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THE DETERMINANTS OF PARTICIPATION IN INTRA- AND INTERORGANIZATIONAL COMMUNICATION NETWORKS

By

Eric Mark Eisenberg

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ABSTRACT

THE DETERMINANTS OF PARTICIPATION IN INTRA- AND INTERORGANIZATIONAL COMMUNICATION NETWORKS

By

Eric Mark Eisenberg

This study examined the determinants of individual communication network participation in two settings, intra- and interorganizational. Three models of network participation, direct, indirect, and interactive were proposed and evaluated in each setting. Following recent work in the areas of organizational environments (Aldrich, 1979; Weick, 1979) and interactional psychology (French, Rodgers, & Cobb, 1974; Kulka, 1979; Rausch, 1979), all forms of the models included both personal and consensual orientations toward individuals and situations. Conceptual and operational definitions of network participation were drawn from recent theoretical and empirical work within the communication network paradigm (Farace, Monge, & Russell, 1977; Roberts & O'Reilly, 1978; Rogers & Kincaid, 1981).

Data was collected in two settings to test the models of network participation. The intraorganizational sample consisted of 173 employees of a research and development firm in Northern California. The interorganizatonal sample included 90 representatives of 44 health-related organizations in a major midwestern city. Three levels of tests were

conducted for each model. First, macroanalyses were done to determine whether the model as an overall system of equations provided a reasonable fit to the data. Next, microanalyses were performed which tested the substantive relationships implied by each model. Finally, the three models were compared within each sample to ascertain which provided the best explanation of individual communication network participation.

The results of the macroanalyses revealed that all three of the models in both samples provided a reasonable fit to the data. Microanalyses indicated that while support for the measurement portions of the models was unequivocal, only some of the theoretical relationships were correctly specified. The major conclusions of the microanalyses were that: (1) the personal view of the situation, defined as perceived dependence of one's job on others, was the best predictor of intraorganizational network participation; and (2) the consensual view of the individual, defined as degree of professional involvement, was the best predictor of interorganizational network participation.

Comparison of the models revealed that the indirect model provided the best fit to the data in the intraorganizational sample. In other words, personal perceptions of individuals and situations tend to mediate the relationship from individual and situational characteristics to network participation. The interorganizational comparisons were less definitive. The direct model was judged superior to the indirect and interactive models, but more work is required to advance this conclusion beyond the speculative stage.

Limitations of the study and directions for future research with these and related models were identified. In particular, the three theoretical distinctions made in this study (intra/interorganizational;

individual/situational; and personal/consensual) were advanced as building blocks for a theory of communication network participation. This theory should (1) be applicable across a variety of setting, (2) recognize the potential multiplexity of interpersonal linkages, (3) lay the groundwork for more dynamic models which account for the mutual definition of persons and situations, and (4) consider the philosophical implications of using personal or consensual data, and specifically the notion that personal and consensual orientations shape each other over time.

DEDICATION

To Lori, my soulmate.

Allons y!

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There are a number of people who have made my graduate career an intriguing and worthwhile one, and I would like to mention them briefly here. My strongest sentiments go out to my advisor and friend, Dr. Peter R. Monge. Through some yet unspecified process, he has taught me the value of intellectual rigor, without compromising the sheer joy in the tireless pursuit of ideas.

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INTRODUCTION

A key activity in the process of science is the integration of diverse, seemingly unrelated findings into general explanatory frameworks or theories. It is only when this kind of integration has occurred that individual research findings can truly be made sensible, and implications for theory and practice can be fully exposed. One area which is ripe for such an integration is that of communication network research.

Communication networks have been the subject of considerable research attention in a variety of contexts. Recent work has reflected a desire among researchers to develop an integrating paradigm or theoretical framework within which future network research can proceed. Monge, Edwards, and Kirste (1978) identified the beginnings of an "interdisciplinary synthesis" which is being undertaken by researchers interested in communication networks from a diverse variety of disciplines. Granovetter (1979) has identified the "theory gap" in network research, and has encouraged future work to include a more complete explication of chosen theoretical frameworks. Compendiums by Leinhardt (1977) and Holland and Leinhardt (1979) have contributed somewhat to the emergence of an overriding conceptual framework. Recently, Rogers and Kincaid (1981) attempted to integrate much of communication network research under what they have identified as the "convergence model" of human communication.

Admittedly, the task of integrating such a diverse area of interest is formidable. A more sensible course would be to identify some segment of the research which is somehow representative of the whole, and to

develop a framework to better explain it. Since a substantial portion of social network research has focused on communication contacts at work (i.e., organizational communication networks), it is participation in these networks which is the specific focus of this paper.

Two distinct areas of research have emerged which apply the concepts and techniques of social network analysis to organizational phenomena. The first, organizational communication research, has used communication network analysis to identify more accurately the "relational qualities of organizational life" (Roberts & O'Reilly, 1978) through the mapping of an organization's "actual" or emergent structure (Monge, Edwards, & Kirste, 1978). A fair amount of research has been conducted in recent years which examines the importance of communication network participation in organizations (Farace, Monge, & Russell, 1977; Lincoln & Miller, 1979; Moch, 1980; Monge et al., 1978; Roberts & O'Reilly, 1978; Rogers & Kincaid, 1981). Research in this area has been predominantly exploratory and atheoretical, as researchers have attempted to identify those conditions under which certain communication structures emerge, and the impact of specific interaction patterns on other organizational outcomes.

A second line of research which applies social network analysis is that of interorganizational relations, through the study of patterns of interagency cooperation and coordination. Through the implementation of joint programs and other, less formal agreements, agencies attempt to reduce duplication of services and to make more efficient use of scarce resources (Aiken & Hage, 1968; Benson, 1975; Evan, 1966; Levine & White, 1961; Litwak & Hylton, 1962; Offerman, 1976; Turk, 1970). Much of the research in this area has been cast in terms of social exchange theory (Homans, 1961) and theories of organizational environments (Aldrich, 1979; Dill, 1958; Weick, 1979).

To date, there has been little integration of these two lines of research, although they focus on the same general question: What factors influence the extent to which people in organizations participate in communication networks? This paper develops and tests a model of the determinants of individual communication network participation which is applicable to both inter- and intraorganizational settings. The terms individual and communication need to be highlighted here, since the model explicitly addresses the determinants of information exchange at the individual level of analysis.

In addition to the comparison of inter- and intraorganizational determinants, this study also undertakes several other comparisons which have not been made in previous network research. First, borrowing from foundational work in interactional psychology (Endler & Magnusson, 1976; French, Rodgers, & Cobb, 1974; Kulka, 1979; Lewin, 1942; Schneider, 1981; Terborg, 1981), both individual and situational factors are included as determinants in the model, as compatible rather than as rival hypotheses (Glick, 1980). Second, personal and consensual views of both situational and individual characteristics are included, in keeping with recent work on organizational environments (Aldrich, 1979; Weick, 1979) as well as recent critiques of the job characteristics model (Aldag, Brief, & Barr, 1981; Roberts & Glick, 1981). Third, and finally, three different forms of the model, one containing only direct effects, another both direct and indirect effects, and the third direct and interactive effects are evaluated and compared to determine which provides the best account of communication network participation. The overall test of a model (or system of causal relationships), when taken in conjunction with the more microscopic tests of those relationships, provides a more complete

understanding of the explanatory process most consistent with the data.

The dissertation is presented in four chapters. In chapter one, three things are accomplished: (1) a rationale for the study of communication network participation is offered; (2) relevant literature from the inter- and intraorganizational areas is reviewed and shown to be subsumable under a general model of communication network participation; (3) the model and specific hypotheses to be tested are presented. In chapter two, the methods of the research are described, including a full description of samples, procedures, instrumentation and analyses. In the third chapter, the results of the study are presented within the context of the model and related hypotheses. Finally, in chapter four, these results are interpreted in theoretical and practical terms, and implications for future research are explored.

CHAPTER 1

PARTICIPATION IN INTRA- AND INTERORGANIZATIONAL COMMUNICATION NETWORKS: REVIEW AND SYNTHESIS

In this chapter, past research on communication networks existing within and between organizations is reviewed, and the case made for a general set of determinants of communication network participation which is common to both the intra- and interorganizational settings. This is accomplished in three major stages. First, a rationale for the study of the individual communication network participation in organizations is advanced. Second, both the intra- and interorganizational literatures are reviewed and the determinants of participation which are uncovered in each case are shown to be subsumable under a more general model of network participation. This model is organized according to two dimensions: individual-situational, and personal-consensual. Each dimension is presented as reflecting an important theoretical and epistemological distinction which is applicable to both literatures, and potentially other kinds of organizational behavior. Three alternative specifications of the model are developed: direct effects, indirect effects, and interactive. A rationale for the efficacy of each model in both of the settings is provided. Third, and finally, formal hypotheses are presented which represent the more macroscopic model tests and model comparisons, as well as the more microscopic tests of individual relationships within each model.

Rationale: Why Study Individual Communication Network Participation?

As is the case for the remainder of this paper, this question can be addressed within the context of intra- or interorganizational communication networks. Each is dealt with below, beginning with intraorganizational network participation.

Intraorganizational Network Participation

One topic of continued interest among organizational communication scholars is the differential involvement of individuals in communication networks (Farace, Monge, & Russell, 1977; Roberts & O'Reilly, 1978; Rogers & Kincaid, 1981). Communication networks, defined as the "repetitive patterns of interaction among organizational members," make possible the sharing of information, achievement of goals, diffusion of new ideas, and the socialization and maintenance of organizational participants (Farace, Monge, & Russell, 1977). Different levels of participation in communication networks have been shown to have different effects on individual behavior. In their review of research, Rogers and Kincaid (1981) found that participation had an important impact on an individual's (1) physical and mental health, (2) role in the diffusion of ideas through the organization, (3) degree of influence in the organization, (4) academic success, (5) tolerance of ethnic differences, and (6) degree of upward social mobility. These findings clearly show that the study of communication network participation in organizations is likely to have important outcomes.

Much of the attention which has been paid to communication networks in organizations has focused on how and why they come to be (Farace, Monge, & Russell, 1977; Jablin, 1979). These studies, however, have typically focused on units of analysis other than the individual, such as the dyad,

clique, or network (Monge, Edwards, & Kirste, 1978). Studies which have explored the determinants of individual network participation are rare (Roberts & O'Reilly, 1978), and are greatly needed.

Interorganizational Network Participation

There has been considerable work in the interorganizational area which suggests the importance of studying individual participation in communication networks. Recently, Miller (1980) reported the finding that:

> . . . network centrality, measured sociometrically, was in fact a better predictor of the participant's community contact and community activism than their personal attributes, the technical resources and skills they brought to their work, or the formal status or autonomy they had achieved in the agency that employed them. (p. 479)

Others have attempted to identify the "dimensions" of interorganizational activity. These taxonomies have typically included communication or information exchange as a major component (Aveni, 1978; Gerlach & Hine, 1970; Mitchell, 1969; Van De Ven, Walker, & Liston, 1979). Cook (1977) summarizes Aldrich (1974):

> The flow of resources represented in terms of a network of exchange relations among organizations may take an entirely different form from the flow of communications among the same set of organizations; and the degree of overlap of these two networks may be an important feature of the interorganizational field. (p. 79)

Another group of researchers (Klonglan, Warren, Winkelpleck, & Paulson, 1976; Molnar & Rogers, 1978; Rogers, 1974) also included information exchange as a critical dimension of interorganizational cooperation. These writers view the role of information exchange among individuals from different organizations (usually the directors of these organizations) as an interim stage in the development of a more formal, materials-based

relationship. Numerous others (Benson, 1975; Eckstein, 1977; Galaskiewicz, 1979; Levine & Roy, 1979; Sarason & Lorentz, 1979) have acknowledged the importance of communication contact among key interorganizational decision-makers in the development and maintenance of effective interorganizational relations (see also Hage & Dewar, 1973).

In summary, both the inter- and intraorganizational literatures approach individual communication network participation as a critical component of organizational life, and one which has important consequences. We know that participation in communication networks can have important outcomes; what, then, causes participation? It is to this question that we now turn. This study posits and evaluates a general model of the determinants of individual communication network participation in two settings, intra- and interorganizational. In the next section, determinants which have been identified in past research are reviewed in light of this general model of network participation.

Research on the Determinants of Communication Network Participation

This section presents the determinants of communication network participation which have been distilled from the intra- and interorganizational literatures. Within each section, situational determinants are discussed separately from individual determinants whenever possible.

Participation in Intraorganizational Communication Networks

As was noted earlier, studies which examine the determinants of individual communication network participation are few in number (Roberts & O'Reilly, 1978). Research in this area has often focused on the dyad, clique, or network as the unit of analysis. Further, intraorganizational

network research has been significantly more atheoretical than has inter-organizational network research (Granovetter, 1979). A few studies have been done which have examined the situational determinants of individual communication network participation.

Situational determinants. Monge, Edwards, & Kirste (1978) reviewed literature which addressed the determinants of communication structure in large organizations. They found that degree of communication involvement was correlated positively with proximity to others in the work group or organization, as well as with certain task and technology variables (James & Jones, 1974; Mohr, 1971). Variables such as the differentiation of jobs, density of people in the work area, and interpersonal proximity have been found to be much better predictors of amount and quality of communication than the individual measures seniority and age (Form, 1972). In addition, Blau (1954) and Wade (1968) found that total amount of communication is positively correlated with the extent to which employees are given discretion over the performance of their work.

The enormous literature of task design, job characteristics, and job enrichment (Hackman & Lawler, 1971; Pierce & Dunham, 1976; Roberts & Glick, 1981) is relevant here. This area of study operates from the assumption that changes in task design will affect the affective, behavioral, and motivational potential of jobs. Unfortunately, the behaviors studied as dependent in this approach are for the most part absenteeism, performance, and turnover (e.g., Wanous, 1974; Orpen, 1979) and not participation. Although numerous studies have uncovered relationships between task characteristics and employee "responses" (affective and behavioral) (cf. Roberts & Glick, 1981) there has been substantial confusion concerning operationalizations and the functional form of the

task characteristics-employee responses relationship. These problems have prevented this area from moving beyond the explanatory stages (Pierce & Dunham, 1976; Roberts & Glick, 1981; White, 1977).

Considerably more research attention has been directed towards the effects of individual characteristics on intraorganizational network participation. These are reviewed below.

Individual determinants. The most common finding relating individual characteristics to network participation is that communication involvement is positively associated with an individual's informal status within a work group or organization (Monge et al., 1978). For example, network liaisons, those persons who are not themselves group members but connect various groups, have in general higher status than non-liaisons (Frost & Whitley, 1971).

The different characteristics associated with liaisons have been documented by a variety of researchers (Amend, 1971; MacDonald, 1970; Schwartz, 1968). Porter and Roberts (1973) have argued that:

> Certain individuals probably have a much greater propensity for wanting to serve as key communication links than do other individuals, thus indicating that personality factors may play an important role in the quality and quantity of such communication. (p. 55)

This argument has been supported empirically. Monge et al. (1978) report that different communication network roles (which are associated with different levels of network participation) are characterized by different personality characteristics and behavioral tendencies. For example, Roberts and O'Reilly (1974) found that network participants had significantly higher mean rank and tenure, and were older than isolates.

Lincoln and Miller (1979) examined the determinants of work and friendship network participation in five organizations. They employed

the following rationale:

> By examining the characteristics of persons in organizations that determine the sequences of direct and indirect ties between them, we arrive at insights into organizational communication processes . . . (p. 183).

Lincoln and Miller use the same operationalization of individual network participation as is employed in this study. They conclude that:

> . . . certain attributes of organizational participants, particularly that confer status both in the organization and in the larger society, influence network ties by placing high status persons in central positions . . . the number of channels converging on an individual also increases with education . . . (p. 196-197).

Lincoln and Miller argue further that ". . . network patterns in organizations may be responsive both to situational contingencies and to lasting characteristics of the actors involved" (p. 183), although they provide scant empirical support for the effects of situational characteristics. A similar argument, however, has been made by Roberts and O'Reilly (1978) in their discussion of communication roles. They concluded that:

> Some antecedents, no doubt, are determined by the environments in which individuals work (e.g., Hage, Aiken, & Marrett, 1971). However, others are likely to be characteristics of the individuals themselves (e.g., Kernan & Herman, 1972; Zajonc & Wolfe, 1966). (p. 291)

In summary, while much of the work has been atheoretical, both situational and individual factors have been identified as potential antecedents to intraorganizational communication network participation. The next section reviews the determinants of individual communication network participation which have been examined in the interorganizational setting. In a similar fashion to the previous section, individual and situational determinants are treated separately whenever possible.

Participation in Interorganizational Communication Networks

The social network paradigm has had numerous applications to networks whose "nodes are organizations" i.e., interorganizational networks (Lincoln

& Miller, 1979). Stern (1979) has observed that:

> Though much of the research based on network concepts and methods uses the interpersonal tie as the basic unit of analysis, a number of researchers have argued that network analysis may be applied to the examination of interorganizational ties (Aldrich, 1979; Benson, 1975). (p. 242)

The set of linkages which emerges among organizations has been alternatively described as an interorganizational field (Warren, 1967), organizational set (Evan, 1966), or interorganizational network (Galaskiewicz, 1979; Mitchell, 1969; Sarason & Lorentz, 1979; Turk, 1977). Benson (1975) and Aldrich (1979) have reviewed the interorganizational literature and distilled a basic set of concepts which are applicable to interorganizational network analysis.

Two approaches to the determinants of interorganizational participation are common in the literature. The first, or resource dependence model, focuses on the impact of tangible aspects of environments, essentially unmediated by organizational participants. The second approach corresponds most closely to the information flow model of organizational environments (Dill, 1958; Weick, 1979) and focuses primarily on the predispositions, characteristics and enactments of key decision makers as they impact on interorganizational behavior.

Beginning with the work of Levine and White (1961), which presented the resource dependence model of interorganizational relations, the primary goal of many studies has been to identify and describe the dimensions of coordination (or exchange) which characterize interorganizational relations. The dimensions which have been identified are surprisingly similar across studies, and have in general included resource, information, and social support components (Aveni, 1978; Benson, 1975; Mitchell, 1969; Gerlach & Hine, 1970; Galaskiewicz, 1979).

Other writers, however, have attempted to go beyond description and to investigate causal factors which might impact on interorganizational networks. In particular, researchers have investigated situational and individual characteristics as they impact on network participation. Each of these areas of research is addressed below.

Situational determinants. The majority of research which has been done on the determinants on interorganizational linkage formation has emphasized aspects of the situation which are tangible and economic in nature, such as organizational size or budget. Following Levine and White (1961) and to some extent Aiken and Hage (1968), researchers have argued that organizations in a community are in competition for scarce resources (Galaskiewicz, 1979) and will only establish linkages when they will facilitate goal attainment. In general, according to this viewpoint, interorganizational relations will be avoided, for fear of the accompanying loss of organizational autonomy (Aiken & Hage, 1968). In her review, Marrett (1971) concluded that interorganizational relations are primarily conducted to maximize resource gains while at the same time minimizing losses in power or organizational autonomy.

The resource dependence approach has two identifying characteristics: (1) situational or environmental factors which may affect participation are focused upon to the exclusion of the attitudes or behaviors of individual decision-makers; and (2) linkages between organizations are "reified" in that interaction is examined between formal organizations representing "key community actors" independent of organizational members or boundary role personnel (Galaskiewicz, 1979; Gillespie & Mileti, 1979).

The resource dependence tradition is neatly summarized in Benson's (1975) discussion of the "political economy" of interorganizational

relations. Although individual sentiments and interactions are discussed briefly in his model, they are clearly subordinate to the more "fundamental considerations" of resource exchange.

Aiken and Hage (1968) conducted one of the earliest studies which attempted to identify those factors which would facilitate interorganizational participation. In their study, they focused specifically on organizational characteristics which were associated with degree of participation in joint programs. They concluded that organizations which were complex, decentralized, had low levels of formalization and stratification, and had active internal communication channels were more likely to participate in joint programs.

Levine and White (1961) first applied social exchange theory (Homans, 1950) to the study of interorganizational relations with their introduction of the resource dependence model. In their ground-breaking work, they examined 77 health organizations in two communities, and classified them by degree and type of exchange (money, clients, services or information) in which they were typically engaged. Levine and White found that the two best predictors of degree of involvement in interorganizational relations were (1) degree of local dependence on resources (those who had external resources needed to interact less within the community), and (2) degree of domain consensus, or the overlap of goals and procedures between two organizations.

Dillman (1969) studied those factors which facilitated interorganizational relations among alcohol-related and other health agencies. He found that intensity of interorganizational relations was positively related to (1) size of the organization's resource base, (2) perceived interdependence, (3) goal diversity, (4) number of past transactions,

(5) support from an authoritative source, (6) threats of coercion, and (7) complementarities between the two organizations.

Galaskiewicz (1979) conducted a similar study to identify the determinants of interorganizational relations. In his study of organizations in a midwestern city, Galaskiewicz found support for the hypotheses that organizations which (1) control more expendable funds, (2) have a greater number of employees or members, and/or (3) are dependent upon the local community for cash flow will be more central in interorganizational networks.

Finally, Schermerhorn (1977) examined those factors which would influence individual administrators' participation in networks across 76 hospitals. The dependent variable in his analysis was "degree of information sharing activity," operationalized at the individual level of analysis. Schermerhorn found that hospital size and hospital type were both associated with degree of information sharing activity, such that individuals from community non-profit hospitals (as opposed to religious or government hospitals) and large hospitals (measured as number of active beds) were more active.

Schermerhorn (1977) also has argued that the individual is a key participant in interorganizational networks, and that individual characteristics have been a neglected area in interorganizational research. In the context of his study (described above), Schermerhorn contends that:

> It is reasonable to suspect, however, that the dependent variable may be in part subject to the influence of the environment . . . as well as certain personal characteristics of the responding administrators. (p. 149)

This assertion is supported by his data, which reveal a negative relationship from administrator tenure to information sharing, as well as a positive relationship from the administrator's perceived hospital task accomplishment

to information sharing activity. Schermerhorn is one of the few inter-organizational writers to recognize the potential impact of individual level characteristics, along with environmental factors, on individual network participation.

The literature which has been reviewed above for the most part reflects the prominence of what Aldrich (1979) has termed the "resource flow" view of organizational environments. This view effectively excludes the predispositions and enactments of the individual decision-maker. Instead, the resource flow model, of which the resource dependence model is a special case:

> . . . treats environments as consisting of resources for which organizations compete, with the level of resources and the terms under which they are made available the critical factors . . . the process through which information about environments is apprehended by decision-makers is not given much attention. (p, 110)

Stated differently, the resource flow view is a "natural selection" model which posits a direct relationship from the more consensual characteristics of the situation to individual behavior, one which is not mediated to a significant extent by the complexities of individual human information processing. Other researchers have taken exception to this view, however, and present a different answer to the question: "How do interorganizational networks come into existence?"

