This is to certify that the

dissertation entitled

Inequality and Heterogeneity in
Interorganizational Networks

presented by

Gaston J. Labadie

has been accepted towards fulfillment
of the requirements for

PhD degree in Sociology

Philip M Marcus
Major professor

Date 21 February 1986

INEQUALITY AND HETEROGENEITY IN INTERORGANIZATIONAL NETWORKS

By

Gaston J. Labadie

A DISSERTATION

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

DOCTOR OF PHILOSOPHY

Department of Sociology

1986

ABSTRACT

INEQUALITY AND HETEROGENEITY
IN INTERORGANIZATIONAL NETWORKS

by

Gaston J. Labadie

Blau's macro-structural theory on the effects that inequality and heterogeneity have on rates and patterns of interaction is extended and tested at the interorganizational level. Major limitations of theoretical approaches to interorganizational relations, as well as the network techniques and approaches employed to analyze them, are reviewed. Blau's theory and some of its major limitations are introduced and discussed. On the basis of the organizational literature, nominal and graduated parameters of organizations are distinguished. The nominal parameters employed are whether the organization is public or private and what type of activity is practiced. Graduated parameters are considered to be size, as measured by number of employees, budget size, power, influence and prestige.

Hypotheses as to the effects of heterogeneity and ine-

quality on the rates of out-group relations and the status distance among associates are tested in twelve interorganizational networks from twelve Midwestern cities. Measures of power, influence and prestige are performed, for substantive reasons with different algorithms, and a relational inequality measure is extended so as to account for the possibility of multiple ties for each actor. Two regression models that establish curviliner relationships between heterogeneity and inequality and their respective dependent variables, are estimated by OLS. The dependent variables are indexes calculated on two different exchange dimensions: information exchange and cooperation among organizations.

Major findings fail to confirm the expected relationships for heterogeneity but confirm the positive relationship between inequality and the status distance among associates. This "paradox of inequality" is interpreted in terms of systems' theory statements on the relationship between complexity in the environment and complexity in the interorganizational network. The consequences of the findings for Blau's theory and for interorganizational relations and cooperation are discussed. In the conclusion the main limitations and difficulties encountered in this research are reviewed and suggestions for further theoretical and empirical work are offered.

ACKNOWLEDGEMENTS

I wish these pages came closer to the masterpiece I had in mind when I dreamt about writing my doctoral dissertation. I wish they even came close to what I had in mind when I wrote my proposal. On one hand, however, I do not suppose I am the first to run short of his expectations. On the other hand, I suppose every student faces the reality of limited resources, whatever these may be. Time was among those I was the most keenly aware of. The above notwithstanding, this dissertation is the culmination of my graduate studies in the US. A learning experience that was extremely rewarding, and not only in its intellectual aspects.

Many people enriched my experience while in the U.S. and helped, whether knowingly or unknowingly, at different stages of my personal and professional development.

In particular, with respect to the dissertation, all the members of my committee provided helpful comments.

Philip Marcus, the chair of my dissertation committee,

"made" me work for him with the kind of social network data that is used in this resaearch. Something that I would not have done just for myself. In so doing, he provided much needed financial support. Besides, and foremost, he informally oriented me and encouraged my study of the social networks literature (as well as many others) in a department where there is not one course taught on the topic.

J. A. Beegle, my advisor during my graduate studies, not only provided useful suggestions but he was also a most patient and helpful editor. He has also provided support of all kinds and in all amounts during the course of my studies. In fact, the Beegles have played a major role in my own and my wife's social support network. This is, of course, a sociologically alienated way of saying that they are very dear to us.

Tom Conner and Craig Harris have substantially improved the quality of the final version of this dissertation with their comments. Contact with them during my studies was always instructive and gratifying.

Frank Camilleri was not a member of my comittee but he might as well have been. He provided, as usual, very helpful critical comments. He has also been my preferred "methodological foil" (if there can be such a thing), as well as a

constant example of critical analytical thought.

Time was indeed a constraint in this dissertation. Its completion would have been impossible without the support that Pat Terry, a colleague and friend, provided, in particular with respect to the assistance in computer-related matters, but in many conceptual issues as well.

Professors R. Burt, J. Skvoretz, and L. Freeman were kind enough to send helpful materials and computer programs from other Universities.

Intelectual and affective support was also provided in a general sense by countless other people, at different stages, from different professions, from different nationalities, all of whom cannot possibly be mentioned but who have all enlightened my perception and appreciation of this world and have enriched this experience. Ines, our Colombian friend for all these years, played a particular role, but she was certainly not the only one. I am sure some of the friendships I have developed here are among the most enduring I will have.

When one belongs to two worlds, support is needed from the two of them. It was provided, as usual, by my parents and brother - my family as a whole -; and by Ana -who shared both of my worlds-, first as my girlfriend in Uru-

guay, and more recently in the U.S., as my wife.

Word of mouth has it in my family that my grandmother used to say that books were the gems that intellectuals gave (or dedicated) as presents. While a dissertation is not a book, and this one in particular may not be a gem, I would like to dedicate this work to Ulises Graceras. Many things have passed by since he was my professor, then my mentor and, finally, in so doing, became my friend. We may agree or disagree on many issues - and indeed we do - but the fact is that it was his model as a sociologist and his way of thinking that were instrumental in motivating me to become one.

TABLE OF CONTENTS

LIST OF TABLES

INTRODUCTION

The concept of social structure is used in different ways by different authors and it is by no means an unequivocal concept in sociology. On the one hand, its ambiguity stems from the now classical distinction between two approaches: the "linguistic or French structuralism" (e.g., Saussure, 1959; Levi-Strauss, 1963; 1969)[1] and the structuralism of the British social anthropologists (e.g., Radcliffe-Brown, 1957; Nadel, 1957), to which the Marxist version could be added (e.g. Althusser, 1970; Althusser and Balibar, 1970; Poulantzas, 1975). On the other hand, the ambiguity of the concept is generated because there seems to be little consensus with respect to the concept even in each of the various traditions (Blau, 1975; Merton, 1975; Leach, 1981; Rossi, 1981; 1983; Heydebrand, 1981).

A few convergences can be found, however. Whatever the epistemological orientation of the author, most writers agree that social structure refers to emergent properties that do not characterize the separate elements that compose the aggregate (Blau, 1981). Most agree also, in that social structure is a system with a hierarchy of levels (Miller, 1965; Harary and Batell, 1981). Those that can be included within the epistemological orientation of the British anthropologists,[2] would loosely adhere to a concept of social structure as a "regular arrangement of social relations that result from laws operating over time in a persistent though, not necessarily unchanging fashion" (Holland and Leinhardt, 1977: 386). Among them, there is also an increasing consensus for the idea that social networks should play a major role in whatever structural conceptualization is proposed (Blau, 1975; Goode, 1975; Coleman, 1975; Homans, 1975; Holland and Leinhardt, 1977). To the extent that for some structural analysis is identical to network analysis (Berkowitz, 1982; Wellman, 1983). While the latter assimilation may be considered an exageration, the concept of social network does provide a formalization of most interactional systems that uses an explicit mathematical representation: a set of relationships shown in a matrix (Freeman, 1980), which in turn can be the object of multiple algebras. Consequently, the least ambitious claim that can be made with respect to the relationship between social networks and social structure is that the former provides a representation, formalization, and calculus for the latter. Burt is even more radical:

> "At once a connection between micro and macro level social theory as well as an epistemic link between abstract concepts and empirical research, network models offer a powerful framework for describing social differentiation among actors in a system"(1980:79)

While there are different ways of conceptualizing social networks (see review in Burt, 1980), few substantive theories of the structure of networks are available. According to Berkowitz,

> "The relationships between the constituent parts or elements of this paradigm itself have yet to be articulated in detail" (1982:154).

All these aspects of the notion of social structure are present in the literature on interorganizational networks, to the extent that an interorganizational concept of social structure and a new actor have been introduced. As Warriner suggests:

> "The organization is the acting unit , and its activity systems are the acts that are observed. This implies that societal structure at this level is no longer conceived in terms of persons or of actors in positions, but rather in positions embedded in organized acting units" (1981: 187)

In fact, these organized acting units or corporate actors interact with each other and are able to draw significantly larger amounts of resources than would be possible for individual actors (Coleman, 1974; 1982).

Research on interorganizational relations (IOR), however, has rarely treated interorganizational behavior as subject to social structural opportunities and constraints similar to individual behavior.

One recent and notable theoretical attempt to explain how social structure influences the extent of interrelations and associations among individuals has been proposed by Blau (1977). The theory does not explicitly address the dynamics of social networks, but to the extent that it addresses any behavior that symmetrically involves two or more actors, its application to them should be most fruitful. In fact, some attempts have already been made (Rytina and Morgan, 1982).

Although Blau's theory is deductive, with a quantitative conception of social structure and suggested operationalization of the main concepts, there have been very few attempts to test it empirically. The work has been cited in a host of different publications but the only serious attempts to test some propositions of the theory have been those of Blau et al., (1982); Blau et al., (1984); Blum, (1984); Blau and Blau (1982) and Sampson (1984). The former three tests used data on intermarriages, while the latter two used data on criminal victimization. More recently Blau and Schwartz (1984) have published further tests and some restatements of the theory using the same types of data.

The present dissertation tests and extends Blau's theory as applied to interorganizational networks. In comparison with the tests mentioned, interaction among organizations offers the advantage that its process is not apparently influenced to any great extent by spatial propinquity as in the case of marriage or crime, and hence its effects can be ruled out. Another improvement of the present study is that actual social networks are employed and that for the first time the theory is tested with multiple ties and not just one to one ties, as is the case with marriages.

Using organizations as the unit of analysis, however, poses a series of problems since the theory is consistently concerned with predicting the behavior of groups or populations of individuals and not groups or populations of organizations. Hence, the present work is not, stricto sensu, a test of Blau's theory. It is an attempt ,instead, to extend Blau's theory, increasing its scope and generality.

The present research uses data on twelve interorganizational networks to perform this test. While new procedures and techniques are introduced and, for the first time, tables of tie-accounts are used, the study is preliminary in its nature. That is, sophisticated quantitative techniques are used to obtain qualitative evaluations of the effects of variables. This, of course, is not strange in structural analysis. Further, sometimes the number of cases precludes any definitive conclusion.

The dissertation is organized in five chapters and a conclusion. The literature on interorganizational networks is reviewed in Chapter 1 and an attempt is made to show some limitations of the most commonly accepted approaches to interorganizational relations (IOR). It is also shown that organizations can be conceived as actors at a hierarchical level different from that of individuals. Blau's theory is also introduced in that chapter.

In Chapter 2 the main shortcomings of Blau's theory are reviewed in the context of its application to interorganizational behavior. Nominal and graduated parameters are determined on the basis of the existing literature.

