

# Effects of Organizational Strategies and Contextual Constraints on Centrality and Attributions of Influence in Interorganizational Networks

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**This study examines the effects of organizational strategies and contextual constraints on location in interorganizational transaction networks and the effects of strategies, constraints, and network position on attributions of influence. A model of these effects is presented, and eleven propositions specific to social service organizations are examined. In client referral networks in 17 communities, it was found that centrality in referral flow, in communication exchanges, and in joint program activities was positively associated with attributions of influence. A revised model is tested using path analysis. •**

## INTRODUCTION

From an exchange perspective, there are two important dimensions of interorganizational networks. These are the horizontal differentiation of transactions into more or less stable subsystems and the vertical differentiation of organizations into a dominant elite core and a more dependent and less powerful periphery. Recent refinements in exchange theory have sought to clearly conceptualize the emergence of power differentials and other patterns of vertical dominance in relations among organizations (Aldrich, 1972; Benson, 1975; Cook, 1977). To date, however, most interorganizational network studies have focused on horizontal differentiation, with the result that there is little information about patterns of dominance among organizations.

Most current network methodologies, particularly blockmodeling (Breiger, Boorman, and Arabie, 1975), are designed to statistically derive a model of an interorganizational system composed of a set of specialized subsystems. Recent studies using this perspective include Van de Ven, Walker, and Liston (1979), Knoke and Rogers (1979), and Galaskiewicz (1978). While these studies move one step beyond dyadic interorganizational studies, they have two deficiencies. First, they are basically descriptive. The principal objective has been to adapt matrix modeling techniques to interorganizational settings, but applications of these techniques have typically examined only a single network, usually in one community (e.g., Stentz, 1972; Rieker, Horan, and Morrissey, 1976; Van de Ven, Walker, and Liston, 1979). Second, they consider only horizontal differentiation, ignoring the need to study power and status differentiation. The present study, along with the recent work of Laumann and Pappi (1976), Rogers and Maas (1979), and Galaskiewicz (1979), examines vertical differentiation in interorganizational networks.

## Network Centrality and Influence

Vertical differentiation refers to the natural tendency for social system actors to become differentiated according to an explicitly acknowledged and enforced status hierarchy. The power-dependency perspective (Emerson, 1962; Cook, 1977) and the resource-dependency perspective (Yuchtman and Seashore, 1967; Benson, 1975; Aldrich, 1976; Aldrich and Pfeffer, 1976; Pfeffer and Salancik, 1978) posit that power is derived from control over strategic interdependencies. Power can be accrued in an exchange network by gaining control over various types of valued resources. These include information, monetary supplies from outside the network, and alliances.

A basic postulate of power theories is that network centrality enhances power because the ability to control valued resources increases as a function of proximity to the core of a system of transactions. The relationship between power and network centrality has been researched most extensively in the small group communication network literature (Bavelas, 1948, 1950; Leavitt, 1951; Guetzkow and Simon, 1955; Davis, 1969; Shaw, 1971). Bavelas developed a sociometric measure of relative centrality in communication networks by counting the number of communication channels required for actors to reach other actors and then determining which actors could communicate most readily with others.

The relationship between network centrality and power was tested at the organizational level by the Aston group (Hinings et al., 1974). In their study of the determinants of intraorganizational power, they found a modest positive correlation between the power attributed to a work unit and its centrality in the organization's workflow — as measured by the number of links it had with other work units.

At the interorganizational level, the relationship between network centrality and attributed influence was postulated by Benson (1975) and Cook (1977) and tested in single networks by Laumann and Pappi (1976) and Galaskiewicz (1979). However, the extent to which the dynamics of influence attribution in interorganizational networks parallel those previously observed in interpersonal and interdepartmental networks is not known.

While it is evident that vertical differentiation occurs at group, intraorganizational, and interorganizational levels, the manner in which status hierarchies emerge in interorganizational networks may differ from the manner in which they emerge at less aggregated levels. Specifically, it appears that intraorganizational and interorganizational networks differ in two fundamental ways. First, group and organizational networks are consciously imposed. They are based on experimental manipulations, in the case of the small group research, or on a formal division of labor in organizations. While a system of informal interactions frequently develops to supplement the formal structure in these settings, most network research has examined only the formal structural configuration of an organization or group. In contrast, interorganizational networks are emergent in nature. While some relationships are mandated, most are locally initiated and arise from the needs of network participants.

The second principal difference between intraorganizational and interorganizational networks is visibility. In an experimental small group setting, network configuration is denoted by the physical arrangement of participants. In organizations, the structural arrangement of departments and work groups is represented graphically on organization charts. At the interorganizational level, however, representations of a network's configuration are seldom published, and, consequently, participants must construct their own. As a result, it is more difficult for participants to perceive the dynamics underlying the relationship between network centrality and attributed influence in interorganizational networks.

