A note on social capital and network content

Ronald S. Burt [*]

Graduate School of Business and Department of Sociology, University of Chicago, Chicago, IL 60637, USA

Abstract

As a guide to selecting name generators for social capital research, I use network data on a probability sample of heterogeneous senior managers to describe how they sort relations into kinds, and how the kinds vary in contributing to social capital. Managers sort relations on two dimensions of strength – intimacy (especially close versus distant) versus activity (frequent contact with new acquaintances versus rare contact with old friends) – and with respect to two contents – personal discussion (confiding and socializing relations) versus corporate authority (the formal authority of the boss and informal authority of essential buy-in). Comparing name generators for their construct validity as indicators of social capital, I compute network constraint from different kinds of relations, and correlate constraint with early promotion. The correlation is strong for the network of personal relations, zero for the network of authority relations, and strongest for personal and authority relations together. I close with research design recommendations for selecting name generators. © 1997 Elsevier Science B.V.

1. Introduction

This note is about the connection between social capital and network content. Social capital is not in all settings defined by network form alone. In some settings, the social capital value of a network is a function of both form and content, which contents is the issue to be discussed.

I frame the issue in terms of structural hole theory, which describes the social capital defined by the brokerage opportunities in a network (Burt, 1992). The central premise is that an exchange is more difficult to negotiate, less rewarding, when it is locked into other exchanges. Discontinuities between exchange relations (structural holes) are entrepreneurial opportunities to broker the flow of *information* between people on opposite sides of the structural hole, and *control* the form of projects that bring together people on opposite sides of the structural hole. The conclusion is that individuals with relations to otherwise disconnected social groups are positioned for entrepreneurial

---

[*] E-mail: ron.burt@gsb.uchicago.edu.

action, building bridges between groups where it is valuable to do so. The argument draws on several lines of network theorizing that emerged in sociology during the 1970s (most notably Granovetter, 1973, 1974, on the strength of weak ties; Cook and Emerson, 1978, on the power of exclusive exchange partners; Freeman, 1977, 1979, on between-ness centrality; and Burt, 1979, 1980, on the structural autonomy created by network complexity).

Accumulating evidence for the argument can be separated into two broad classes from research that emerged in sociology during the 1970s (see Burt, 1992, Chs. 1, 2, for review; Breiger, 1995, for integrative review of emerging research). In the first class of evidence, selecting relations with which to measure network variables is unambiguous because the criterion variable is a function of specific relations. An example is the research of Cook and Emerson (1978) on power in exchange networks (Cook et al., 1983; Markovsky et al., 1988). Laboratory subjects earn a profit from their exchange relations with others. The network structure of their exchange relations affects relative profit. The central finding is that people with exclusive exchange relations to otherwise disconnected partners earn higher profits. The network most relevant to the criterion variable of relative profit is unambiguous – it is the network of exchange relations from which profit is derived. Another example is the evidence from market structure research. Census data on exchanges between sectors of an economy are used to predict the relative profits of producers in each sector. As expected from structural hole theory, producer profits margins increase with the network disorganization of transactions with suppliers and customers. Burt (1979, 1983) describes the association in 1967 with profits in American manufacturing markets, and extends the results to nonmanufacturing through the 1960s and 1970s (Burt, 1988, 1992). Burt et al. (1996) extend the results into the 1980s. Using profit and network data on markets in other countries, similar results are observed in Germany during the 1970s and 1980s (Ziegler, 1982; Burt and Freeman, 1994), Israel during the 1970s (Talmud, 1992, 1994), Japan in the 1980s (Yasuda, 1993), and Korea in the 1980s (Jang, 1995). In these studies, the network most relevant to the criterion variable of relative profit is unambiguous – it is the network of inter-sector exchange relations from which profit is derived.

This note is about the other class of evidence, from survey network data. Selecting a network content is a more ambiguous task in this class of evidence because the criterion variable of relative success is qualitatively distinct from the networks used to measure social capital. The central research result is that there are career advantages to having a contact network rich in structural holes. A well-known example is the demonstration of Granovetter (1973, 1974) that white-collar workers find better jobs, faster, through weak ties that bridge otherwise disconnected social groups. Lin worked with several col-leagues to present evidence of the importance of ties to distant contacts for obtaining more desirable jobs (e.g., Lin et al., 1981; Lin and Dumin, 1986; Lin, 1996). Related empirical results appear in Campbell et al. (1986), Flap and De Graaf (1989), Marsden and Hurlbert (1988). Moving to the top of organizations, Burt (1992, 1995, 1997) and Podolny and Baron (1997) present survey evidence from probability samples of man-agers. Working with more limited data, Gabbay (1995) shows how promotions occur more quickly for salesmen with strong-tie (versus weak-tie) access to structural holes, and Sparrowe and Popielarz (1995) innovatively reconstruct past networks around

managers to estimate an event-history model of how holes in yesterday's network affect the likelihood of promotion today. The benefits that accrue to individuals aggregate to the management teams on which they serve. Studying TQM teams in several midwest manufacturing plants, Rosenthal (1996) shows that the teams composed of employees with more entrepreneurial networks are significantly more likely to be recognized for their success in improving the quality of plant operations.

These survey network studies use data on various kinds of relations; emotional closeness, frequency, years known, support, discussion, influence, and other of the many kinds of relations used in network analysis. However, network content is rarely a variable in the studies – analysts agree that informal coordination through interpersonal networks is important as a form of social capital, but their eyes go shifty like a cornered ferret if you push past the network metaphor for details about how specific kinds of relations matter. The usual procedure is to aggregate across the kinds of relations elicited in a study to define a network wound an individual, from which measured of social capital are derived (e.g., Burt, 1992). Podolny and Baron (1997) raise the first serious questions about network content as an issue for social capital. Their distinctions between kinds of relations are familiar, but Podolny and Baron speak with a particularly authoritative voice because they were the first to address the content issue with survey network data on a probability sample of managers. They find that the social capital benefits of structural holes only occur in personal discussion networks, the networks through which information unofficially flows through and between organizations. Structural holes in networks of authority relations do not increase the chances of manager promotion. This is more than the familiar distinction between formal and informal relations (almost all of the relations studied were informal). The content distinction is about whose interests are paramount in a relationship, the manager's or the corporation's. Podolny and Baron's results raise questions about how managers sort relations into kinds, and how kinds of relations differ in their contribution to social capital. My purpose in this note is to address these questions with the survey network data in Burt (1992).