Individual determinants. Other writers have considered a much different set of individual-level determinants of interorganizational network participation. This approach is closely allied with the information flow view of organizational environments (Dill, 1958; Weick, 1969, 1979). The information flow view contends that individual decision-maker's predispositions, desires, and enactments of situational characteristics are the key determinants of interorganizational behavior

(Eckstein, 1977; Gillespie & Mileti, 1979; Schermerhorn, 1977). Aldrich (1979) argues that this approach:

> . . . relies heavily on theories of perception, cognition, and decision-making, focusing on environments as seen through the eyes of organizational members. The 'environment' thus consists of information serving as raw material and acted on by sentient actors. (p. 110)

Aldrich further states that:

> The main concerns of theorists adopting this perspective are with decision processes within organizations and with the conditions under which information is perceived and interpreted by participants . . . environmental elements--other organizations or individuals--are of no interest in themselves, but are only relevant insofar as information about such elements is attended to by organizational participants. (p. 122-123)

In other words, the information flow view is a "rational selection" model which focuses on individual characteristics of decision-makers and considers situational characteristics only to the extent to which they are enacted (Weick, 1979) by organizational participants.

Gillespie and Mileti (1979) have argued that interorganizational research from the resource dependence perspective does not effectively incorporate the true motivations of the community "ruling elite" who forge interorganizational linkages. Eckstein (1977), in her study of politicos and priests, contends that a complete understanding of the factors which influence interorganizational relations requires an examination of the:

> . . . indirect and informal ties established by specific group members acting in their own best interests as well as the formal and direct linkages between organizations. (p. 465)

Schulze (1961) has made a similar argument, which further incorporates the motivations of the individual decision-maker:

> Presumably (interorganizational) networks function as delivery systems that help to meet demands for goods and services in the community. It is clear, though, that they also function to protect certain special interests (1961), p. 1346).

Finally, Galaskiewicz (1979) highlights the role of the individual in interorganizational relations:

> . . . liquidity (of exchanges) also allows individual actors to 'wheel and deal' with one another, increase their power relative to other organizations, and ensure a position in the hierarchy of organizations which inevitably will evolve. (p. 1347)

White (1973) reviewed research pertaining to decision-making in interorganizational systems. He concluded that a major factor in interorganizational decisions was the selfish motivations of the individual participants. In other words, those variables which reflect an individual's desire to participate, for whatever personal or political reason, will lead to increased interorganizational network involvement.

Galaskiewicz and Shatin (1981) recently studied the determinants of interorganizational cooperation in both relatively stable and unstable environments. They found that "particularistic" or individual leader characteristics affected degree of participation: "In all, organizations were more likely to cooperate if leaders had overlapping organizational memberships." In organizations with uncertain environments, they found that leaders with similar ethnic and racial backgrounds cooperated even more (suggesting an interaction effect). They concluded that:

> . . . criteria other than those related to simple resource procurement, such as finding dependable interorganizational partners, are important in establishing interorganizational relations. (p. 445-446)

Galaskiewicz and Shatin (1981) also provided a specific contrast between individual and situational determinants of network participation:

> . . . we suggest that networking among organizations, here defined as the formation of cooperative relationships, can be based as much on particularistic criteria, such as the personal network of organizational leaders . . . as on strict cost-benefit calculations in terms of resource procurement. (p. 435)

Particularistic factors may include personal ends, or attempts to improve the organization's position in the community. The necessity for both kinds of determinants in a model of interorganizational participation is noted by Whetten (1981) in his recent model of interorganizational relations:

> In summary, successful voluntary coordination depends upon both perceptual assessments and resource and structural adequacy. Both are necessary and neither is sufficient for the initiation and maintenance of a voluntary coordinative linkage.

In summary, there have been two distinct lines of research which address the determinants of interorganizational relations. The first, or resource dependence view, is the more prevalent and focuses on the effects of tangible aspects of organizations and environments, unmediated by the perceptions of individual actors. The second line of research corresponds to the information flow view of environments, and focuses primarily on the characteristics of key decision-makers as the determinants of network participation.

One can conclude from this research that both situational and individual characteristics have been identified in both settings as potential determinants of network participation. Specifically, those task attributes or environmental characteristics which encourage perceptions of dependence, or which allow for greater proximity to others will also lead to increased network participation. In addition, those characteristics of persons or situations which lead to attributions of status are likely to bring about

increased network participation on the part of the higher status individual. Researchers who have examined the determinants of participation in intra- and interorganizational communication networks have arrived at similar conclusions. The degree to which an individual participates seems to be in part a function of situational and in part a function of individual characteristics or predispositions.

The similarities between the two literatures become more evident when one relates the concept of "organizational environment" to the more microscopic work or job environment surrounding an individual within an organization. Using this analogy, the theoretical distinctions which have been made between resource and information flows in the context of organizational environments could also be applied to models of job characteristics and work environments.

Implicit within each category of determinants (situational and individual) is an additional distinction with particular relevance for data collection and measurement in general. There are at least two views of an individual or a situation which could be assessed: the public or consensual view, which is the way the individual or situation is perceived in general, by most people; or the personal or enacted view, which is the way the individual decision-maker sees both him or herself as well as the situation. The next section examines the utility of this distinction for a model of network participation.

Personal and Consensual Views of Individuals and Situations

Throughout their discussion of the resource and information flow views of environments, writers have considered an additional distinction between types of determinants which has not always been obvious from their presentations (Aldrich, 1979; Roberts & Glick, 1981). For example,

the information flow view does not focus solely on what we have been calling "individual determinants;" situational factors are also considered, but only to the extent to which they are enacted by the individual decision-maker. Resource dependence studies have been conducted which attempt to assess situational characteristics, but do so through the self-reports of chief administrators, and therefore include individual perceptions in their analyses (Offerman, 1976). In general, it can be stated that information concerning both individuals and situations may be further cast along a continuum from more "consensual" to more "personal" observations. More personal views of individuals or situations are less tangible, public, or seemingly objective; they are enacted by the individual actor, and may or may not correspond to any other enactment. More consensual views, on the other hand, are less dependent upon individual enactments (e.g., budget size, year an organization was founded, annual income) and more verifiable (although not perfectly) across people.

A variation on this distinction appears in a model developed by French, Rodgers, and Cobb (1974) which includes four classes of determinants of behavior: subjective person, objective person, subjective environment, and objective environment. This model is described in detail by Kulka (1979) and appears in Figure 1.

More precisely stated, the French et al. (1974) model has four classes of determinants:

> (1) the objective environment, which includes aspects of the physical and social world which exist independently of the person's perception of them; (2) the subjective environment, representing the person's perceptions and cognitions or relevant aspects of his or her objective environment; (3) the objective person, referring to the objectively demonstrable characteristics of the person . . . and (4) the subjective person, the individual's reported perceptions or cognitions of his or her own characteristics. (Kulka, 1979, p. 56, italics in original)

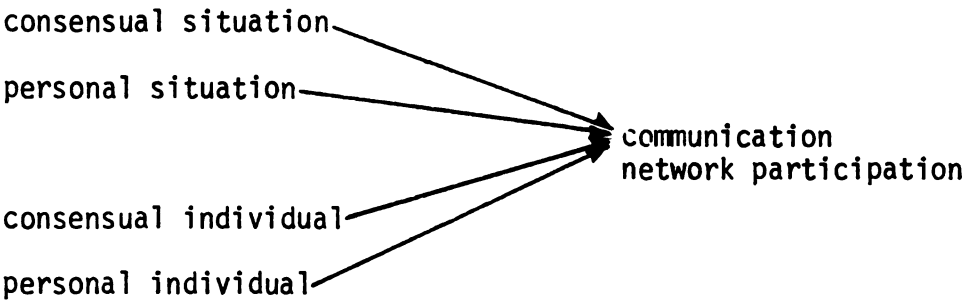


Figure 1. Direct effects model of the determinants of communication network participation (French, Rodgers, & Cobb, 1974; Kulka, 1979; Rausch, 1979).

While this typology is instructive to consider, it has certain flaws which must be addressed. Most problematic of these is the use of the terms "objective" and subjective." By employing this particular dichotomy, the writers suggest that an "objective reality" exists independent of individual perceptions. This position has been the subject of extensive debate among epistemologists (Gibbs, 1979; cf. Rausch, 1979), and is not in and of itself central to the intent of the taxonomy; that is, a similar distinction could be made which would effectively separate personally held views of persons or situations from more public, tangible characteristics.

Rausch (1979) makes this preferred distinction in his work:

> As to "persons" and "situations", I prefer to think of these as orientations that we take, whether as participants in our existence in the world or as investigators. We hold "personal"--rather than subjective--views of ourselves and of situations. There are also what might be termed "consensual"--rather than objective--views that others hold of us and of situations . . . and as noted above, such a consensus is always by particular persons, located in a particular time or culture. (p. 103)

In other words, the type of information which one might have about an individual or situation falls along a continuum from highly personal to highly consensual. While this view recognizes that all information must be enacted by someone, it also distinguishes between those pieces of information which are generally verifiable across people and those which are highly subject to differences across people.

The personal-consensual continuum shows some similarities to Jablin's (1979) treatment of communication climate, although Jablin continues to bear the weight of the problems associated with the terms objective and subjective:

> Thus, while these (objective) observations may be reliable they are not necessarily subjective-free . . . . Rather they are <u>independent</u>, relative to

> the active participants in the interaction, measures of communication phenomena. (p. 330, italics in original)

Given Rausch's framework, one can begin to identify those characteristics of individuals and situations which would determine network participation. If we begin with the question, "What factors facilitate participation in communication networks?", a number of answers are immediately identifiable. Both within and between organizations, people participate in communication networks because: (1) certain environmental, organizational or job-related factors place them in a position such that they are required to interact, although they do not perceive this as influencing their behavior; (2) they perceive that a specific situation requires them to participate, either for the good of the organization or as part of their job; (3) certain characteristics in their personality or background predispose them to interact, although they are not aware of them; and (4) they choose to participate because they perceive it to be desirable for political or personal reasons, regardless of whether the job or oganization requires it. Each of these four rationales corresponds to a dimension of the model described above, and each is potentially a determinant of participation in an inter- or intraorganizational setting.

The basic concepts of Rausch's (1979) revision of the French et al. (1974) model are not new, and their roots may be traced to the work of Lewin (1942), the founder of psychological interactionism. According to Lewin, all behavior is a function of both personal and environmental conditions, i.e., $B = f(P,E)$. In his work in field theory, Lewin conceived of a number of "forces" which could potentially influence behavior. These were driving forces, restraining forces, induced forces, forces corresponding to one's own needs, and impersonal forces. Driving forces,

which facilitate behavior, can be divided into those which correspond to a person's own needs and those which are induced, such as that of a supervisor for workers. Forces which do not correspond to one's own needs or the wishes of another are called impersonal forces, and arise from the requirements of the situation (Shaw & Costanzo, 1970). Finally, Lewin (1942) addressed the personal consensual dimension by defining a "reality-irreality" dimension of the "life space" or psychological environment of a person. "The level of irreality involves imagery and fantasy, whereas the level of reality involves more objective aspects of the life space, such as the toys in a playroom." (Shaw & Costanzo, 1970, p. 124-125). In all, one can see that Lewin considered both the individual-situational and the personal-consensual dimensions to be important factors in identifying the determinants of behavior. Recently, Schneider (1981) and Terborg (1981) have begun to offer different interpretations of Lewin's general model (B = f(P,E)) which have applications to organizational behavior.

Schneider (1981) and Schneider, Parkington, and Buxton (1980) have been strong advocates of the incorporation of individual level variables as well as personal orientations toward situations into theories of organizational behavior. Most generally, Schneider et al. (1980) argued that human behavior never exists independent of perceptions, and that employee perceptions are therefore the critical data of organizational behavior. In a recent critique of situationist conceptualizations of organizational decision-making, Schneider (1981) rejects the currently popular view that " . . . chief executive officers (and other decision-makers) have essentially no discretion over the direction their organizations take nor their level of activation." (p. 20). He argues instead

that:

> Those views make it sound like organizations, not people, make decisions or that environments, not the people in those environments, structure options for organizational decision-makers. (p. 20, italics in original)

In all, Schneider and his colleagues advocate a view of organizational behavior which takes into account both the characteristics of individual decision-makers as well as the characteristics of environments (situations) as enacted by those decision-makers.

Recent work by Keeley (1980) on the subject of organizational goals further suggests that research which focuses only on the more consensual aspects of situations may be limited in its ability to explain human behavior. In choosing the organismic over the social contract or political analogy, Keeley argues that many organizational researchers have blurred the distinction between "goals of" and "goals for" an organization. On the one hand, the goals of an organization may be consensually recognized by most employees; one aspect of these goals may be the degree to which the organization needs to forge interorganizational linkages. Each employee, however, may have a variety of "goals for" the organization which both deviate from each other, as well as from the consensual goals of the organization. Hence we are once again reminded that the discrepancy between personally enacted and consensually acknowledged characteristics of a situation may be quite wide, and it is yet to be determined which type of information has the most important effects on individual behavior.

The issue of personal versus consensual views of individuals or situations has presented no less of a problem in the intraorganizational job characteristics literature. Researchers in this area, however, have

focused their attention in the opposite direction from interorganizational writers; they have tended to emphasize personal or enacted views of the situation to the exclusion of more consensual or "objective" measures (Aldag, Brief, & Barr, 1981; Roberts & Glick, 1981). Researchers who study characteristics of jobs have tended to rely on subjective assessments (Kulka, 1979). Although in some cases the choice of perceptual data has been deliberate (Feather, 1972; Locke, 1969), more often it has been used as a proxy for more objective data which is difficult to obtain in the field (Veroff & Feld, 1970).

Over ten years ago, Hulin and Blood (1968) suggested that much of the confusion in task design research could be traced to an ambiguity in the correspondence between the conceptualization and measurement of task characteristics. While most theories of tasks specify more consensual characteristics, most researchers have focused on perceptions. The situation has not improved in recent years. Roberts and Glick (1981) observed that:

> Construct measurement cannot be evaluated independently of the models underlying those constructs. The job characteristics model proposed that task perceptions are a function of objective task characteristics . . . Unfortunately, there have been no systematic attempts to develop task assessments consistent with such a model. (p. 207)

While it is outside the focus of this paper to develop such task assessments, the issue of personal versus consensual data is an important one to be considered relative to a model of network participation.

In their critique of job characteristics research, Roberts and Glick (1981) present a taxonomy of studies which distinguishes not only between situational and individual determinants (and moderators) but also between subjective and objective measurement procedures for each antecedent.

From this perspective, Roberts and Glick indicate where theory has not been isomorphic with measurement, and argue that certain concepts require objective measures, while others require subjective measures. They conclude that:

> Person-situation relations between task characteristics and job responses were discussed as if they were interchangeable with within-person relations . . . . This confusion appears to be a direct consequence of the lack of a clear distinction among within-person, person-situation, and situational relations in the job characteristics model. (p. 196)

Aldrich (1979), in his comparison of the resource and information flow views of organizational environments, criticizes the frequently adopted position that self-report data are somehow "soft," while more consensual data are more "hard" or "real." Instead, Aldrich contends that both subjective and objective types of data collection provide different kinds of valuable information, to a greater or lesser degree dependent upon one's theory. The issue is not one of a choice between one or the other, but rather of establishing an isomorphism between construct definitions and measurement. Theories which have a natural selection orientation should in most cases use more consensual measures which best reflect the tangible characteristics of the environment; theories which rely on rational selection principles should make use of personal (more subjective) data which best reflect individual enactments and predispositions. Theories which combine both kinds of processes, it then follows, would require both types of data if they were to be adequately tested.

An integrated model, such as that which is presented in Figure 1, requires both personal and consensual data on individual and situational characteristics. Aldrich (1979) has argued that:

> Environments have been treated as resources for organizational survival or as images in participant's heads. Although at the extremes these two views are identified with the natural selection and rational selection models, respectively, theorists within these two traditions have not maintained a clear position in their own research. A comprehensive theory of organizational change will undoubtedly incorporate both views of the environment. (p. 134-135)

Before formally presenting the models and hypotheses which are to be evaluated, the major points of this chapter may be summarized as follows:

1. Communication network participation can have a significant impact on other aspects of organizational and interorganizational attitudes and behavior.

2. Both situational and individual level characteristics can affect participation of individuals in inter- and intraorganizational communication networks.

3. Personal and consensual views of individual or situational characteristics may have divergent effects on participation.

4. A model which is based on the individual-situational and personal-consensual dimensions can be constructed to explain individual communication network participation.

The next section details the three models to be tested, along with the specific hypotheses associated with each of the models.

Hypotheses and Models

The above discussion leads to the specification of a set of individual and situational variables which have a potential impact on network participation. Although some basic similarities exist in the determinants identified in the two literatures, the specific variables which have been examined in each setting are somewhat different. In this section, hypotheses are advanced separately for the intra- and interorganizational settings so that the specific variables which were employed can be clearly identified.

Unfortunately, both literatures are highly ambiguous concerning the arrangement of determinants in their impact on participation. With few exceptions, research has focused on the direct effects of each determinant on participation, although a good deal of theoretical work has been done which suggests alternative specifications which may be plausible. At least three alternative models can be developed utilizing the determinants which have been identified in the literature: These are direct, indirect, and interactive. The direct effects model is the collection of simple causal statements from each model to network participation. The indirect model states that direct effects exist only from personal views of the individual and situation, which mediate the effects of consensual views of these characteristics. Finally, the interactive model includes all of the direct effects, plus the interaction between the personal view of the situation and the personal view of the individual.

In both the intra- and interorganizational settings, specific variables were selected which represented the class of variables indicated by each model. For example, indicators of the consensual situation in the intraorganizational setting were span of control, annual income,

and exempt/non-exempt status. Indicators of the consensual situation in the interorganizational setting were the number of full time staff employed by the organization and the size of the annual budget. In each setting, variables were chosen which (1) had been researched and found to have some relationship to network participation; and (2) represented the class of variables specified in the model (personal-individual; consensual-situational, etc.). In the intraorganizational setting, it is predicted that persons with higher income, greater span of control, longer tenure, and who were exempt would be highly involved in communication networks. In addition, persons who were highly predisposed to communication or who perceived their jobs to be highly dependent on others in the organization were expected to exhibit higher levels of network participation than their less predisposed, more independent counterparts. In the interorganizational setting, persons belonging to organizations which were large, wealthy, or highly dependent on the local community for resources were expected to participate more in interorganizational networks than those belonging to small, less well-funded, or independent organizations. Further, persons who themselves were highly predisposed to communicate or involved in professional associations would be expected to show greater participation in interorganizational networks than those less predisposed to communicate or less involved professionally. Beginning with Figure 2, each of these specific variables is designated as an indicator of one of the latent constructs: personal-individual, personal-situational, consensual-individual, and consensual-situational.

Three levels of tests were conducted: Macroanalysis, microanalysis, and comparative analysis. For the macroanalyses, each of the three models was evaluated in each setting against a null model which represents

total independence among all observed variables. There are six macro-hypotheses, one for each model in each setting.

Next, each of the theoretical relationships implied by each of the three models are evaluated to constitute the microanalysis. While specific hypotheses are not written for these tests, the number of significant paths obtained in any model provides evidence about its ability to represent the data.

Finally, all three models are compared within each setting. An increment-of-fit test (Bentler & Bonett, 1980) is used which determines whether a particular model provides a significantly better fit to the data given a change in degrees of freedom. A determination is made as to which model best accounts for variation in communication network participation in each setting.

Direct Model: Macroanalysis

This form of the model corresponds exactly to Figure 1 above. Both individual and situational determinants of network participation are specified, as well as consensual and personal types of data reflecting each class of determinants. Similar to the argument made by Glick (1979), the effects of situational and dispositional variables on network participation are considered as compatible rather than as rival hypotheses.

The direct model is in part supported by evidence which indicates that enactments of situations may vary considerably from more consensual assessments (Roberts & Glick, 1981; Tosey, Aldag, & Storey, 1973). Both kinds of data are included in order to evaluate their relative merits in predicting network participation.

Although it is somewhat easier to see how personal orientations would impact on individual behavior, Hirsch (1975) has argued for the necessity

of also including consensual variables in the prediction of individual behavior. Hirsch contends that more consensual measures of the situation must be included since any specific personal assessment tends to (1) reflect a brief time period, and (2) be limited to those organizational factors most directly visible (although not necessarily influential) to the respondent. Hirsch recommends that the major factors in an organization's environment "must be sought out independently by the detached investigator, whether or not respondents point out their existence." (p. 10).

In their study of the perception of power in organizations, Bacharach and Lawler (1976) argued for the relevance of both objective and perceived aspects of the actor's relationship with his or her environment. Commenting on this study, Aldrich (1979) suggests that:

> Research can help investigators determine whether the conditions deemed important by the resource dependence view also affect how persons perceive power differences in social interaction. (p. 124, italics in original)

Finally, Jablin (1979) confronts a similar problem in his discussion of communication climate:

> Obviously, future research in this area is required before we can confidently state the degree to which objective and subjective measures of communication climate covary, and the impact of each type of measure on indicators of organizational performance. (p. 331)

The literature on the determinants of communication network participation is in a similar situation. The direct model proposed here is an attempt to examine the extent to which consensual and personal measures covary, as well as to begin to gauge their relative impact on network participation.

In order to test the direct effects model, the covariance matrix

among all of the observed variables is first compared with the covariance matrix which is reconstructed on the basis of the model specifications, to ascertain an indication of the goodness-of-fit of the theoretical model. The formal hypothesis for the macroanalysis, however, is stated in terms of the comparison between the goodness-of-fit of the theoretical model and the goodness-of-fit of another, "null" model. The null model, of which there is one for each sample, reflects the fit which would be obtained were no structure imposed upon the data; i.e., if all observable variables were mutually independent. To the extent to which the theoretical model (in this case, the direct model) is statistically different from the null model, we can say that the theoretical model accounts for significant variation in network participation (Bentler & Bonett, 1980).

Before proceeding to the hypotheses, a brief discussion of notation is required. In order to unambiguously identify each of the models (M), subscripts will be employed which specify both the form of the model (null, direct, indirect, or interactive), as well as the sample in which it applies (intra- or interorganizational). Null models are subscripted with a "0", direct models with a "1", indirect models with a "2", and interactive models with a "3". Each model is further subscripted with either an "A", indicating the intrAorganizational sample, or an "R", indicating the inteRorganizational sample. For example, the direct effects model in the intraorganizational sample would be written as "M_{1_A}", and the null model in the interorganizational sample would be written as "M_{0_R}".

The direct effects formulation states that each of the four factors, consensual-situational, consensual-individual, personal-situational, and personal-individual impact directly on network participation. The

combined theoretical and measurement representation of this model for the intraorganizational sample appears in Figure 2. The same model for the interorganizational sample appears in Figure 3.