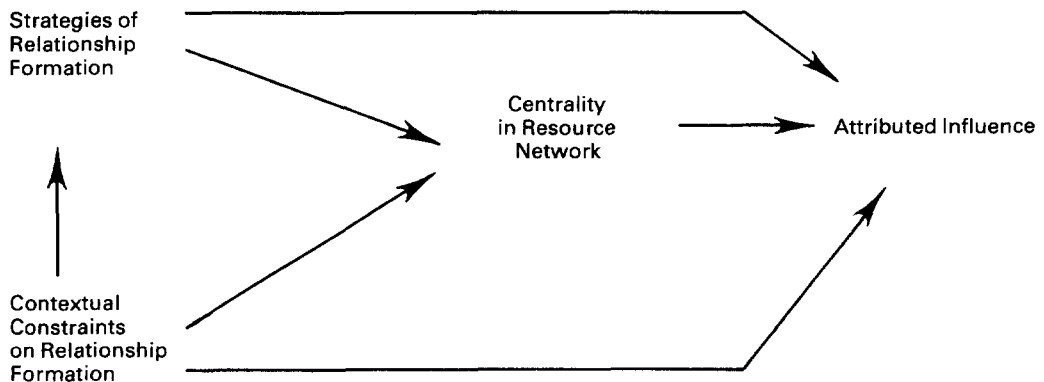
## A CAUSAL MODEL

The purpose of this study was to develop and test a model of network centrality and attributed influence that would reflect the unique characteristics of interorganizational networks. It was evident that the configuration of an interorganizational network at a given time was a consequence of past efforts by member organizations to enhance their power relative to that of other network members (Aldrich, 1979; Galaskiewicz, 1979). Interviews conducted for this study suggested that an organization's concern for improving its prestige among other organizations strongly influenced its policy and program decisions. Therefore, an investigation of the strategies used in this "jostling for position in the pecking order" (in the words of one respondent) was deemed important in a study of interorganizational network centrality.

It has also been demonstrated that a public agency's position in a local resource exchange network is significantly affected by funding and policy decisions originating outside the network. For example, Whetten and Aldrich (1979) found that the best predictors of the size and diversity of a public agency's set of interorganizational relations were organizational characteristics over which local administrators had little control. These included level of funding and diversity of services. Therefore, a predictive model of the determinants of an organization's position in a network, and its accompanying position in the status hierarchy, must include both strategic initiatives of the organization's members and the constraints imposed on the organization by regulatory and funding bodies. The model shown in Figure 1 incorporates these considerations.

This model draws heavily on Burt's (1977) typology of power. He argues that there are three aspects of power: control of resources as the bases of power; processes converting the bases of power into the manifestations of power; and the network of influence relations as manifestations of power. Burt criticized the common practices of equating power with control of resources or perceived influence, since both equations hold as unproblematic the process of translating control over resources into the distribution of influence among actors in a system.

The model in Figure 1 includes all three aspects of Burt's typology. Organizations formulate strategic plans to improve



**Figure 1. A causal model of centrality and attributed influence in an interorganizational network.**

**Centrality in Interorganizational Networks**

their resource transaction position. However, this is limited by contextual constraints. Over time, strategies and constraints combine to determine the organization's position in a local resource exchange network. Out of the structure of dyadic exchanges emerges a network configuration wherein a position of centrality enables an organization to control the flow of resources between more peripheral actors. Network position becomes translated into attributed influence as others attribute to central actors greater potential for establishing coalitions to enhance their political influence. Galaskiewicz (1979) found that network centrality was a better predictor of attributed influence than size of resource base, because network members assumed that central actors had greater potential for mobilizing resources controlled by others. This result was consistent with Perrucci and Pilisuk's (1970) finding that persons influential in a community held positions in a significantly larger number of community-based organizations than persons not judged to be influential. By occupying multiple positions, these people were strategically located at the intersections of communication and resource networks and were, as a result, viewed as potential coalition builders.

The link between network centrality and attributed influence in the model does not mean that a person's rating of an organization's influence represents explicit knowledge of the organization's location in a resource exchange network. Instead, it is proposed that the behaviors of individuals in an organization reflect the organization's network location. Members of a central organization may indicate the organization's location by serving as authorities on changes in policies and procedures in other organizations, by acting as arbitrators in conflicts between other organizations, or by serving as brokers in the formation of coalitions between other network members. All of these activities represent clues regarding network location. They also serve as criteria for judgments about organizational influence. Hence, it is proposed that influence is attributed to centrally located organizations in an interorganizational network because observed differences in the day-to-day activities of members of those organizations cause members of other organizations to attribute more influence to them.