2. Network data

The data in Burt (1992) are a promising research site because (1) they are comparable to the data in Podolny and Baron (1997), and (2) the multiple kinds of relations obtained in the study have not been analyzed for their different contributions to social capital (they were used only to define an aggregate network around respondents). Both studies are mail surveys with a stratified random sample of respondents from a heterogeneous study population, and the network around each respondent generated by name generators and name interpreters (Marsden, 1990, reviews network data strategies). Further the studies describe similar kinds of relations in similar study populations: managers in all business functions of a large American manufacturer of electronic components and computing equipment. The studies are not identical – Podolny and Baron use a computer-assisted mail questionnaire on diskette instead of a paper-and-pencil questionnaire, and the study population in Burt (1992) spans slightly higher ranks in a larger

organization (three times larger sales volume, five times as many employees) – but the data in the two studies are sufficiently similar to expect similar results in the two studies. The opportunity for independent replication is clear.

The 284 managers to be analyzed here cited a total of 3,584 relations within and beyond the firm. The managers are a random stratified sample of the more than three thousand managers just below the rank of vice-president in the study population (see Burt, 1992, pp. 118–125, on sampling and the lack of selection bias). The managers are employed in the same firm, but their firm is the size of a small city, and the managers are heterogeneous in background, geographic location (scattered across the United States), and business function (sales, service, manufacturing, information systems, engineering, marketing, finance, and human resources).

2.1. Name generators

I have network data on nine name generators, the survey questions that ask respondents for the names of people with whom the respondent has relations. The network items were shaped by results from Fischer's regional probability network survey (Fischer, 1982), methodological notes on the General Social Survey (GSS) national probability network data (see Marsden, 1987 and Burt, 1990, for review), intuitions from organization case studies (especially Kanter, 1977, 1984), and intuitions from case studies of manager networks (five managers in Mintzberg, 1973, and 15 managers in Kotter, 1982). [1]

The nine generators are listed in Table 1 with the minimum, mean, and maximum number of names each elicited. The first is taken from the name generator in the 1985 GSS, and I will just refer to it as the GSS generator (see Burt and Celotto, 1992, for response comparisons to the GSS data). The other generators concern informal discussion and socializing, authority relations to supervisor and promising subordinates, most valued work contacts, critical sources of political support for projects (buy-in), most important contact for continued success, most difficult contact, and sources of advice on leaving for a job in another firm.

The nine name generators ask about similar kinds of relations, but there is little overlap in the contacts elicited Over half of the contacts are cited on only one name generator (57%). Another twenty percent are cited on two generators (21%). Less than ten percent are cited on four or more generators (9%). More specifically, look at the counts in Table 2. Managers named 1,200 people as most valued contacts. At the bottom of the table, 42% of the most valued contacts are not named on any other generator. At the other extreme is the manager's boss and his or her most important contact, who are likely to be named on another generators (92% of bosses are named on another

---

[1] There is more evidence to guide survey network studies of people toward the bottom of their organization. The Fischer and GSS data provide the best guidance since they describe general populations. A promising methodological development is the Kalleberg et al. (1994) design for studying organizations by asking a probability sample of Americans about the organizations in which they work (though network items on relations with and among co-workers were postponed to future research).

Table 1
Name generators

1.	We will start with a general question. 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?** Remember, just list their first names or initials. [2–4.9–11 names]
2.	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?** [0–2.9–4 names]
3.	Do your job responsibilities include assigning work to direct report managers? If YES; **In your opinion, who among them is the most likely to be successful at [THE FIRM]?** [0–0.7–4 names]
4.	**Who would be considered to be your immediate supervisor?** [0–1.0–2 names]
5.	**Of all the people working for [THE FIRM], who are the four or five people who have contributed most to your professional growth within [THE FIRM] – your most valued work contacts?** [0–4.2–6 names]
6.	Making things happen at [THE FIRM], as in many high technology firms, requires buy-in from people working in other groups within the firm. Suppose you were moving to a new job and wanted to leave behind the best network advice you could for the person moving into your current job. **Who are the three or four people you would name to your replacement as essential sources of buy-in for initiatives coming out of your office?** [1–3.6–6 names]
7.	**Of all the people you know at [THE FIRM], whom do you see as your single most important contact for your continued success within the firm?** [0–1.0–3 names]
8.	**At the other extreme, who among the people working for [THE FIRM] has made it the most difficult for you to carry out your job responsibilities?** Again, just list the person's first name or initials (and remember that these data will not be released from the Research Program at Columbia except as aggregate statistics on groups of managers). [0–0.9–2 names]
9.	**If you decided to find a job with another firm doing the kind of work you do at [THE FIRM], who are the two or three people with whom you would most likely discuss and evaluate your job options?** These could be people who work at [THE FIRM], or people outside the firm such as friends, family, or people who work at other firms. [0–2.8–5 names]

Note: In the booklet, [THE FIRM] is replaced by the firm's name. The numbers in brackets at the end of each question are the minimum–mean–maximum number of names generated per respondent.

generator). [2] In short, redundant questions elicit nonredundant names. Managers respond to multiple questions on similar kinds of relations with a larger number of contacts than they would in response to any one or two of the name generators.

---

[2] The interaction effect of multiple name generators is further illustrated by uncited contacts. There are 51 contacts not cited on any of the nine name generators. Forty-one managers, after responding to the name generators and assembling their cumulative list of contacts, realized that they had forgotten to cite someone significant. The overlooked person was added to the cumulative list without going back to cite them on a name generator. I find no pattern in the name interpreter data to identify a name generator that would have elicited the uncited key contacts. They are independent of the four kinds of work roles in Table 3 (chi-square = 1.33, d.f. = 3, $P = 0.72$), independent of the four levels of emotional closeness in Table 3 (chi-square = 2.80, d.f. = 3, $P = 0.42$), and independent of the four levels of frequency in Table 3 (chi-square = 2.36. d.f. = 3, $P = 0.50$). They are significantly likely to be recent acquaintances; people known for less than two years (2.71 loglinear z-score statistic). The implication is that the list of name generators should include a final item asking the manager to review the list of cited contacts to see if a contact as significant as those listed is missing from the list.