Main propositions and hypotheses to be tested are presented in Chapter 3, followed by a discussion of their operationalization and measurement in Chapter 4.

Chapter 5 presents and discusses the findings. In the conclusion the main advantages and limitations of the present research are discussed and suggestions are made for further research.

CHAPTER 1

SITUATING THE PROBLEM

The present chapter situates the problem of this dissertation within the context of two different kinds of literature. First, a review of the literature on interorganizational networks is done in order to show some limitations of the most commonly accepted theoretical and methodological approaches to interorganizational relations (IOR). An effort is made to show that complex organizations can be conceived as actors at a hierarchical level different from that of individuals. Second, Blau's theoretical framework is introduced and reviewed, in an attempt to show that it should be applicable to any level of social organization.

ORGANIZATIONS AS ACTORS: INTERORGANIZATIONAL NETWORKS

The fragmented and non cumulative IOR research (White and Vlasek, 1973), has yet to provide a consensus on theoretical perspectives or levels of analysis (Aldrich, 1979; Laumann and Marsden, 1982). Granted, a network is usually used as the metaphor, with the organizations acting as nodes and their interrelationships as the links in the network. Most of the studies, however, have examined a focal organization, that is, one specific organization treated as the node of concern (an "ego"), and characteristics of that organization that are related to its interorganizational network are identified. Hence, the unit of analysis has been the organization and not the relationship. Three main types of studies can be distinguished in this tradition (Marcus and Smith, 1980):

1- Studies of the linkage patterns of a few organizations (e.g., Aiken and Hage, 1968; Levine and White, 1963; Hall, 1977; Aldrich, 1976: Schmidt and Kochan, 1977).

2- Investigations of the interorganizational relationships of particular kinds of organizations, that deal with a single type of client (e.g., Lehman, 1975; Adamek and Lavin, 1974).

3- Investigations of portions of organizations' "role-sets" (Evan, 1966), with the focus on the respondent organizations (Aldrich, 1976; Hall, 1977).

Other aproaches have included the effect of community variables on interorganizational relations (Turk, 1970; 1973; 1977) and some relational analysis of dyads (Paulson, 1976; Rogers, 1974).

At a more global level, that is, taking into account systemic interrelations among organizations, models have been proposed to explain patterns in networks of interorganizational transfer of political information (Galaskiewicz, 1979); exchange among industrial sectors (Burt, 1982); inter-locking directorates of major corporations (Pennings, 1980; Mizruchi, 1982); and transactions in and among voluntary associations (Knoke and Wood, 1981).

Many alternative techniques have been used to analyze these networks (Burt, 1982; Burt and Minor, 1983; Berkowitz, 1982). Most of these techniques try to establish "socially homogeneous" subgroups, differing in the way they explicitly or implicitly conceive and create the groups.

Two main traditions have been distinguished (Burt, 1983; Friedkin, 1984). One tradition, a relational one, attempts to analyse networks on the basis of the concept of cohesion or social proximity. On this basis cliques are established using graph theoretic models (Harary Norman and Cartwright, 1965, Alba, 1973; Alba and Kadushin, 1976; Alba and Moore, 1983; Seidman and Foster, 1978; Seidman, 1983) or using small space analysis and related distance based and multidimensional scaling measures (Laumann and Pappi, 1976; Galaskiewicz, 1979); with the potential for an analytical integration of these two techniques (Freeman, 1983). Another tradition, a positional one, tries to establish the similarity among the patterns of interrelations that a series of actors have among themselves in order to determine if they are "structurally equivalent" (Lorrain and White, 1971; White et al., 1976; Burt, 1976; 1977).[3] This approach employs procedures such as blockmodelling (Breiger et al.,1975; Arabie et al.,1978; Knoke and Wood, 1981) and related techniques (Bonacich, 1980; Boyd, 1983; Carring-ton and Heil, 1981; Everett, 1983; 1984; White and Reitz, 1983; Wu, 1984).

A few other techniques that try to accomplish the same purpose might prove to be useful but they have not been used in large networks. Examples are techniques based on information theory (Phillips and Conviser, 1972) or those based on algebraic topology and Q analysis (Atkin, 1977; Doreian, 1982).

None of these techniques, however, provides

> "much in the way of even informal guidelines based on experience (to say nothing of formally justified standards) to guide an investigator in deciding whether the structure resulting from a given analysis reflects anything more than random processes" (Laumann and Marsden, 1982: 330).

It is probably too soon to determine if the actual application of log-linear models to multivariate directed graphs (Fienberg and Wasserman, 1980; 1981; Fienberg, Meyer and Wasserman, 1981; Galaskiewicz and Marsden, 1978; Galaskiewicz and Krohn, 1984; Holland and Leinhardt, 1981) will provide guidance in this respect. They do provide, by way of using contingency table-like counts of types of relationships, a way of determining whether the structure is a result of random processes or not. A counting procedure of this sort is used in the present work too.

The theoretical aspects are not much more promising. On one hand there seems to be some convergence among the global models in terms of using an exchange framework (White et al., 1971; Adamek and Lavin, 1974; Cook, 1977) or a resource dependence or a political economy approach (Zald, 1970; Benson, 1975; Aldrich, 1976; Pfeffer and Salancik, 1978; Laumann, Galaskiewicz and Marsden, 1978). As Knoke and Wood put it:

> "These various writers seem to have reached a consensus that an organization's ability to continue functioning in a competitive, resource-scarce environment depends on its ability to select an appropriate internal structure and to establish interorganizational relations that sustain a steady flow of resources" (1981: 17)

On the other hand, the population ecology approach also shows promise (Hannan and Freeman, 1977; Brittain and Freeman, 1980; Freeman and Hannan, 1983; Freeman et al.,1983; McPherson, 1983; Carroll,1984). While organizational ecology cannot be equated with the population ecology approach (Carroll, 1984), most of the analytical developments as well as research have taken place in the latter area (see review in Carroll, 1984). The approach basically incorporates the ecological models usually applied to animal populations into the study of populations of organizations with the consequent use of concepts such as organizational births, deaths, niches, that call attention to such processes as competition and mutualism. Hence, the diversity of organizational forms and their survival is accounted for in terms of the relative fit of the organizational form (species) and its environment.

No actual research on interorganizational networks has been performed with the population ecology approach, but the compatibility exists and the potential usefulness of the population ecology model for the study of IOR has already been noted (Aldrich, 1979; McKelvey, 1982). If nothing else this possibility should have sensitized researchers as to the importance of general parameters of the populations of organizations.

All these approaches, however, provide only very general orientations for the researcher. The current state of the field is such, then, that "we lack a theoretical basis of comparable generality to that provided for networks of interpersonal relations by theories of balance (Heider, 1958) or cognitive consistency (Heise, 1979)" (Laumann and Marsden, 1982:331).

Since Blau's Inequality and Heterogeneity (1977) addresses the behavior of groups of individuals and not of organizations, the relevant issue to be determined here is whether, on theoretical grounds, his theory should be applicable to the social structure conceived in interorganizational terms. Heydebrand (1973) has argued that conceptualizations developed for intra-organizational phenomena to explain individual behavior are not applicable for interorganizational behavior. White (1974), on the other hand has argued that decision making approaches could be used at both levels of analysis. In point of fact, the resource-dependence and the population ecology approaches imply more or less explicitly that organizations are purposive entities, trying to maximize or optimize some kind of utility[4] (the ultimate one being survivability).

A structural theory with a sufficient level of generality should be applicable to both levels of analysis. Logical support for such a theory can be drawn from system conceptualizations and the existence of hierarchies in social systems.

There is no apparent *a priori* reason to assume that the general principles of organization of social systems should be different from those of any other system (Miller, 1965; 1976). Hierarchical organization of different levels seems to be a common principle of organization in biological systems, in languages and in ecosystems (Dawkins, 1976b;

Miller, 1976; Webster, 1979; Whyte, Wilson and Wilson, 1969; Pattee, 1973; Allen and Starr, 1982). It is, in fact, a definitional characteristic of the concept of system (Harary and Batell, 1981).

Simon (1973; 1981) has argued that social systems tend to organize in a hierarchical way. Partial or near decomposability, that is, a relative independence of the components, would characterize the different levels. In fact, this hierarchical organization implies that the different levels act as filters and the environment of the units at one level is constituted by those units or Holons (Koestler, 1967) that are peers at the same level, or by units at a higher level. The notion of environment then is not a static one but is related to different "rythms", and it entails that some units (upper level) can await others and appear to be "fixed" since their change is perceived by lower level units as if it were not taking place. Upper levels, then, have different thresholds of information processing and input reception.

In essence, this accounts for the fact that the social system can be considered to evolve with a series of nested hierarchical levels and that the behavior of the different levels can be analytically treated as partially independent. In fact, utility maximization of information approaches could be considered to operate at each level (Kaniss, 1981)[5].

Organizations, then, while composed of individuals, would constitute a different hierarchical level of social organization. Their interrelations, while clearly handled by individuals occupying positions, would be performed by those individuals insofar as they are acting for the organization. Recent research has once again shown that the same individuals, while acting as representatives (agents) of the organization will report opinions different from their personal ones (Namenwirth et al., 1981)[6].

This argument is somewhat suggested by Blau (1977) when he implicitly refers to two "hierarchical levels of entities which can perform ...work: individuals... and collectivities ('organizations')"(Wallace, 1981:217) and when he discusses the notion of substructures (1977:174ff.). Recent work pays more attention to the issue of different hierarchical levels, at least from a theoretical point of view. According to Blau and Schwartz:

> " ...society's structure entails variations and relations among, as well as within, its subunits. There are emergent properties on every level of social structure, and the combinations and interrelations of subunits are what produces these emergent properties. The analysis of society's structure must take the differentiation and connections both among and within communities (or other subunits) into account." (1984: 153)

In conclusion, there is no a priori reason to believe that Blau's theory and its predictions are not applicable to patterns of association among organizations.

Even if this work were not stricto sensu a test of Blau's theory, just the metaphorical application of it provides a very much needed theoretical framework to understand: 1) the effects of different structural opportunities and constraints as they affect interorganizational relationships and 2) the effects of vertical differentiation among organizations, an issue hardly researched in the IOR literature (Whetten, 1981).

BLAU'S CONCEPTUAL FRAMEWORK

The aim of Blau's theory "is to explain how the structure of opportunities and constraints resulting from variations in population compositions and distributions affect people's relations, independently of their psychological preferences and cultural norms ..." (Blau and Schwartz, 1984:193).

Social structure is defined, according to Blau (1977), as the distribution of people among social positions. Different proportions and frequencies of persons located in different positions have major consequences for the patterning of social relations.