Organizational activities reflecting current network location are not the only criteria used in the influence attribution process. Attributions of influence may reflect aggressive behaviors intended to increase an organization's centrality in the network. The model proposes that these strategic actions will have an independent effect on attributed influence. An aggressive leadership style conveys an image of power before an organization actually moves into a central position in the network. Examples of this style include establishing a broad communication network, inviting administrators from other organizations to serve on a board of directors and serving as an advocate for the network's interests in the public policy arena.

Attributions of influence may also be based on inherent organizational characteristics. These are designated as contextual constraints in the model and include the number of services offered and the size of an organization's staff. These aspects of a public organization reflect regulations and resource allocation decisions made by state or federal officials.

Contextual constraints are an important component of this model for two reasons. First, they influence an organization's choice of strategies and thus its location in a network. For example, an organization with a small staff is unlikely to establish an elaborate communication system with other network members. The resulting lack of visibility will reduce its resource flow and hence lower its centrality in the resource network. Second, contextual constraints are directly visible to other organizations and thus directly affect influence attribution. For example, while a local organization's administrator generally has little control over the services offered to clients, this organizational feature is known throughout the network. As a result, network members may attribute greater influence to those organizations that provide a wide range of services to a broad constituency.

In summary, the model states that a favorable combination of constraints and strategies will enable an organization to become central in a resource exchange network. The highly visible initiatives taken by central organizations will, in turn, lead peripheral actors to attribute greater influence to them.

## PROPOSITIONS

Eleven propositions regarding the determinants of centrality and influence in interorganizational networks were chosen as tests for the model of the emergence of a network hierarchy. These propositions pertain specifically to social service organizations and were derived from a review of interorganizational literature, previous research by the authors, and exploratory interviews conducted at the beginning of this study. Proposition 1 establishes a relationship between network location and attributed influence. Propositions 2 through 5 concern the effects of strategies on referral centrality and attributed influence. Propositions 6 through 11 concern the effects of contextual constraints on centrality and attributed influence. Operationalizations of these propositions are shown in the Appendix.

### Attributed Influence as a Result of Centrality

**Proposition 1.** Relatively central organizations will have greater influence across three types of network relationships: (1) referral exchanges; (2) joint program strategies; and (3) formal and informal strategic communications.

This research examined three types of exchanges between social service organizations, as noted in the proposition. In each of these exchange relationships, it was proposed that being more central in an exchange network will have the positive outcome of improving an organization's attributed influence. Client referral is clearly the most important of these forms of exchange for manpower organizations. Clients can be viewed as: (1) a generalized resource, because they are used to obtain other resources, such as funds; (2) a liability requiring greater investment of other resources, such as funds and personnel; or (3) an idealized purpose, valued by actors who have been socialized into a professional commitment. Regardless of an agency's motivation for exchanging clients, these transactions represent the most important purpose for developing an interorganizational network among these agencies. Consequently, strategies to achieve centrality in communication

and joint program networks can be viewed as strategies to enhance position in the referral network.

Centrality scores in the communication and joint program networks were used in two ways in this study. First, these scores were treated as predictors of reputational influence, along with centrality in the referral network, as stated in proposition 1. Second, they were viewed as strategic actions used by an organization to increase its centrality in the referral network.

### **Organizational Strategies Affecting Referral Centrality**

Strategies for establishing interorganizational referral linkages include: establishing joint programs; engaging in formal and informal communications with other organizations; inviting administrators of other organizations to serve on an advisory board; and targeting services to particular clients in the system.

**Proposition 2.** A joint program strategy will increase the flow of clients through an organization and enhance its attributed influence.

Joint programs with other organizations can ensure an adequate supply of clients or suitable output capacity for clients. While a joint program results in a certain loss of autonomy, it gives an organization access to more resources and increases the possibilities for referral exchange.

**Proposition 3.** Strategic formal and informal communication linkages will increase both an organization's knowledge of critical contingencies affecting attributed influence and its client intake and output options.

One important strategy in interorganizational networks is selectivity in the release of information about activities and preferences (Rogers and Maas, 1979). While the resource-dependence model treats information as a resource, advocates of an information-processing model (e.g., Pondy, 1977) argue that information is the medium through which influence and control are transmitted. Examples of this are supplying other organizations with strategic information about agency activities and initiating personal communication with decision makers in other organizations in order to frame decision premises, define alternatives, influence actual decisions, or block implementation of decision results (Bachrach and Baratz, 1970). The present study examined two communication mediums: formal transmittal of written correspondence, brochures, and program announcements; and interpersonal exchanges between organization representatives.

**Proposition 4.** The placement of administrators from other organizations on an advisory council or board of directors will enhance influence with organizations referring clients or providing services.

Cooptation, which Thompson (1967: 35) defined as "the process of absorbing new elements into the leadership of the policy-determining structure of an organization as a means of averting threats to its stability and existence," is an important strategy in interorganizational relations (Pfeffer and Salancik, 1978). One way to increase network centrality is to create advisory councils or boards of directors on which elite members of other organizations are invited to serve. This strategy increases a social service organization's visibility and legitimacy with organizations that provide clients and services. In addition, because of their stake in the success of the organization, board members may volunteer resources, information, and expertise.