Table 2
Joint probabilities

GSS discussion (1)	–								
Socializing (2)	0.247	–							
Protégé (3)	0.047	0.036	–						
Boss (4)	0.098	0.017	0.010	–					
Valued contacts (5)	0.203	0.058	0.012	0.110	–				
Needed buy-in (6)	0.179	0.046	0.022	0.187	0.187	–			
Most important (7)	0.093	0.017	0.002	0.232	0.154	0.152	–		
Most difficult (8)	0.012	0.001	0.000	0.058	0.015	0.045	0.009	–	
Discuss leaving (9)	0.279	0.183	0.017	0.078	0.177	0.102	0.100	0.007	–
GSS discussion (1)	1384								
Socializing (2)	435	811							
Protégé (3)	71	35	201						
Boss (4)	149	18	5	284					
Valued contacts (5)	436	111	17	147	1200				
Needed buy-in (6)	365	81	26	205	350	1020			
Most important (7)	142	18	1	107	198	172	285		
Most difficult (8)	19	1	0	30	21	55	5	263	
Discuss leaving (9)	475	248	17	78	299	167	98	7	791
% of contacts only cited for this content	25%	38%	53%	8%	42%	38%	8%	69%	21%

Note: Joint probabilities in the upper matrix are computed from the counts m the lower matrix of contacts named for each pair of name generators. The probability of contents A and B appearing in the same relationship (p_{ij}) is estimated by the number of relations in which they both appear, divided by the number of relations in which either appears (e.g., 0.247 = 1384 + 811 − 435).

2.2. Name interpreters

Name interpreters are the survey questions that ask about the people cited on the name generators. Table 3 lists name interpreters on the manager relations. In addition, the survey included interpreters about the kind of person contacted (sex, age, and years with the firm). [3] The interpreters in Table 3 distinguish contacts by their roles with the manager, and the strength of their relation with the manager. The roles distinguish contacts connected to the respondent by formal authority (solid line contacts) versus informal authority (dotted lines to people who have no formal authority over the manager, but with whom the manager keeps in touch because his or her work affects, and is affected by, the work of the dotted line manager). Thin line contacts are personal ties to people within the firm, often people with whom the manager had occasion to work in the past. Outsiders are family and friends in other firms.

---

[3] The survey included another two interpreters that were unproductive: (a) 'Co-member' of an outside organization (a club, church, or the school that the manager's children attend) was too rarely cited to he useful. (b) The contact's functional area within the company was left open-ended, and respondents named functions in such varied ways that the data were useless. The lesson is that the function name interpreter should be limited to pre-defined response categories to allow comparisons across respondents.

The strength of relation between manager and contact is measured on the three usual dimensions of emotional closeness, frequency, and duration. Response categories on the three dimensions are scaled for relation strength in Fig. 1 on the basis of a loglinear association model. [4] All three dimensions illustrate the range of the manager networks. The closeness results in Table 3 show that the managers more often cite close and especially close contacts, but many less close and distant people are cited as key contacts. The frequency results in Table 3 show that the managers maintain close relations across infrequent communication. Contacts are as likely to be met less than once a month as every day. The duration results in Table 3 show that the managers preserve relations over long periods of time. In the average network, there are three new acquaintances, three or four established contacts, and six old friends. The distribution of relations across the new-established-old categories is 8%, 14%, and 78% for contacts outside the firm, versus 23%, 31%, and 46% for contacts inside the firm. Outsiders are more often old friends, but insiders are also most often old friends.

3. Manager distinctions between kinds of relations

Fig. 2 is a map of manager distinctions between relations. Kinds of relations are close in the map to the extent that they lead to the same people. Fig. 2 is a multidimensional scaling of joint probabilities where the map preserves monotonic differences between probabilities (Kruskal, 1964). The nine name generators in Table 1 with the 17 name interpreter categories in Table 3 provide a (26,26) matrix of joint probabilities. Joint probabilities among the nine name generators are listed in Table 2. For example, the probability of a person being named on the GSS generator and the socializing generator is the number of people named on both (435), divided by the number named on either (1,384 plus 811 minus 435), which is the 0.247 joint probability in Table 2.

---

[4] Response category scores are derived from patterns of citations on the name generators. The three dimensions are modelled similarly, so I just describe the duration results since they are the basis for collapsing years known into the qualitative categories of recent, established, and old. I began with a nine by nine table. Rows distinguish relations by duration; row one is relations with people known for a year or less, row two is relations with people known for up to two years, and so on, through row nine which is relations with people known for nine or more years. The nine columns in the table correspond to the nine name generators in Table 1 Cell (1,1), for example, is the number of contacts cited on the GSS name generator who the manager has known for less than a year. Fit a one-dimensional association model to the table (Goodman, 1984). The model parameters describe tile tendency for relations of each age to be cited (row marginals), the tendency for relations to he cited on each name generator (column marginals), and the position of each row and column on a duration continuum (one-dimensional interactions between rows and columns). The three duration categories are apparent in Fig. 1 from the three clusters of rows on the duration continuum. People known for a year or two are new acquaintances. People known for three to five years are established contacts. People known for more than five years are old friends (the five-year threshold is the point at which trust is significantly more likely between contacts, Burt and Knez, 1995). The duration categories are probably firm-specific. The expected time at the same rank in this organization is two and a half years. Moving to a new job within the firm is a convenient time to discontinue relations with unproductive colleagues. Given a two-and-a-half-year expected time in rank, the three duration categories correspond to moves between jobs within the firm; someone met during the current job (new acquaintance), someone known from the prior job (established contact), someone known from the job before last (old friend).

Table 3
Name interpreters

Min	Mean	Max	Qualities of relationship
(per respondent)			
			Role
0	2.8	11	Solid line contact (direct report up or down within the firm)
0	3.1	12	Dotted line contact (informal supervision through buy-in)
0	4.7	12	Thin line contact (anyone else in the firm)
0	2.0	7	Outsider (anyone not employed by the firm)
0	3.6	11	Friend (informal socializing; e.g. lunch, dinner, drinks, house visit)
0	1.0	7	Family (includes spouse surrogate)
			Emotional closeness
0	3.9	10	Especially close (one of the respondent's closest contacts)
0	5.1	13	Close (close, but not one of the closest contacts)
0	2.4	10	Less close (Ok to work with, no desire to develop friendship)
0	1.0	8	Distant (avoid contact unless it is necessary)
			Frequency
0	3.0	8	Daily (person met at least once a day)
0	3.4	9	Weekly
0	3.0	9	Monthly
0	3.0	11	Rare (person met less than once a month)
			Duration
0	2.6	12	New relationship (person met within last two years)
0	3.5	10	Established relationship (person known for three to five years)
0	6.3	16	Old relationship (person known for six or more years)

Joint probabilities are a redundancy criterion for distinguishing relations (versus a substitutability criterion, Burt and Schøtt, 1985). They measure the extent to which kinds of interaction are combined in multiplex relations. Cognitive distinctions between kinds of relations in Fig. 2 depend on behavioral distinctions; people can distinguish kinds of relations to the extent that they have different kinds with different people. If a manager's co-workers are her only friends and her only outlet for discussing important personal matters, then she will not distinguish friends and colleagues. The distinction will be more apparent to a manager who confides only with friends outside the firm.