The issue of the emergence of social structure then, is treated by Blau as the result of the differing numbers and proportions of different positions as they affect interaction, something that cannot be accounted for by the description of the individual units involved.

Blau's concept of social structure could lead one to interpret the emergent properties of social structure as the mere result of an aggregation process in which interelations among parts are taken into account. But then the issue of emergence of social structure would be true but trivial (Nagel, 1961).

While the issue is not straight forward, I tend to consider that Blau's structuralism is trivial in the above sense but not trivial in the conclusions that it leads to. Although proportions have an effect on the constituent parts and appear to be the sum of their interrelations only because of their relationship to the whole, they are obtained by performing operations on the component parts. This is what constitutes Blau's "trivial" structuralism.

Further, Blau's structuralism, despite appearances, cannot be classified with the one that

> "tends to see structural and morphological characteristics as ...mechanisms capable of defining their own teleology and imposing it on their agents" (Bourdieu, 1981: 312).

Quite on the contrary, from an analytical point of view, Blau's treatment of collective phenomena corresponds (at least his independent variables) to the properties classified by Lazarsfeld and Menzel (1961) as analytical and not global, that is, properties of collectives which are obtained by performing some mathematical operation upon some property of each single member. Hence, his conception of macro-phenomena seems to be in accord with what reknown pro-"methodological individualism" authors, such as Collins (1981) and Harre'(1981) would admit to be pure macro-concepts (see also Knorr-Cetina, 1981 and Wallace, 1983).

Further, Blau's interactionist structuralism (Bourdieu, 1981) makes possible a "methodological individualistic" interpretation, at least at the explanatory level (Brodbeck, 1973), of some of his theoretical predictions. For example, the unintended consequences of an agent seeking to interact with his socially homogeneous co-actors are, nonetheless, due to the aggregation of many heterogeneous individuals, higher rates of interaction with his socially "non-homogeneous" co-actors.

This way of framing the problem could provide Blau's theory a sense of process that the current version lacks, locating many of the processes studied in the tradition of a prisoner's dilemma-type situations of the kind Schelling (1978) and Boudon (1981; 1982) exemplify[7].

Social structure then, reflects the differences in social position that different numbers of people have. Social positions "are indicated by attributes or affiliations that distinguish people and that they themselves take into account ...and use as criteria for making social distinctions in their social intercourse" (Blau and Schwartz, 1984: 9). Consequently, they are defined quantitatively and empirically as "any attribute that influences people's role relations" (1977:277). Hence, they are defined in terms of parameters of differentiation or characteristics for which people tend to differentially associate among themselves, in particular choosing as associates those like themselves. "(I)f no differences in social relations can be discovered, positions cannot be considered to be socially distinct" (1977:4)[8].

Parameters, which are "the axes that delineate social space" (Messner, 1980:398; Blau, 1977:6), can be nominal or graduated. Nominal parameters or characteristics divide populations into groups with no inherent rank ordering; they establish horizontal differentiation. Groups are "all nominal categories of persons who share a social position that influences their role relations" (Blau, 1977:276). Graduated parameters entail a vertical differentiation, establishing rank orders among people in the population on the basis of the quantity of social resources in their possession or available to them. That is, they determine their status.

These two kinds of parameters generate, respectively, two different kinds of differentiation in society: heterogenity and inequality . Actually, graduated parameters, given the existence of a rank order, establish two forms of differentiation. Inequality, which is "the average difference in distribution of the population among many groups, defined by the relative status" and status diversity, which "refers to the great number of different statuses among which a population is distributed (and) is the graduated-parameter equivalent of heterogeneity" (Blau,1977 276-7). Heterogeneity, which refers to people's distribution along a nominal parameter, that is, among groups with no inherent rank order, is quantitatively defined as "the probability that two randomly chosen persons do not belong to the same group" (1977:276).

Parameters can be more or less salient. They are salient when ingroup relations are more frequent than chance expectations would dictate. That is, the sheer numbers of people in different categories would determine a random distribution of ties within and accross categories. The larger is the number of ingroup ties in relation to the expected number of ties determined by chance, the more salient is the parameter.

A complex structure is characterized by the consolidation and intersection of its parameters. The latter are consolidated when they are correlated (for graduated: "positively")[9]. Nominal parameters are maximally intersected when they are orthogonal, that is, not correlated. Graduated parameters are maximally intersected when they have a negative correlation of minus one.

In complex structures individuals tend to have role relations with others in a large number of different social positions, which Blau denotes (using a combination of Mertonian terminology) as cosmopolitan role sets. Structures can be more or less integrated. Integration "refers to the extensive social associations among different groups and strata, either in terms of a specific parameter or, as a theoretical concept, in terms of all parameters" (Blau, 1977:277).

The theoretical strategy employed by Blau is to make a series of assumptions and then to deduce a series of theorems. In the following section I will list the assumptions and the propositons relevant to those to be tested, with their number in parenthesis , as used by Blau (1977).

Single parameter statements

It is assumed that the members of a society associate with others not only in their own but also in different groups (A-Ø) and hence, for any dichotomy of society, the small group has more extensive intergroup relations than the large group (T-1). Also, the probability of extensive intergroup relations increases as the size of groups, distinguished by a given nominal parameter, decreases (T-1.5)(for a constant salience - cf.Blau and Schwartz, 1984:31).

It is further assumed that social associations are more prevalent among persons in proximate rather than between those in distant social positions (A-1) , that ingroup associations are more prevalent than outgroup associations (A-1.1) , that the prevalence of associations declines with increasing status distance (A-1.2) and that superior status is manifest in superordinate roles in social association (PA-6).

As consequence, and because elites are small, for any division of status above the median, the upper stratum has more extensive relations with the lower than the lower has with the upper (T-5).

Since social associations depend on opportunities for social contacts (A-9), increasing heterogeneity increases the probability of intergroup relations (T-11) and increasing status diversity increases the probabilities of associations among persons whose status differs (T-11.3). These two final theorems are readily testable and are the most important ones with respect to predictions concerning only one parameter of differentiation.

With the latest revision (Blau and Schwartz, 1984), predictions with respect to relative inequality are similar: the greater the inequality, the greater the probability of status distant associations (1984: 15). This prediction, however, is one of the most important ones so as to distinguish the effects of inequality and heterogeneity. If the latest revision is correct, that is, if the greater is the relative inequality, the greater is the probability of status distant associations, predictions with respect to inequality and heterogeneity are identical on everything except as to some of the effects of consolidation-intersection[10].

Furthermore, this statement on the effects of inequality is one of the most perplexing ones in Blau's theory because of its apparently paradoxical effects. Since integration is defined by extensive social associations among groups and strata, the greater is the relative inequality, the greater is the probability of integration in society[11].

Multiple parameter statements.

When more than one parameter is involved, their interrelations depend on the type of parameter at issue. The influences of various parameters on social associations are partly additive, not entirely contingent on one another (A-11). Hence, the lower the positive correlations between parameters, the more extensive are intergroup relations (T-12). When nominal parameters are intersecting they improve the integration of various groups by raising the rates of association between their members (T-12.1). When they are consolidated, ingroup bonds are stregthened and the intergroup relations that integrate various groups are attenuated (T-12.11). Size, again, plays a role in the process: as group size, in terms of one nominal parameter, declines, the probability of intergroup relations in terms of other intersecting parameters increases (T-14).

Graduated parameters are those that determine status differences, which are differences in comparable social resources of generally acknowledged validity in social exchange (A-12). Hence, the less that graduated parameters intersect, the greater is the inequality (T-15.3).

When there is multiform inequality, intersecting graduated parameters attenuate the rates of social association among different strata and thus weaken their integration (T-12.2) and the intersection of nominal by graduated parameters integrates groups and strata by raising the rates of social association among them (T-12.3). In turn, the more consolidated group differences are with correlated status differences , the less frequent are integrative social associations among groups and strata (T-12.31). These final theorems (T12.2, 12.3 and 12.31) are also readily testable.

CHAPTER 2

INEQUALITY AND HETEROGENEITY IN INTERORGANIZATIONAL NETWORKS

In the present chapter Blau's theory is translated from the inter-individual level to the inter-organizational level. Before doing so, however, a series of problems that the theory presents are introduced and reviewed. In order to improve the understanding of some of these problems a "biased net" formalization of the theory is reviewed in very general terms. Then, parameters of differentiation among organizations are distinguished based on the organizational literature.

DIFFICULTIES AND LIMITATIONS OF THE THEORY

As Bell (1978:695) has noted, one of the main problems with the theory is that Blau takes as a fundamental axiom that people prefer associates with whom they share social attributes and that ingroup associations are more prevalent than outgroup associations (A-1).

This presents problems for individual behavior (Bell, 1978; Fararo, 1981, Skvoretz, 1983) but there is evidence that mutuality (reciprocity) and transitivity play a major role in networks of interpersonal attraction and affect (e.g. Davis, 1967; 1979)[12].

There is no equivalent principle for organizations. Indeed, the resource-dependence approach would suggest that the opposite is the case: organizations tend to develop asymmetric flows of resources (Laumann and Marsden, 1982) and try to relate to those that are not in the ingroup (Galaskiewicz and Wasserman, 1981), especially when exchanges of only one type of resource are considered (Knoke and Rogers, 1979). However, as Laumann and Marsden (1982) argue, principles of autonomy (Cook, 1977; Schmidt and Kochan, 1977) and plurality (Kochen and Deutch, 1980) or redundancy (so as to mantain organizational security or stability), may act against an all-asymmetrically tied network. These arguments would suggest that there is in fact reciprocity and mutuality even among organizations, a view that is supported by some empirical evidence (Knoke and Rogers, 1979; Galaskiewicz and Wasserman, 1981).

Two other problems arise when trying to apply Blau's theory. What types of parameters will be of the "inbreeding" (with an ingroup bias) type and what kind will be of the "outbreeding" (outgroup bias) type ? (Skvoretz, 1983). At the empirical level, although not at a theoretical level, this problem has a relatively easy solution. It can be determined statistically.

A theoretical difficulty remains, however, namely, what are the consequences of heterogeneity and inequality with respect to "outbreeding" types of relations ? (such as marriage at the individual level, if the parameter is sex). The answer to this problem is not such a simple one and a proper understanding of it is very much related to the concept of salience . Indeed, this concept of salience may also be related to the solution of yet another limitation of Blau's theory. This limitation is that it does not state how structural conditions interact with or mediate each other. That is, at the individual level, does income weigh the same as race in a person's choice, or is one more important than the other?. Also, how does the prior opportunities and constraints created along one parameter determine the opportunities and constraints along others that come later ?.