**Proposition 5.** Providing services for clients who are less difficult to treat will facilitate the maintenance of a large number of interorganizational relationships, which will increase attributed influence.

A strategy of some agencies is to conserve resources such as funds, personnel, and equipment by refusing to accept clients who are difficult and costly to serve successfully. This can be an effective strategy, since the overall quality and quantity of services provided by an organization is reduced by admitting clients who have no hope of rehabilitation. Organizations that accept difficult cases expend their scarce resources on a few clients. Thus, they are unable to handle large numbers of linkages with other organizations and are unlikely to be central actors in a referral network.

### **Constraints upon Referral Centrality**

Autonomy of local organizations, organization size, geographic proximity to other organizations in the network, ideological consensus, mandated relations, and interpersonal ties with staff members of other organizations will have a demonstrable effect on centrality and attributed influence.

**Proposition 6.** Locally administered organizations will be better adapted to local constraints and will therefore have greater attributed influence than state or federal organizations.

Levine and White (1961) and Galaskiewicz (1979) proposed that locally administered organizations will be more responsive to local conditions and thereby gain advantage over externally administered organizations. Interviews conducted for this study with administrators in both types of organizations suggested that administrators of federal and state agencies believe they must follow the dictates of central offices. These dictates function as contextual constraints.

**Proposition 7.** Larger organizations, in terms of number of staff members and number of services offered, will be less constrained in obtaining and making client referrals and will have more attributed influence.

Kimberly (1976) argued that different measures of size have different theoretical implications and are, in general, lumped together without attention to those differences. The present study examines two measures of size: number of staff members and number of services. Both measures are predicted to be positively associated with referral centrality. A large staff tends to increase an organization's visibility in the community. A large organization can maintain more interorganizational ties, can process more clients (Galaskiewicz, 1979), and can offer a wider range of services (Rogers and Maas, 1979). Offering numerous services, in turn, enables the organization to establish linkages with a variety of interorganizational networks and client pools.

**Proposition 8.** Organizations more geographically proximate to other community organizations will receive more referrals and will consequently have more attributed influence.

Proximity should enhance referral flow between organizations because it facilitates communication between staff members, increases the chance of random contact between staff members, and reduces the referral costs borne by clients. Rogers and Maas (1979) found that proximity was significantly related to the number of joint programs established between social

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service agencies in 16 counties. Several respondents in the sample for the present study stated that relations between the members of nearby organizations were better because of increased opportunities for frequent interaction among staff members. These respondents also proposed that proximity increased referral flow because clients were more likely to travel between organizations.

**Proposition 9.** Organizations having ideologies dissimilar to the ideologies of other network organizations will be less central and will have less attributed influence.

The resource dependence model of interorganizational relations de-emphasizes the role of ideology (Benson, 1975; Aldrich, 1976). Economic and political factors are held to be more salient. This view is buttressed by examples of organizations that have transformed their ideologies in the face of changing resource circumstances (Clark, 1965). An opposing view has been proposed by the authors of several empirical studies (e.g., Warren, Rose, and Bergunder, 1974). These authors proposed that ideology is an antecedent that defines acceptable exchange relationships. The position taken in the present study is that decision makers operate within a fairly wide zone of indifference regarding this criterion for selecting exchange partners. As long as there is not a wide discrepancy in ideology, it will not be a salient issue. However, organizations with ideologies that deviate sharply from the norm will be located on the periphery of the referral network.

**Proposition 10.** Organizations having a greater number of imposed relationships with other organizations will be more likely to be central but will have less attributed influence.

Referral linkages between manpower organizations are sometimes mandated by law (Hall et al., 1977). It is predicted that increased centrality in the referral network will occur as a result of these mandates (Aldrich, 1976). However, there is likely to be a decrease in attributed influence, since mandated relationships will increase vulnerability to the demands of other organizations and will decrease autonomy. Attributed influence will decrease as perceived fate control decreases (Pondy, 1977; Whetten and Leung, 1979).

**Proposition 11.** Organizations having a large number of interpersonal ties with other organizations will be more able to take a central position in the referral network and will have more attributed influence.

Interpersonal ties between organizations increase knowledge of exchange opportunities and increase the predictability of the exchange process (Whetten and Aldrich, 1979). In the present study, a distinction was made between social ties — such as those based on club memberships, attending the same schools, or growing up together — and work ties. It is predicted that work ties, such as transfer of persons from one agency to another, will have a stronger effect on referral centrality than social ties, because the former will produce more relevant information.