3.1. Dimensions of relation strength: Intimacy and activity

The map shows two dimensions underlying the distinctions between relations; intimacy and activity. Intimacy varies on the horizontal axis, from family and especially close relations at the left, to distant and most difficult co-workers at the right. A bold line runs from left to right across categories of decreasing closeness. Activity varies on the vertical axis, from daily contact with new acquaintances at the bottom of the map, to rare contact with old friends at the top. Two dashed lines run from top to bottom in the map. Contact frequency divides into two categories, daily or weekly contact at the

Emotional Closeness

Frequency

Duration
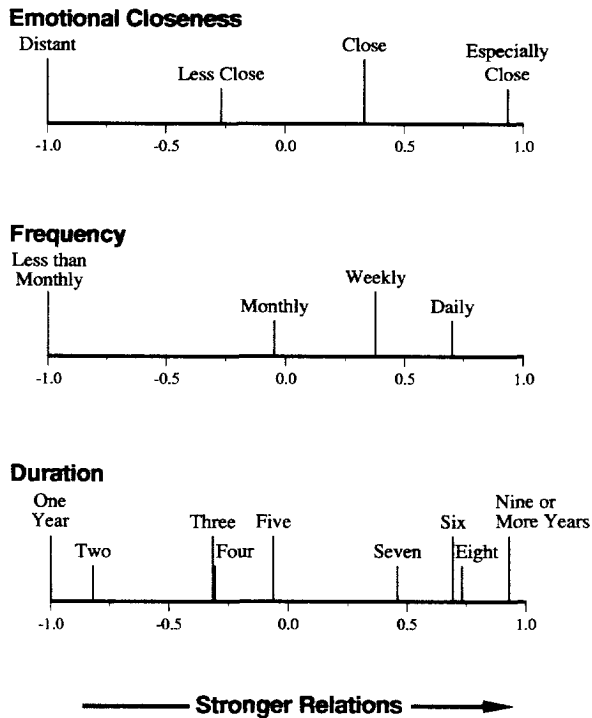

◄───────── **Stronger Relations** ───────►

Fig. 1. Strength of relationship.

bottom of the map, versus monthly or less frequent contact at the top of the map. Duration varies from new acquaintances known for one or two years at the bottom of the map, to old friends known for six or more years at the top of the map. Also note that the intimacy dimension describes more variation between relations. Relations vary more widely in Fig. 2 over the horizontal than the vertical (from scores of -2 to 2 on the horizontal axis, versus -1 to 1 on the vertical).

This pattern of distinguishing relations on orthogonal dimensions of intimacy and activity is familiar in American populations (Marsden and Campbell, 1985; Burt, 1990; Marsden, 1990). Managers, like people in the general population, do not distinguish relations on a single dimension of strong versus weak. They distinguish on orthogonal dimensions of intimacy and activity.

3.2. Content categories: Personal discussion versus corporate authority

At the same time that Fig. 2 is a map of continuous distance between kinds of relations, it is a map of relations organized around two general categories; personal and corporate.

Personal discussion relations form a cluster in the upper-left corner of Fig. 2. The three name generators are: people with whom the managers discuss important personal matters (GSS generator), people with whom the managers socializes, and people with whom the managers would discuss the costs and benefits of leaving for a job in another
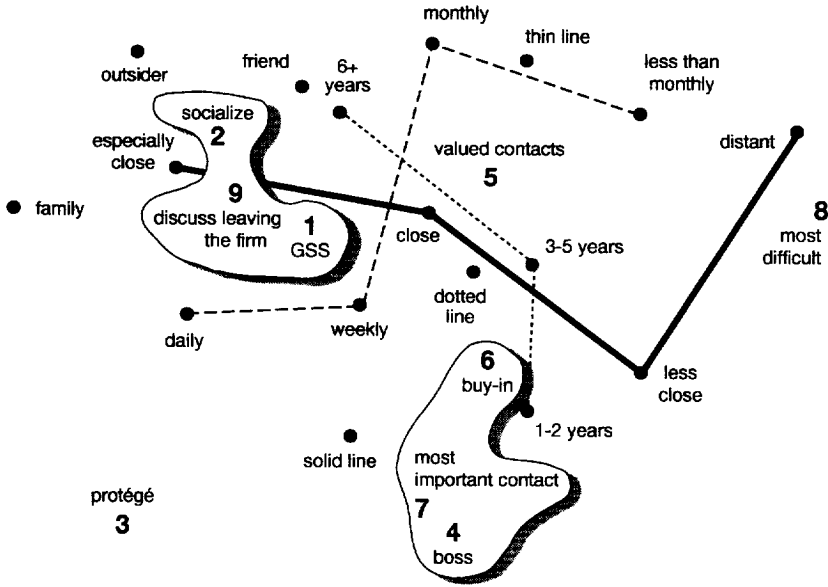
MDS of Joint Probabilities

relations close together in the map reach the same contacts
(.74 R^2 between predicted and observed probabilities)

Fig. 2. Manager distinctions between relationships.

firm. These are all personal relations in the sense that they continue at the discretion of the people involved.

Forming a second cluster circled at the bottom of the map in Fig. 2, corporate relations are ties to authority. Formal authority is exercised by the manager's supervisor. Informal authority is exercised by the person most important for the manager's future success (which is the boss for 38% off the managers), and the people who are essential sources of political support (buy-in) for projects coming out of the manager's office.