Salience seems to be a critical concept in this respect but Blau does not "formalize his predictions to the same degree as in his other theorems" (Blum, 1984:609). These relationships have been shown better by a biased net formalization developed by Fararo (1981) and Skvoretz (1982; 1983) and Fararo and Skvoretz (1984).

Biased net theory, or a theory of random networks, was first developed by Rapoport and clleagues (Rapoport and Horvath, 1961; Foster, Rapoport and Orwant, 1963). They originally argued that biased networks could be characterized by a series of parameters . Fararo and Sunshine (1964) introduced a new parameter, and consequently a biased net could be characterized by a reciprocity or parent bias, a cofriend or sibling bias (in recent work related to the notion of weak ties) and a popularity bias. Fararo (1981) and in particular Skvoretz (1983), making a few assumptions, develop a model in which Blau's theory is embedded and formalized in a biased net model. I will not develop the model in detail, but an introduction of some of the terminology and formuli will facilitate a proper understanding of the complexities involved.

The reader should assume two bias events. A first event is "inbreeding", meaning that if it occurs, there is a probability one (1) that a co-actor will be selected and will belong to the same category as that of the actor initiating the action. The second event is "outbreeding", where the opposite situation takes place. Assuming that the bias, or preference strengths if the reader prefers, is constant accross categories, Fararo (1981) proved that (in the extended form of Skvoretz, 1983:361), the probability of an ingroup association is: $P = in+(1-in-out)(1-H)$, where H is Blau's heterogeneity. This formula is applicable in the general case when there is an inbreeding bias (in) or an outbreeding bias (out) or a mixed situation. Salience, as already mentioned, refers to the degree to which observed ingroup associations deviate from those theoretically expected on the assumption of independence. Independence means that there is no bias or no particulare preference. Hence, if (in) and (out) are set to zero in the previous equation, the probability of ingroup relations becomes: $P = 1-H$. Notice that the probability of outgroup relations is the complement, that is, $Q = H$; where, again, H is Blau's heterogeneity. This, of course, is consistent with Blau's theory.

A refinement of the theory is introduced with a proper definition of salience, as the difference between the observed associations, that is the first P, and the expected under the assumption of independence, the second formula for P. As a result, salience becomes, if the situation is an exclusively inbreeding one, $S = (in)H$, and if it is an outbreeding one, $S = (out)(1-H)$ (Skvoretz, 1983).

From these formuli Skvoretz (1983) extends and corrects Blau's predictions in the sense that "even though increasing heterogeneity produces more outgroup and less ingroup association, it also makes the characteristic more salient ...(and correcting Blau)...there is absolutely less but relatively more ingroup association...,heterogeneity may exacerbate the tendency to discriminate against outgroup members" (Skvoretz, 1983:362), when there is a pure inbreeding bias. When there is a pure outbreeding bias, as in the case of marriage, in which gender is the parameter, with increasing heterogeneity there is absolutely more but relatively less outgroup association.

These conclusions are certainly clarifying with respect to the relationships among heterogeneity, salience and rates of inter-group association.

The assumptions of the model are somewhat problematic for some sets of data, because real data sets usually show, as is the case in the data used in this work, that there is not a uniform bias accross categories. Further, biases are mixed, not uniform and different for different networks. The model sensitizes, however, with respect to the importance of the relationship between in-group ties and out-group ties, since this is an indicator of the bias.

The biased net model is only one possible formalization of Blau's theory. Rytina (1980), in a less elegant but useful formalization of topics related to the theory, obtained very rich and insightfull results (see also Rytina and Morgan, 1982). Among them, it is worth noting the fact that the effects of heterogeneity on the diversity of contacts are relatively minor (an increase in number of categories from 5 to 100 only leads to an increase of 24% in diversity of contacts). Salience, again, seems to be the most important concept in this respect.

Another major problem with Blau's theory is the distinction between nominal and graduated parameters. In the summary of the theory outlined earlier, the issue was presented as non problematic. However, Blau's notion of these types of parameters is not quite consistent accross his publications (see Blau, 1974; 1975; 1977).

Blau defines a nominal parameter as a variable that "divides the population into subgroups with explicit boundaries", while a graduated parameter is one that "differentiates people in terms of a status rank order" (Blau, 1974:617).

Marsden, in his interpretation of the difference between these types of parameters, has drawn the distinction that the "defining criterion of a nominal parameter from a relational standpoint might be that persons in a particular category of it do not discriminate among outsiders, beyond the fact that insiders are in general to be preferred to outsiders", For a graduated parameter, instead, 'sociable intercourse is expected to be inversely related to the status distance between persons'(Blau, 1974:617)" (Mars-den, 1981: 3). From there Marsden considers that the parameters should be distinguished "in terms of the characteristic patterns of association that they generate" and assimilates

Blau's notions of status distance and social distance with Bogardus' (1925; 1933) and Laumann's (1966; 1967) notions of social distance.

Marsden's interpretation, however, seems inappropriate and would make all of Blau's work totally tautological. If parameters are defined in terms of relational distance (social distance) based on the amount of interaction among individuals, how enlightening would it be to make predictions with respect to rates of interaction among groups?

The problem is not absent in Blau's conceptualization and it is related to what Messner (1980) has typified as the "dual nature" of structural analysis (Blau's). That is, in order to know if a parameter exists it is necessary to empirically determine if it affects social relations. Once it has been established that it exists, predictions are made as to the types of effects that it will have. The problem is not so serious because in the second step the researcher is concer-ned with the distribution of individuals along those parameters but it is still somewhat "bootstrapping".

Further confusion is introduced for Marsden by Blau's use of the notions of social distance and status distance. Marsden interprets them in the sense referred to above, a la Laumann or Bogardus. However, as McFarland and Brown (1973) remarked, two notions of social distance have been distinguished in sociology: 1) a concept that is based on interaction, determined by the intensity or the type of social interaction likely to take place between two individuals (Bogardus, 1933) or by the amount of interaction (Laumann, 1966; 1967), and 2) a concept based on similarity, identified with Sorokin (1927), and typified by the following quotation:

> "The greater the resemblance of the positions of the different men, the nearer they are toward each other in social space"

Blau's notion, in my opinion, is that of Sorokin, and in fact is that of Simmel when he refers to social types (Levine, 1971), as suggested in an earlier note. Further, Blau's suggestion of measuring intersection and consolidation of parameters by correlations indicates that social distance refers to the fact that individuals share characteristics (although they may not actually interact, namely be distant according to the interactional concept).

This concept of distance can be generalized to the notion of local distance and or similarity employed by Feld (1982) and also by Fararo and Skvoretz (1984). This different interpretation has, of course, empirical consequences, precluding, among other things, the use of Marsden's loglinear techniques for characterizing the structural parameters of groups (1981)[13].

The concept of social distance and Blau's eventual inconsistency are not the only causes of problems with the distinction between nominal and graduated parameters. As I see it, the distinction between nominal and graduated parameters hinges on issues of classification, nomothetic vs. ideographic issues, measurement, and theoretical problems.

Let me begin with the issue of classification. The problem in sociology, as usual, is as old as Durkheim (Durkheim and Mauss, 1963). It was argued there that the classification of things reproduce the classification of men. The point of concern here being that of men (or organizations, for that matter).

When the classification of men is addressed, the problem of logical and social classes is at stake. In this respect it is important to distinguish between those classifications in which the classes distinguished are defined by attributes or where the classes are defined by internal relations, an issue that has been remarked by many authors (Bourdieu, 1966; Naville, 1961) and which is at the core of the distinction between the categorical and structural approaches to social structure that White et al.(1976) draw and, of course, related to the Marxian problem of "class by itself" and "class for itself" (see, as a classic, Ossowski, 1963). The reader may have guessed already that my treatment of the problem of classification is extremely cursory and, having been a major problem for these authors, will hardly be solved here.

A nominal parameter, as was stated above, is a "criterion of group membership underlying social distinctions people make in their role relations" and groups are "all nominal categories of persons who share a social position (<u>social attribute</u>) that influences their role relations ...They have boundaries and no rank order" (Blau, 1977:276-77).

Hence, the "dual nature" of Blau's structuralism is given by the fact that distinctions and consequent classes based on attributes are tested to see if, in fact they are classes based on positions.

But then, do these attributes establish a natural or an artificial classification ?. Blau seems to suggest in the way he compares heterogeneity to status diversity, that an artificial classification would be, let us say, appropriate enough.

But if it is an artificial classification, why would this have a positional effect ?. Why would people draw significant distinctions (Bourdieu, 1966) so as to derive the condition or situation of class ? This, then, is related to the nomothetic and ideographic issue, well addressed on these matters of class by Naville (1961) and Carlsson (1958).

Not only are attributions and distinctions problematic. What does it mean that groups have no rank order ? As Bell

(1978) notes, some of those parameters that Blau considers nominal, such as occupation, sex and race carry a rank order. Indeed, the whole literature on occupational complexity and hierarchies of skill is based on these "non-vertical dimensions of stratification" (e.g. Kohn and Schooler, 1978; Kohn, 1981; Spaeth, 1979) (where non-vertical may be a tribute to tradition). Further, the literature on status characteristics has clearly shown the effects of sex and race as such status characteristics. That is, attributes or "characteristics of actors around which evaluations of and beliefs about them come to be organized" along dimensions of power and prestige (see Berger, Conner and Fisek, 1974; Berger, Rosenholtz and Zelditch, 1980).

Social differentiation among units usually implies two kinds of processes: differentiation of subpopulations and ranking of them (Turner, 1984). The process of differentiation of subpopulations usually supposes, in turn, the processes Kochen and Deutsch (1980) call pluralization and functional specialization.

Pluralization, with spatial dispersion or not, implies a process that essentially generates redundancy in a system (for whatever reasons). This process is sometimes called segmentation (Luhmann, 1982) and consists of a process in which all the parts generated are esentially identical actors, or if the reader wishes, structurally equivalent from a functional and relational point of view.

When organizations are concerned and their activities are considered, segmentation is the situation described by Thompson (1967) as parallel technology, and discussed in graph theoretic terms in the context of the division of labor by Kemper (1972).

Pluralization cannot constitute what Blau considers to be heterogeneity because all plural actors share one common attribute that constitutes the "mark of distinction" between them and the rest.

Functional specialization could instead lead to the distinctions that Blau wants to make. But again, most literature, including earlier writing by Blau (1972) tends to argue and show that functional differentiation is usually accompanied by a ranking process (or a re-ranking one). The famous (or infamous) "structural mobility" is generated by these processes (see, for example, Mayhew, 1975; Turner, 1984).

Theoretically, then, one has to conclude that situations where heterogeneous groups co-exist without some kind of ranking, cannot occur.