## METHOD

### Manpower Networks

This study was conducted in 17 communities of a large mid-western state. Each community was treated as a population of



organizations within which business, government, and social service agencies were treated as distinct sectors. After conducting field interviews and compiling lists of social service agencies in the communities, it was possible to separate each sector into action sets (Aldrich and Whetten, 1981). One of these action sets consisted of public, voluntary, private for-profit, private not-for-profit organizations, and religious and ethnic interest groups providing manpower services to economically disadvantaged adults. These organizations provided both people-changing and people-processing services (Hazenfeld, 1972). Their technologies were labor intensive and their staffs varied considerably in professional background and orientation. Manpower organizations included in the study offered at least one of three kinds of services: (1) outreach; (2) counseling, advocacy, training, or rehabilitation; and (3) placement in public or private sector jobs.

### Data Base

Data for this study were generated from interviews with the top administrators of 316 manpower organizations in the 17 communities. The number of organizations in each community network ranged from 15 to 27, with an average of 18.6. The key informant approach to data collection (Seidler, 1974) was used. While agency administrators have been shown to be poor informants for specific details of interorganizational exchanges (Whetten and Sz wajkowski, 1978), analysis of respondent bias in similar organizations showed that these agency directors would be able to provide the information requested in this survey (Whetten and Leung, 1979). Their familiarity with this information is greater because of the small size of these organizations (mean staff size of 23.2) and the practice of appointing agency directors from within the staff. There were a few cases where a director had been in the agency for less than six months and was unable to answer all questions. In these instances either an assistant or a line supervisor was also interviewed.

Two additional data sources were used. Agency documents were reviewed and, in the case of public agencies, telephone interviews were conducted with regional, state, and federal level administrators.

The data were analyzed as one large population of 316 organizations. The study was conducted in 17 counties so that the effect of county-level contextual factors on network configuration could be examined. This analysis will be presented in a subsequent paper. It was expected that county characteristics would affect overall network characteristics (e.g., dispersion, size) but would not affect the location of an individual organization in a network. Two tests were conducted to determine whether county characteristics were contaminating analyses of the determinants of organizational location. First, dummy variables for each county were added to the two regression equations shown in Table 2. None had significant betas. Further, the addition of the dummy variables added only 2 percent to the  $R^2$  in both equations. Second, community size, various poverty indicators, indicators of economic activity, and network size were controlled for. Effects were again found to be insignificant.

### Measures of Attributed Influence and Centrality

Attributed influence was measured by asking respondents to identify the network members they felt were particularly influential in shaping the formation of policies related to employment and training activities (Laumann and Pappi, 1976; Galaskiewicz, 1979; Rogers and Maas, 1979). Centrality scores were computed using the Diagraph Analysis Program developed by Laumann (1977). The program first calculates a reachability matrix based on binary data. Reachability is defined as the minimum number of links required for one organization to reach another. It represents, therefore, both direct and indirect ties in the network. In the present study centrality was measured as an organization's distance from the centroid of the reachability matrix. In the case of referrals, more central organizations were those having the greatest number of referral ties to other organizations and having the shortest reachability paths in their indirect ties to peripheral organizations. Relative centrality was calculated similarly for joint program networks, formal communication networks, and informal communication networks. Since the magnitude of centrality computations will be severely affected by the number of actors in a network, centrality scores were standardized for each county to allow for comparison across networks.

### RESULTS

To test proposition 1, network centrality in four types of interorganizational relationships was examined to determine if relative centrality was associated with greater attributed influence. To test propositions 2 through 11, the effects of organizational strategy and contextual constraint variables on referral centrality and attributed influence were examined. To test the model of interorganizational network relations in Figure 1, the causal links between constraints, strategies, referral network centrality, and attributed influence were tested using path analysis.

#### Evaluation of the Propositions

The correlations in Table 1 were supportive of proposition 1. The mean correlation was .60. Attributions of influence appeared to be related to position in the four networks. From this data it was not possible to ascertain whether these attributions of influence were the result of dominating behaviors or simply of the visibility afforded central actors. Information from interviews suggests that the behavior of central organizations was

Table 1

#### Correlations Among Centralities in Four Networks and Attributed Influence (*N* = 316)\*

	S1†	S2	S3	Y1
S1 Joint programs				
S2 Informal communication	.76			
S3 Formal communication	.65	.61		
Y1 Referrals	.58	.61	.60	
Y2 Attributed influence	.66	.68	.57	.56

\*All correlations are significant at the .001 level.

†S = strategy variable; Y = dependent variable.