The personal–corporate contrast is a frame of reference for discussing the other name generators as separate networks. First, subordinates are a separate network. Bosses are cited as personal contacts (52% are named on the GSS name generator), or for their authority (72% are named as essential sources of buy-in). Only 12% are not cited as personal contacts or essential sources of buy-in. In contrast, proteges are not viewed as key contacts. Elicited by the third name generator in Table 1 ('most promising subordinate'), proteges lie in the lower-left corner of Fig. 2, distinct from all other relations. The people cited as most promising subordinates are most often only cited for that (53%). Second, there is a little of the personal and the corporate in citations to a manager's 'most valued contacts' within the firm. These contacts lie equi-distant from the personal and corporate clusters in Fig. 2. Almost half of the 1,200 most valued contacts are cited as personal contacts (44%), a third are cited for their authority (36%), and almost half are cited only as most valued contacts (43%). Third, 'most difficult'
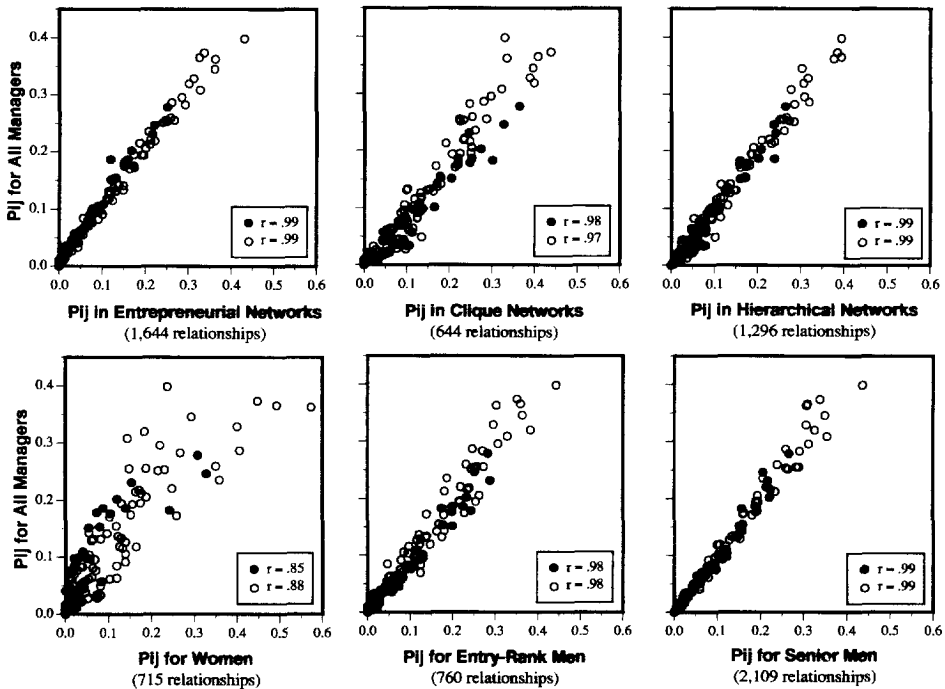
Fig. 3. Joint probabilities consistent.

colleagues are also their own network. The probabilities in Table 2 show that difficult colleagues are of course rarely cited for personal relations, but they are also rarely cited for authority. They are most often cited only on the difficult colleague generator (69%). [5]

3.3. Stability of the content distinctions

The results in Fig. 3 show that the Fig. 2 content distinctions are consistent across important social capital categories of managers. Each graph in Fig. 3 is a plot of the 325

---

[5] Managers were asked to explain why they cited the person they did. Content analysis of their explanations is reported elsewhere (Burt and Celotto, 1992), but the gist of the analysis is that the cited contacts are viewed as uncooperative. All kinds of contacts in the firm are cited as 'most difficult'. The typical explanation for citing a boss is his or her failure to lead; 'no support; no coaching, no feedback', 'did not explain the firm's system/culture and advise me', or 'egotistical, self-oriented, liar; worst manager I have ever met'. Poor team spirit is the typical explanation for citing a colleague in the manager's own function; 'not a team player; does only what is good for himself'. The problems are with colleagues who pursued their 'own agenda' rather than the interests of the group, who were 'proprietary' rather than cooperative, who did not 'follow through on their commitments', who could not be 'trusted'. Typical explanations for citing peers in related functions express the manager's frustration over being denied political support; 'did not support my proposals', 'high rank but does not open door, in fact he gets in the way', or 'tree hugger; do it his way or don't do it at all'.

joint probabilities for the 26 kinds of relations in Fig. 2 (solid dots are the 36 joint probabilities among the nine name generators in Table 1, hollow dots are the 289 joint probabilities among the name interpreter categories and between the name generators and name interpreter categories in Table 3). The vertical axis in each Fig. 3 graph is the joint probability for all managers, and the horizontal axis is the same joint probability for a subset of managers. In the first Fig. 3 graph, for example, the joint probability of citing the same person on the GSS and socializing name generators is 0.247 for all managers (vertical axis, cf. Table 2) and 0.258 for managers in entrepreneurial networks (horizontal axis). To the extent that the dots in a graph are tightly clustered in a line, joint probabilities are similar for all managers and the subset of managers, so Fig. 2 is an accurate map of content distinctions for the subset managers. [6]

The first row of the graphs in Fig. 3 show that the content distinctions in Fig. 2 do not vary with the structure of a manager s network (the three structures are distinguished and discussed for their social capital value in Burt, 1992, pp. 74–81, 140–163). Fig. 2 content distinctions are correlated 0.99 with distinctions by managers in entrepreneurial networks (low-density, decentralized networks), 0.98 with distinctions by managers in cliques (high-density, decentralized networks), and 0.99 with distinctions by managers in hierarchical networks (one contact is central in the manager's network).