What can occur, instead, as Marsden (1981) would argue, is that differential distinctions are drawn. For nominal categories the distinction only involves the out-group and the in-group distinction, without discriminating among outsiders. These kinds of situations in which dychotomies are involved, have long been described by anthropologists, and it is a favourite among the French structuralist tradition (e.g. left vs. right, white vs. black). For graduated parameters, the distinction is based on a finer discrimination of social distance (again, not in Marsden's sense).

Measurement of these local distances (Feld, 1982) is not yet developed and we certainly do not have an empirically based list of those variables that fit that situation at the individual level, much the less at the organizational level.

A proxy to these situations, however, may be the interpretation that Bell (1978) gives to the distinction between nominal and graduated parameters. Graduated parameters would be based on a resource that can be exchanged. The interpretation is, of course, based on Blau and it was the definition of a graduated parameter that was emphasized in the outline of the theory presented in the preceding chapter.

NOMINAL PARAMETERS IN ORGANIZATIONS

Blau (1977) does not provide any way to determine what categories are relevant criteria of distinction for social interaction and which are not (i.e. which ones are parameters). He suggests that the concept of salience of a parameter is the one that establishes that distinction.

Skvoretz (1982), however, has shown that Blau's predictions with respect to the effects of heterogeneity are valid for any categorical distinction, whether it is salient or not. He has further shown that categories that may not be relevant as parameters of differentiation from a theoretical viewpoint, (e.g. the brand of tooth brush that individuals use) will be relevant with respect to the individulas'patterns of association if they are significantly associated with a salient parameter. This then, introduces a distinction similar to Rytina's, between salience and significance of a parameter (Rytina, 1980) or between primary and derivative salient parameters (Skvoretz, 1983:371).

The literature on organizations has traditionally studied structural characteristics of organizations that have been shown to be relevant in order to determine organizational types. These variables then should eventually constitute primary salient parameters of differentiation among organizations.

Typologies of organizations have emphasized different elements in determining the main criteria to classify organizations, such as fuctional categories, societal function performed, prime beneficiaries, type of authority, type of compliance of members, major structural factors, technological and environmental complexity and uncertainty, and type of relationship to clients and participants (see review in

Scott, 1981). When considering nominal or graduated parameters of differentiation among organizations then, all these characteristics seem to be relevant.

For the present purposes, and given the data on social service agencies described below, many nominal parameters have been controlled, such as whether the organizations are work organizations or not (Blau and Scott, 1963), whether they use remunerative power and calculative participant involvement or not (Etzioni, 1975), whether they use rational-legal types of authority or not (Weber, 1947), and who are the prime beneficiaries of the profit (Blau and Scott, 1963).

The issue then,for present purposes, is to establish relevant parameters of differentiation among non-profit social service organizations.

Whether or not the organization is public should be a relevant parameter of differentiation. Public organizations do not have the same competitive constraints that some private organizations have (Aldrich, 1979; Downs, 1967; Jackson, 1983) and their birth, growth and death processes tend to suggest an absence of predators but no significant shortage of sustenance (Casstevens, 1980). They also differ in that public organizations often have an externally imposed legally mandated network (Hall et al., 1977). That is, they are organized in a hierarchy (in Williamson's (1975) sense -

a relational hierarchy-), while private organizations are more prone to be organized in a "market" (also in Williamson's sense).

Among those structural factors that are relevant, technology, defined as the characteristics of inputs, throughputs, and outputs as related to materials, operations and knowledge (Scott, 1981), seems to be a most important one (Perrow, 1967; 1970). The technical core has been used as the main criterion to establish a concept of organizational species (McKelvey, 1982). Greater technological complexity is associated with greater structural complexity; greater technological uncertainty is negatively associated with formalization and centralization (Scott, 1981). It has also been shown that technological organization is related to systems of control (Woodward, 1965; Hrebiniak, 1974), as a function of the type of interdependence generated by the technology in use (March and Simon, 1958; Thompson, 1967; Baumley, 1971)[14].

Hence, type of technology should be a main parameter of differentiation. Unfortunately the percentage of non-response in the present set of data precludes the use of a complex measure of technology. However, the functional category of the organization, namely the type of service provided should be related to the type of technology employed and it will be used as in this work as a proxy variable.

GRADUATED PARAMETERS IN ORGANIZATIONS

Whether it is understood as a dimension of organizational structure (Hall and Tittle, 1966) or as a contextual variable (Blau and Schoenherr, 1971; Pugh et al., 1969), size has generally been conceived as a relevant characteristic of organizations (Scott, 1981). As measured in the most common way, by number of employees (Scott, 1981), size is, however, related to a scarce resource, manpower (Nielsen, 1978; McPherson, 1983). Another common measure of size for service organizations is the number of clients served which clearly refers to an important resource for service organizations.

Consequently, given that a graduated parameter is based on the possession or availability of a scarce resource, size should be considered as such.

Another measure of size is the budget available to the organization (Kimberly, 1976). This variable is clearly the equivalent of income at the individual level, in particular for non-profit organizations. Hence budget size should also be a graduated parameter of differentiation.

Inequality refers to the distribution of people in terms of a status dimension. Power, influence, and prestige are sources of social status for individuals. The same should be the case for organizations.

The concept of power is another of those significant concepts in the social sciences upon which there is no agreement, to the extent that it has been considered an "essentially contested concept" (see Lukes, 1974).

The lack of agreement as to how power should be defined and the indistinct use of related terms as influence and control (Rogers, 1974) have increased with the relatively recent resurgence of interest in the concept within sociological theory, in general, (e.g. Burns and Buckley, 1976; Chazel, 1974; Crozier and Friedberg, 1980; Foucalt, 1980; Goetschy, 1981; Liebert and Imershein, 1977; Lukes, 1974; Martin, 1975; Poulantzas, 1974; Wrong, 1979) and organization theory in particular (e.g. Clegg, 1979; Pfeffer, 1982). The only <u>un</u>contested aspect of power is that by its nature it is a dispositional concept, namely, that power is not an observable construct and that it implies a potentiality. Further, under some circumstances it is a multidimensional concept (Kadushin, 1968).

Among those notions of power that are relational and that can be conceptually applied to exchange and social networks, Coleman (1977) has distinguished two forms of power. A "perfect (competition) market" form, where "the power of an actor is the control he has over events, weighted by the value of these events" and an "imperfect (competition) market" form, where power is to gain the outcome one prefers in opposition to the other party's interest in gaining the outcome he prefers" (1977: 184-5). Extended models of the former type have been developed for social networks (Burt, 1977; Marsden and Laumann, 1977; Marsden, 1981; Marsden, 1983).

The concept of power that has been the most researched, however, is Emerson's bilateral conception of power-dependence relations (1972; Cook and Emerson, 1978). This concept of power makes it a direct function of the dependence of A upon B, which in turn is "a direct function of the value to A of B's resources" and "an inverse function of the number of A's alternative exchange relations with ...parties with resources similar in kind to B's" (Stolte and Emerson, 1977: 120). Unfortunately this notion is based on a bilateral conception of power and must be reformulated in order to be properly applied in large networks (Cook et. al., 1983).

That organizations exercise power is hardly a revelation (Warwick, 1975; Rourke, 1976; Coleman, 1984; 1982). Few studies, however, have addressed the issue of power at the interorganizational level (Beniger, 1983; Burt, 1980; Galaskiewicz, 1979; Miller, 1980; Mizruchi and Bunting, 1981; Rogers, 1974).

The concept has been operationalized as centrality in a network of relations. Centrality has been considered a source of structural power (see Hickson et. al, 1971). Centrality also links the notion of status as power, which is typically represented "vertically" (as in an organization chart), with a "structural positional meaning, a la 'status in the Linton sense' " (Stolte and Emerson, 1977: 126).

As Freeman (1977; 1979) makes clear, there are three general types of centrality measures that have been used: those of point centrality; those based on betweenness; and those based on closeness[15].

The second type of measure, those based on betweeness, index the potential of a node for control of exchange (Freeman, 1977; 1979). This measure has been given a game theoretical interpretation (and hence some substantive "sense") (Grofman and Owen, 1982) and it is then, clearly related to brokerage as a source of power in controlling exchange networks. While the most recent empirical evidence with respect to its equation with power is mixed, at least in "negatively connected" networks (Cook et al., 1983)[16], it is still the best operationalization of the concept available, and it has been shown to be relevant in empirical research (Beniger, 1983; Burt, 1982; Galaskiewicz and Krohn, 1984).

Clientele support, as an exchange dimension, is important in determining the power of social service agencies

(Beniger, 1983; Rourke, 1976) and clients are a significant resource for these agencies. Hence, those organizations that are central (in the betweeness sense) with respect to the distribution of clients should be more powerful.

The concept of influence is also used in a vague way, sometimes it is understood as the genre, being power the species (Wrong, 1979); sometimes it is used interchangeably with power or with prestige. However, in everyday speech it is not the same to describe a person as powerful as to call him/her influential. To be influential (for a person or an organization) seems to be related to the ability of affecting B's actions in the absence of a sanction ,a contingency of reinforcement if the reader prefers it, (Bell, 1975), and much related to what Wrong (1979) calls anticipatory influence.

Influence then, as compared to power, clearly entails an attribution process, probably best captured at the measurement level by the reputational techniques (see Bonjean and Olson, 1964).

Prestige is another dimension of organizations that has hardly been dealt with. The relevance of prestige as a scarce resource and its importance for social interaction is extensively shown by Goode, who defines the concept as "the esteem, respect, approval that is granted by an individual or a collectivity for performances or qualities they consider above the average" (1978: 7). The issue of prestige in organizational networks has been singularly argued by Perrow (1961), who identifies it with a favorable public image, and Caplow (1964).

Prestige affects the distribution of resources, attracting personnel, clients, donors, investors and the distribution of credibility and influence with respect to relevant legislation, and in setting the standards of achievement in its organizational set.

The differences between concepts such as prestige and power or centrality have been recently discussed by Knoke and Burt (1983) in dealing with the concept of "prominence". In the latter concept, the prominent actor, i.e. prestigeful, is the object of many relations, while the actor may not directly participate in those relations.

The distribution of organizations along these three graduated parameters of differentiation should have similar effects to those predicted by Blau for groups of individuals.

In the next section, specific hypotheses involving these variables are presented, following Blau's theoretical statements.

CHAPTER 3

STATEMENT OF THE PROBLEM AND HYPOTHESES

RESEARCH PROBLEM

The problem addressed in the present work can be stated as a test of a theory that predicts how the structure of opportunities and constraints, as generated by the different proportions and frequencies of complex organizations along parameters of differentiation, affects the degree of interrelations among them. More specifically, the predictions are made with respect to the rates of out-group associations and the degree of status distance among actual associates that occur in a previously defined interorganizational network.