The macrohypothesis to test the direct effects model in the intraorganizational sample can be written as follows:

$$H_1: \chi^2 M_{1_A} - M_{0_A} \neq 0$$

where χ^2 is the difference in χ^2s (goodness-of-fit) between the direct effects model (M_{1_A}) and the null model (M_{0_A}) in the intraorganizational sample. The parallel hypothesis in the interorganizational sample can be written as follows:

$$H_2: \chi^2 M_{1_R} - M_{0_R} \neq 0$$

where χ^2 is the difference in χ^2s between the direct effects model and the null model for the interorganizational sample. Both versions of the model imply that all lambdas (λs, factor loadings) are positive and significantly greater than zero. In addition, each macrohypothesis implies four microhypotheses concerning specific theoretical relationships within each model. These are presented next.

Direct Model: Microanalysis

In this section, research literature from both the intra- and interorganizational areas is presented which supports specific substantive relationships which are subsumed under the direct model. Since much of this literature has been described above, specific studies are not noted in great detail.

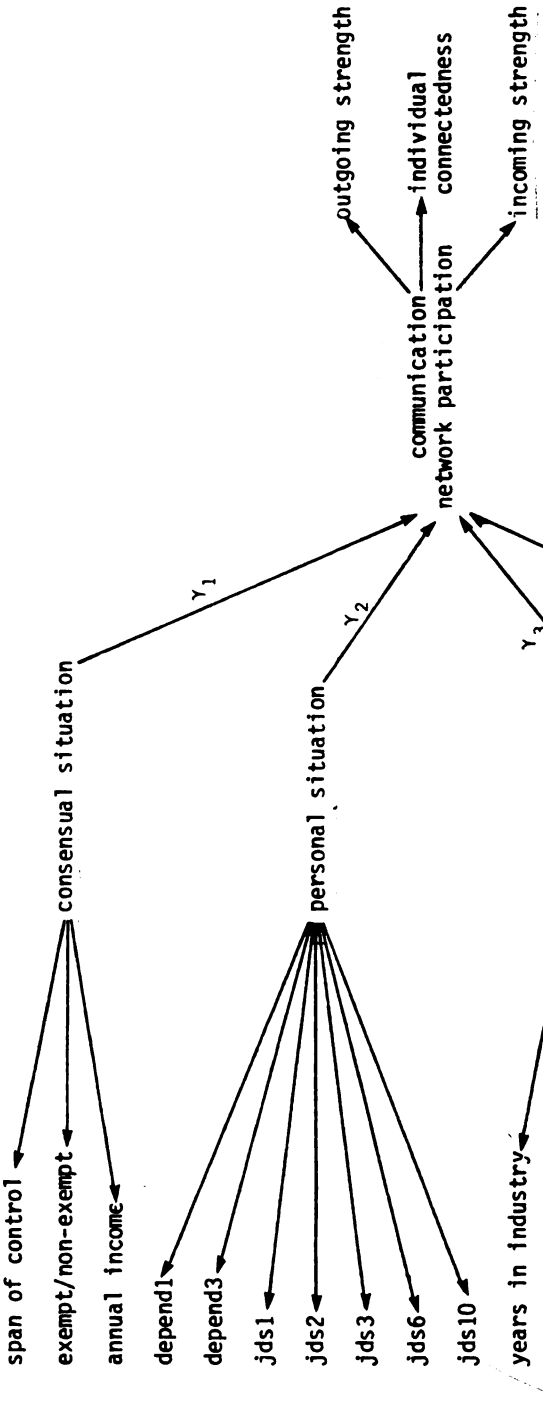


Figure 2. Direct effects model of the determinants of network participatio: Intraorganizational sample.

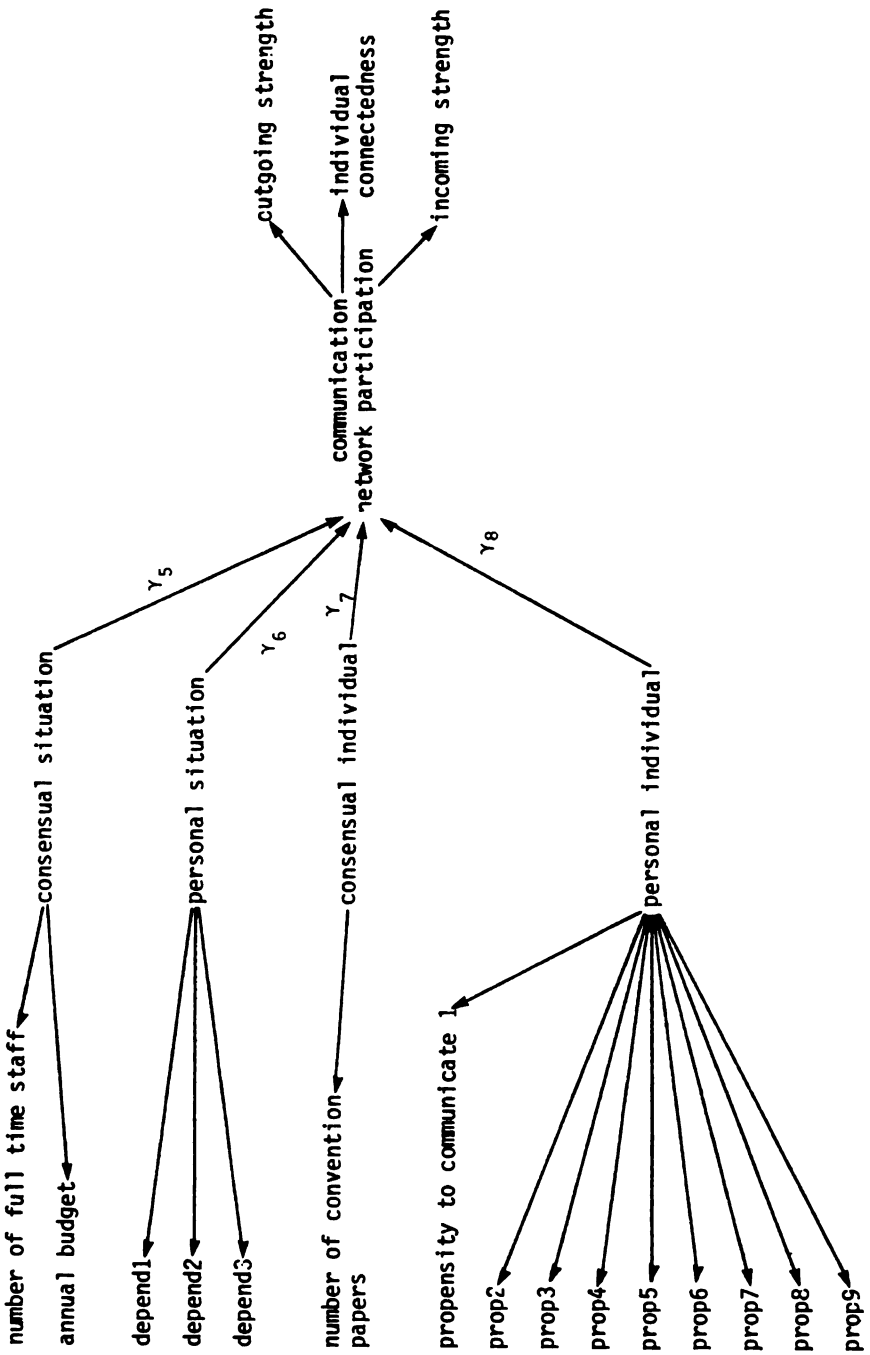


Figure 3. Direct effects model of the determinants of network participation: Interorganizational sample.

Intraorganizational sample. The direct effects model implies that all gammas (γ s, regression coefficients) in Figure 2 be positive and significantly greater than zero. In this sample, the variables which were chosen to represent the four factors consensual situation, personal situation, consensual individual, and personal individual were (1) span of control, income, and exemptness, (2) perceived job dependence, (3) tenure in the job, organization and industry, and (4) predisposition to communicate.

There is research evidence to suggest that employees with higher positions in an organizational hierarchy are also more central in communication networks (Frost & Whitley, 1971; Monge, Edwards, & Kirste, 1978; Roberts & O'Reilly, 1974). Job situations which are associated with higher incomes, larger spans of control, and exempt status may be characterized by unique kinds of tasks, which may also impact positively on network participation (James & Jones, 1974; Mohr, 1971).

A related body of literature would suggest that it is the perceived dependence of a job, or the degree to which the job requires contact with others that determines network participation (Blau, 1954; Form, 1972; Wade, 1968). Employees who perceive their jobs to be highly dependent upon others are expected to show higher levels of participation in intraorganizational communication networks.

A handful of writers have suggested that tenure influences centrality in communication networks directly (Lincoln & Miller, 1979; Roberts & O'Reilly, 1974). While this hypothesis is more tentative, employees with greater tenure in the job, organization, and industry are expected to show higher levels of communication network participation.

Finally, there is minimal research to suggest that predisposition

to communicate should be positively and directly related to degree of network participation. Arntson, Mortensen, & Lustig (1980) uncovered a positive relationship between predisposition to verbal behavior and actual amount of communication behavior. The hypothesis is supported in general by Porter and Roberts' (1973) argument that different people may be predisposed to take different network roles. In this sample, it is expected that those employees high in predisposition to communicate would also show higher levels of participation in communication networks.

Interorganizational sample. As was stated above, the direct effects model implies that all gammas in Figure 3 are positive and significantly greater than zero. In the interorganizational sample, the four classes of determinants were represented by: (1) size of organization, both in terms of budget and staff, (2) perceived dependence of the organization on the local community, (3) degree of professional involvement, and (4) predisposition to communicate.

Large organizations which control a large resource base have been shown to be more likely to become involved in interorganizational relations (Aiken & Hage, 1968; Dillman, 1969; Galaskiewicz, 1979; Schermerhorn, 1977), and it is expected that individual members of these organizations will also be high in individual network participation.

Greater perceived dependence of an organization on a local community, usually assessed by asking the chief administrator (Offerman, 1976), is also expected to have a positive effect on network participation, such that organizational members who are affiliated with highly dependent organizations (or, more accurately, perceive their organizations to be dependent), will also be more likely to participate in interorganizational communication networks.

Individuals with higher levels of professional involvement, as indexed by number of convention papers authored in the past five years, would also be expected to show greater participation in interorganizational communication networks, as a result of their relatively high informal status and cosmopolitan nature (Becker & Carper, 1957; Whetten & Leung, 1975).

Finally, people who score high on the predisposition to communicate scale are expected to be more active in interorganizational networks than those who are not so predisposed (Arntson, Mortensen, & Lustig, 1980). This hypothesis is supported in principle by the work of Eckstein (1977), Gillespie and Mileti (1979) and Galaskiewicz and Shatin (1981). These writers have advanced the notion that the predispositions of individual decision-makers impact on degree of interorganizational network participation.

Two specific hypotheses. In the direct model only, two additional hypotheses are advanced which contrast the effects of situational and individual variables in each setting. Hypotheses three and four posit specific relationships among coefficients in the direct effects model. Since the constraints which are placed on network participation are much less formal and explicit between organizations than within organizations, it is expected that individual factors will be more potent predictors of participation in interorganizational networks than situational factors (Eckstein, 1977; Gillespie & Mileti, 1979; Schulze, 1961), and that situational factors will be better predictors than individual factors of intraorganizational network participation (Form, 1972). This can be written as follows, with no distinction made between consensual and personal orientations toward each class of determinant:

$$H_3: \gamma_1 > \gamma_3 \quad ; \gamma_2 > \gamma_4$$

$$H_4: \gamma_7 > \gamma_5 \quad ; \gamma_8 > \gamma_6$$

where the gammas correspond to their positions in Figures two and three. The next section presents the macroanalysis for the indirect model.

Indirect Model: Macroanalyses

Aldrich (1979) has suggested that one potential way to reconcile the two views of organizational environments is a model which posits an indirect relationship from "objective" characteristics to behavior which is mediated by perceptions:

> Decision makers' perceptions of dependence may still play a part in determining an organization's response to a situation of dependence, and this proposition may be a way of linking the resource view of environments with the information view. (p. 120)

The indirect effects model is presented in Figure 4. Tangible conditions in the work or organizational environment are seen as inputs to an individual's perception of these conditions, which subsequently affects behavior. In their discussion of "objective" and "subjective" measures of communication climate, Campbell, Dunnette, Lawler, and Weick (1970) argue that:

> To speak of the influence of 'perceived feelings of autonomy' on managerial behavior is very different from speaking of the influence of 'span of control' or some other structural property. The linkage between environmental characteristics and behavior is much longer in the latter case and makes the eventual investigation of cause and effect much more complex. Perceptions of climate and independent measures of organizational characteristics just do not operate on the same <u>level of explanation</u>. (p. 399-400, italics in original)

Jablin (1979) concludes that the objective characteristics of organizational or work environments indirectly affect organizational behavior,

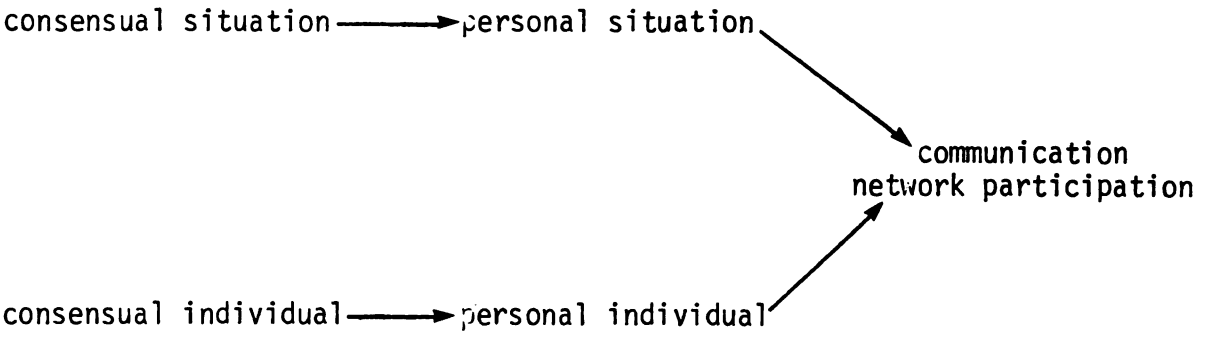


Figure 4. Indirect effects model of the determinants of communication network participation.

while perceptual measures have direct effects (see also Indik, 1968; Lawler, Hall, & Oldham, 1974; James & Jones, 1976; Offerman, 1976).

Hypotheses five and six test the indirect model in both samples. Using the same notation as described above, we may propose that:

$$H_5: \chi^2 M_{2_A} - M_{0_A} \neq 0$$

where χ^2 is the difference between the χ^2s of the indirect effects model (M_{2_A}) and the null model (M_{0_A}) for the intraorganizational sample. The complete indirect effects model for the intraorganizational sample is presented in Figure 5; for the interorganizational sample, in Figure 6. The comparable model in the interorganizational sample is:

$$H_6: \chi^2 M_{2_R} - M_{0_R} \neq 0$$

where χ^2 is again the difference between the χ^2s of the indirect model and of the null model for the interorganizational sample. Both versions of the model imply that all lambdas are positive and significantly greater than zero. In addition, four theoretical paths (gammas and betas, regression coefficients) are also subsumed by the indirect model. The test of each of these paths in both samples constitutes the microanalysis described below.

Indirect Model: Microanalyses

In this section, research from both the intra- and interorganizational areas is presented which supports specific substantive relationships which are implied by the indirect model. Once again, these studies are not described in great detail, since they have for the most part been reviewed above.

Intraorganizational sample. Beginning with the same core set of variables identified in the direct effects model, other writers would suggest a different configuration of effects. Specifically, it has been argued that a decision maker's perceptions mediate the relationship from consensual aspects of the environment to individual behavior (Aldrich, 1979; Bacharach & Lawler, 1976; Indik, 1968; James & Jones, 1976; Lawler, Hall, & Oldham, 1974; Offerman, 1976). Unfortunately, most of these arguments have been conceptual, and not based on empirical evidence; as Jablin (1979) has argued in the context of communication climate research, more studies are required which investigate the role of personal and consensual factors as they impact on organizational behavior.

In addition, all work which has addressed the indirect formulation has focused on the effects of consensual situational factors, rather than consensual individual factors. The two direct linkages in the indirect model are supported by the same evidence noted above; perceived dependence of one's job and greater predisposition to communicate are expected to lead to higher levels of network participation. The indirect linkages, however, are supported by a different literature. A number of writers (Aldag et al., 1981; Hulin & Blood, 1968; Roberts & Glick, 1981) would assert that there may only be a rough correspondence between span of control, income, exemptness and perceived dependence of the job, and that these two classes of determinants in fact operate on different "levels of explanation" (Campbell et al., 1970). The causal chain from the consensual situation to individual behavior may be long and complicated (Campbell et al., 1970), but it has also gone relatively uninvestigated.

As was stated above, the link from tenure to predisposition to

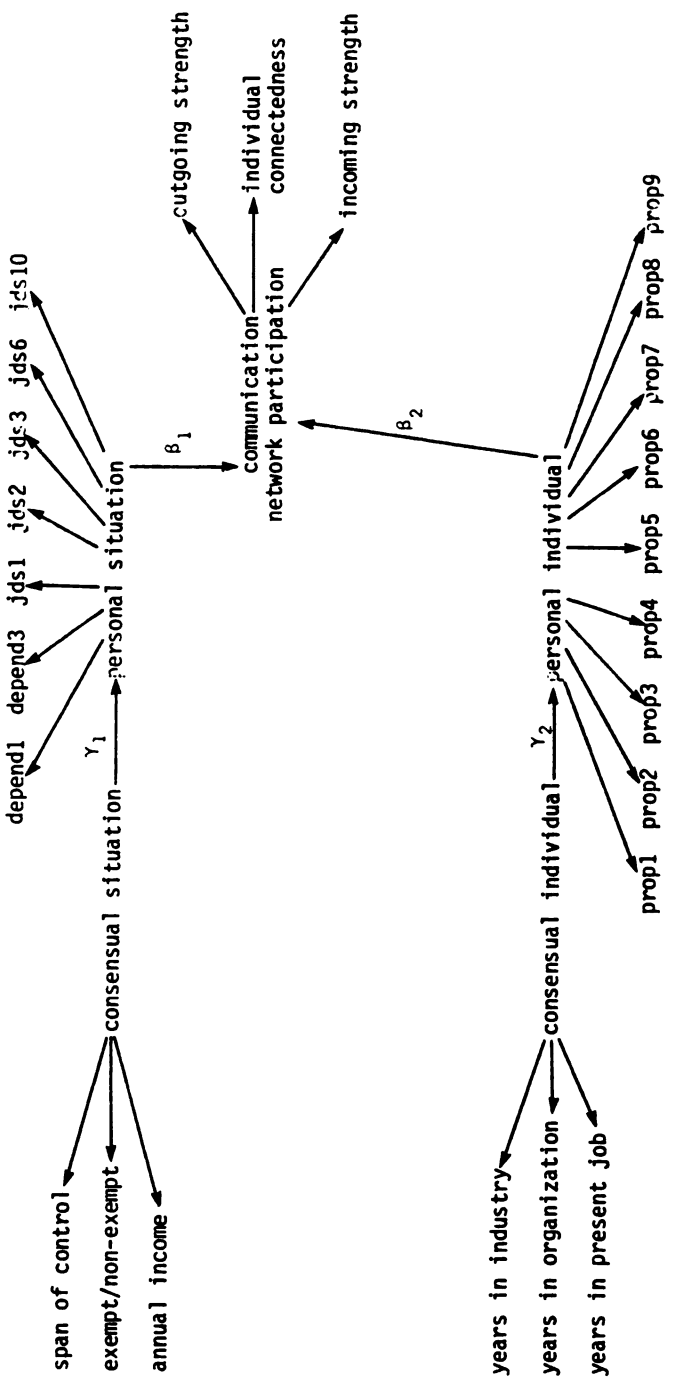


Figure 5. Indirect effects model of the determinants of network participation: Intraorganizational sample.

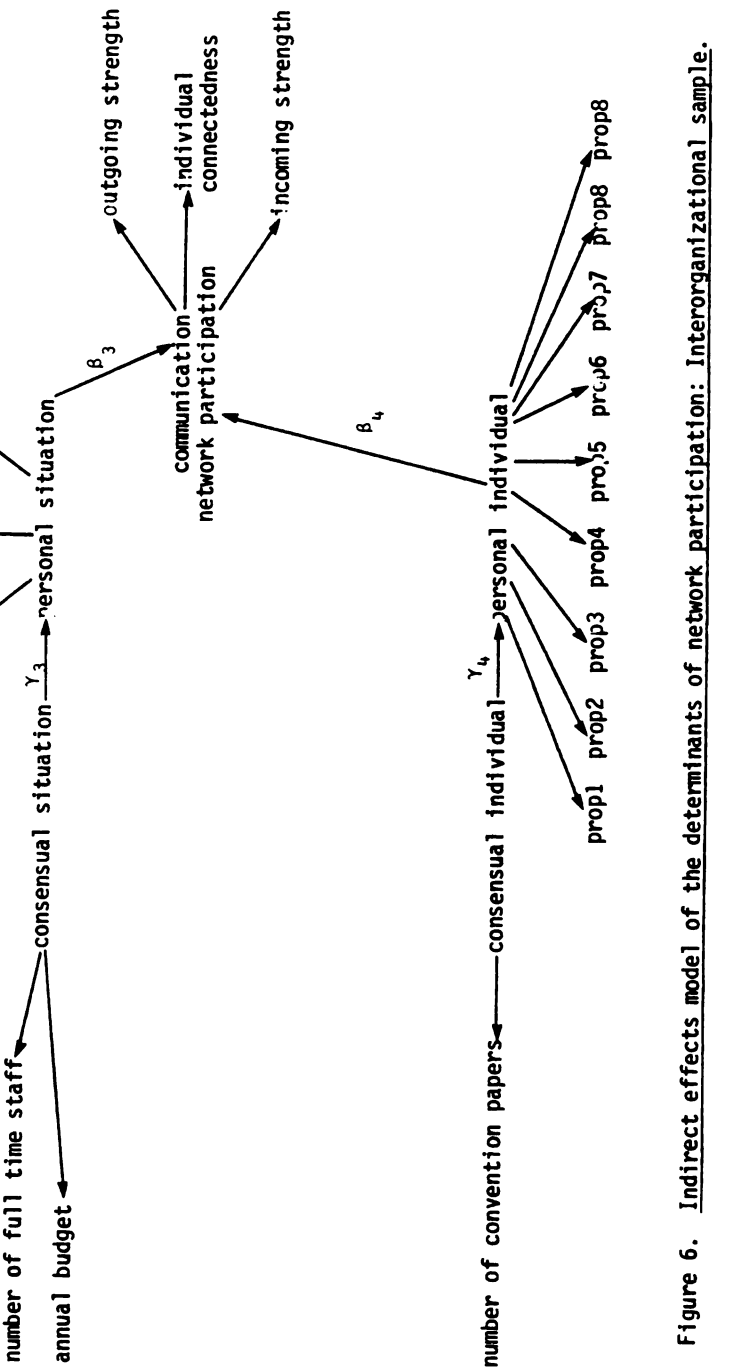


Figure 6. Indirect effects model of the determinants of network participation: Interorganizational sample.

communicate has not received research attention. The relationship makes intuitive sense, however, given the reported relationships between formal status and network participation (Monge et al., 1978) and the assumed rough correspondence between status and tenure. It is apparent that more empirical work needs to be done to determine the nature of the individual portion of the indirect model. This study is a first attempt to provide some of this information.