The second row of graphs show similarity between men and women. With respect to social capital, senior men in this study population are significantly different from women and entry-rank men (Burt, 1992, pp. 74–81; Burt, 1996), but all three categories of managers make the content distinctions mapped in Fig. 2. Entry-rank refers to managers just entering the study population of senior managers. Women deviate most from the aggregate pattern (the dots in the lower-left graph vary most widely around their regression line). The deviation is a tendency for women to have more multiplex personal relations – the people with whom they socialize are more likely to be important discussion partners, and more likely to be the people with whom they would discuss the

---

[6] Both reviewers were troubled by the inelegance in Fig. 3 of correlating probabilities for a subset of managers with probabilities for all managers; correlations are biased upward. Fig. 3 is merely a heuristic to illustrate the dramatic stability across kinds of managers. I use all managers for the vertical axis to make vertical axes comparable across the six graphs. Here are the correlations for each pair of manager categories (solid-dot correlations in Fig. 3 are above the diagonal, hollow-dot correlations are below the diagonal):

All managers	1.00	0.99	0.98	0.99	0.85	0.98	0.99
Entrepreneurial networks	0.99	1.00	0.96	0.96	0.84	0.98	0.98
Clique networks	0.97	0.95	1.00	0.95	0.86	0.96	0.97
Hierarchical networks	0.99	0.97	0.96	1.00	0.81	0.97	0.98
Women	0.88	0.86	0.86	0.90	1.00	0.77	0.79
Entry-rank men	0.98	0.98	0.96	0.95	0.79	1.00	0.99
Senior men	0.99	0.99	0.95	0.97	0.81	0.98	1.00

The first row contains the solid-dot correlations in Fig. 3 and the first column contains the hollow-dot correlations. All correlations are very strong. The first principle component of the (6,6) correlation matrix among joint probabilities for the six kinds of managers accounts for 94% of all variation between the probabilities.

costs and benefits of moving to a new job. For example, the joint probability of citing someone on the GSS and socializing name generators is 0.247 for all managers, 0.328 for women. The joint probability of citing someone on the socializing and discussing a job change name generators is 0.183 for all managers, 0.242 for women. These differences are slight, especially in comparison to the similarities between men and women. The aggregate results in Fig. 2 are correlated 0.98 and 0.99 with content distinctions by men, and only slightly less correlated with the content distinctions by women ($r = 0.88$).

4. Kinds of relations as social capital

My construct validity criterion variable is early promotion. Expected age at promotion, E(age), is the average age at which a manager with a specific personal background (education, race, gender, and seniority) is promoted to a specific rank within a specific function (rank, function, and plant location). Early promotion is the difference between when a manager was promoted to his or her current rank and a human-capital/demographic model predicting the age at which similar managers are promoted to the same rank to do the same work; E(age) – age. A score of − 5.5, for example, indicates a manager promoted 5.5 years behind similar managers promoted to the same job. Twelve percent of the variance in promotion age is predicted by the model, and residuals are nicely distributed in a bell curve around expected age at promotion (Burt, 1992, pp. 126–131).

4.1. Baseline result

The central social-capital result in these data is that managers with networks rich in the social capital of structural holes are promoted early. For the purposes of this note, I assume the primacy of social structure. [7] Contacts elicited by the nine name generators in Table 1 were pooled to define the network around each manager, and relations between contacts were scaled with name-interpreter questions into four levels of emotional closeness (Burt, 1992, pp. 287–288). The lack of structural holes in the network is measured by network constraint, C. Constraint is a function of network size, density, and hierarchy that measures the extent to which relations are directly or indirectly concentrated in a single contact (see Burt, 1992 p. 50 ff, for detailed discussion). Contact-specific constraint, the extent to which manager i's network is concentrated in the relationship with contact j is defined as follows: $c_{ij} = (p_{ij} + \sum_q p_{iq} p_{qj})^2$, $q \neq i, j$, where p_{ij} is the proportion of i's relations invested in contact j $(0 < p_{ij} < 1, \sum_j p_{ij} = 1)$. Measuring indirect connections, the sum $\sum_q p_{iq} p_{qj}$ is the

---

[7] The structural hole argument gives a causal role to social structure. I am limited to assuming the primacy of social structure here because the network data are cross-sectional and so offer no evidence of causation (see Burt, 1992, pp. 173–180, for detailed discussion). Burt (1997) offers evidence of the predicted network effect with data in which network measurement clearly precedes the performance measure.

portion of i's relations invested in contacts q who are in turn invested in contact j. In the parenthetical expression, the sum of the two terms is the proportion of i's relations that are directly or indirectly invested in the connection with contact j. Summing across contacts, $\Sigma_j c_{ij}$, yields a constraint index C measuring the concentration of a manager's direct and indirect relations in one contact – more constraint, less social capital. I multiply C by 100 to discuss regression coefficients as years of early promotion lost with each point of constraint.

The central result is the negative association between early promotion and network constraint. A one-point increase in constraint is associated with an average promotion delay of four months (slope $= -0.35$, correlation $= -0.40$, t-test $= -5.4$). [8] This aggregate result is the baseline reported at the bottom of Table 4. The other rows in Table 4 show what happens when I limit the network to specific kinds of relationships.

4.2. Social capital effect with different kinds of relationships

The first and second rows of Table 4 show what happens when networks are defined only by personal discussion relations. The average network contains 7.2 contacts (5.2 other employees in the firm). Having a large, diverse network of personal discussion contacts is associated with early promotion. The correlation between early promotion and network constraint is strong, though weaker than when all nine name generators define the network (-5.4 t-test at the bottom of Table 4 decreases to -4.7 and -3.4, at the top of the table, all of which reject the null at beyond the 0.001 level of confidence).

The third and fourth rows of the table show what happens when networks are defined only by corporate authority relations. The average network contains 4.2 contacts. There is no constraint correlation with early promotion (t-test $= 0.3$). There is no correlation if small networks are deleted (-0.3 t-test for networks of three or more contacts), or if corporate contacts are expanded to include the manager's most promising subordinate and most difficult colleague (t-test $= -0.2$).

The remaining rows of Table 4 show what happens with various mixtures of name generators. The mix of personal and authority content in the 'most valued contacts' generator is apparent. The network of most valued contacts has no direct association with early promotion (-1.0 t-test for the one-generator network), but a significant association if combined with corporate authority relations (-2.4 t-test for the four-gen-

---

[8] I lose 16 degrees of freedom because early promotion as a residual score: 1 for education, 1 for race, 1 for sex, 2 for seniority, 3 for job ranks, 7 for distinctions between corporate functions, and 1 for plant location. Many of these background variables have negligible association with promotion age, but I take the conservative route of holding them all constant to define early promotion. I have 284 early promotion scores, but only 268 independent observations given the 16 degrees of freedom used to define expected promotion. For the purposes here, I test construct validity with data on the 170 senior managers for whom structural holes have their expected social capital effect on early promotion (Burt, 1992, pp. 145–148; see Burt, 1996, on the 170 senior managers versus others). The ordinary least-squares (OLS) t-tests in Table 4 are multiplied by 0.97, the square root of 268/284, to decrease the t-tests in proportion to the lost degrees of freedom. The adjustment has no effect on the conclusions because the t-tests for authority relations are so close to zero and the t-tests for personal relations are so obviously different from zero.