Table 2

**Separate Regressions of Referral Centrality and Influence on Strategies and Constraints (N=316)**

Strategies & constraints	Referral centrality Y1*	Attributed influence Y2
S1† Joint programs	.19***	.22***
S2 Informal communications	.24***	.29***
S3 Formal communications	.27***	.17***
S4 Advisory board	—	—
S5 Difficult clients	-.15**	—
C1 External administration	—	.14**
C2 Staff size	—	-.11**
C3 Service size	.14**	.17**
C4 Proximity	.08*	—
C5 Ideological conformity	—	—
C6 Mandated ties	.36***	-.10**
C7 Interpersonal ties	—	—
C8 Previously worked together	—	.17***
R <sup>2</sup>	.60***	.60***

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$

\*Y=dependent variable

†S=strategy variable; C=constraint variable

the basis for these judgments. For instance, CETA was one of the two most central actors in 13 of the networks. CETA was repeatedly described as "the richest kid on the block." "They used their money and clout to muscle into old established organizational cliques." It appeared that people were attributing power to CETA on the basis of its actions associated with its movement into the center of the manpower network.

Table 2 displays the regressions of referral network centrality and attributed influence on strategies and constraints. The results for joint program and communication strategies (S1 through S3) were all in the predicted directions. Working with the more difficult-to-serve clients (S5) had no relation to attributed influence and was inversely related to referral centrality. Hence, as predicted, problematic clients were being processed by peripheral organizations. Offering advisory board seats to other agencies (S4) appeared to be a weak strategy. It neither improved referral centrality nor increased attributed influence. These results provided strong support for propositions 2 and 3, concerning joint programs and communication, moderate support for proposition 5, concerning difficult clients, and no support for proposition 4, concerning the use of advisory councils.

Contrary to the prediction of proposition 6, external or local administration did not significantly affect referral network centrality. Further, administration by a federal or state body increased the likelihood that an organization would be considered highly influential. One explanation for this unpredicted result is that the federal and state sponsored agencies tend to be the older and better established members of the manpower systems. Perhaps deference is given to this "old boys' " network.

Using separate indicators of size proved to be a useful approach. Staff size and service size were related quite differently to both referral network centrality and attributed influence.

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Maintaining many services was positively associated with centrality and attributed influence, while having a large staff was inversely related to attributed influence. One explanation may be that the agencies in the present study all had small staffs (mean of 23.5), so that staff size was not a meaningful variable in this sample. Another explanation might be that smaller staff size indicated a strong professional orientation, which would tend to make an agency more responsive to the needs of other network members. Large organizations may have been perceived negatively as being preoccupied with internal bureaucratic operations and procedures.

Geographic proximity showed a slight positive relationship to referral network centrality. One explanation for the weakness of this result is that the agencies were simply not dispersed enough for differences to be significant. Rogers and Maas (1979) found that geographic proximity was a significant predictor of joint program formation between rural development organizations. Since those organizations tended to be more widely dispersed than manpower agencies, whose clients tend to be concentrated in urban centers, proximity would probably play a more significant role in rural settings.

Ideology was not predictive in either of the regression equations. This result supports the resource dependency position that ideology is not an important consideration in interorganizational relations. Political and economic rather than ideological interests would appear to be paramount in these networks.

The betas for mandated ties (C6) supported the logic of proposition 10. While this constraint was positively related to referral network centrality, it was negatively related to attributed influence. Mandates produced a larger volume of referrals but limited an organization's options in selecting relationships. Hence, organizations constrained by many mandates were viewed as having less influence over manpower policies.

Finally, only one of the two measures of interpersonal ties, having previously worked with members of other organizations, was significant. While work ties were apparently not being used to generate referrals, they did enhance an organization's visibility in the network and, thus, its attributed influence. This is similar to the finding in Whetten (1978) that community leaders' ratings of manpower organizations were related to extensive staff participation in extraorganizational activities. Visibility appears to have a significant influence on how others perceive and evaluate these organizations.

In summary, the separate regression analyses of network centrality and attributed influence gave partial support for propositions 7, 8, and 10 and no support for propositions 6 and 9.

**A Path Analysis Test of the Causal Model**

These results were an incomplete test of the model in Figure 1, since they did not show the relative contributions of the strategy and constraint variable sets on the referral process, nor did they show how strategies, constraints, and referral network centrality combined to account for attributed influence. In order to fully test the model, it was necessary to reduce the number of strategy and constraint variables, since a path analysis model with 15 variables would be virtually incomprehensible. The