Interorganizational sample. The macrohypothesis which tests the indirect model against the null in the interorganizational sample implies four specific theoretical relationships. A similar argument can be made for the indirect relationships in this sampe as was made in the intra-organizational sample. In addition, the indirect model applied here bears close resemblance to the information flow view of organizational environments (Aldrich, 1979) which argues that key decision-makers perceive and enact relevant organizational environments (Dill, 1958; Weick, 1979).

The direct effects of perceived dependence on the community and predisposition to communicate on interorganizational network participation were supported above. Introduction of a direct linkage from the size of an organization's resource base to perceived dependence, however, reveals some potentially conflicting arguments. Both Dillman (1969) and Galaskiewicz (1979) report that organizations with large resource bases and which are highly dependent upon the local community tend to be more involved in interorganizational networks. It might appear, however, that the larger an organization's resource base, the less it would require community support. Alternatively, one could argue that organizations with large staffs and budgets are especially dependent on the

community since so much of their workforce is drawn from it. Recognizing that other alternative explanations exist, we argue that organizations with larger resource bases will also be perceived by their members to be more locally dependent, hence leading indirectly to greater network participation on the part of these individuals.

As was noted earlier, there has been no research which has tested the indirect path at the individual level; that is, from consensual individual factors to personal individual factors, and finally to participation. One component of this path, however, the relationship from professional involvement to predisposition to communicate, is supported in principle by self-perception theory (Bem, 1972). By authoring more convention papers, and by observing one's degree of professional involvement, persons may become more cosmopolitan in attitude and subsequently more predisposed to communicate. Self-perception theory has had extensive application in the organizational setting by Weick (1979). In the next section, the third specification, an interactive model, is proposed and macroanalyzed.

Interactive Model: Macroanalysis

A number of interactive forms of the model are possible, only some of which are reflected by the construction of a multiplicative term (Bem, 1979; Schneider, 1981; Terborg, 1981). For the purposes of this study, only the multiplicative interaction which may occur between the personal view of the situation and the personal view of the individual is examined (see Figure 7). This interaction suggests that a person's view of him or herself combines with his or her views of the work or organizational situation to impact on individual network participation. This particular interaction was chosen because it is easiest to defend;

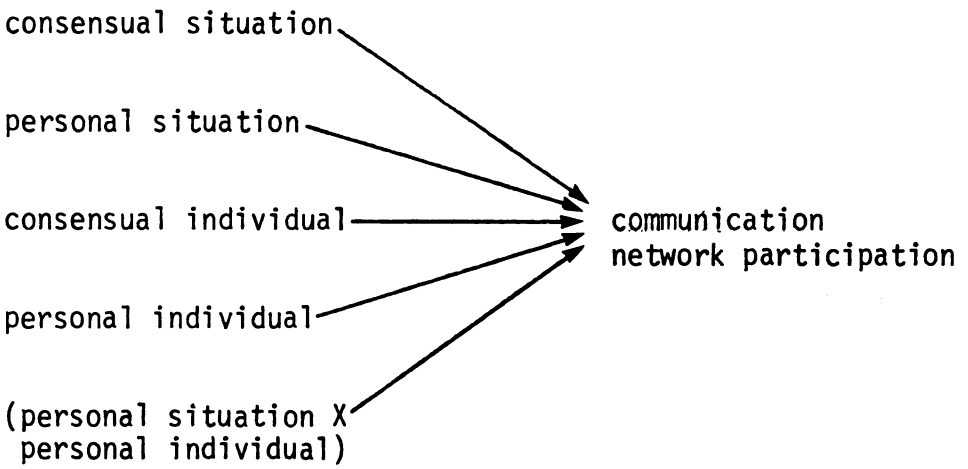


Figure 7. Interactive model of the determinants of network participation.

other possible interactions would require substantial development of the personal-consensual distinction before they could meaningfully be put to test.

A growing number of social scientists have argued that interactive models are most appropriate for explaining social behavior (Carson, 1979; Endler & Magnusson, 1974; cf. Kahle, 1979). Carson in particular has called for an "interactionist resolution" to the situationism-dispositionism-interactionism controversy, citing the "widespread existence of potential person-by-situation interaction effects in studies which permit their exposure" (p. 249).

Terborg (1981) and Schneider (1981) have presented the case for person-situation interactionism in organizational behavior. Terborg states that:

> Briefly summarized, interactional psychology explicitly recognizes that situations vary in cues, rewards, and opportunities and that people vary in cognitions, abilities, and motivations. Consequently, accurate measurement of both individual differences and situational differences becomes necessary. (p. 56)

Terborg also utilizes a variation on the personal-consensual dimension discussed earlier. He argues that both the "psychological meaning" and the "behavior potential" of situations for the individual contribute to human behavior. Terborg concludes that " . . . the cognitive interpretation and reinterpretation of situations emphasizes the need to attend to both subjective and objective situations." (p. 570).

Numerous other industrial and vocational psychologists have for a long while advocated interactive models of organizational behavior (Schneider, 1981). Various theories of vocational adjustment have person-situation interaction as their central theme (Holland, 1973;

Schein, 1978; Super, 1953). On a more microscopic level, Nadler and Tushman (1977), Staw and Oldham (1978) and Dillard, Monge, Eisenberg and Bachman (Note 1) have all investigated the effects of psychological compatability or person-organization "fit" on individual attitudes and behavior. While these writers have not reached an agreement on exactly how this type of interaction should be represented (Terborg, 1981), there is a growing consensus among psychologists that both individual and situational characteristics must be included in the prediction of individual behavior. The complete interactive models for the intra-organizational and interorganizational samples appear in figures 8 and 9, respectively.

The macrohypotheses for the interactive model differ only slightly from the direct model, the only change being the addition of the single interaction term. The interactive model can be tested first in the intraorganizational sample:

$$H_7: \chi^2 M_{3_A} - M_{0_A} \neq 0$$

where χ^2 is the difference between two χ^2s, for the interactive model (M_{3_A}) and the null model (M_{0_A}), both in the intraorganizational sample. We can of course write the parallel hypothesis for the interorganizational sample:

$$H_8: \chi^2 M_{3_R} - M_{0_R} \neq 0$$

where χ^2 is the difference between the χ^2s for the interactive and null models in the interorganizational sample.

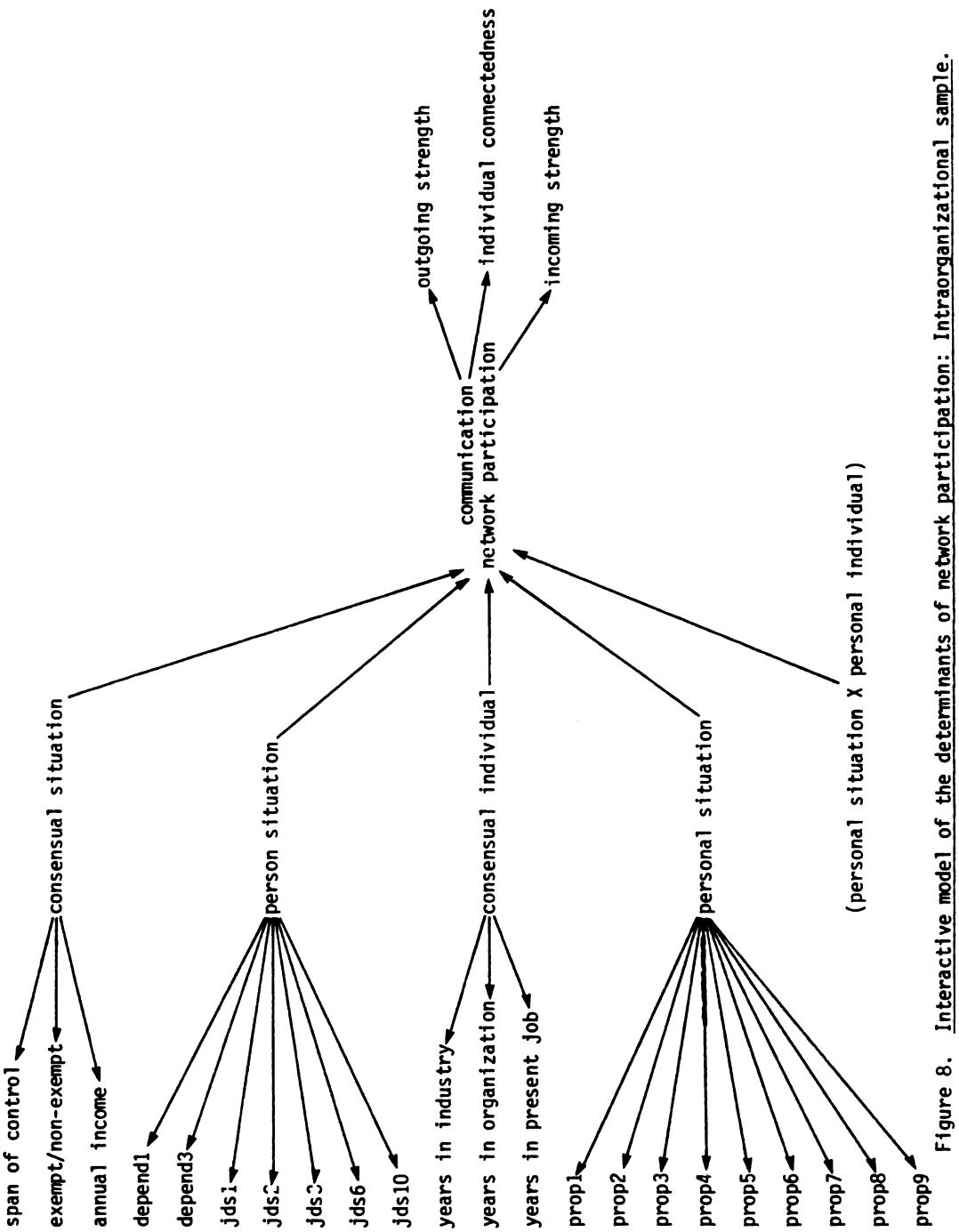


Figure 8. Interactive model of the determinants of network participation: Intraorganizational sample.

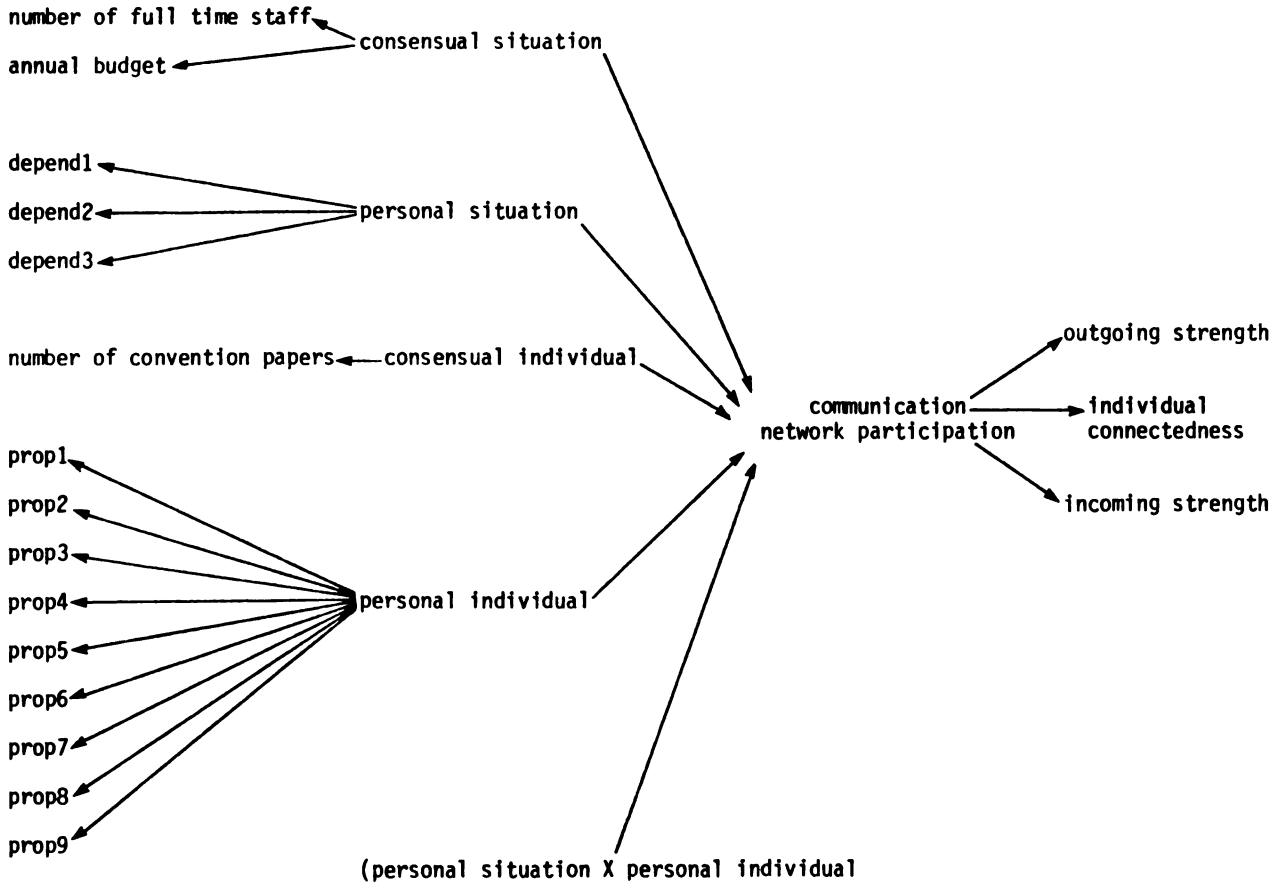


Figure 9. Interactive model of the determinants of network participation: Interorganizational sample.

Interactive Model: Microanalyses

As is the case for the direct model, the interactive model implies that all gammas (regression coefficients) are positive and significantly greater than zero. The rationale for each of the direct relationships in the interactive model is identical to what was described for the direct model, and hence will not be repeated here. This discussion, then, focuses specifically on the relationship from the interaction term to network participation in each sample.

Intraorganizational sample. Unfortunately, to a similar extent as with the indirect model, empirical evidence which might support or refute an interaction between perceived job dependence and predisposition to communicate which impacts on network participation is sparse. In studies which focus on employee responses other than participation, however, there has been some work to suggest that interactions between employee predispositions and job characteristics can have an effect on organizational commitment (Eisenberg, Monge, & Williams, Note 2; cf. Salancik, 1977) and job satisfaction (Wanous, 1974; White, 1978). These findings are consistent with the approach which argues that employee attitudes and behaviors occur as a function of the "fit" between individual needs and organizational characteristics (Argyris, 1958; Nadler & Tushman, 1977; Staw & Oldham, 1976; Schneider, 1981; Terborg, 1981). Rather than simply examining the direct effects of individual or organizational characteristics on participation, this model argues that perceived job dependence will only lead to increased participation if the individual is predisposed to communicate; or, alternatively, individuals who are predisposed to communicate will become involved in intraorganizational networks only if their jobs permit a reasonably high degree of interaction with others.

Interorganizational sample. The same argument which is applied above is applicable here. Notably, there has been no research in the interorganizational area which explicitly examines the notion of individual-situation interaction as it might impact on interorganizational relations. Even so, it makes intuitive sense that the perception of dependence on the local community may not be enough to encourage a person to participate in an interorganizational network; they may also need to be predisposed to communicate. Similarly, an individual who is predisposed to communicate might not express this predisposition in interorganizational networks, unless there was also some feeling of the organization's dependence upon these interactions.

The next section describes how the three models, direct, indirect, and interactive, will be compared within each sample to determine which provides the best explanation of variation in communication network participation.

Model Comparison

In addition to the comparison of each model against the null model for each sample, and the examination of the individual theoretical paths within each model, each model is compared with the other models to determine which provides the best explanation of communication network participation. These comparisons are done formally with the increment-of-fit test developed by Bentler and Bonett (1980), but they also involve a series of judgements at the macro and micro level. First, increment-of-fit is calculated between each pair of models, expressed as the difference of the obtained χ^2 for the models being compared, divided by the χ^2 for the appropriate null model (for that sample). A substantial increment of fit indicates that the proposed model provides significantly

better explanation given the change in degrees of freedom.

Given the relative paucity of research with these macrohypotheses, it is difficult to make specific predictions concerning which model should prove superior in explaining network participation in either setting. Researchers in both areas have been divided between the direct and indirect models. It is in all probability premature to expect that the specific interactive model specified here will provide a better fit to the data than these other, less complex models. If there is an overriding sentiment in both literatures, perhaps it is that individual perceptions (i.e., personal orientations, particularly toward situations) tend to mediate the relationship from consensual characteristics of the situation to individual network participation (Aldrich, 1979; Campbell et al., 1970; Jablin, 1979; Offerman, 1976) and hence the indirect model would be expected to provide the best fit to the data. In making these model comparisons, considerations of parsimony, increment-of-fit, and the significance of individual paths will all play a part in the final evaluation.

The models and hypotheses to be evaluated have been presented above. In the next section, the methods and procedures which were used to evaluate them are described.

Chapter II

METHODS

This section describes the samples, procedures, instrumentation and analytic techniques used in this research.

Samples

The intraorganizational sample consisted of 173 employees from a research firm in Northern California. Employees were located in five different facilities spread over a five square mile area. A census of the organization was attempted, and all but 10 of the 183 employees participated. Approximately 75% of the participants were salaried and 25% were hourly. Most respondents were system analysts with responsibility in a wide variety of areas such as analysis, consulting, and training. A wide range of positions and job levels was represented, including clerical-technical staff and high level managers. The annual mean income for the sample was $25,000, normally distributed with a range of $9,000 to $50,000. The average education was 15 years, distributed with a negative skew indicating a large number with 18 or more years of education. 76% of the respondents were White, 7% Asian, 5% Black, and the rest were distributed among other categories. 73% were male, and 27% female.

The interorganizational sample consisted of 90 representatives of 44 organizations in a major Midwestern city. Data were collected as part of a larger project which examined the effectiveness of a large scale

interorganizational health care delivery program. Funding for the program totaled nearly $20 million over a five year period (1976-1981). The program was developed to provide an integrated and coordinated approach to the delivery of health care services. The funding was provided to a local community agency, whose major task was to coordinate the 43 other organizations in the program. This interorganizational set consisted of state, county and city health departments, a medical school, several hospitals, a professional health association, and 37 community organizations, including several medical groups and voluntary assistance groups.

A list of 227 persons who had officially participated in the project was provided to us by the coordinating agency. Most of these people had participated on one or more of the coordinating committees during some or all of the five years of the project. Individuals were removed from the list if they (1) had moved out of state, (2) were deceased, (3) refused to participate, (4) could not be contacted, or (5) had no valid address which could be located. The original list of 227 was thereby reduced to 166. The project participants were divided into five functional groups: (1) employees of the coordinating agency (4%), (2) participants serving on planning and advisory committees (25%), (3) participants involved in the formulation of health care protocols (59%), (4) social service workers (8%), and (5) community members (4%). The final number of usable responses, 90, constitutes a 57% response rate, which is acceptable for a mail survey of professionals. A good portion of the nonresponse resulted from the large variation in level of participation in the project across participants; those who had only attended one meeting (or none at all, but had been invited) were reluctant to participate in the study.

Procedures

In the intraorganizational sample, respondents completed a questionnaire containing items relating to their communication contacts at work, job attitudes, perceptions of their organization, and some personality and demographic information. An organizational liaison assisted in the study by providing consistent answers to those participants with questions. Respondents were assured of the complete confidentiality of their responses. A copy of the intraorganizational participant's questionnaire is included in Appendix A.

Data collection in the interorganizational sample was significantly more complicated. Two structured questionnaires were developed and were administered to separate groups. The interorganizational participants described above were sent their questionnaire via mail during July and August, 1981. These were preceded by a letter from the principal investigator of the interorganizational venture requesting the support of participants. The questionnaires were followed by telephone calls and finally a face-to-face pick up by the researcher. Some participants returned their questionnaires by mail. The interorganizational participant's questionnaire is included in Appendix B.

In addition, 50 administrators of the participant's respective organizations were contacted by telephone to obtain more consensual information concerning their organizations of affiliation; this is the typical technique employed in interorganizational research. Participants were asked to record their communication network participation, their perceptions of the organizations they were most closely affiliated with, as well as some information about their personality and demographics.

Administrators were asked to report specific information about their organization's budget and staffing from company records. The chief administrators were contacted from those organizations which had originally signed letters of agreement to participate in the interorganizational venture, plus some other organizations which were represented by specific individuals but had not formally agreed to participate. Questions which were asked of organizational administrators are included in Appendix C.

Instrumentation

The next section contains a detailed description of the operationalization of variables which was measured in this study. As was noted previously, the items which were used are included in the various appendices.

Intraorganizational Sample

Three measures of the consensual situation, span of control, annual income, and whether or not an employee was exempt was used. To assess span of control, employees were asked "How many people report directly to you?" Participants also indicated the salary range which applied to them and whether or not they were exempt. While it is clear that self-report measures of these variables are not ideal (Sathe, 1978), other sources of data were not available, and it is evident that these variables are at least less dependent upon individual orientations than those in the personal category.

Seven items were used to assess the personal view of the situation. These items measured the extent to which an employee perceived that his or her job depended upon others to get done, and required him or her to move about while performing the job (Morris & Steers, 1980). Selected items from the job diagnostic survey (JDS) which reflected the degree

of interaction required by a job were among these items (Hackman & Lawler, 1971).

The consensual view of the individual was measured with three items reflecting tenure in the industry, tenure in the organization, and tenure in present job. Each was measured via self-report. To measure the personal view of the individual, a nine-item scale which measures predisposition to communicate, adapted from the Predispositions Toward Verbal Behavior Scale, was used (Mortensen, Arntson, & Lustig, 1977). From the Mortensen et al. scale, the three items were chosen which loaded most strongly on each of the three factors (Dillard, Monge, Eisenberg, & Bachman, Note 1). Research by Mortensen and his colleagues (Arntson, Mortensen, & Lustig, 1980) has demonstrated that people scoring highly on this scale are also more likely to become involved in communication activity.