Table 4
Social capital effect by kinds of relations

Network segment	Size (min–mean–max)	Correlation	Slope
Personal relations	4–7.2–13	0.35	−0.196
			(−4.7)
Just within firm	1–5.2–10	0.26	−0.078
			(−3.4)
Corporate relations	1–4.2–7	0.02	0.007
			(0.3)
Plus protégé and most difficult	2–5.5–9]	0.02	−0.007
			(−0.2)
Most valued contacts	0–4.3–6	0.08	−0.025
			(−1.0)
Plus personal	5–9.7–15	0.27	−0.195
			(−3.5)
Plus authority	1–6.9–11	0.19	−0.089
			(−2.4)
Personal and corporate relations, and most valued contacts	6–11.6–19	0.38	−0.294
			(−5.1)
Whole network	7–12.7–22	0.40	−0.354
			(−5.4)

Note: These are ordinary least squares estimates of the regression coefficient predicting early promotion from network constraint for various segments of a manager's network. Metric coefficients are presented with t-tests in parentheses (see footnote 7). The personal segment is all contacts cited on the three personal name generators in Fig. 2. The authority segment is all contacts cited on the three authority name generators.

erator network), and a still stronger association if combined with personal discussion relations (-3.5 t-test for the four-generator network). Social capital evidence is stronger still when personal, corporate, and most valued contacts jointly define a manager's network (-5.1 t-test for the seven-generator network). Whatever the social capital in a network of personal relations, more is generated by strong personal ties to disconnected authority contacts (Han, 1996, describes contingency between theme two kinds of relations).

Social capital is underestimated with personal discussion relations more for some managers than others. Here are correlations between early promotion and network constraint for manager in the three senior ranks:

	All contacts	Personal contacts	Corporate contacts
Senior rank	−0.32	−0.29	0.02
Higher rank	−0.42	−0.32	−0.01
Highest rank	−0.75	−0.53	0.07

The increasing correlation between early promotion and network constraint defined with the data on all contacts shows the increasing value of social capital at higher ranks in the

organization (Burt, 1997). Networks of corporate authority relations consistently show no social capital effect. Networks of personal discussion relations show a strong social capital effect, stronger in higher ranks, but increasingly underestimate the effect at higher ranks. The -0.32 and -0.29 are about the same for the senior rank. The -0.42 versus -0.32 make underestimation apparent at the higher rank. The -0.75 versus -0.53 make underestimation most apparent at the highest rank.

5. Conclusion

Consistent with Podolny and Baron's argument (Podolny and Baron, 1997), the managers analyzed here make a distinction between personal discussion and corporate authority relations. Further, the social capital value of structural holes is greater in the network of a manager's personal discussion contacts. I find no association between early promotion and the network structure of corporate authority relations, however, I get the strongest evidence of social capital effects with the combined network of personal and corporate relations.

My conclusion is that managers adapt to whatever structure of corporate authority defines their job (consistently no social capital effect for authority relations), and benefit from a large, diverse network of personal discussion contacts (consistent social capital effect for personal relations), but managers at higher ranks benefit in addition from having diverse personal contacts scattered across clusters of essential political support (strongest social capital effect for personal and authority relations together). The data ignored when network constraint is computed separately for personal relations and corporate relations are the data on the overlap between personal and corporate relations. The fact that constraint defined by personal relations alone increasingly underestimates the social capital effect for more senior managers means that how personal relations are mixed with corporate authority relations matters more for managers toward the top of the firm. It is at the higher ranks that essential sources of buy-in are least determined by the corporate bureaucracy and most determined by personal relationships.

I draw five conclusions about research design:

(1) *Use multiple name generators.* Presented with multiple questions asking for similar kinds of relations, managers respond with a larger number of contacts than they will in response to one generator. Order effects seem likely. One set of contacts will be in the respondent's mind after answering the GSS 'discussion' generator, another set will be in his or her mind after answering the 'essential sources of buy-in' generator. The fact that new people are named on sequential items that ask about similar kinds of relations means that what the first item puts in a respondent's mind is significant for the names cited on the next item. The conservative response – in the absence of methodological research describing name-generator order effects – is to include redundant name generators to give respondents more than one opportunity to cite relations of an important kind (e.g., personal discussion relations).

(2) *Measure the strength of relations in terms of intimacy and activity.* Fig. 2 displays the two dimensions on which managers distinguish strong relations from weak. Intimacy is measured by emotional closeness (especially close versus distant). Activity

is measured in time (frequent contact with new acquaintances versus rare contact with old friends). Content distinctions vary more with intimacy than with activity.

(3) *Personal discussion generators are a minimum module sufficient to reveal social capital effects* (e.g., items 1, 2, and 9 in Table 1). Contacts will be named within and beyond the firm, and the structure of relations among the named contacts will predict relative success within the firm. Fig. 2 indicates who will be named. The results in Table 4 show that the network of personal discussion contacts is sufficient to generate evidence of social capital effects.

(4) *Corporate authority relations are an unproductive alternative* (e.g., items 4, 6, and 7 in Table 1). It seems logical to ask about authority and essential sources of buy-in to study behavior at the top of the firm, but the results in Table 4 show that the resulting network is a poor predictor of relative success. The structure of relations among essential sources of buy-in, including the boss, does not explain relative success. [9]

(5) *The best research strategy is to elicit both kinds of relations multiple personal discussion generators and multiple corporate authority generators.* What is missed by personal discussion relations without the corporate authority relations, or vice versa, is the structure of relations between personal and authority contacts. The strongest evidence of social capital occurs when personal and corporate relations together define the network used to measure social capital.

References

Breiger, R.L., 1995. Socioeconomic achievement and social structure. Annual Review of Sociology 21, 115–136.

Burt, R.S., 1979. Disaggregating the effect on profits in manufacturing industries of having imperfectly competitive consumers and suppliers. Social Science Research 8, 120–143.

Burt, R.S., 1980. Autonomy in a social topology. American Journal of Sociology 85, 892–925.

Burt, R.S., 1983. Corporate Profits and Cooptation. Academic Press, New York.

Burt, R.S., 1988. The stability of American markets. American Journal of Sociology 93, 356–395.