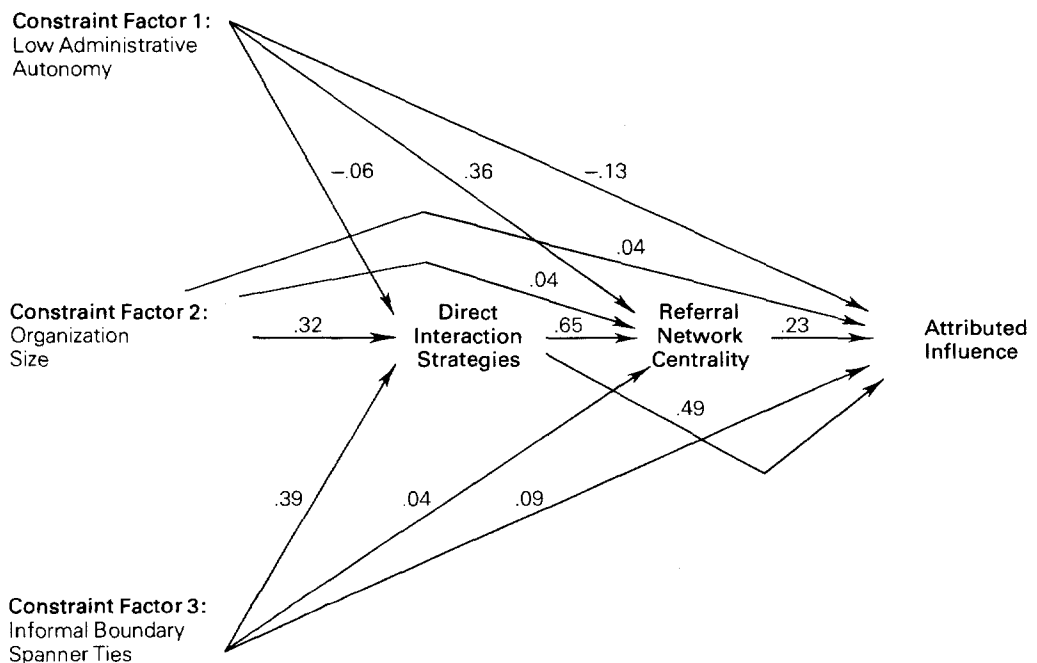
Table 3

**Results from Factor Analysis of Strategies and Constraints Variables\***

Variables		Factors		
Strategies		SF1	SF2	
S1	Joint programs	.89	.19	
S2	Informal communication	.83	.13	
S3	Formal communication	.77	-.20	
S4	Advisory board	.22	.15	
S5	Difficult clients	.02	.57	
Percent variance explained		.85	.15	
Constraints		CF1	CF2	CF3
C1	External administration	.64	-.04	-.13
C2	Staff size	.06	.52	-.17
C3	Service size	-.18	.49	.07
C4	Geographical proximity	-.02	-.03	.18
C5	Ideological conformity	.10	.21	.00
C6	Mandated ties	.92	.12	.01
C7	Interpersonal ties	.00	.38	.54
C8	Previously worked together	-.09	.26	.57
Percent variance explained		.49	.41	.10

\*The SPSS Factor Analysis program was used in this analysis. Factors were rotated using the varimax technique.

strategy and constraint variable sets were therefore factor analyzed separately. The results are shown in Table 3. One factor (SF1) emerged from the five strategy variables that explained 85 percent of the variance. This factor reflected direct interaction strategies used by organizations to increase their centrality in the referral network. Since it accounted for 85 percent of the common variance between these five strategy variables, and since the second factor had only one variable with a high loading, only the first factor was used in subsequent analyses.



Note: The  $R^2$  for referral centrality and perceived influence is .56.

**Figure 2. Path analysis of a revised causal model.**

Three interpretable factors emerged in the factor analysis results for the constraint variables. The first factor (CF1) reflected low administrative autonomy due to the effects of centralized control of externally administered programs and legal requirements to interact with a large number of other organizations. The second factor (CF2) represented the scale of an organization's operations, measured by the size of its staff and the number of programs it offered. The third factor (CF3) reflected the use of informal interorganizational relationships between staff members. Although the third factor only explained 10 percent of the variance, it was included in subsequent analyses because it represented a neglected aspect of interorganizational relations.

Using these factors, a path model was constructed. The results of analysis of this model are shown in Figure 2. First, the effect of dropping two strategy variables and two constraint variables and grouping the remaining variables into four indices on the predictive power of the model proved to be modest; the  $R^2$  for attributed influence only dropped to .56 from .60. Second, the direct effects of referral network centrality and strategies on attributed influence were significant, as predicted. Third, the direct effects of the three constraints on attributed influence were not significant. Fourth, the indirect effect of strategies on attributed influence through referral network centrality was substantial (.15). Fifth, two of the constraint indices (CF2 and CF3) had significant effects on strategies, as predicted. Sixth, only one of the constraint indices (CF1) had a significant effect on referral network centrality.

These results suggest two modifications of the model in Figure 1. First, the arrow from constraints to attributed influence should be dropped. While contextual constraints affected the attribution of influence among network members, Figure 2 shows that this effect was indirectly transmitted through referral network centrality and strategies. Second, the constraints variable in the model should be disaggregated to show different types of constraints having different relationships with other variables in the model. Specifically, low administrative autonomy (CF1) appeared to affect the network location of an organization. Organizational size (CF2) and informal ties between boundary spanners (CF3) appeared to constrain an administrator's choice of strategies for establishing linkages with other network members. The observed effects of constraints on strategic choice and on referral centrality were both predicted by our model, but results point out the need for further refinement of the constraint construct to pinpoint the specific effects of various types of constraints.