Individual communication network participation was assessed using the communication network analysis procedures described in considerable detail by Farace, Monge and Russell (1977), and also Rogers and Kincaid (1981). According to Rogers and Kincaid (1981):

> Individual connectedness is the degree to which a focal individual is linked to other individuals in the system. The concept is indexed as the actual number of links between the focal individual and the other members of the network, divided by the number of possible links (which is the number of individuals in the system minus one). (p. 178)

Participants were provided with an alphabetical listing of all employees, and asked to estimate to the nearest quarter-hour how many hours they spent communicating with each employee in a typical week, about work-related matters. Since measures of network participation can be improved by including assessments of frequency or strength of

linkages (Kim, 1978), three indicators of degree of network participation were used: Individual connectedness, or a person's total number of reported contacts divided by his or her total number of possible contacts within the network; outgoing link strength, or the total amount of time reported by the respondent as spent with all other contactees communicating about work in a typical week; and incoming link strength, or the total amount of time reported by contactees as spent communicating with the respondent over a typical week.

Interorganizational Sample

Two measures of the consensual situation which were hypothesized to have positive effects on amount of network participation were the size of the organizational budget (in millions of dollars), and the total number of full time staff. Both pieces of information were obtained from chief administrators from company records.

To assess the personal view of the situation, three items were included which asked participants to assess how dependent the organization which they were affiliated with was on the local community. Each of these items were in Likert format, and were responded to by the participants in the interorganizational venture. A seven-point scale was used which ranged from strong disagreement to strong agreement; two items were reverse-coded to control for potential response bias.

The consensual view of the situation was assessed with one indicator, which reflected degree of professional involvement. Respondents were asked to report the number of papers which they had authored or co-authored at professional conventions over the past five years.

The personal view of the individual was again measured with the nine-item predisposition to communicate scale described above, which

was adapted from the Predispositions Toward Verbal Behavior Scale (Mortensen et al., 1977).

Network participation was again operationalized using the procedures developed by Richards (1975). The same three indicators of participation were used: Individual connectedness, outgoing strength, and incoming strength. As in the intraorganizational sample, participants were provided with an alphabetical listing of all those individuals whose names had appeared in the archival records of the coordinating agency for the interorganizational venture as serving on any committee. Participants were asked to review the list of names, and to stop whenever they identified someone with whom they had had some communication contact over the past six years. They were next asked to indicate on a scale ranging from 1 to 4 (1 being about once a year, 4 being once a week or more) how often they typically communicated with this person about work-related topics. In addition, the six-year period was divided into three equal parts, and respondents indicated their degree of communication contact for each time period. The six year span represented the approximate life-cycle of the interorganizational venture. For the purposes of this study, only communication related to work which took place over the first four years was used to calculate measures of participation.

Data Analysis

Preliminary analyses were conducted with both data sets to prepare them to meet the assumptions of the analytic techniques. All variables were plotted to examine their distributional properties, particularly normality. Bivariate theoretical relationships were also plotted to determine whether transformations for non-linearity were necessary.

Extensive reliability analyses were also conducted to establish the

integrity of the sets of multiple indicators for each class of determinants. Variables which did not reflect underlying latent factors were transformed and removed from analyses if there was no improvement. Reliability estimates were calculated for each of the sets of multiple indicators, once established.

Data from both samples were analyzed using structural equation modeling, a technique described in detail by a number of writers (Bentler, 1979; Bentler & Bonett, 1980; Cappella, 1980; Duncan, 1975; Fink, 1980; Heise, 1975; Kenny, 1979). The purpose of this technique is to ascertain whether the set of restrictions implied by a hypothesized model can effectively reproduce the relationships in an observed covariance matrix. In this study, six theoretical and two null models were evaluated, each containing both a theoretical and a measurement component.

The structural equation analysis was performed with LISREL IV, a program developed by Joreskog and Sorbom (1978) which provides maximum likelihood estimates for parameters in recursive and nonrecursive systems of equations with or without multiple indicators of latent variables. LISREL IV is considered a full-information technique because information about the quality of measurement is included in the estimates of theoretical parameters, and vice-versa. The analytic procedures provide an overall goodness-of-fit test of each model to the data, which is not possible in ordinary regression analysis, which is just-identified. This overall test of goodness-of-fit is sensitive to both significant and non-significant (zero) paths which exist in either the data or the model (Bentler, 1979; Heise, 1975; Kenny, 1979).

Once the overall goodness-of-fit tests for each model have been completed, each model is then contrasted with the "null model" for that

sample, which constitutes the macroanalysis. A significant difference which is obtained between a theoretical model and its corresponding null indicates that the specified structure provides a significantly better fit to the data than the null specification of independent observed variables (Bentler & Bonett, 1980).

The efficacy of a system of equations (or a "model," as we have been calling it) is not completely isomorphic with the efficacy of specific equations subsumed or implied by the system. As a kind of microanalysis, the significance of each of the theoretical parameter estimates was evaluated using simple t-tests. The significance of the parameter estimates for the measurement model (factor loadings) was also calculated, dividing the desired alpha by the number of tests to avoid confounding (Tukey, 1980). Also as a part of the microanalysis, hypotheses two and three were evaluated, which address the relative impact of individual and situational factors on network participation in each setting. The differences between coefficients were examined using the formula provided by Kmenta (1971, p. 239).

Finally, within each sample, the three models were contrasted to determine which provided the best fit of the three to the data. The increment-of-fit test (Bentler & Bonett, 1980) was used to ascertain whether each subsequent change in degrees of freedom was accompanied by a significant improvement in explanation. Other criteria, such as parsimony and the significance of specific parameter estimates, were also used to aid in model comparison. The next chapter provides the results of these analyses.

Chapter III

RESULTS

This chapter presents the results of the study, including information concerning the macroanalyses, microanalyses, and model comparisons. Preliminary analyses which were performed to prepare the data to meet the assumptions of the major analyses are reported first.

Preliminary Analyses

Correlations and covariances were calculated for all of the variables in each data set. Correlation matrices for each data set appear in Tables 1 and 2. In each table, a box has been drawn around those variables which were used as multiple indicators for each class of determinants (i.e., consensual-situation). Ideally, multiple indicators of the same latent construct should be positively and strongly associated (Fink, 1980), and indicators of different constructs should be minimally associated. The intercorrelations demonstrate that this condition was met in these data sets. Standard reliability coefficients for each set of multiple indicators are reported in Tables 3 and 4 for the intra- and interorganizational samples, respectively. Coefficient alphas for the intraorganizational sample ranged from .60 to .82, and for the interorganizational sample from .72 to .83. While these results indicate that some of these scales could be improved, all coefficients fall within an acceptable range for proceeding with the remainder of the analyses.

Once the integrity of the measurement component of the models has

Table 1

Intraorganizational Correlations

Outgoing Stren.	1.0																								
No. of Links	.56	1.0																							
Incoming Stren.	.46	.34	1.0																						
Span of Control	.06	.13	.36	1.0																					
Exempt/Non	-.39	-.17	-.17	.13	1.0																				
Income	-.26	-.01	.05	.27	.62	1.0																			
Depend 1	.13	.12	.25	.34	-.03	.15	1.0																		
Depend 3	-.01	.12	.17	.30	.17	.33	.55	1.0																	
JDS 1[a]	.20	.13	.18	.20	-.21	.03	.22	.25	1.0																
JDS 2	.02	.17	.26	.23	.15	.39	.08	.04	.44	1.0															
JDS 3	.04	.22	.13	.14	-.02	.10	.19	.04	.22	.36	1.0														
JDS 6	.14	.17	.17	.03	-.03	.22	.13	-.05	.24	.43	.32	1.0													
JDS 10	.17	.18	.25	.25	-.06	.27	.17	.03	.19	.47	.22	.43	1.0												
Tenure indus.	-.10	.07	.17	.16	.35	.64	.12	.15	.09	.41	.15	.15	.26	1.0											
Tenure organ.	-.05	.10	.17	.14	.14	.34	.10	.05	.13	.29	.18	.17	.24	.59	1.0										
Tenure job	.03	.17	.11	.00	-.01	.13	.05	-.13	-.03	.16	.13	.18	.11	.35	.51	1.0									
PROP 1[b]	.12	.07	.04	-.07	-.15	-.10	.05	-.11	.12	.09	.12	.02	.08	.01	-.04	-.01	1.0								
PROP 2	-.01	-.05	-.03	-.10	.04	.03	-.04	-.04	.05	.11	.03	-.11	.00	.10	.06	-.02	.41	1.0							
PROP 3	.06	.04	-.02	-.09	.03	.03	-.06	-.04	.03	.09	.11	-.02	-.06	-.03	-.02	-.14	.31	.20	1.0						
PROP 4	-.10	.00	-.03	-.07	.18	.18	.03	.04	-.02	.17	.08	.02	.02	.01	-.11	-.13	.17	.29	.49	1.0					
PROP 5	-.05	-.04	-.04	-.10	.02	.02	-.03	-.01	-.04	.01	-.01	-.07	.06	.14	.04	.04	.43	.36	.24	.17	1.0				
PROP 6	.05	.04	-.03	-.09	.04	-.05	.02	-.04	.05	.12	.13	.04	.02	-.04	-.07	-.06	.29	.30	.57	.50	.21	1.0			
PROP 7	.07	.06	-.07	-.09	.04	.07	-.07	-.01	.09	.08	.05	-.03	.07	.08	.03	-.03	.48	.29	.30	.21	.32	.30	1.0		
PROP 8	-.11	-.10	-.08	.02	-.03	-.13	-.07	-.24	.02	.02	.13	-.01	-.06	-.11	-.05	-.05	.30	.17	.36	.24	.05	.56	.23	1.0	
PROP 9	-.01	-.03	-.01	-.06	-.05	-.08	-.05	-.11	.12	.00	.19	-.01	-.02	-.03	-.04	-.06	.50	.24	.44	.22	.25	.36	.50	.46	1.0
S.D.	49.79	7.18	27.32	6.12	.42	4.36	1.66	1.81	1.31	1.83	1.81	1.65	1.53	8.20	6.11	2.68	1.42	1.56	1.60	1.47	1.40	1.33	1.57	1.27	1.37

[a] JDS is an abbreviation for items taken from the Job Diagnostic Survey (Hackman & Lawler, 1971)

[b] PROP is an abbreviation for items taken from the Predispositions Toward Verbal Behavior Scale (Mortensen et al., 1977)

[c] Correlations among multiple indicators of the same construct are grouped together in boxes

Table 2

Interorganizational Correlations

Outgoing Strength	1.0																	
No. of Links	.96	1.0																
Incoming Strength	.26	.31	1.0															
No. of Staff	.09	.10	.01	1.0														
Total Budget	.12	.13	.05	.83	1.0													
Depend 1	.02	.05	-.01	.15	.17	1.0												
Depend 2	-.13	-.15	.01	-.11	-.06	.31	1.0											
Depend 3	-.13	-.11	.07	-.09	-.02	.44	.66	1.0										
No. of Papers	.26	.21	.31	.18	.17	.02	-.08	-.16	1.0									
PROP1[a]	-.11	-.11	-.16	-.26	-.34	-.16	-.09	-.15	-.26	1.0								
PROP2	-.22	-.20	.02	-.08	-.17	.11	.19	.09	-.12	.47	1.0							
PROP3	-.29	-.27	-.19	-.17	-.16	-.14	-.06	-.10	-.13	.37	.40	1.0						
PROP4	-.06	-.07	.07	-.07	-.18	-.12	-.24	-.28	.20	.19	.29	.59	1.0					
PROP5	-.15	-.15	.04	-.38	-.45	-.09	.07	.04	-.21	.51	.26	.24	-.01	1.0				
PROP6	-.14	-.15	-.09	-.13	-.21	-.01	-.18	-.13	-.19	.31	.34	.54	.51	.17	1.0			
PROP7	.04	.05	-.03	-.22	-.31	-.12	.05	.03	.07	.44	.37	.28	.38	.28	.20	1.0		
PROP8	-.13	-.12	-.14	-.14	-.21	-.03	-.14	-.05	-.07	.40	.33	.46	.24	.38	.53	.21	1.0	
PROP9	.07	.05	-.10	-.13	-.17	-.15	-.24	-.22	-.02	.55	.24	.44	.32	.26	.44	.28	.52	1.0
S. D.	74.21	15.83	14.80	3.33	2.53	1.99	1.90	1.82	9.89	1.47	1.51	1.52	1.46	1.34	1.38	1.52	1.35	1.31

[a]PROP is the abbreviated form of predisposition toward verbal behavior

[b]Multiple indicators of the same latent construct are grouped together in boxes

Table 3

Reliability Coefficients: Intraorganizational

Scale		Alpha
I.	Consensual situation: span of control; exempt-non-exempt; annual income	.60
II.	Personal situation: depend1, depend3, jds1, jds2, jds3, jds6, jds10	.67
III.	Consensual individual: tenure in industry, tenure in job, tenure in organization	.74
IV.	Personal individual: propensity to communicate items 1-9	.82
V.	Network participation: connectedness, outgoing link strength, incoming link strength	.73

Table 4

Reliability Coefficients: Interorganizational

Scale		Alpha
I.	Consensual situation: number of full time staff, total annual budget	.76
II.	Personal situation: depend1, depend2, depend3	.72
III.	Consensual individual: number of convention papers	--[a]
IV.	Personal individual: propensity to communicate 1-9	.83
V.	Communication network participation: connectedness, outgoing strength, incoming strength	.76

[a]alpha not computable for single item measure

been established, initial investigations of the theoretical paths were conducted to assess the degree to which variables met distributional assumptions of normality and were free from significant non-linear association. Frequency histograms for each variable, and scattergrams for each of the bivariate theoretical relationships implied in the models, were plotted.

In order to correct for the extreme positive skew of the budget and staff variables, a natural log transformation was performed. This is a common method for remedying this problem (Hamblin, 1974), since it preserves the relationships among the data points but shrinks the scale into a more manageable range. The transformed values of these two variables are referred to in all of the remaining analyses. All other variables were distributed in ways which did not deviate significantly from normality.

Nonlinear patterns were tentatively identified in all of the relationships between the individual items measuring perceived job dependence and the indicators of intraorganizational network participation. Two transformations were tried to address this potential problem. First, the perceived dependence variables were squared and used as predictors of the network variables. Second, the original values of the perceived dependence variables were used to predict the natural logs of the network participation variables. Neither transformation of the data improved the size of the theoretical relationships between perceived dependence and network participation, and both were in a few cases detrimental. Since there was no other nonlinear pattern immediately identifiable from the scatterplots, the assumption of linearity was maintained. Except for the natural logs of staff and budget described above, the original data were used in the remainder of the analyses (Mosteller & Tukey, 1979).

Primary Analyses

Overview

Model testing and evaluation is relatively new to the social sciences, and hence there are few published guidelines for the researcher to follow. The decision to support one model over another involves a series of trade-offs and the satisfaction of necessary conditions, some of which are reasonably subjective. Fortunately, recent work has provided a set of criteria which can be applied to model evaluation and comparison. Fink and Monge (Note 3) suggest that there are at minimum three criteria for evaluating the success of a model. These are:

1. The structure specified by the model should provide a good fit to the data. This has been achieved if the χ^2/degrees of freedom ratio for the model is less than 5 (Wheaton, Muthen, Alwin, & Summers, 1977).

2. The model should be better at fitting the data than a null model which reflects complete independence among all observed variables (Bentler & Bonett, 1980).

3. The individual coefficients, both of the theoretical and measurement models, should be significant and in the hypothesized directions.

The first two of these criteria correspond to the macroanalyses performed in this study, and the third criteria corresponds to the microanalyses. All three criteria are applied to the evaluation of each of the three models in both samples. Finally, the models are compared within each sample using the increment-of-fit test ($\hat{\Delta}$; Bentler & Bonett, 1980).

Direct Effects Model

Macroanalyses. The first hypothesis stated that the direct effects model was significantly better at representing the intraorganizational data than a model which assumed complete independence (i.e., imposed no structure) of the observed variables, the null model. The hypothesis

received strong support. A χ^2_d (chi-square difference) of 954.74 with 35 degrees of freedom (df) was obtained, which is highly significant ($p < .001$). In addition, a χ^2/df ratio of 2.5 was calculated for the model, which is considerably less than the recommended value of 5 (Wheaton et al., 1977). These results are reported in Table 5.

The second hypothesis tested the direct model in the interorganizational sample. Once again, the direct effects formulation provided a better fit to the data than the null model ($\chi^2_d = 642.13$, with 27 degrees of freedom) with a χ^2/df ratio of 1.9. Hypothesis two is supported (see Table 6).

Microanalyses. Of the four regression coefficients implied by the intraorganizational direct effects model, only one was significantly greater than zero and in the hypothesized direction (see Figure 10). Indicators of the personal-situational class of determinants had a significant impact on network participation ($\gamma = 42.7$, $t = 2.44$, $p < .01$). The path from the consensual situation variable to network participation was significantly different from zero but negative, and hence is not supportive of the hypothesized model.

In the interorganizational sample, only one of the four relationships implied by the direct model received support. The consensual individual, represented by the number of convention papers authored or co-authored over the past five years, had a significant positive impact on network participation ($\gamma = 1.27$, $t = 1.66$, $p < .05$; see Figure 11).

The third and fourth hypotheses made claims about specific portions of the direct effects model. Specifically, situational factors were argued to be more potent predictors of participation in intraorganizational networks, while individual factors were expected to be more potent in the

Table 5

Model Tests and Model Comparisons: Intraorganizational Sample

Model	χ^2	df	χ^2/df
M_{0_A}	1603.14	300	5.3
M_{1_A}	648.40	265	2.5
M_{2_A}	672.06	270	2.5
M_{3_A}	695.47	385	2.4

Hypothesis Tests

Model Comparison	χ^2	df
Null-Interactive	907.67*	15
Null-Indirect	931.08*	30
Null-Direct	954.74*	35

Model Comparisons

Model Comparison	χ^2 difference	df	$\hat{\Delta}$ [a]
Null-Interactive	907.67*	15	.566
Interactive-Indirect	23.41^{ns}	15	.015
Indirect-Direct	23.66*	5	.015
Interactive-Direct	47.07*	20	.029

[a] $\hat{\Delta} = (\chi^2_j - \chi^2_k / \chi^2_0)$ where j and k refer to any two models which are being compared.

*p <.001

Table 6

Model Tests and Model Comparisons: Interorganizational Sample

Model	χ^2	df	χ^2/df
M_{0_R}	885.54	153	5.8
M_{1_R}	243.41	126	1.9
M_{2_R}	259.63	131	2.0
M_{3_R}	255.15	139	1.8

Hypothesis Tests

Model Comparison	χ^2	df
Null-Interactive	630.39*	14
Null-Indirect	625.91*	22
Null-Direct	642.13*	27

Model Comparisons

Model Comparison	χ^2 difference	df	$\hat{\Delta}$ [a]
Null-Interactive	630.39*	14	.737
Interactive-Indirect	-4.48^{ns}	8	.000
Indirect-Direct	16.22**	5	.018
Interactive-Direct	11.74^{ns}	13	.013

[a] $\hat{\Delta} = (\chi_j^2 - \chi_k^2 / \chi_0^2)$ where j and k are any two models being compared.

*p <.001

**p <.01

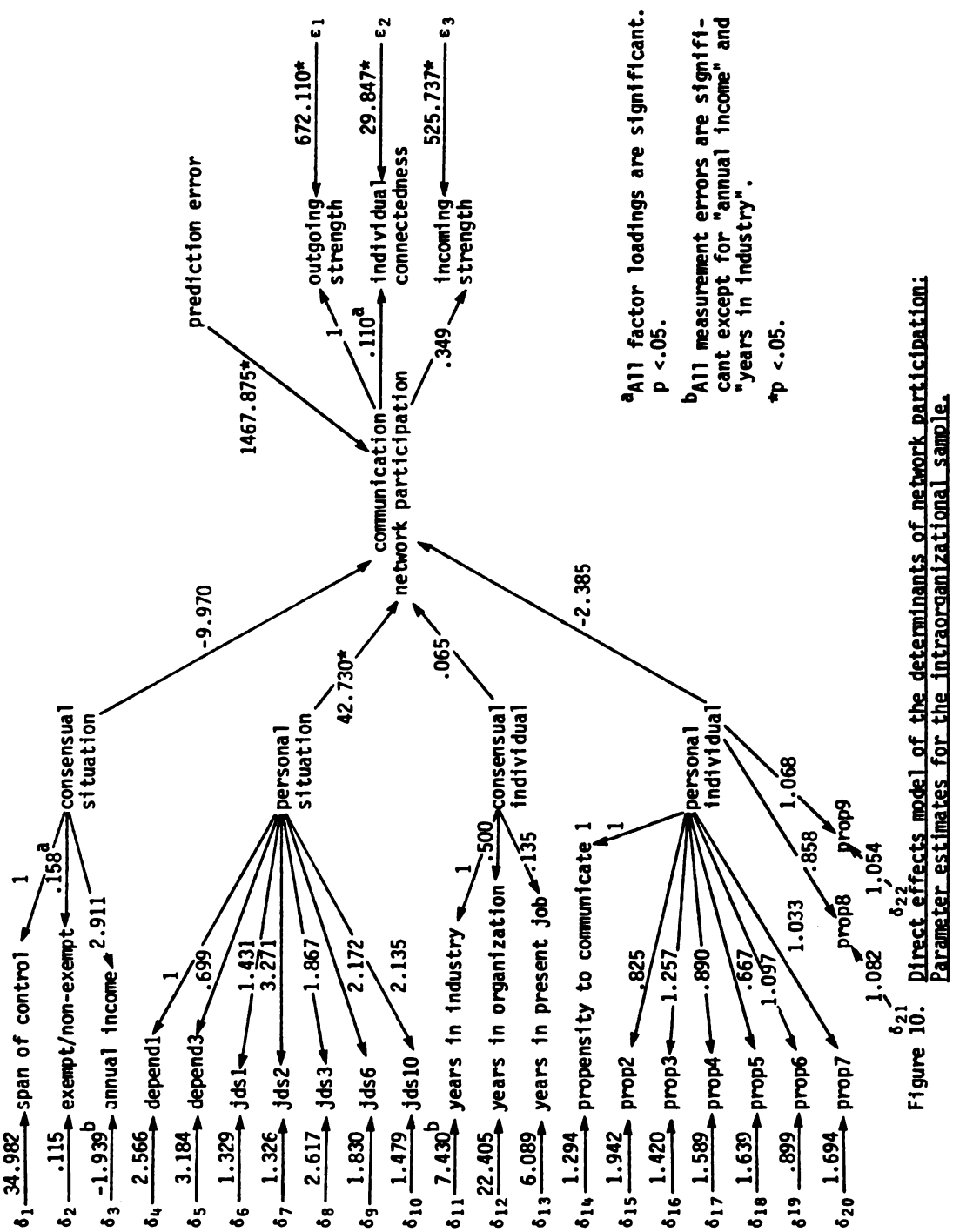


Figure 10. Direct effects model of the determinants of network participation: Parameter estimates for the intraorganizational sample.

[a] All factor loadings are significant. $p < .05$.

[b] All measurement errors are significant except for "annual income" and "years in industry".

*$p < .05$.

