network related to influence for men, but not women.

Burkhardt & Brass, 1990 - longitudinal study - centrality preceded power, early adopters of new technology gained in-degree centrality and power.

Krackhardt, 1990 - knowledge of network related to power.

Brass & Burkhardt, 1993 - centrality and influence strategies each mediated the other in relation to power.

Gargiulo, 1993 – two-step leverage: managers built strong relationships with people who may constrain the performance of the party on whom they depend.

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 - extend LMX theory to social networks, how social structure facilitates the exchange.


Pastor, Meindl & Mayo, 2002 - attributions of charisma related to network proximity in communication and friendship networks.

Mehra et al., 2005 - leaders’ centrality in external and internal friendship networks was related to objective measures of group performance and to their personal reputations for leadership among different organizational constituencies.
Getting a Job


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.

See Flap & Boxman, 1999 in S.M. Gabbay & R. Leenders, "Corporate Social Capital and Liability" for recent 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.

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.

Higgins & Kram, 2001 – develop a typology of developmental networks based on tie strength and diversity. Propositions explore antecedents and consequences of four developmental types.
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).


Lazega, 1999 – in collegial law firm, embeddedness (high constraint/ low structural holes) positively related to performance.


Cross & Cummings, 2004 – ties to diverse others related to performance in knowledge intensive work.
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).

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.

Gargiulo & Benassi, 1999 – constraint (low structural holes) related to
coordination failures (high task interdependence coupled with low
consultation).

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 in knowledge sharing network related to group
performance (as measured by project duration).

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.

**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.

**Citizenship Behavior**

Settoon & Mossholder, 2002 – In-degree centrality related to supervisors’ ratings of person- and task-focused interpersonal citizenship behavior.

Bowler & Brass, 2005 – people performed interpersonal citizenship behavior for friends, powerful others, and friends of powerful others.
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.


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.
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).

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.
Recent Reviews

Borgatti & Foster, 2003, JOM

Brass, Galaskiewicz, Greve, & Tsai, 2004, AMJ
Table 1. Typical Social Network Measure of Ties

<table>
<thead>
<tr>
<th>Measure</th>
<th>Definition</th>
<th>Example</th>
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<tbody>
<tr>
<td>• indirect links</td>
<td>Path between two actors is mediated by one or more others</td>
<td>A is linked to B, B is linked to C, thus A is indirectly linked to C through B</td>
</tr>
<tr>
<td>• frequency</td>
<td>How many times, or how often the link occurs</td>
<td>A talks to B 10 times per week</td>
</tr>
<tr>
<td>• stability</td>
<td>Existence of link over time</td>
<td>A has been friends with B for 5 years</td>
</tr>
<tr>
<td>• multiplexity</td>
<td>Extent to which two actors are linked together by more than one relationship</td>
<td>A and B are friends, they seek out each other for advice, and work together</td>
</tr>
<tr>
<td>• strength</td>
<td>Amount of time, emotional intensity, intimacy, and reciprocal services (frequency or multiplexity often used as measure of strength of tie)</td>
<td>A and B are close friends, or spend much time together</td>
</tr>
<tr>
<td>• direction</td>
<td>Extent to which link is from one actor to another</td>
<td>Work flows from A to B, but not from B to A</td>
</tr>
<tr>
<td>• symmetry</td>
<td>Extent to which relationship is bi-directional</td>
<td>A asks for B for advice, and B asks A for advice</td>
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*reciprocity*
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<tr>
<td>• Degree</td>
<td>Number of direct links with other actors</td>
</tr>
<tr>
<td>• In-degree</td>
<td>Number of directional links to the actor from other actors (in-coming links)</td>
</tr>
<tr>
<td>• Out-degree</td>
<td>Number of directional links form the actor to other actors (out-going links)</td>
</tr>
<tr>
<td>• Range (Diversity)</td>
<td>Number of links to different others (others are defined as different to the extent that they are not themselves linked to each other, or represent different groups or statuses)</td>
</tr>
<tr>
<td>• Closeness</td>
<td>Extent to which an actor is close to, or can easily reach all the other actors in the network. Usually measured by averaging the path distances (direct and indirect links) to all others. A direct link is counted as 1, indirect links receive proportionately less weight.</td>
</tr>
<tr>
<td>• Betweenness</td>
<td>Extent to which an actor mediates, or falls between any other two actors on the shortest path between those two actors. Usually averaged across all possible pairs in the network.</td>
</tr>
<tr>
<td>• Centrality</td>
<td>Extent to which an actor is central to a network. Various measures (including degree, closeness, and betweenness) have been used as indicators of centrality. Some measures of centrality weight an actor’s links to others by the centrality of those others.</td>
</tr>
<tr>
<td>• Prestige</td>
<td>Based on asymmetric relationships, prestigious actors are the object rather than the source of relations. Measures similar to centrality are calculated by accounting for the direction of the relationship (i.e., in-degree).</td>
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**Roles**

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<tr>
<td>• Star</td>
<td>An actor who is highly central to the network</td>
</tr>
<tr>
<td>• Liaison</td>
<td>An actor who has links to two or more groups that would otherwise not be linked, but is not a member of either group.</td>
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<tr>
<td>• Bridge</td>
<td>An actor who is a member of two or more groups.</td>
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<tr>
<td>• Gatekeeper</td>
<td>An actor who mediates or controls the flow (is the single link) between one part of the network and another.</td>
</tr>
<tr>
<td>• Isolate</td>
<td>An actor who has no links, or relatively few links to others.</td>
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<tr>
<td>Measure</td>
<td>Definition</td>
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<tr>
<td>• Size</td>
<td>Number of actors in the network</td>
</tr>
<tr>
<td>• Inclusiveness</td>
<td>Total number of actors in a network minus the number of isolated actors (not connected to any other actors). Also measured as the ratio of connected actors to the total number of actors.</td>
</tr>
<tr>
<td>• Component</td>
<td>Subset of network actors and links. All actors in the component are connected (either direct or indirect links) and no actors have links to nodes outside the component.</td>
</tr>
<tr>
<td>• Connectivity (Reachability)</td>
<td>Extent to which actors in the network are linked to one another by direct or indirect ties. Sometimes measured by the maximum, or average, path distance between any two actors in the network.</td>
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<tr>
<td>• Connectedness</td>
<td>Ratio of pairs of actors that are mutually reachable to total number of pairs of actors</td>
</tr>
<tr>
<td>• Density</td>
<td>Ratio of the number of actual links to the number of possible links in the network [\frac{n(n-1)}{2}].</td>
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<td>• Centralization</td>
<td>Difference between the centrality scores of the most central actor and those of other actors in a network is calculated, and used to form ratio of the actual sum of the differences to the maximum sum of the differences</td>
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<tr>
<td>• Symmetry</td>
<td>Ratio of number of symmetric to asymmetric links (or to total number of links) in a network.</td>
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<tr>
<td>• Transitivity</td>
<td>Three actors(A, B, C) are transitive if whenever A is linked to B and B is linked to C, then C is linked to A. Transitivity is the number of transitive triples divided by the number of potential transitive triples (number of paths of length 2).</td>
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References