Nominal parameters that determine groups of organizations were determined on the basis of the existing literature and are: public vs. private organizations and type of activity of the organization. The graduated parameters that will determine the status groups are size, budget size, power, influence and prestige of the organizations. These same parameters determine degrees of inequality which are used to make predictions with respect ot the status distance among interacting organizations.

For the sake of clarity, it should be noted again that Blau's notion of group is a categorical one, where the standard introductory textbook distinctions between an aggregate (a mass), a category (an age group) and a group (with the classical Mertonian characteristics) do not hold.

Theoretical predictions with respect to the dependent variable, instead, refer to an actually relational variable: degree of association among organizations. Namely, interrelations in an actual symmetric social network, that is, a set of links in which A has, for example, named B and B has named A and so on, (from here on, called ties) are predicted. In what follows, the main hypotheses, as deduced from the relevant theorems of the theory, are elaborated.

HYPOTHESES

From the theorem that increasing heterogeneity increases the probability of intergroup relations (T-11), it is expected that:

H-1. Those networks with higher heterogeneity with respect to the nominal parameter public-private will have a higher average number of ties to the outgroup than those with lower heterogeneity in that parameter.

H-2. Those networks with higher heterogeneity with respect to the nominal parameter type of activity performed will have a higher average number of ties to the outgroup than those with lower heterogeneity in that parameter.

From the theorem that increasing status diversity increases the probability of associations among persons whose status differs (T-11.3), it is expected that:

H-3. Those networks with higher status diversity with respect to size will have higher average number of ties to the outgroup than those networks with lower status diversity along that parameter.

H-4. Those networks with higher status diversity with respect to budget size will have higher average number of ties to the outgroup than those networks with lower status diversity along that parameter.

H-5. Those networks with higher power status diversity will have higher average number of ties to the outgroup than those networks with lower status diversity along that parameter.

H-6. Those networks with higher status diversity with respect to influence will have higher average number of ties to the outgroup than those networks with lower status diversity along that parameter.

H-7. Those networks with higher status diversity with respect to prestige will have higher average number of ties to the outgroup than those networks with lower status diversity along that parameter.

From the theorem that intersected nominal parameters improve the integration of various groups by raising the rates of association between their members (T-12.1), it is hypothesized that:

H-8. Those networks with higher intersection (lower correlations) among type of activity and public-private distinction , will have higher average number of ties to the outgroup than those networks with lower intersection (higher correlations) of these parameters, when controlling for the degree of intersection between graduated and nominal parameters.

From the theorem that intersecting (less consolidated) graduated parameters increase the rates of association among different strata and thus weaken their integration (T-12.2), it is hypothesized that:

H-9. Those networks with higher intersection (higher negative correlations) among size, budget size, power, influence, and prestige will have higher average number of ties to the outgroup than those networks that do not have such high level of intersection (such high negative correlations), when controlling for the degree of intersection between graduated and nominal parameters.

From the theorem that the greater the relative inequality , the greater is the probability of status distant associations, it is hypothesized that:

H-1Ø. Those networks with greater relative inequality with respect to the parameter size, will have a greater relative inequality among those organizations that are linked by one or more ties.

H-11. Those networks with greater relative inequality with respect to the parameter budget size, will have a greater relative inequality among those organizations that are linked by one or more ties.

H-12. Those networks with greater relative inequality with respect to the parameter power, will have a greater relative inequality among those organizations that are linked by one or more ties.

H-13. Those networks with greater relative inequality with respect to the parameter influence, will have a greater relative inequality among those organizations that are linked by one or more ties.

H-14. Those networks with greater relative inequality with respect to the parameter prestige, will have a greater relative inequality among those organizations that are linked by one or more ties.

As mentioned earlier the last hypotheses (10 to 14) are particularly relevant for their paradoxical effects on the integration or connectedness of a network.

CHAPTER 4

METHODOLOGICAL PROCEDURES

Data

The data used in this research was collected by survey interviews with the heads of social service organizations that participated in the delivery of mental health services to the aged. The services were located in twelve midwestern cities (six in Michigan and six in Ohio), whose population ranged between 100,000 and 600,000 inhabitants. The data were collected by P. Marcus and A. Sheldon under grant # 31898-02 from NIMH in 1978. Sample frames were built on the basis of United Way listings, telephone directories and information obtained from interviews with informants involved in the cities' social service delivery systems. The organizations included in the sample were actual providers of services and had more than five permanent members on their staff.

Three questionnaires were used. In the first, directly administered by a professional interviewer, the directors of the agencies were asked to determine, (on the basis of a list provided) the agencies with which their agencies interacted on 21 different types of dimensions. Actually, some of these dimensions did not refer to exchange dimensions but rather provided, by means of a sociometric technique, data that were not available otherwise (i.e. prestige of different organizations). The second and third questionnaires were self administered and sought information on structural characteristics of the organization. The interorganizational networks that resulted from these data ranged in size from 37 to 47 organizations. The response rate for these questionnaires, ranging from 65% to 75%, was not as high as the response rate for the first questionnaire (about 95%). Consequently, technological charac-teristics as well as some other variables for some cities cannot be used without seriously biasing the analysis. Response rates for each city are provided in Appendix I.

Details regarding data collection and descriptive characteristics of the data can be found in Marcus and Sheldon (1983).

The three main criteria for defining a boundary are spatial, functional and analytical (Kuhn, 1974). Analytically, the boundaries of the netwoks in the present study are defined nominally, according to their geographic (spatial) location and to the type of service delivered by the organization (function performed).

Operationalization and Measurement

<u>Dependent</u> <u>variables</u> Two types of dependent variables are used in this study. For those predictions based on heterogeneity (hypotheses 1 to 9), the dependent variable is always the number of ties to the outgroup. However, since the effects of heterogeneity are contingent on the salience of the parameter and the relative number of in-ties, the dependent variable was operationalized as the ratio of the number of ties to the outgroup over the number of ties to the ingroup.

Two different dependent variables are used to obtain different outgroup counts. The variables measured are information and informal exchanges of cooperation. Data on these variables were collected through the following questions: With which agencies do you exchange opinions, information and ideas?, and ...please identify any agencies with which your agency works on any sort of informal cooperative basis. (For precise wording of the questions, see Appendix II, where the relevant questions are reproduced).

The nature of these exchanges is substantively symmetrical, satisfying in this sense the requirements Blau (1977) imposes on the type of social relations with which he is concerned.

It is the case, however, that acknowledged reciprocation is also dependent on dimensions such as prestige (people tend to choose peers or "superiors" -Davis, 1967; Davis and Leinhardt, 1972 ; Laumann, 1966; Laumann and Senter, 1976) It should also be clearly dependent on the volumes of the resource that are exchanged, relative to the total amount of that resource that is received or given by a specific organization. Hence, each choice made by a member of category X1 to X2, is considered to be symmetrical, namely it implies that there is a tie from X2 to X1, as well.

The reciprocity issue, however, implies that actual choices from X1 to X2 and from X2 to X1, may differ. Consequently, both choices for both categories have to be counted and the actual reciprocated choices discounted. To state it another way, reciprocation is imposed for each of those choices from X1 to X2 and from X2 to X1 that were not actually reciprocated. The counting procedure is relatively simple. Since the ties are symmetrical, (Ties OUT + Ties OUT - Reciprocated OUT Ties) / N1 + N2 = Ties OUT + Ties OUT / N = Average number of ties to outgroup. For the polytomous case and for the multivariate case, the general counting formula is: (Total # of Ties - E Ties IN - Reciprocated Ties) / N = Average number of ties to outgroup. The computer program employed for this counting was written by Patterson Terry and it is reproduced in Appendix III.

For those predictions that concern inequality, the dependent variable is always status distance among associates. For these purposes, a special rate, similar to the one used by Blau and Schwartz (1984) for marriages, is developed. The purpose of such a rate is to determine the average status distance among organizations that actually interact, expressed in terms of a unit which is the mean status in the population or social network of concern (see Skvoretz and Fararo, 1983). Hence, for the present purposes a <u>relational</u> Gini index would be:

$$G_{rel} = \frac{\sum_{i=1}^{n} \left[\left(\sum_{j=1}^{k} |S(i) - S(j)| \right) / k \right]}{2 \bar{S} n}$$

Where k is the number of associates j that an actor i has, n is the total number of actors in the network, S(i) is the status of actor i, S(j) is the status of the associate, and $\bar{S}$ is the mean status in the population.

A relational Gini coefficient was calculated for each of the two dimensions of exchange mentioned in each of the twelve cities, using the same computer program shown in Appendix III.

The choice of two dimensions of exchange was made for several reasons. On one hand, it provides a way of testing

Blau's theory with two kinds of relation and not just one. On the other hand, it is a way of improving the validity of the results. Evidently the _a priori_ probability of finding sig-nificant statistical relations with twelve cases is v^r small. Besides, the statistical validity of the findings. based on twelve cases could be argued. If the statistical analysis is performed for two different kinds of ties, a replication of the test of the theory is carried out and the findings may not be statistically significant but they will be more robust.

For those readers who still remain critical after this rationale, it should be noted that there is no published study that uses network variables and uses twelve cases. By current standards in the discipline then, using twelve di-fferent networks seems to be an improvement on previous work.

Independent variables. The independent variables are pu-blic-private distinction, type of activity, heterogeneities and size, budget, power, influence,and prestige status diversities, when hypotheses concerning heterogeneity and status diversity are concerned (H-1 to H-9).

Type of activity is measured by the reported main acti-vity of the organization and a subsequent classification performed by Marcus and Sheldon (see list, 1983: 201), generating the following categories: Primary Mental health organizations, Secondary Mental health organizations and No Mental health.

Whether the organization is public or not was determined on the bases of self reports of the main source of funding plus the reports of selected informants,

Blau (1977:9) suggests as a measure of heterogeneity the following formula:

$H = 1 - \sum (Pi^2)$, where H is heterogeneity and Pi is the proportion of organizations in each nominal category. For the case of sampling without replacement this formula is not appropriate, however. Blau correctly notes that these would not be a problem for large samples. For the present data the same measure developed for the case of sampling without replacement is used, as suggested by Skvoretz (1983: 360n).

$$H = 1 - \sum [f(i) (f(i) - 1)] / n (n-1)$$

Where f_i is the number of organizations in each nominal category, and n is the size of the population.

Size of the organization is determined by the reported number of employees in the organization .

Size of the budget is measured by the reported total income or revenue of the agency from any source, except clients' income maintenance funds, circa 1978.

Power and influence were extensively discussed in the preceding sections. Following conceptual and traditional principles, power was considered to be a positional concept, while influence was a reputational one (Bonjean and Olson, 1964). Consequently, and for present purposes, a distinction is drawn between informal power acquired through the strategic (central) structural location in the network of scarce resources -and influence, based on the reputation (or perceived power) of the organization.