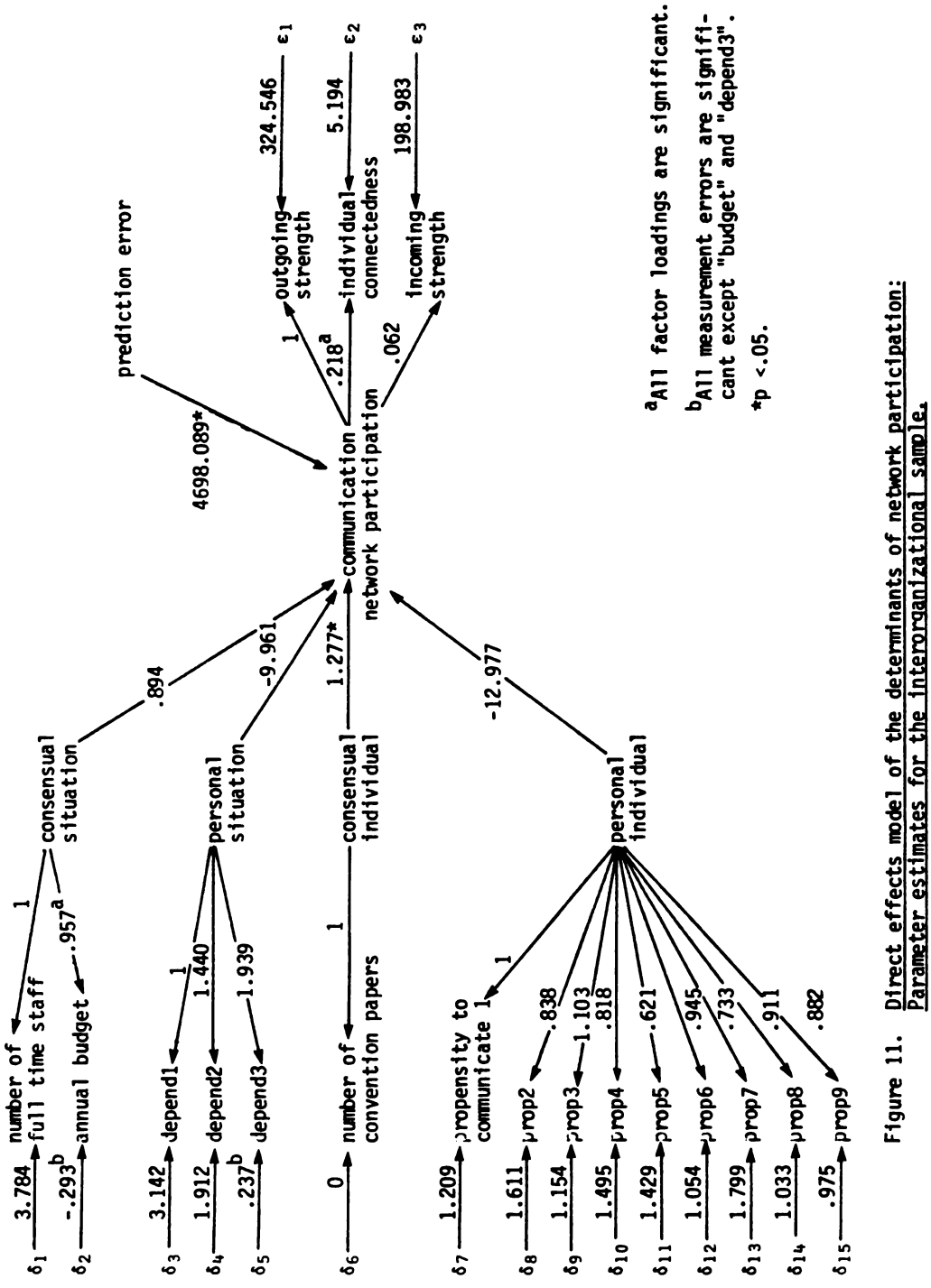


Figure 11. Direct effects model of the determinants of network participation: Parameter estimates for the interorganizational sample.

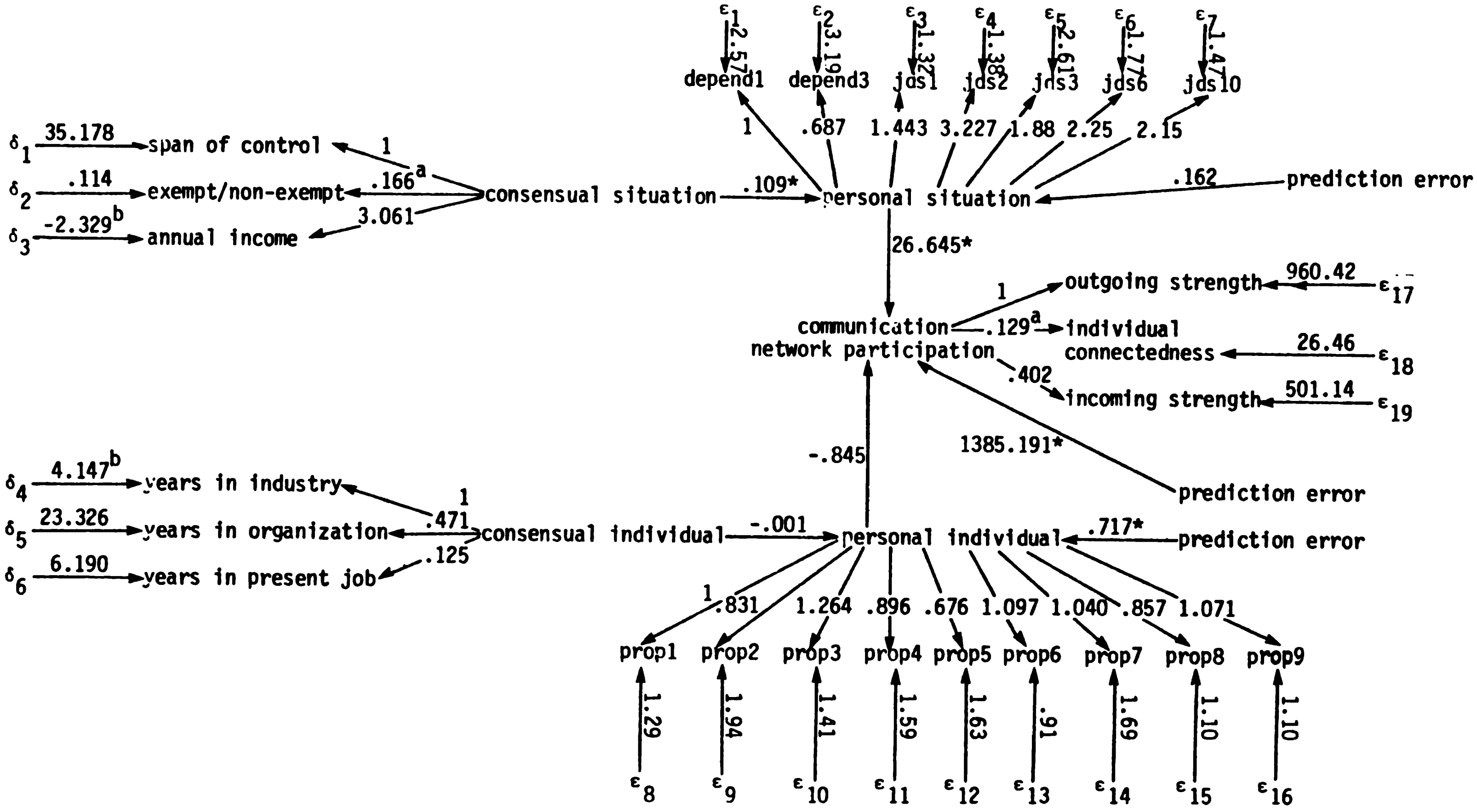
interorganizational sample. Hypothesis three was partially supported. Personal-situational variables were much stronger predictors of intra-organizational network participation than were personal-individual variables ($t = 2.578$, $p < .01$, 88 df). Consensual-situational factors had a stronger impact on network participation than did consensual-individual factors, but this was not in the predicted direction, hence does not count as support for hypothesis three.

Hypothesis four was not supported. Neither the difference between the coefficients for consensual-individual and consensual-situational nor those for the personal-individual and personal-situational were significantly different in the interorganizational sample.

Indirect Effects Model

Macroanalyses. Hypotheses five and six text the indirect model in the intra- and interorganizational samples, respectively. Both hypotheses received support. For the intraorganizational sample, a χ^2 difference of 931.08 with 30 degrees of freedom was obtained; in the interorganizational sample, χ^2_d was 625.91, with 22 degrees of freedom. The χ^2/df ratios for the intra- and interorganizational samples were, respectively, 2.5 and 2.0, indicating further support for the indirect model (see Tables 5 and 6).

Microanalyses. The parameter estimates for the indirect model in the intraorganizational sample appear in Figure 12. Of the four theoretical paths implied in the model, two attained significance. Both the path from the consensual situation to the personal situation ($\gamma = .11$, $t = 2.13$, $p < .025$) and from the personal situation to network participation ($\gamma = 26.65$, $t = 2.16$, $p < .025$) were significant and greater than zero. The indirect path from the consensual individual to network participation,



[a] All factor loadings are significant
* p <.05.

[b] All measurement errors are significant except "income" and "years in industry".

Figure 12. <u>Indirect effects model of the determinants of network participation: Parameter estimates for the intraorganizational sample.</u>

mediated by the personal view of the individual, was entirely nonsignificant.

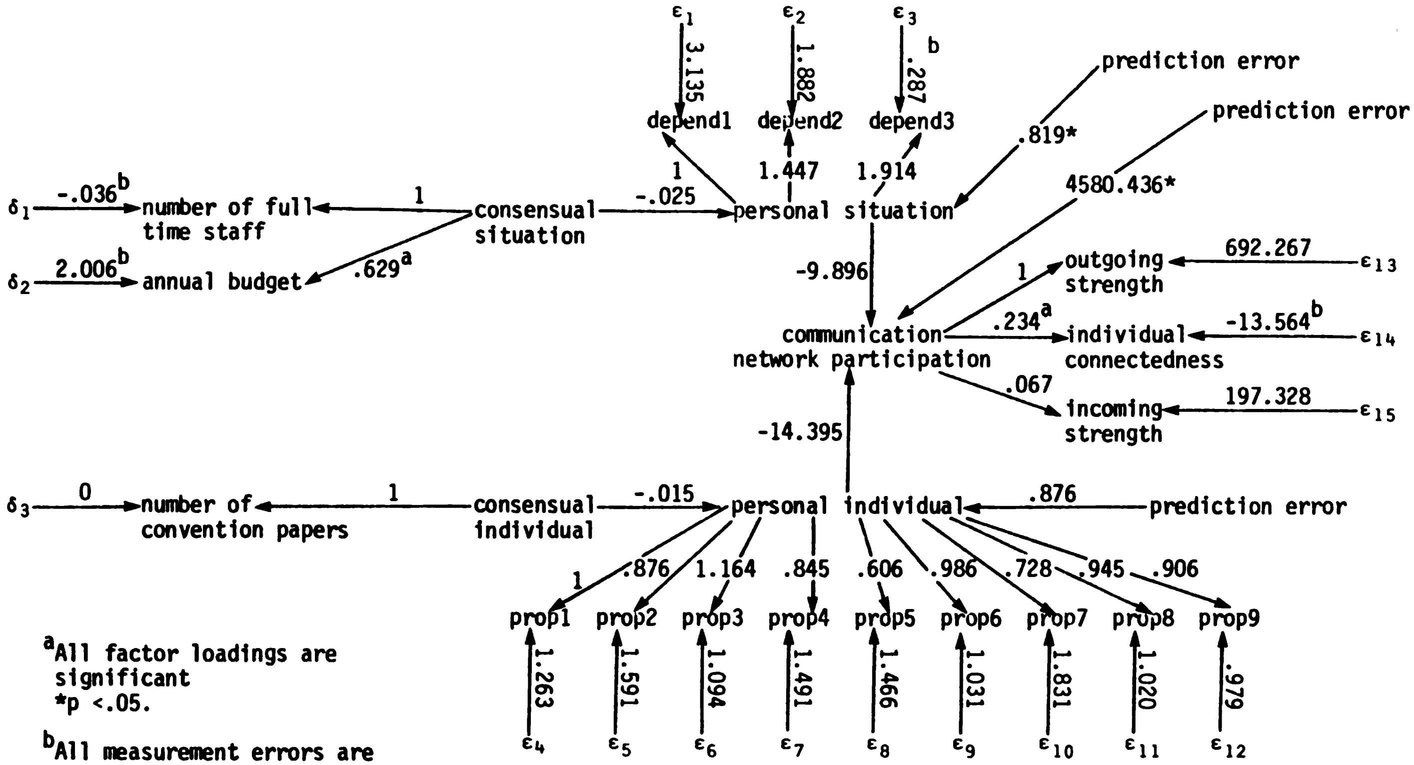
Parameter estimates for the indirect model in the interorganizational sample are provided in Figure 13. Of the four paths which are specified, none attain significance. This finding is evidence of serious misspecification in the theoretical portion of the model.

Interactive Model

Macroanalyses. Hypotheses seven and eight assert than an interactive model which contains all four main classes of determinants as direct effects plus the interaction between personal views of the situation and personal views of the individual would provide a reasonable fit to the data. Once again, both hypotheses received support. For the intraorganizational sample, a χ^2 difference of 907.67 with 15 degrees of freedom was obtained; for the interorganizational sample, χ^2_d = 630.39 with 14 degrees of freedom. The χ^2/df ratios for the intra- and interorganizational samples were, respectively, 2.4 and 1.8 (see Tables 5 and 6).

Microanalyses. Parameter estimates for the interactive model in the intraorganizational sample are provided in Figure 14. Once again, only one of four regression coefficients is significant, that being the path from personal-situational variables to network participation (γ = 42.55, t = 2.49, p <.01). The path from the interaction term to network participation was nonsignificant (γ = -.11, t = -1.66) and not in the expected direction.

Parameter estimates for the interactive model in the interorganizational sample are provided in Figure 15. None of the coefficients are significant, the path from the interaction term to network participation included (γ = -.01, t = -.054).



[a] All factor loadings are significant
*p <.05.

[b] All measurement errors are significant except "budget", "staff", "depend3" and "connectedness".

Figure 13. Indirect effects model of the determinants of network participation: Parameter estimates for the interorganizational sample.

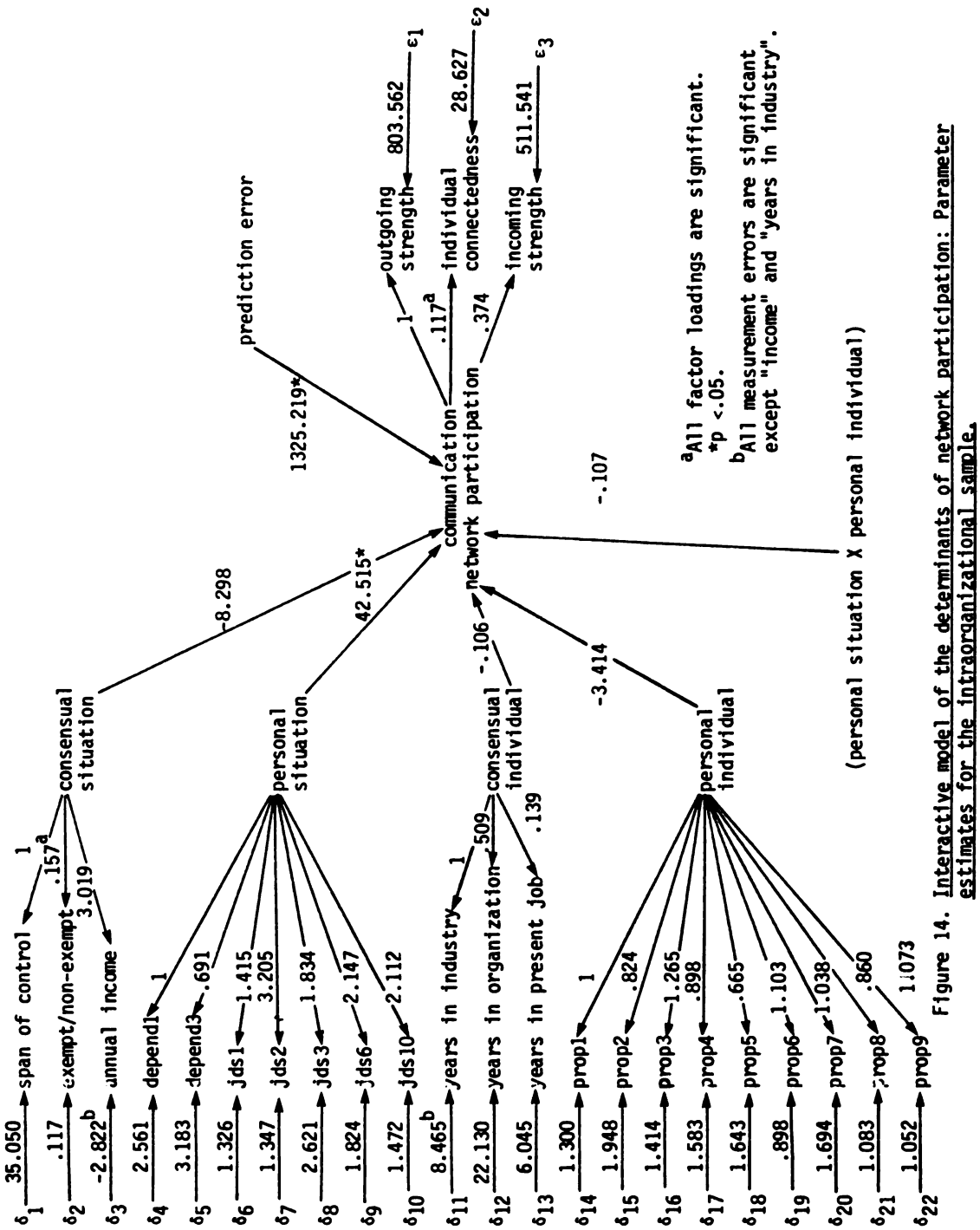


Figure 14. Interactive model of the determinants of network participation: Parameter estimates for the intraorganizational sample.

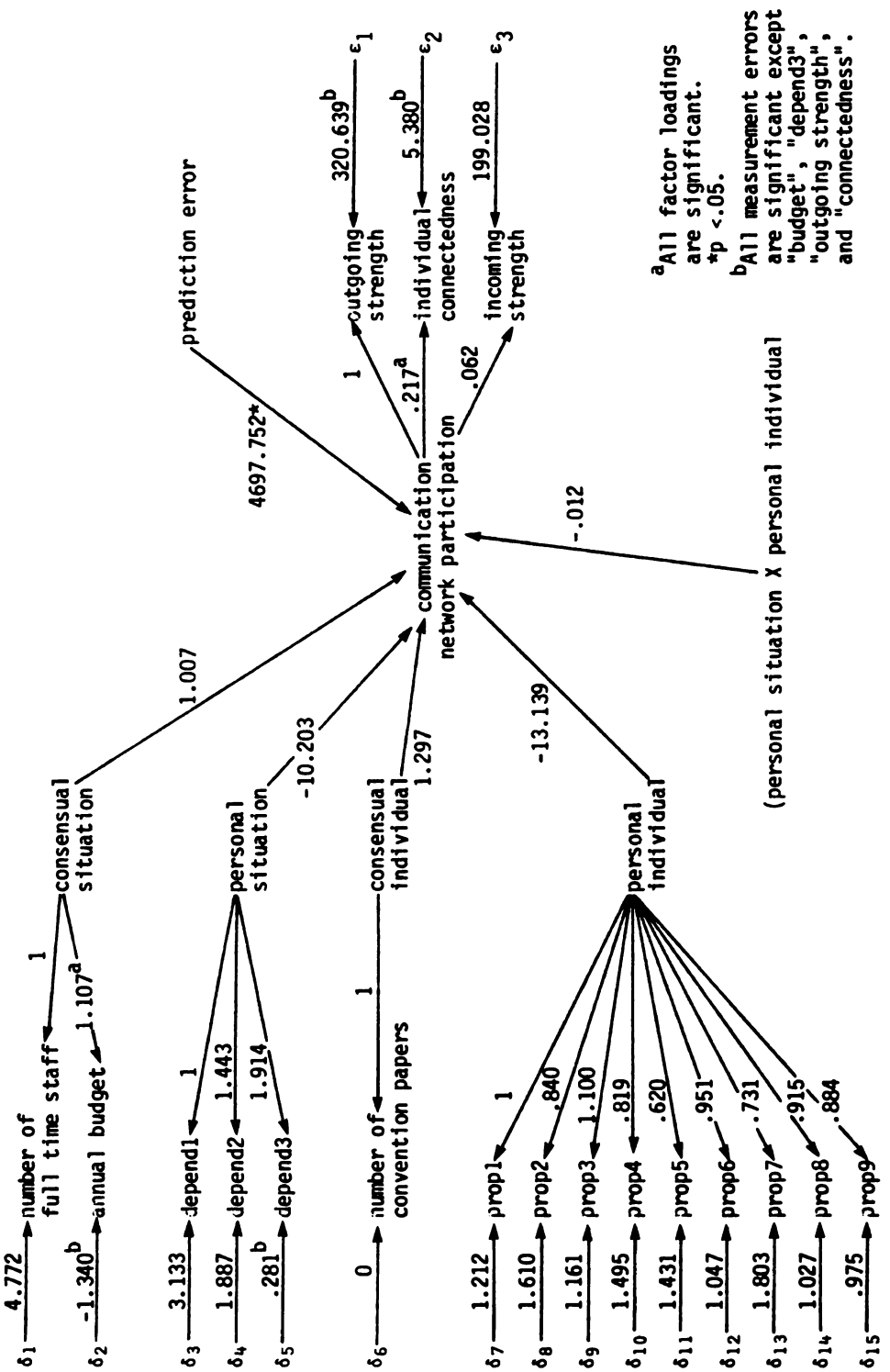


Figure 15. Interactive model of the determinants of network participation: Parameter estimates for the interorganizational sample.

Measurement Models

Each of the microanalyses performed above imply, in addition to the theoretical relationships described in the microanalyses, that all factor loadings (lambdas) be positive and significant. Even after correction was made to protect experiment-wise power, that is the desired level of alpha (.05) was divided by the number of lambdas tested for each sample, all factor loadings for all variables in both settings were significant at $p < .05$ (Tukey, 1980).

Model Comparisons

An attempt was made to determine which of the three models provided the best representation of the data within each sample. All six models are examined, both in the interest of completeness, and because each provided an account of the data significantly superior to the corresponding null model. It should be clear that some of these comparisons are more informative than others, in particular those contrasts of models which contain individual paths which are significant, such as the direct and indirect intraorganizational formulations. Throughout this section, it is important to remember that the overall χ^2 test used in model comparison is only one basis for judging the superiority of a particular formulation; two other criteria were employed here: (1) an increment-of-fit test, and (2) the significance of the individual coefficients within each model. The model comparisons and associated test statistics are reported in Tables 5 and 6 for the intra- and interorganizational samples, respectively.