## CONCLUSIONS

Four conclusions may be drawn from this study. First, these results demonstrate the value of including both organizational strategies and environmental constraints in a model of interorganizational relations. Recent theoretical work by Boje (1980a, 1980b) and Rumelt (1979) has asserted that studies of organizational strategy and studies of population ecology make widely different assumptions about the role of strategic choice and environmental constraints in interorganizational relations. This model offers a means of integrating the two schools of thought.

Second, the results show that there are both costs and benefits associated with externally imposed interorganizational ties. The fact that the constraint of mandated relations was the best predictor of referral network centrality, but was negatively related to attributed influence, suggests that central organizations with low autonomy will have low status. It is usually assumed that network centrality is beneficial because it increases an actor's ability to influence resource transactions between network members. However, it has been argued that central actors are actually in the position of greatest dependence because they are vulnerable to excessive and conflicting expectations (Thompson and McKewn, 1958; Pandy, 1977). Constraints on the decision-making process breed internal frustration and dissatisfaction, and attributed influence is low because the organization is perceived as not controlling its own fate.

Third, these results underscore the robustness of the relationship of centrality to attributed influence that has previously been demonstrated at intraorganizational levels of analysis. It appears that the distinctive properties of interorganizational networks do not significantly interfere with this relationship. In this study, the most consistent predictors of referral network centrality and attributed influence were the number of joint programs and the extent of formal and informal communications.

Finally, the past emphasis on dyadic analysis of interorganizational relations clearly has limitations, since it ignores the fact that a relationship between any two organizations is strongly influenced by network context. This study suggests that information about network centrality will improve predictions of the form, stability, and usefulness of dyadic linkages between network members.

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## APPENDIX: Measurement of Study Variables

**Joint Programs.** Persons interviewed were asked to list organizations with which they had jointly planned and implemented any specific programs or activities during the past three years.

**Formal Communication.** Persons interviewed were asked to list organizations from whom they regularly received newsletters, annual reports, or other information. The most central organization was the one whose formal communications were more widely received by other organizations.

**Informal Communication.** Persons interviewed were asked to indicate those organizations for which they had personally met with the administrative director during the last year to discuss the activities of their respective organizations.

**Client Referral.** Persons interviewed were asked to list organizations to which their organization commonly sent adult disadvantaged clients and to indicate the approximate number of clients sent to each organization. Referrals received was not measured, since most manpower programs have ample clients requesting services. The critical contingency was to get other organizations to accept clients as referrals.

**Advisory Board.** Persons interviewed were asked if their organization had a board of directors or advisory council.

**Attributed Influence.** Persons interviewed were asked to list organizations that were very influential in shaping community policies related to the provision of employment and training services to disadvantaged adults. The number of nominations received by each organization was counted.

**Difficult Clients.** This was measured through calls to regional, state, and federal administrators, as well as calls to all local agencies. The measure was the number of problems of the typical client served by an agency. A client with a single problem was assumed to be the least difficult to serve. Clients having two or three problems were viewed as moderately difficult. Clients with more than three problems were viewed as most difficult.

**Ideological Conformity.** Factor analysis of 12 interview items yielded three types of ideologies: (1) blaming the client, (2) blaming the environment, and (3) blaming the system. Items with loadings above .40 were weighted with factor weights, standardized, and summed to create the three scores.\* The final measure was computed by taking the mean difference between each organization and each other organization in the network for each ideological score. These mean differences were then added together to serve as an overall measure of ideological conformity. The scale was inverted so that a larger value represented greater ideological conformity.

**Geographic Proximity.** These data were compiled by the interviewers. The following scale was employed to measure geographic proximity: 6=same office of building; 5=within two blocks; 4=same side of city (3-15 blocks); 3=across town; 2=different city, but same county; 1=in next county. A score for each organization was computed by calculating the organization's mean distance to all other organizations in the sample site.

**External Administration.** This was ascertained through telephone calls to federal, state, and regional administrators and calls to all local agencies. The measure was binary state or federally administered versus locally administered agencies.

**Organization's Size.** Two measures were used. Staff size was determined through the interviews. Extent of services was determined through review of agency documents and phone calls to local administrators. Fifteen distinct services were identified.

**Mandated Linkages.** These were determined from a review of federal and state legislation and calls to federal, state, and regional administrators. The measure included mandates resulting from court orders, as in the case of

\* Specific interview questions and factor analysis results available from the first author.

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probation officers. The number of organizations mandated to work with each focal organization was computed.

**Interpersonal Ties.** Persons interviewed were asked to list organizations for which they had ties with one or more members. They were asked to select among the following reasons: (1) grew up with the person; (2) attended the same college or similar institution; (3) had common membership in a fraternal organization; or (4) had previously worked in an organization with the other person. The first three items indicated informal ties, the fourth item indicated work ties.