Informal power is measured by the centrality index, based on betweeness (Freeman, 1977; 1979) in the network of exchange of the resource "clients", namely, in the referral network. In order to establish control over the flow of clients, a sociometric matrix was built based on the question "Which agencies send people to your agency?" The transpose of this matrix (where the rows become columns and viceversa) has senders as headings of rows and receivers as headings of columns. The centrality index, based on betweeness, was calculated for this matrix, according to the following formula (Freeman, 1977):

$$C_b\,[p(k)] = \sum_{i<}^{n} \sum_{j}^{n} b(ij)\,[p(k)]$$ [17], where n is the numb r of nodes in the network and $b(ij)\,[p(k)] = g(ij)\,[p(k)] \,/\, g(ij)$, where g_{ij} is the number of geodesics linking p_i and p_j and $g_{ij}(p_k)$ is the number of geodesics linking p_i and p_j that contain p_k (Freeman, 1977; 1979)[18].

To facilitate the comparison accross networks a normalizing factor of $N^2 - 3N + 2$ is used[19]. The measure of centrality was calculated with the computer program Center that belongs to the library of UCINET from the University of California at Irvine.

In order to make this measure usable for the indicator of status diversity, five 20th percentiles are established.

Influence, established by a reputational technique, is measured by the answer to the question: Which agencies have the most influence over decisions about human services in this community? Harary (1959), when suggesting the only measure of status based on graph thery (Roberts, 1979), introduced the concept of contra-status. This concept takes into account that status is determined not only by the subordinates but also by the superordinates that an actor has. His measure of status, however, gives a higher weight to those that have more subordinates. That is, the more "distance an actor can put between himself anf his subordinates, the higher is his status (Taylor, 1969).

This is in conflict with the concept of influence which implies that higher levels in a relational hierarchy should have relatively less influence over an actor than those that are directly over the actor (Simon, 1981)."Popularity" measures of status, that is ,the sum of the direct and indirect links to an actor, do not capture these different weights.

The most appropriate measure of influence then, would seem to be Taylor's (1969) reformulation of Katz's (1960) measure. This measure uses a matrix (M) in which the ones represent "influences to". Hence, since the question collects information on who has influence over another, its transpose is the desired matrix M. The measure is the following:

$$Inf(i) = r(i) - c(i) / \sum_{j} r(i)$$

Where, r and c are the ith row and columns sums of P, and

$$P = [(I - wM)^{-1} - I] / w$$

Where I is the identity matrix, w is a weig en ng constant such that $0 < w < 1$ and M is the influence matrix above described. The measure ranges from -1 to 1 but a constant of 0.5 was empirically determined so as to have all positive values. In order to standardize the results, the weighting constant was 1 / n; where n is the number of organizations in the network.

Prestige, instead, is a typical example of prominence, that is, "an actor's prestige is higher to the extent that it receives many ties directed to it by many prestigious actors who are themselves the recipient of directed ties from many other actors" (Knoke and Kuklinsky, 1982: 55). The measure is the following:

$$\mathrm{Prest}(i) = \sum_{j=1}^{n-1} p(j)\, z(jik)$$

where each element in the column vector of an actor i is multiplied by the prestige scores (p) of the n-1 j actors. Since prestige is on both sides of the equation, a simultaneous solution is required and is described in Knoke and Burt (1982) and Burt (1982). The computer program employed for the calculation of prominence or prestige was a variation of Burt's Structure (version 2) [20].

All these graduated parameters were divided in five percentiles and the formula for heterogeneity was applied so as to measure status diversity.

Relative inequality is the other independent variable, employed in hypotheses 10 to 14. While there are many measures of inequality (Allison, 1978; Schwartz and Winship, 1979), Blau's suggestion is followed and the Gini index is employed in this work. For practical reasons the formula applied is not identical with the one Blau (1977; Blau and Schwartz, 1984) suggests, but is the equivalent one proposed by Allison (1978), which is equivalent.

The formula employed is the following:

$$G = \frac{\sum_{i=1}^{n} \left(\sum_{j=1}^{n} \left| S(i) - S(j) \right| \right)}{2\, \bar{S}\, n^{2}}$$

Where S(i) is the status value of i, S(j) is the status value of j, $\bar{S}$ is the mean status in the system, and n is the number of organizations in the network of concern. Again, this measure was performed on each of the graduated parameters for each of the cities.

Statistical Analysis

Independent and dependent variables were entered in two basic statistical models. In both of them the dependent variables are limited dependent variables, which would require special statistical techniques (see Maddala, 1983). However, no "limit values", that is zeroes (minimum values) or the maximum values, were present. Hence, the only requirement for a dependent variable that can only assume positive values is to postulate a log-normal distribution. Consequently, a logarithmic transformation was performed in both sets of dependent variables (for statistical reasons).

The statistical model for heterogeneity has another constraint. In order to linearize the relationship between heterogeneity and the dependent variable, a logarithmic transformation was performed on heterogeneity. This transformation is in accord to Rytina's (1982) specification of a similar model based on substantive reasons.

The resulting model to test for effects of heterogeneity, that is hypotheses 1 and 2, and its consolidation (hypothesis 8) has the following functional form:

$$\log (OUT/IN)_i = b_1 \log H_i + b_2 \, Cons_{nom(i)} + b_3 \, Cons_{np(i)} + u$$

Where OUT is the number of out ties, IN is the number of in-ties, H is heterogeneity, Cons(nom) is a measure of the consolidation among nominal parameters and Cons(np) is a measure of consolidation or intersection among nominal and graduated parameters and i is the nominal parameter under consideration.

The measures of consolidation and intersection are identical to the ones used by Blau et al. (1982; 1984; and Schwartz, 1984) and by Blum (1984). Namely, bivariate correlations based on Pearson's product-moment, Phi, Cramer's V, and Eta are calculated for the parameter under consideration and all the others in relation to it, and their mean is the resulting measure of consolidation.

The only departure with respect to these authors is that two separate measures are introduced for each of hte different types of parameters, so as to be able to perform some test of Hypothesis 8.

A reliability test based on Cronbach's alpha (Cronbach, 1959; Nunally, 1979) was performed, and if dropping one variable increased the value of alpha, the item (correlation) was dropped (see also Blau and Schwartz, 1984). The resulting components of these multiple intersection indexes and their respective alphas are listed in Appendix IV.

A second statistical model is used to test the hypotheses concerning inequality (hypotheses 9 to 14), with the following specification:

$$\log G_{r(i)} = b_1 G_i + b_2 Cons_i + b_3 Cons_{nom(i)} + u$$

Where G(r) is the relational Gini index above described, G is the Gini index, Cons is a similar measure of consolidation for graduated parameters based on the average of Pearson's correlation coefficients, Cons(nom) is a measure of multiple intersection for graduated and nominal parameters and (i) is the graduated parameter under consideration.

Both statistical models were tested for heteroscedasticity by White's (1980) test and visual inspection of residuals[21]. Since no heteroscedasticity was detected both models were estimated with OLS (ordinary least squares) regression.

CHAPTER 5

FINDINGS AND DISCUSSION

Findings

The results of the regression models are presented in this chapter, following the order in which hypotheses were formulated.

Before proceeding any further, the reader should be reminded that the regressions are performed with 12 cases. Therefore, for the present purposes no stringent demands on levels of significance will be required from the regression coefficients. However, in order to draw some distinctions in the interpretation of the coefficients, four broad ranges of significance levels are determined and shown in the tables. These levels are: those that are plainly significant for the number of cases or significant at $P < .05$, those that are significant between $P > .05$ and $P < .1$, which for the number of cases is considered here to be a fairly acceptable level, those that are between $P > .1$ and $P < .3$ and those that are plainly not significant, above $P > .3$. Those results that are only significant at the latter level are not always presented. As a visual aid, the more asterisks used, the less significant is the value of the coefficient.

The reader should also be reminded that both statistical models used and introduced in the previous chapter are non-linear (or curvilinear) when the relationship is stated in the original units (before the logarithmic transformations).

Results for the regressions that test the effects of heterogeneity on the rate of out-ties are shown in Table 1.

As can be seen there are two possible interpretations of the results.

If no attention whatsoever is paid to levels of significance, the effects of heterogeneity along the nominal parameters are contrary to the effects expected from hypotheses 1 and 2. That is, in those interorganizational networks where there is higher heterogeneity of groups of organizations based on whether they are public or private or based on the kind of activity practiced or social service delivered (Primary mental health, secondary mental health or no mental health), the rate of intergroup association is lower than in those less heterogeneous networks.

The alternative interpretation, a more logical and correct one, is that there is no effect whatsoever of heterogeneity on the rate of outgroup associations. Indeed, not only the significance levels but the null or very low adjusted R squares support this interpretation.

TABLE 1

EFFECTS OF HETEROGENEITY ALONG NOMINAL PARAMETERS PUBLIC-/PRIVATE AND TYPE OF ACTIVITY ON TWO EXCHANGE DIMENSIONS

HYPOTHESIS NUM.	HETEROGENEITY ALONG PARAMETER	EXCHANGE DIMENSION: INFORMATION $\hat{b}$	R^2	AdR^2	COOPERATION $\hat{b}$	R^2	AdR^2
1	Public/Private	-.61***	.21	.0	-.72***	.44	.23
2	Type of Activity	-.78***	.07	.0	-.46***	.37	.09

AdR^2 = Adjusted R^2
*** b value is not significant even at P<= .30

Many alternative ad hoc explanations could be attempted in view of these unexpected results.

A first explanation could be that, given the fact that the theory is being applied to complex organizations and not to associations among people, the predictions of the theory are not applicable. Two sets of reasons seem to counterbalance the validity of this argument in the present context.

First, similar findings (and lower R squares) have been reported for individual level data, as is the case with extremely salient characteristics, such as race (Blau and Schwartz, 1984). Second, and more important, the two discussions of the relationships between salience, heterogeneity and outgroup relations that were previously reported (Rytina, 1980; Skvoretz, 1983) suggest that the effects of heterogeneity are more complex than those Blau suggests. Indeed, Rytina (1980) shows formally in a model that the effects of heterogeneity are practically unimportant in comparison with those of salience. As already mentioned, in his bias net model Skvoretz (1983) has shown the complex paradoxes that can be created depending on the type of bias that exists. Indeed, the reason the dependent variable was operationalized the way it was (as the ratio of outgroup to ingroup relations) was precisely to control for the relative vs. the absolute effects of outgroup associations vis a vis ingroup associations.

This distinction, as remarked earlier, seems to be at the core of these complex effects. The results shown in Table 1, in the context of the results to be shown subsequently, tend to support in an informal way the argument that heterogeneity is relatively unimportant in comparison with salience (Rytina, 1980) in the determination of the rates of association.