Intraorganizational sample. In order to effectively compare the four models (including the null) for this sample, they must first be ordered from most restrictive to least restrictive. More restrictive models are associated with greater degrees of freedom, while less

restrictive models have fewer degrees of freedom. The total possible degrees of freedom for this sample was 325. The null model was the most restrictive (by definition) with 300 degrees of freedom, followed in order by the interactive, indirect, and direct effects models.

As was reported in the macroanalysis, the interactive model was significantly better at fitting the data than the null model (χ^2_d = 907.67, $p < .001$). The increment of fit for this comparison, which may be interpreted as the proportion of variance explained by the change in model specification, was .566, or about 57%. Further analysis reveals that the indirect model does not provide additional information (relative degrees of freedom lost) over the interactive model (χ^2_d = 23.41, ns; $\hat{\Delta}$ = .02). Finally, the direct effects model provides additional fit to the data above and beyond both the interactive (χ^2_d = 47.07, $p < .001$) and the indirect (χ^2_d = 23.66, $p < .001$) with small increments of fit ($\hat{\Delta}$ = .03, and $\hat{\Delta}$ = .02, respectively). It would appear from the use of these criteria (chi-square difference and increment-of-fit) that the direct model is superior in the intraorganizational sample.

The imposition of other criteria, however, shows the situation to be less clearcut. Both the direct and interactive models had only one theoretical coefficient which was significant; the indirect model had two. Also, since the model as a whole is sensitive only to the existence or non-existence of relationships, rather than their direction, it is certain that the strong negative relationship uncovered between the consensual situation and network participation in the direct effects model improved the goodness-of-fit of that model. This outcome is undesirable and somewhat misleading, as it reflects the data irrespective of the theoretical rationale; hence the acceptance of the direct effects model would imply

the logical fallacy of claiming this particular regression coefficient to be "significant, but in the wrong direction," and would undermine the a priori logic of hypothesis testing. Unfortunately, it is unclear just how much this negative relationship improves the fit of the model. Given the full set of criteria, however, it would be safest to say that the indirect model deserves the most support, since both macro and microanalyses show it to be most consistent with theory, although clearly in need of respecification in certain places.

Interorganizational sample. The total degrees of freedom for this sample are 171. The models were arranged hierarchically from the most restrictive to the least restrictive, beginning with the null (df = 153) and followed in order by the interactive, indirect, and direct models.

As was reported in the macroanalyses, the interactive model does a better job of fitting the data than the null model (χ^2_d = 630.39, p <.001). The change in specification to the interactive model over the null provides a 74% improvement in fit ($\hat{\Delta}$ = .737). Further analysis indicates that neither the indirect (χ^2_d = -4.48, ns; $\hat{\Delta}$ = .000) nor the direct (χ^2_d = 11.74, ns; $\hat{\Delta}$ = .013) formulation provided a better fit to the data above and beyond the interactive model. It would appear from the use of these criteria that the interactive model should receive the most support in the interorganizational sample.

This conclusion needs some additional qualification. In reality, what the nonsignificant increment-of-fit test reveals to us is that the indirect and direct models were no better at fitting the interorganizational data than the interactive model, but they were also only slightly worse, as a result of reduction in degrees of freedom. In light of the fact that none of the theoretical paths in the interactive model attained significance,

it would be foolish to accept this model as superior to the others. The direct model, on the other hand, does contain one non-zero path, from the consensual individual to network participation. Primarily due to this relationship, and also on grounds of parsimony, the direct model was deemed superior in the interorganizational sample, while at the same time it is recognized that the model needs substantial theoretical respecification in order to fit the data well.

Summary of Results

Preliminary analyses were conducted to prepare the data to meet the assumptions of the primary analyses. Two variables, budget and staff size, were log transformed to render their distributions more normal. A variety of transformations were tried to improve certain of the theoretical relationships, based on some potential nonlinearity observed in the scatterplots, but none of these provided noticeable improvement over the original data.

All of the hypotheses which compared the fit of the three models in the two settings to the respective null models received unequivocal support; hence each of the models at least met this necessary condition for success. Hypotheses three and four received somewhat more tentative support. Situational factors which were personal (enacted) were better at predicting intraorganizational participation than were personal individual factors, but this relationship did not hold for consensual factors. Hypothesis four, which stated that individual factors would be more potent predictors than situational factors of interorganizational network participation, was not supported by the data, although the coefficients were in the expected direction.

The measurement portions of all of the models considered in the

study received strong support. Even with correction of alpha to avoid confounding, all factor loadings for all variables in both models were positive and significant ($p<.05$).

The microanalyses revealed that variables representing the personal situation were the best predictors of intraorganizational network participation, while the variable representing the consensual individual was the best predictor of interorganizational participation. In the indirect model, an additional path from the consensual to the personal situation was also significant in the intraorganizational sample.

A number of criteria were applied to determine which model best represented the data in each sample. In the intraorganizational sample, it was argued that while the direct effects model fit the data best, this was largely because of a statistically significant relationship which was not in the predicted direction; hence the indirect model was judged to be superior and more consistent with theory, as well as containing two non-zero paths (as opposed to one in the direct model). It was noted that respecification of the individual portion of this model could substantially improve the fit to the data.

In the interorganizational sample, it was concluded that while the direct and indirect models were technically no better than the interactive model, they were also only slightly worse. While none of the three models received strong support for its theoretical component in this sample, the direct effects model was judged marginally superior because of its one non-zero path, and on grounds of parsimony.

Chapter IV

DISCUSSION

This chapter is divided into four major sections. First, the conclusions of the study are reviewed and highlighted. Second, the theoretical implications of the research are explored. Third, the limitations of the study, both conceptually and methodologically, are presented. Fourth, and finally, directions for future research using these and related models are described.

Major Conclusions

The results of this study are somewhat tentative, but two general statements can be made about network participation from these data. First, as least within the organization, the information flow view of organizational behavior appears to be the best representation of the data, as manifest in the indirect model. Consensual aspects of jobs which were associated with increased perception of dependence in fact led to these perceptions, which in turn impacted upon participation in the intraorganizational network. In addition, in the intraorganizational sample, personal or enacted views of the situation were more potent predictors of network participation than were individual characteristics.

Second, it appears that in general, consensual factors can have an impact on network participation; specifically, degree of professional involvement was a good predictor of interorganizational network participation. Related to this conclusion is the observation that those

situational (or environmental) factors which predispose organizations to forge linkages may not be the same factors which predispose individual members of those organizations to make communication contact with members of other organizations. This finding reflects an important difference in units of analysis which should be examined in future research.

It is apparent that each of these conclusions needs additional research using different variables, operationalizations, and kinds of samples. Given this, the study presented here represents a step toward closing what Granovetter (1979) has dubbed the "theory gap" in network research. Granovetter has argued that:

> The time has come in the development of social network analysis when every model which is put forward for serious consideration must be quite explicit as to the theoretical framework in which it operates. (p. 517)

The two-dimensional model of the determinants of participation developed in this paper addresses the various theoretical and epistemological assumptions which accompany the choice of any determinant or combination of determinants in putting together a model of network participation.

Theoretical Implications

In this section, the results of this study will be interpreted in light of a number of theoretical issues raised in the literatures of intra- and interorganizational behavior. Specifically, the issues which will be dealt with are:

1. The efficacy of the resource dependence model;
2. The problem of multiple levels and units of analysis in describing and predicting network linkages;
3. The applicability of theories of uncertainty reduction and environmental control to communication network research;

4. The potential application of a contextual interpretation of the direct effect of consensual variables on individual behavior;

5. An examination of various status explanations of network participation which have been offered in the literature, and what they say about the data reported in this study;

6. The idea that this study is a special case of a setting by determinants interaction;

7. A discussion of interactional psychology in general and how it relates to these findings and future work in particular;

8. A description of the potential epistemological implications of the research and the framework in general.

The Resource Dependence Model

If one's conceptual definition of resources were broad enough, such that individual variables such as reputation were included in it (Benson, 1975; Gamson, 1966), the finding that professional involvement was a good predictor of interorganizational participation could be construed as support for the resource dependence perspective. Analogous to a large, rich organization which has valued funds, a professional has access to other valuable though less tangible commodities.

Support for the resource dependence perspective is perhaps stronger in the intraorganizational setting, if one allows enactments of dependence to serve as a mediating variable between consensual dependence and behavior. Again, however, relying on a coworker for time, assistance, and energy is different from relying on another organization for money. Even so, there is clear evidence here that enacted job dependence directly affects participation. Some would argue that this intervening variable was always implicit in resource dependence views, due to the ways in which environments have been measured (Offerman, 1976). Offerman has argued that the perception of situations is always subject to the

"mediation of environmental realities by decision-makers in the organization . . . (This is an) empirical truth to be assumed and accepted." Roberts and Glick (1981) noted that the usage of the job diagnostic survey (JDS) implies the use of enacted or perceived job characteristics. It appears from the research, however, that not all writers have equally acknowledged this 'empirical truth' in their work (Aldrich, 1979).

We conclude from these data that (1) the information flow view of environments seems most applicable to data from the intraorganizational setting; (2) the resource dependence view seems potentially applicable to the interorganizational setting, but much more data is needed to advance this hypothesis beyond the tentative stages; and (3) both perspectives deserve further consideration in both types of settings. Those who have supported a resource dependence view of organizations and environments have considered economic and materials-related issues to be the primary determinant of behavior, rather than political and social issues. This general orientation has been roundly criticized for its incompleteness by many writers, notably Bowers (1973) and Keeley (1980). The results of this study call for a more moderate interpretation, one which combines elements of both models in a more complete picture of the determinants of network participation.

Units and Levels of Analysis

In the past two decades, the systems model of organizational behavior has become increasingly popular among researchers and theorists (e.g., Etzioni, 1960; Katz & Kahn, 1966; Farace, Monge, & Russell, 1977). A system consists of interdependent components, separated by a boundary from their "environment" (Farace, Monge, & Russell, 1977). In an intraorganizational system, individual members (and sometimes dyads and

groups) are usually seen as the system components, and the interactions or communication linkages among them the emergent structure of the organization (Monge et al., 1978; Roberts & O'Reilly, 1978). When one extends the systems analogy to apply to interorganizational systems, the unit of analysis changes. An interorganizational system may have a greater number and variety of component parts than an intraorganizational system; entire organizations, as well as individual employees and groups can be considered as parts. Researchers must be careful, then, to specify the types of linkages which are being considered in any discussion of exchange. Not only can the commodity of exchange differ, but the units of analysis involved may also vary from study to study. In this sense, this study has not been a replication of past work with interorganizational systems, since those studies have typically taken their dependent variable to be linkages between organizations, in the form of resource exchange through joint programs, rather than linkages between persons, in the form of information exchange.

These data also suggest that different units of analysis for analyzing interorganizational linkages may lead to different results pertaining to the determinants of participation. The use of joint programs (Aiken & Hage, 1968) to operationalize interorganizational linkages might have yielded different results. As noted by Roberts, Hulin, and Rousseau (1979), further work needs to be done which makes explicit the connections between the different levels of analyses in organizational and interorganizational systems. Resolutions such as that by Levine and Roy (1979) are required. Levine and Roy argue that linkages between organizations should be reified to be meaningful, and proceed to model linkages between organizations and persons, and organizations and organizations.

Whether or not one takes this particular approach, some explicit rationale for connecting the various levels of analyses would be desirable.

As was noted earlier, the operationalization of interorganizational linkages in this study did not reflect the common level of analysis employed in most interorganizational research (Levine & White, 1961). Given this caveat, we can state rather strongly that those variables which have typically been found to impact on organization-organization linkages (usually in the form of formal agreements or joint programs) do not also predict individual participation in communication networks. It appears that while individuals are often responsible for forging or maintaining interorganizational relations, there may be significant variability across individual participation, perhaps dependent upon the length of time for which the organizations have been cooperating (long-standing agreements may take less individual involvement), or the type of exchange which is most prominent at the time (different stages of a relationship may require unequal concentration on material exchange over information exchange, for example). Consider two companies which have had a mutual agreement to exchange goods and services for many years. This linkage may have at first required a great deal of individual involvement, but over time has come to represent "business as usual" and hence requires much less extensive individual contact.

Basic to this discussion is the concept of multiplex linkages. This study has focused specifically on the exchange of work related information. As such, it has been limited to the examination of only one of a variety of different kinds of linkages which may occur between individuals and organizations (Eisenberg, Farace, Monge, Bettinghaus, White, Kurchner-

Hawkins, & Williams, Note 4; Farace et al., 1977; Lincoln & Miller, 1979; Roberts & O'Reilly, 1978). While in one sense this observation points to a limitation of this research, on the other hand it clearly delineates the nature of the communication or social contact, which is not done in many studies (e.g., Moch, 1980).

As relationships among individuals and organizations emerge, three kinds of linkages may develop. These are primary (friendship or socially related, instrumental (work related) and material (resource related). While all three types of linkages could occur at the individual or organizational level of analysis, most material linkages occur between organizations, whereas most primary and instrumental linkages occur between individuals (Eisenberg et al., Note 4).

All three types of linkages could co-occur between any given pair of individuals or organizations. Alternatively, as a relationship develops, it may progress through various types of linkages. For example, contact between two people representing either the same or different organizations may begin socially (as in a primary linkage), lead into some business opportunities (instrumental linkages) and ultimately some kind of contract or formal working relationship between the people or the organizations which they represent (i.e., a material linkage). Conversely, two organizations may have a long history of contractual agreements and/or informal cooperation, and these agreements may lead individual decision-makers from each organization to come into more frequent contact with one another, in a social or work-related setting.

To reiterate, instrumental linkages were the focus of this study; placed in this context, the knowledge that perceived job dependence leads to more instrumental ties within organizations, or that greater professional

involvement leads to more instrumental ties between organizations is only a beginning. One may next ask: "What effects do these same variables have on the formation of primary and material linkages? Ultimately, one could construct a dynamic (time-dependent) model of network or linkage development, one which would take into account relevant individual and situational characteristics, as well as the degree of participation in other networks as predictors of participation in any given network.

Uncertainty Reduction and Environmental Control

One of the most common theoretical mechanisms employed in modern organizational research is that of the drive toward uncertainty reduction (March & Simon, 1958; Weick, 1979). Adopting an essentially rational selection model, these theorists argue that decision making processes within organizations are affected by the degree of environmental uncertainty and in general the "equivocality of information available to decision-makers" (Aldrich, 1979, p. 122). The information flow view of environments incorporates environmental uncertainty reduction as a key concept. As Aldrich (1979) has argued, the information flow view of organizational environments focuses attention on perception, since it posits a kind of two-step flow where information about environmental elements are filtered to remove equivocality, and the filtered information subsequently makes its way into the decision-maker's frame of reference. In contrast, the resource flow view has not confronted the issues of perception and cognition, and has either treated the flow of "accurate" information as nonproblematic or irrelevant to the explanation of environment effects on organizations and their members.

A primary component of Weick's (1979) uncertainty reduction view is that a potential response to uncertainty is the initiation of double-

interacts, or interactions with others. Although the uncertainty reduction view has been applied mainly to the organization and its environment, it can be extended to apply to an individual's social environment. According to Miller and Steinberg (1975), the major reason why people communicate is to control their environments; i.e., to maximize the potential for the occurrence of personally desired outcomes. This sounds very much like what Weick might describe as the process of equivocality reduction, and it locates communication as a central concept: A major way of responding to and coping with an uncertain environment is to initiate communication contact with others.

Unfortunately, this argument finds no empirical support in the data from the interorganizational sample. In the intraorganizational sample, however, the results may be taken to support this viewpoint. Perceived dependence of one's work on others can be viewed as analogous to the extent to which an employee has control over his or her environment. The finding that perceived dependence led to increased participation may be evidence of an uncertainty reduction taking place. More generally, it would appear worthwhile to consider the implications of a general environmental control theory which could be applied to the uncertainty reducing activities of individual actors across settings for a variety of role-related and personal reasons.

Should such an environmental control theory be developed, one which is sufficiently general to include uncertainty reduction processes in a number of different settings, it might also provide some potential explanations for the nonsignificant findings in this and related studies. A general theory might recognize the importance of "partial inclusion" (Weick, 1979), that individuals are never totally within organizations;

rather, only some of their behaviors are "inside." Within the context of this study, one can see how there is no guarantee that persons who experience uncertainty and are predisposed to forge communication linkages will do so within the defined network or even the organization! It is difficult to establish the boundaries which constitute an organizational or interorganizational system; it may be that the use of any consistent psychological mechanism like uncertainty reduction will require inquiry into more than one setting in which the individual behaves. What if those who are highly predisposed to communicate express that tendency primarily at home?

Rogers and Kincaid (1981) have argued that "Network communication is especially important whenever individuals are involved in exchanges in order to reduce their uncertainty" (p. 90). This research demonstrates, according to one possible interpretation, that amount of network participation within an organization will be higher for individuals who perceive greater uncertainty surrounding their work activities.

Environmental Context

Another way to approach these results is through the notion of environmental context. The finding that number of formal professional contributions predicted degree of interorganizational network participation may not be something that most organizational participants would be aware of, or even able to articulate; but it may be a basic operating procedure which pervades all of their interactions through a professional code of behavior (Hirsch, 1976). To understand the insidious nature of context, consider the newly wedded couple who profess to have married for love, only to discover that they are in fact quite similar in religious, social, and economic orientation, none of which they consider to

be important factors in their choice to marry. While there is no question that emotionality has something to do with their bonding, a strong case could be made for the numerous environmental and consensual-individual factors which have unwittingly influenced their decision.

If we conceive of the environment or situation as a general orientation which the person has agreed to partake in as a "whole," at least in terms of daily activities, setting, and persons to interact with, it is easy to see how this larger context could structure expectations for more specific attitudes and behaviors. Both Becker (1960) and Kiesler (1971) have argued that mere participation in a situation can have a binding effect on consequent attitudes and behaviors. The environmental context is effectively "consensual" not personal, since the individual participant may or may not be aware of these influences. The data in this study provide only weak support for this notion, and it should be explored further in future research.

Status Explanations

While status explanations are far from being formal theories, they are included here because of their frequent citation in the intraorganizational literature (cf. Monge et al., 1978; Lincoln & Miller, 1979). The status approach states that individuals with higher attributed status will be more central in communication networks. In the interorganizational sample, it would appear that this view is supported, if one assumes that those with higher professional involvement are also the recipients of attributions of relatively high status.

The results from the intraorganizational sample were more complex and unexpected. A negative regression coefficient was obtained from the consensual situation (span of control, income, exemptness) to network

participation. According to status explanations, all three of these variables should be related positively to network participation, since they all reflect status (high income, span of control, and exempt status). Closer inspection of the zero-order correlations reveal, however, that while there is a significant positive correlation between span of control and participation (although quite small), a negative correlation of -.39 was obtained between exemptness and participation. Non-exempt (hourly) employees were found to have more than twice the strength of linkages than exempt (salaried) employees. Interestingly, in the indirect model, the consensual situation variables have a uniformly positive effect on perceived dependence, indicating that this process is perhaps the least ambiguous for describing the determinants of intraorganizational network participation.

Examining the direct effects model for a moment, however, leads to a variety of interpretations. First, past research on intraorganizational network participation has focused primarily (as has most organizational research) on middle level managers, and as such has rarely included non-exempt employees. The finding that exempt workers in fact communicate much less than non-exempt workers runs counter to the status explanation of centrality. It suggests instead a different explanation, more common to the personnel literature, which would state that communication amount is more closely related to job characteristics and requirements than formal status or position. Perhaps we are in a position to recommend separate theories of participation for different employee groups, such as hourly or salaried, which might be based on different needs and job requirements (Eisenberg, Note 2). Finally, it is intriguing to note that the negative correlation obtained here was between exemptness and strength

of outgoing links, rather than number of contacts. It may be that people of higher status have more contacts, while people whose jobs require frequent interaction, regardless of status, report more time communicating.

Setting by Determinants Interaction

This study can be seen as a special case of a setting by determinants interaction in causing network participation. Different settings have different normative expectations for behavior and, in particular, amount of participation. Many jobs could be described as having a "ceiling" on interaction above which employees cannot participate. It was argued here, however, that in the interorganizational setting these restrictions are less common, and the expectation is that substantial contact can be made with other organizational members, often outside of the work setting. Other organizations which might be studied would fall on the continuum between these divergent norms of participation, and one would expect an interaction between an organization's position on this continuum and the determinants which affect participation.

Interactional Psychology as a General Framework

The models which have been offered in this paper are meant to reflect the broad view of interactionism which considers both the importance of individual and situational factors in shaping individual behavior (Lewin, 1942; Schneider, 1981; Terborg, 1981). The results of this study show that while the specific, multiplicative interaction tested here is not a good predictor of network participation, both situational and individual level variables can make a difference in network participation. Other interactions should be tried which reflect specific theoretical rationales. More importantly, new theories should be developed which model the dynamic

interaction between persons, situations, and individual behavior (cf. Kahle, 1979; Schneider, 1981). This undertaking is discussed further in the section on future research.

Epistemological Implications of the Research

The results here can only lead to very tentative epistemological claims. At minimum, we may argue that both consensual and personal factors may impact upon participation. This opens the possibility that individuals may be affected by factors which are outside of their present awareness. Further, these findings suggest that the resource view in and of itself is not a good explanation of individual work-related communication. Instead, it would appear that some combination of situational and individual level variables may be required. The data favor most strongly an information flow view, where environmental conditions are perceived by decision-makers, who then act on them.

More importantly, this study presents an integrative framework within which future work can be classified. In a similar fashion to Roberts and Glick (1981), this paper highlights for researchers which types of variables (individual or situational) have been given a great deal or very little research attention. In addition, it also indicates which views of these variables have been employed, bringing to light the epistemological assumptions behind each study. It is hoped that the framework will in this way be heuristic, in that previously unconsidered relationships will be tested, and results from research conducted with this model in mind will have implications for the more general issue of what determines organizational communication behavior.

Limitations of the Research

In this section, the major limitations of this research, both conceptual and methodological, are discussed.

Problems with Survey Sociometry

The problems with survey sociometry (network analysis conducted with survey techniques) have been given ample space elsewhere (Rogers & Kincaid, 1981) and need not be repeated here. It is enough to say that there is considerable ambiguity as to whether people can make accurate reports of their communication participation, where accuracy is judged in terms of their actual contacts (Bernard & Kilworth, 1976). Although these arguments appear to be overstated given the limitations of the studies addressing the issue (small organizations, observations conducted at fifteen minute intervals, etc.), a multimethod approach to the operationalization of linkages would obviously be desirable (Rogers & Kincaid, 1981). Until this is accomplished, however, there is no clearcut reason to choose either survey sociometry or observational techniques as the superior "standard" against which other techniques need to compare. The distinction between observation and self-report data is akin to the consensual-personal distinction made earlier in this paper and is by no means resolved.