Burt, R.S., 1990. Kinds of relations in American discussion networks. In: Calhoun, C., Meyer, M.W., Scott, W.R. (Eds.), Structures of Power and Constrain. Cambridge University Press, New York, pp. 411–451.

Burt, R.S., 1992. Structural Holes. Harvard University Press, Cambridge, MA.

Burt, R.S., 1995. Le capital social, les trous structuraux, et l'entrepreneur (translated by Emmanuel Lazega). Revue Française de Sociologie 36, 599–628.

Burt, R.S., 1996. The gender of social capital. In: Lindenberg, S., Ultee, W., Bosman, R. (Eds.), Solidarity and Inequality. University of Groningen, The Netherlands.

Burt, R.S., 1997. The contingent value of social capital. Administrative Science Quarterly 42, in press.

Burt, R.S., Freeman, J.H., 1994. Market Structure Constraint in Germany. Graduate School of Business, University of Chicago.

---

[9] A related point is that the protégé and most difficult colleague name generators add nothing to the prediction. This observation, combined with the separation of protégés and most difficult colleagues from key contacts in Fig. 2 suggests that neither name generator is critical. The protégé name generator would be useful in a study of manager relations with subordinates, but will need to be augmented with more than the generators in Table 1 since subordinates are so rarely mentioned on these items. Managers look up and around for key contacts, not down. The difficult colleague generator provides data useful to study why managers distrust colleagues, but managers do not see the difficult colleague as a key contact, and including the difficult colleague generator adds nothing to predicting relative manager success.

Burt, R.S., Knez, M., 1995. Kinds of third-party effects on trust. Rationality and Society 7, 255–292.

Burt, R.S., Celotto, N., 1992. The network structure of management roles in a large matrix firm. Evaluation and Program Planning 15, 303–326.

Burt, R.S., Schøtt, T., 1985. Relation contents in multiple networks. Social Science Research 14, 287–308.

Burt, R.S., Yasuda, Y., Guilarte, M., 1996. The external structure of markets. Paper presented at INSEAD conference on Organizations in Markets.

Campbell, K.E., Marsden, P.V., Hurlbert, J., 1986. Social resources and socioeconomic status. Social Networks 8, 97–117.

Cook, K.S., Emerson, R.M., 1978. Power, equity and commitment in exchange networks. American Sociological Review 43, 712–739.

Cook, K.S., Emerson, R.M., Gillmore, M.R., Yamagishi, T., 1983. The distribution of power in exchange networks: theory and experimental results. American Journal of Sociology 89, 275–305.

Fischer, C.S., 1982. To Dwell Among Friends. University of Chicago Press, Chicago.

Flap, H.D., De Graaf, N.D., 1989. Social capital and attained occupational status. Netherlands Journal of Sociology 22, 145–161.

Freeman, L.C., 1977. A set of measures of centrality based on betweenness. Sociometry 40, 35–40.

Freeman, L.C., 1979. Centrality in social networks: Conceptual clarification. Social Networks 1, 215–239.

Gabbay, S.M., 1995. Building a network organization, Paper presented at the annual meetings of the Academy of Management.

Goodman, L.A., 1984. The Analysis of Cross-Classified Data Having Ordered Categories. Harvard University Press, Cambridge, MA.

Granovetter, M.S., 1973. The strength of weak ties. American Journal of Sociology 78, 1360–1380.

Granovetter, M.S., 1974. Getting a Job. University of Chicago Press, 1995 edition, Chicago.

Han, S.-K., 1996. Structuring relations in on-the-job networks. Social Networks 18, 47–67.

Jang, H., 1995. Social structure and performance in the Korean economy. M.A. Paper, Department of Sociology, University of Chicago.

Kalleberg, A., Knoke, D., Marsden, P.V., Spaeth, J.L., 1994. The national organizations study: An introduction and overview. American Behavioral Scientist 37, 891–910.

Kanter, R.M., 1977. Men and Women of the Corporation. Harper & Row, New York.

Kanter, R.M., 1984. The Change Masters: Innovation and Entrepreneurship in the American Corporation. Simon and Schuster, New York.

Kotter, J.P., 1982. The General Managers. Free Press, New York.

Kruskal, J.B., 1964. Multidimensional scaling by optimizing goodness of fit to a nonmetric hypothesis. Psychometrika 29, 1–27.

Lin, N., 1996. Social Resources and Social Action. Cambridge University Press, New York.

Lin, N., Dumin, M., 1986. Access to occupations through social ties. Social Networks 8, 365–385.

Lin, N., Ensel, W., Vaughn, J., 1981. Social resources and strength of ties: Structural factors in occupational status attainment. American Sociological Review 46, 393–405.

Markovsky, B., Willer, D., Patton, T., 1988. Power relations in exchange networks. American Sociological Review 53, 220–236.

Marsden, P.V., 1987. Core discussion networks of Americans. American Sociological Review 52, 122–131.

Marsden, P.V., 1990. Network data and measurement. Annual Review of Sociology 16, 435–463.

Marsden, P.V., Hurlbert, J., 1988. Social resources and mobility outcomes; A replication and extension. Social Forces 66, 1038–1059.

Marsden, P.V., Campbell, K.E., 1985. Measuring tie strength. Social Forces 63, 482–501.

Mintzberg, H., 1973. The Nature of Managerial Work. Harper and Row, New York.

Podolny, J.M., Baron, J.N., 1997. Relationships and resources; Social networks and mobility in the workplace. American Sociological Review 62, in press.

Rosenthal, E.A., 1996. Social networks and team performance. Doctoral Dissertation, Graduate School of Business, University of Chicago.

Sparrowe, R.T., Popielarz, P.A., 1995. Weak ties and structural holes: The effects of network structure on careers. Department of Management, University of Illinois, Chicago.

Talmud, I., 1992. Market power, political power, and state support: The case of Israeli industry. In: Moore, G., Whitt, J.A. (Eds.), Research in Politics and Society. JAI Press, Greenwich, CT.

Talmud, I., 1994. Relations and profits: The social organization of Israeli industrial competition. Social Science Research 23, 109–135.

Yasuda, Y., 1993. A comparative structural analysis of American and Japanese markets. Doctoral Dissertation, Department of Sociology, Columbia University.

Ziegler, R., 1982. Market structure and cooptation. Institut für Soziologie, University of Munich, Munich.