The inability to survey a complete network, however, can lead to biased results. In both samples, the researcher attempted to obtain a saturated sample; this was nearly accomplished in the intraorganizational sample, but a response rate of only 57% was obtained in the interorganizational sample. The problem in this study is less serious than it would be in studies which used a characteristic of the clique or network, rather than of the individual, as the dependent variable. The measurement of individual connectedness utilizes network analytic techniques without

incorporating the clique or network information available from network analysis. As such, it is a kind of "half-way point" between individual and relational analysis (Rogers & Kincaid, 1981); hence it is less vulnerable to nonresponse bias than would be a relational construct. In effect, individual connectedness as measured in this study could also be obtained by asking an individual to list their communication contacts and the strength of their contacts for a specific kind of linkage. As long as both reciprocated and unreciprocated links are used in the analysis, then the lack of a saturated interorganizational sample is not especially problematic. In other words, all contacts which were reported, whether mutually or by only one of the interactants, were included in the network analysis. In this way, persons who were omitted from the list and were considered important contacts by resondents were added and subsequently became part of the network. In addition, important nonrespondents were also included in the network via their nominations by others. Had the analysis been restricted to include reciprocated linkages only, interpretation of results would have been problematic. While a more complete sample would have been preferable, the use of unreciprocated links helps to provide a more realistic picture of the communication network, albeit somewhat less reliable.

One thing individual connectedness measures do depend upon is the inclusion of all relevant participants on the list of contactees. An effort was made in this study to include all of the people who might in any way be connected with the interorganizational venture. But the list of contactees is probably fundamentally incomplete, given the problem of partial inclusion discussed above; for example, friends and neighbors, rather than colleagues, may be in some cases the major communication

outlet for an individual. It would be interesting to conduct a study which would allow people to list their most frequent communication contacts on a specific subject across a variety of settings; e.g. work, home, or with friends; and to relate these findings to individual and situational characteristics which facilitate participation. As it stands in this study, individuals who are only partially included are only partially measured by these network techniques.

Generalizability of the Results

The interorganizational system observed in this study was unique in that it was not a business enterprise but a professional venture which included doctors who were unlikely to consider themselves to be employees of any particular organization, at least in the common sense of the word. Doctors would in all probability see themselves as adjuncts to organizations, with primary loyalties to their profession. It would be worthwhile to consider the results of this study had it been performed in a more business-oriented environment, where boundary spanning roles were more carefully specified.

As was mentioned in the above discussion, the results from the interorganizational sample are not generalizable to interorganizational research using the resource dependence model, since the dependent variable of interest here was linkages among persons to share information, rather than linkages among organizations primarily in the form of joint programs and formal agreements. Future work needs to extend the model tested here to include these other types of interorganizational linkages.

This research is also difficult to compare with intraorganizational studies, since employee "responses" used as dependent variables in those studies are typically satisfaction, performance, turnover or absenteeism,

not participation. Changes in attitudes may be quite different and respond to different determinants than do changes in participation behavior. Moch (1980) has shown that people who are isolated from social contact at work are not homogenous in terms of personal factors such as job involvement and internal motivation. Future work should extend the model of participation to include both these psychological variables and the commonly investigated employee "responses" described above.

Alternative Interactions

Finally, while this paper has drawn significantly on the basic tenets of interactional psychology, it only evaluated one specific, multiplicative interaction. Others could be tried, and other ways of assessing person-situation interactions might also be investigated. An additional indirect model, one which allows for linkages from the consensual situation to the personal individual, as well as from the consensual individual to the personal situation, might be one worthwhile step in this direction.

Directions for Future Research

The present research is important because it extends work with the communication network paradigm (Rogers & Kincaid, 1981) into the interorganizational setting, and also provides a test of the generalizability of a set of determinants of network participation across two settings, intra- and interorganizational. Future work could have as its goal the integration of findings relevant to determinants of participation with studies which have addressed consequences of participation (Eisenberg et al., Note 2; Miller, 1980; Moch, 1980).

Toward a Model of the Causes and Consequences of Network Participation

A variety of theoretical perspectives could be brought to bear on a combined model of the causes and consequences of network participation. Information exchange would be at the center, playing the key role in determining employee attitudes and behavior. For example, increased participation may help to clarify expectancies for job performance for employees, and hence increase motivation, as predicted by expectancy theory (Campbell & Pritchard, 1976). Interorganizational network participation could be taken to indicate external influence in the sense of being well-connected, and be studied in light of Tushman and Scanlan's (1981) theory of external and internal "stars." Using this approach, one could design a study where data on inter- and intraorganizational participation and influence could be measured for each person. The theory would predict that only those with high involvement and influence in both networks would be effective boundary role personnel.

Multiplexity of Linkages

As was represented in the discussion of multiplex linkages above, linkages between persons and between organizations can be of a number of types, such as instrumental, primary, or material. A series of questions follow from this distinction. Do the same factors which impact on the formation of instrumental ties also predict primary ties? Can a person have strong linkages of both the primary and instrumental types, and what are the consequences of these various combinations? Finally, should strength of linkages and number of contacts (connectedness or centrality) be treated as indicators of the same construct (e.g., linkage intensity) as they are in this study, or should they be considered separately, in such a way that (for example) job requirements might lead to more time

spent communicating, whereas informal status brings about an increased number of contacts?

Other Variables and Operational Definitions

The variables and operationalizations employed here in no way begin to exhaust the potential variables and indicators which could be classified under each type of determinant. It is apparent that other operationalizations of these determinants as well as of network participation should be explored. The variables which were chosen here were selected because many of them had been studied before; some others were derived from theories which had some relevance to network participation. Other variables should be tried, such as proximity (both psychological and physiological) which might impact on participation (Frisch & Zedeck, 1972). Variables could be selected within a variety of different theoretical rationales. For example, one perspective might argue that a major factor which influences degree of participation is the characteristics of supervisors, subordinates, or co-workers. It is clear from the literature that more consensual views of the intraorganizational situation (Aldag et al., 1981; Roberts & Glick, 1981) and more personal views of the interorganizational situation (Eckstein, 1977; Gillespie & Mileti, 1979) are called for.

Dynamic Models of Communication Network Participation

Most importantly, the nature of persons and situations as they affect individual behavior needs to be recognized in a more dynamic or time-dependent way. The distinction between what constitutes an individual and what constitutes a situation is less than clear, due to their continual interaction (Bem, 1979; Bowers, 1973; Rausch, 1979; Schneider, 1981). As Schneider has argued:

> People and situations are in continual and cyclical reciprocal interaction, causing and affecting each other. In brief, this perspective argues that, as Bowers (1973) noted, person and situation are difficult if not impossible to separate. What this means is that researchers can no longer think of person-situation interaction as only a multiplicative term in an ANOVA or moderated multiple regression formula . . . (p. 4).

In a similar fashion, Rausch (1979) has emphasized the necessity for the interactive paradigm to include "a temporal frame of reference for person-situation systems. Such systems evolve, reiterate, and perhaps transform over time through sequences of successive steps and through recurrent cycles of interchange . . ." (p. 103). Failure to recognize the temporal frame, according to Rausch, is tantamount to accepting

> . . . a static model of fixed labels, unproductive for understanding, of minimal use in effecting personal or social change, and untrue to our lives in a world in which our interactions--with ourselves, with others, and with events--are framed in time. (p. 103-104).

From this viewpoint, it would be possible to develop a model of network participation which would include non-recursive relationships between situational characteristics, personal characteristics, participation and perhaps other variables. This model could take into account the continual shaping process of situations by persons, and of persons by situations manifest in enactments, predispositions, and behavior.

Final Comment

This study investigated the determinants of individual communication network participation in two settings, intra- and interorganizational. Three models of participation, direct, indirect, and interactive were evaluated. In the intraorganizational sample, it was concluded that an indirect model in line with the information flow view of organizational environments provided the best fit to the data. In the interorganizational sample, a direct effects model which included a significant path from professional involvement to network participation was found to be the best fitting model. Factors which have been proposed in the literature to have direct effects on interorganizational linkage formation at the organizational level did not have any significant impact on individual communication participation.

Organizational communication and organizational behavior research have reached a critical point in their treatment of interpersonal communication in the organizational context. In response to a long history of research which has been concerned with issues of resource exchange and has reified organizations as "key community actors" (Galaskiewicz, 1979), many writers have begun to incorporate interpersonal ties as a part of their analyses. Recent work with the communication network paradigm (Rogers & Kincaid, 1981) has helped to identify the major issues which are involved in combining communication network data with other, more traditional organizational data, but a synthetic framework for studying interpersonal ties in organizational contexts has yet to appear.

This paper suggests that there are at least three theoretical distinctions which can serve as building blocks for such a framework. The comparisons made here between intra- and interorganizational samples

highlights two things: First, that a general theory of participation should apply to a variety of diverse settings, to be less vulnerable to the concerns of partial inclusion (Weick, 1979); and second, that the complexity of systems components in these different settings will require a multiplex approach to the study of linkages, which in all probability will include linkages which are primary, instrumental, and materially based.

The distinction between individual and situational factors which determines network participation is the least revolutionary of the three. Organizational researchers are at last beginning to explore the propositions of interactional psychology (Schneider, 1981; Terborg, 1981), which has been reasonably successful in explaining human behavior where trait theorists and situationists have not. The area of interactional psychology, however, is changing as we examine it; recent work indicates that we must go beyond the typical notion of multiplicative interaction to more time-dependent models which account for the mutual definition of individuals and situations. Future work should investigate the hypothesis that both situational and individual factors can affect communication behavior, and that their effect changes in predictable ways over time.

Finally, the distinction between consensual and personal orientations helps us to recognize the philosophical underpinnings of our research. Specifically, this distinction should raise awareness in researchers of the problem of establishing isomorphism between construct and measurement (Roberts & Glick, 1981). Of critical importance is the mutual impact of personal and consensual views over time; what one person may enact today can become the consensual view of tomorrow, and what is consensually accepted tomorrow will affect the personal orientation in the more distant future. Taken together with the communication network paradigm, as well

as the two distinctions made above, this insight can provide the basis for a theory of organizational socialization and change which has applications both at the individual and organizational level, and which proposes communication activity as a central concern.

APPENDIX A

PARTICIPANT'S QUESTIONNAIRE

(Intraorganizational)

The following items were included in the intraorganizational questionnaire, and are listed by variable.

Span of control

How many people report directly to you?

Exempt/non-exempt

Are you exempt or non-exempt?

a. exempt b. non-exempt

Annual income

What is your approximate annual income at _____ (name deleted)?

a. 9,000-11,000	h. 23,000-25,000	o. 37,000-39,000
b. 11,000-13,000	i. 25,000-27,000	p. 39,000-41,000
c. 13,000-15,000	j. 27,000-29,000	q. 41,000-43,000
d. 15,000-17,000	k. 29,000-31,000	r. 43,000-45,000
e. 17,000-19,000	l. 31,000-33,000	s. 45,000-47,000
f. 19,000-21,000	m. 33,000-35,000	t. 47,000-49,000
g. 21,000-23,000	n. 35,000-37,000	u. 49,000-50,000

Perceived job dependence

Depend1: In order to do my job I am very much dependent on my fellow workers to do their jobs too.

YES! YES yes ? no NO NO!

Depend3: The way in which my fellow workers do their work has very little to do with whether or not I can do my job.
(same scale as above; item is reverse coded)

JDS1: My job requires me to work closely with others employed at _____.
(same scale as above)

JDS2: My job requires me to work closely with other people who are not members of _____ (e.g., customers or other contractors).
(same scale as above)

JDS3: My job requires me to physically move about to perform it successfully.
(same scale as above)

Intraorganizational items (cont.)

JDS6: My job has much variety; it requires me to do many different things and use different talents and skills.
YES! YES yes ? no NO NO!

JDS10: My job has a substantial impact on people.
(same scale as above)

Tenure in industry, organization, and present job

How long have you worked in the computer and/or aerospace industry (please express partial years as decimals, e.g. 7½ years is 7.5)? _____ years

How long have you worked at _____ (name of organization)? _____ years

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

Propensity to communicate (PROP1 to PROP9 are numbered 1 to 9)

*1. I generally rely on others to keep conversations going.
YES! YES yes ? no NO NO!

*2. I am inclined to let other people talk for long periods of time.
(same scale as above)

3. In most social situations I tend to come on strong.
(same scale as above)

4. I try to take charge of things when I am with people.
(same scale as above)

*5. I am inclined to let other people start conversations.
(same scale as above)

6. I have a tendency to dominate informal conversations with other people.
(same scale as above)

*7. When I am with others it generally takes me quite a while to warm up enough to say very much.
(same scale as above)

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*item was reverse coded

Intraorganizational items (cont.)

8. In one-to-one conversations I tend to talk more than half the time.
   YES! YES yes ? no NO NO!

9. When I am with other people I generally talk often.
   (same scale as above)

The description of the network analysis, plus a sample segment, are included in the next few pages.

First, we would like you to complete a communication contact questionnaire. It asks you to indicate whom you talk to about a variety of communication topics. It will enable us to "map" communication flow at

We want to know only about face-to-face and telephone interactions; we are not interested in written communication. Communication occurs whenever you make contact with another person OR they contact you for one reason or another. The contact can consist of asking for advice, giving information, or the sharing of new ideas. It can be job related or personal.

Different jobs require different amounts of contact; there is no "correct" or ideal amount of communication contact for any given individual.

On the next few pages we will be asking you to describe your communication contacts with other members of Northern California. You will be presented with a list of all current employees. If you find that any name has been omitted, please add it to the list. The list is grouped by buildings and divisions to aid you in locating people's names. Before you begin, please CIRCLE YOUR NAME ON THE LIST.

Three columns appear next to each person's name. They refer to communication topics about which you might communicate with people at The topics are:

(1) WORK RELATED, i.e., discussions about production, the directing, coordinating and performance of your job on a day-to-day basis;

(2) NEW IDEAS, i.e., conversations about new ideas, and new ways to do things;

(3) MAINTAINING RELATIONS, i.e., conversations about how people feel about themselves, each other, and as a place to work.

Two smaller columns appear under each major communication topic. These columns ask you to distinguish face-to-face and telephone communication.

After circling your name, begin reading through the list of names. For each name, estimate roughly HOW MANY HOURS (to the nearest quarter hour) you communicate with him or her IN A TYPICAL WEEK. This will not be as time-consuming as you might expect; leave the boxes BLANK if you have no contact with a person in a typical week. Also leave it blank if you only exchange friendly greetings and casual hellos.

For each person that you communicate with, think about how much time you spend talking with that person in a typical week.

1. Think about the number of hours that are about WORK RELATED MATTERS. Of these hours, indicate how many are face-to-face and how many are by telephone.

2. Think about the number of hours that are about NEW IDEAS. Of these hours, indicate how many are face-to-face and how many are by telephone.

3. Think about the number of hours that are about MAINTAINING RELATIONS. Of these hours, indicate how many are face-to-face and how many are by telephone.

EXAMPLE

Number of Hours Communicating in an Average Week

	WORK RELATED		NEW IDEAS		MAINTAINING RELATIONS	
NAME	FACE TO FACE[a]	TELEPHONE	FACE TO FACE	TELEPHONE	FACE TO FACE	TELEPHONE
01 JAN PETERS						
02 BOB CODER	4	1		1¼		
03 MARY MICRO						
04 SAM CHIPS					4½	2

In this example, MARY MICRO estimated the hours she spends communicating with other SDC members in a typical week. First, she found her own name and circled it. Then, after skipping over names she did not know, she came to BOB CODER, whom she does interact with. She decides that in a typical week, she spends five hours talking with BOB CODER about WORK RELATED matters. Of these five hours, she reasons, four out of five are in person, (face-to-face contact) and the other hour is over the phone. She talks to BOB CODER about one and one-quarter hours a week about NEW IDEAS, always over the phone. She never talks with BOB CODER about MAINTAINING RELATIONSHIPS.

Her interactions with SAM CHIPS, however, have been primarily about MAINTAINING RELATIONS. She estimates six and one-half hours of contact with SAM CHIPS, two hours of which are over the phone, four and one-half in person. She never talks with him about NEW IDEAS or WORK RELATED matters.

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[a] N.B. Only face-to-face, work-related communication was used to calculate individual connectedness scores in this study.

Remember that communication contacts occur whenever you contact someone else, OR when they contact you, by phone or in person. For the purposes of this questionnaire, DO NOT consider memos and other written materials in your responses.

Number of Hours Communicating in an Average Week

	WORK RELATED		NEW IDEAS		MAINTAINING RELATIONS	
	FACE TO FACE	TELEPHONE	FACE TO FACE	TELEPHONE	FACE TO FACE	TELEPHONE
	*** BUILDING 500 ***					
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APPENDIX B

PARTICIPANT'S QUESTIONNAIRE

(Interorganizational)

PART A

One way to assess the network of relations among organizations in a community is to determine who talks with whom on a regular basis. Below is a list of people who were formally designated to committees of the program. Please indicate your frequency on contact with these people over the past five years.

The five year period has been divided into three sections to aid you in remembering your contacts: startup (1976-1977); active (1978-1979); and phaseout (1980-1981).

IF YOU HAVE NOT COMMUNICATED WITH AN INDIVIDUAL ON THE LIST OVER THE PAST FIVE YEARS, LEAVE THAT LINE BLANK. By communication we mean any time you contacted a person on the list to exchange information which was related or unrelated to community cancer control. Communication can be face-to-face, written, or by telephone.

Please follow these steps:

1. Read through the list of names, and CIRCLE YOUR NAME ON THE LIST.

2. Beginning at the top, scan the list until you locate someone with whom you have had contact over the past five years. Think about the startup period (1976-1977). Record how much you communicated with that person about cancer related topics in that time period. Use this scale:

   1 = about once a year
   2 = a few times a year
   3 = about once a month
   4 = once a week or more

   Circle the number in each column which best describes your contact for that topic in that time period.

3. Repeat step (2) for other contacts unrelated to cancer during that time period.

4. Repeat steps (2) and (3) for the time periods 1978-1979 and 1980-1981. If you have had contact with an individual some of the years but not others, or about one topic but not the other, leave those boxes with no contact BLANK. When you have recorded all those

with whom you haye had contact, leave the other lines BLANK.

* * * E X A M P L E * * *

	STARTUP 1976-1977		ACTIVE 1978-1979		PHASEOUT 1980-1981	
NAME	Cancer Related	Non-Cancer Related	Cancer Related	Non-Cancer Related	Cancer Related	Non-Cancer Related
001 Bley, Susan	1 2 3 4	1 2 3 4	1 2 (3) 4	1 (2) 3 4	1 2 (3) 4	1 (2) 3 4
002 Ciegal, Mark	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
003 Mich, John	1 2 3 4	1 2 3 (4)	1 2 3 4	1 2 3 (4)	1 2 3 4	1 2 3 4
004 Sharp, Paul	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

First, MARK CIEGAL reads through the list and circles his name. Next, he thinks about his communication contacts with SUSAN BLEY. He considers the period 1976-1977; since this was before he met her, he leaves these columns blank. In 1978-1979, he saw her about once a month for work related reasons (on a committee together) and a few times a year at social gatherings. This pattern continued through 1980 and much of 1981. He then goes on to JOHN MICH, whom he has never worked with but knew socially until he left the state in 1978. They would get together for golf as often as once a week from before 1976 and well into 1978, but he has not seen him since. He skips over PAUL SHARP, whom he does not know and has had no contact with.

1 = about once a year
2 = a few times a year
3 = about once a month
4 = once a week or more

	STARTUP 1976-1977		ACTIVE 1978-1979		PHASEOUT 1980-1981	
NAME	Cancer Related	Non-Cancer Related	Cancer Related	Non-Cancer Related	Cancer Related	Non-Cancer Related
001	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
002	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
003	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
004	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
005	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
006	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
007	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
008	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
009	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
010	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
011	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
012	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
013	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
014	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
015	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
016	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
017	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

(N.B. This form is repeated exactly for the remaining participants, up to and including person number 227)

PART B

The following questions refer to the organization which you represented during your participation in the survey. The questions are meant to be specific to the period 1976-1981.

Please use the following scale in providing your responses.

1 = very strong disagreement	5 = mild agreement
2 = strong disagreement	6 = strong agreement
3 = mild disagreement	7 = very strong agreement
4 = neutral	

During the period 1976-1981, the organization I represented, _____:
(write in name of organization)

DEPEND1	. . . depended a great deal on other organizations in the community for its survival.	1 2 3 4 5 6 7
DEPEND2*	. . . stood alone in the community and had the ability to resist major shakeups in other organizations.	1 2 3 4 5 6 7
DEPEND3*	. . . was extremely autonomous.	1 2 3 4 5 6 7

The next set of questions refers to your interaction style in general.

PROP1*	I generally rely on others to keep conversations going.	1 2 3 4 5 6 7
PROP2*	I am inclined to let others talk for long periods of time.	1 2 3 4 5 6 7
PROP3	In most social situations I tend to come on strong.	1 2 3 4 5 6 7
PROP4	I try to take charge of things when I am with people.	1 2 3 4 5 6 7
PROP5*	I am inclined to let others start conversations.	1 2 3 4 5 6 7
PROP 6	I have a tendency to dominate informal conversations with other people.	1 2 3 4 5 6 7
PROP7*	When I am with others it generally takes me quite a while to warm up enough to say very much.	1 2 3 4 5 6 7

1 = very strong disagreement	5 = mild agreement
2 = strong disagreement	6 = strong agreement
3 = mild disagreement	7 = very strong agreement
4 = neutral	

PROP8 In one-to-one conversations I tend to talk more than half the time. 1 2 3 4 5 6 7

PROP9 When I am with other people I generally talk often. 1 2 3 4 5 6 7

No. OF PAPERS In the past five years, how many papers presented at professional conventions did you author or co-author? _____ papers

APPENDIX C

ADMINISTRATOR'S QUESTIONNAIRE (Interorganizational)

(N.B. These questions were asked over the telephone of chief administrators of 50 organizations involved in some way in the interorganizational venture)

Opening

HELLO. THIS IS DR. _____ FROM MICHIGAN STATE UNIVERSITY. WE HAVE BEEN CONTRACTED BY THE _____ TO DO A FINAL EVALUATION OF THE _____ PROGRAM. COULD WE SPEAK TO YOU ON THE PHONE FOR ABOUT TEN MINUTES?

Questions

NO. OF STAFF

1. About how many full time staff or full time equivalents work for your organization? If you administer a University department, do not include faculty and graduate students, just non-academic staff.

BUDGET

2. What was your organization's total budget last year, including purchasing and salaries?

3. Approximately what year did your organization begin operating in the Tri-county area?

4. How many volunteer hours did you record last year?

Let me read you a few cancer related services. Please stop me when I come to one which your organization performs.

screening and detection	rehabilitation and continuing care
diagnosis	treatment
health education	coordination of other agencies

Of these items, only the first two were ultimately used in this analysis.

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