They also tend to show that the type of bias is critical in the determination of the effects of heterogeneity, as Skvoretz (1983) has shown. As a mere example, the mean ratio out-ties/in-ties is shown for the two dimensions of exchange, for the two parameters in Table 2.

TABLE 2

RATIO OF OUT TO IN TIES FOR THE GROUPS ALONG THE NOMINAL PARAMETERS FOR TWO EXCHANGE DIMENSIONS

NOMINAL PARAMETER	EXCHANGE DIMENSION INFORMATION Ratio Out/In	COOPERATION Ratio Out/In	MEAN and S.D. for N in Subcategory
Public/Private	.75	.83	{ 31 (5.57) 24 (4.89)
Type of Activity	.68	.75	{ 11 (4.19) 12 (3.40) 17 (4.05)

It is suggestive that the dimension with the highest R square in Table 1, cooperation along the parameter public-private, is the one that presents a clearer bias in favor of in-ties. Inspection of the individual cases would show that this is true, however, in only 9 out of 12 cases.

It is also suggestive that when these cases are sorted out, the effects of heterogeneity become positive (results not shown). Clearly everything is suggestive but not conclusive because of significance levels and the number of cases.

The problems raised by the complex relationships between heterogeneity and salience are increased as a result of testing predictions that are dynamic or longitudinal with synchronic or cross-sectional data. This problem is not only due to the doubtless possibility of determining an equibilibrium state -a priori- but also due to the fact that different trajectories of the relationship among variables may not be properly reflected in a cross-section. Specifically in relation to the issue of heterogeneity and salience, Rytina (1980) argues that:

> "in diachronic comparisons of the state of a single population, to the extent that increases in heterogeneity are not accompanied by increases in salience, cross category contact should increase. But in synchronic comparisons of different populations, the key issue is probably the initial salience, and not the degree to which differentiation has progressed"

And one should add: if, in fact, the parameter is significantly salient[22].

The results of the tests for hypotheses 3 through 7, are shown in Table 3. Inspection of the signs of the b's shows that for both dimensions of exchange, along every parameter (with the exception of budget size), the effects of status diversity are the predicted ones. One b coefficient for power status diversity (for cooperation) poses some

TABLE 3

EFFECTS OF STATUS DIVERSITY ALONG ALL GRADUATED PARAMETERS ON TWO EXCHANGE DIMENSIONS

HYPOTHESIS NUM.	STATUS DIVERSITY ALONG PARAMETER	EXCHANGE DIMENSION: INFORMATION $\hat{b}$	R^2	AdR^2	COOPERATION $\hat{b}$	R^2	AdR^2
3	Size	.90	.56	.46	1.33	.71	.64
4	Budget Size	-.43***	.30	.15	-.15***	.39	.25
5	Power	1.33*	.35	.20	1.48**	.44	.32
6	Influence	1.61	.42	.30	1.96	.67	.60
7	Prestige	.96	.75	.69	.80*	.64	.56

AdR^2 = Adjusted R^2
* Significance between P=.05 and P=.10
** Significance between P=.11 and P=.3
*** Value is not significant even at P<= .3

significance level problems and both coefficients for budget size status diversity are simply not significant.

Hence, those coefficients that show a sign contrary to the expected one, are not significantly different from zero (or a positive value, for that matter). Further, and in logical relationship to this, the R squares are the lowest, in comparison with the other ones along the same dimension of exchange.

The positive and expected results for status diversity, while not necessarily contradicting the previous interpretation of the findings, call for a comparison. Heterogeneity and status diversity are not identical concepts in Blau's conceptualization but their predicted effects are the same. These findings would tend to support the argument that the effects of heterogeneity and status diversity are different.

In fact, there are theoretical reasons to expect this to be the case. In their most recent work on inequality Fararo and Skvoretz (1984), while primarily concerned with other issues, show that for the case of graduated parameters the effects of inequality on the status distance among associates are independent of whether there is an inbreeding bias or an outbreeding bias. This is also the case when strata are distinguished, and these strata are equal-interval strata, as is the case in the present research. The results shown in Table 3 tend to analogously extend these results, as one would expect, to the rates of outgroup association.

This conclusion appears, after the fact, as logical, to the extent that the categories or strata, (status groups as Blau calls them), are based on equal intervals and consequently reproduce, albeit in an aggregate way, the distribution of the graduated parameter that underlies them. Nonetheless, this point has not been noted in the theoretical literature. As to empirical findings, the results are similar to those reported by Rytina (1982) at the individual level.

Before proceeding to show the results of the tests of hypotheses 8 and 9, results for hypotheses 10 to 14 will be shown.

As table 4 shows, the tests of the effects of overall relative inequality on the status distance of associates are, in general, the paradoxical ones predicted in hypotheses 10 to 14. That is, the greater the relative inequality in each of the networks considered along all graduated parameters (except for budget), the greater is the relative inequality in each exchange dimension in terms of the status distance along graduated parameters among those organizations that actually interact with each other. The findings are generally consistent and significant, with the exception of the results for budget.

TABLE 4

EFFECTS OF INEQUALITY ALONG GRADUATED PARAMETERS ON TWO EXCHANGE DIMENSIONS

HYPOTHESIS NUM.	INEQUALITY ALONG PARAMETER	EXCHANGE DIMENSION: INFORMATION $\hat{b}$	R^2	AdR^2	COOPERATION $\hat{b}$	R^2	AdR^2
10	Size	2.37	.67	.55	2.17	.49	.30
11	Budget Size	-3.16**	.46	.26	-2.39**	.49	.29
12	Power	5.27	.55	.38	4.54	.63	.49
13	Influence	.96	.96	.94	.60**	.42	.27
14	Prestige	.70	.71	.61	.56*	.40	.18

AdR^2 = Adjusted R^2
* Significance between P=.05 and P=.10
** Significance between P=.11 and P=.3

These coefficients with negative signs, however, are the least significant among all the regression models listed in table 4. Indeed, if one is to be faithful to the most commonly accepted levels of significance, the findings are not significant (P=.11 and P=.24, repectively). The R squares are also the lowest, in comparison to the other regressions within the respective exchange dimension. On the other hand, given the number of cases (12), standard levels could be left aside, and the results would be contradictory with hypothesis 11.

An empirical reason may account for this. The rate of non-response is significantly higher for the variable budget in comparison with the other ones (see Appendix I). If this is not the case and, consequently, in the sheer realm of speculation, it could be that the processes that lead to the positive results on the other parameters (size, power, prestige) do not take place when budget is considered. I will return to this issue later.

The other rather unexpected result shown in Table 4 is the extremely high R square for the effects of inequality of influence on the status distance along influence among associates. There is no peculiarity either on the original survey data or in the results from the indexes calculated that could account for this. Notice that the differences in R squares and significance levels of the coefficients between the model for cooperation and the model for information is inconsistent with the overall picture of relative consistency among R squares and b values for the other parameters.

Hypothesis 8, which states that the effects of the low consolidation or high intersection of nominal parameters would increase the rate of associations among groups, was tested, as already shown, in the same regression model whose R squares were shown in Table 1. Notice that the test of this hypothesis is not identical to those reported up to now.

The hypothesis, when operationalized, states that the lower the correlation between the nominal parameters public/private and type of activity, the higher will be the rate of out to in group associations, with the correlation of the nominal and the graduated parameters controlled.

Notice, however, that the test must control also for the heterogeneities of the respective parameters. Again, with 12 cases, the test that was chosen for this hypothesis, as well as for hypothesis 9, was a convergent one. Since no two heterogeneities (much the less more) could be controlled at the same time and only one relevant rate of out to in group ties could be a dependent variable in a regression model.

Results of the four regressions for the two nominal parameters -public/private and type of activity- and the two exchange dimensions -information and cooperation-, would at least indicate the direction of the relationship. The results of these regressions all present the expected signs but they are not at all significant (only at levels such as

P=.668 or more). Consequently the values are not shown.

The results of a similar type of test for hypothesis 9 are shown in Table 5.

Hypothesis 9, in its operational form, states that the higher the negative correlations between graduated parameters the higher the rates of out to in group ties, or otherwise stated, the higher the relative distance among associates. The hypothesis refers to negative correlations, which conceptually is the concept of intersection. This concept is, in turn, the opposite of consolidation, which is measured by positive correlations. Since there was no average negative correlation, that is, all graduated parameters tend to be consolidated in the present data set, the hypothesis was reformulated as follows: the higher the positive correlations among graduated parameters, the lower the status distance among associates.

While not all coefficients are significant, all (except for those for budget), show a positive sign, contrary to the prediction. In fact, all those that have a higher statistical significance fail to confirm the hypothesis.

These findings are contrary to what Blau and colleagues (Blau et al., 1984; Blau and Schwartz, 1984) have found at the individual level. None of the previous tests has actua

TABLE 5

EFFECTS OF MULTIPLE CONSOLIDATION OF GRADUATED PARAMETERS, WITH INTERSECTION OF NOMINAL PARAMETERS CONTROLLED, ON TWO EXCHANGE DIMENSIONS

HYPOTHESIS NUM.	CONSOLIDATION ALONG PARAMETER	EXCHANGE DIMENSION: INFORMATION $\hat{b}$	R^2	AdR^2	COOPERATION $\hat{b}$	R^2	AdR^2
9	Size	.37***	.67	.55	.15***	.49	.30
9	Budget Size	-.53***	.46	.26	-.49***	.49	.29
9	Power	1.96**	.55	.38	1.93*	.63	.49
9	Influence	.17***	.96	.94	1.20***	.42	.27
9	Prestige	.35***	.71	.61	.98**	.40	.18

AdR^2 = Adjusted R^2
* Significance between P=.05 and P=.10
** Significance between P=.11 and P=.3
*** Not even significant at P<=.3

lly controlled for the different effects of intersection of nominal and graduated parameters and consolidation of graduated parameters. But this does not seem to be an explanation because those coefficients also show a positive effect (not shown). Hence, the more consolidated the graduated parameters are with nominal parameters, the higher the relational inequality. However, these findings, irrespective of significance levels, are all logically consistent among themselves.

They may suggest, in light of the findings by Blau and collaborators that the effects of consolidation of parameters are different for negatively connected networks, and for positively connected networks or for mixed types (Cook, 1977; Cook et al., 1983). Marriage networks, as those employed by Blau, are "typically negatively connected networks throughout" (Cook et al., 1983: 278). That is, if someone is involved in a marriage exchange relationship, at least in the Western culture, he or she does not have another. The interorganizational networks employed in the present work are not of that kind.

To summarize the findings, then, it was shown in Table 1 that the expected results for heterogeneity, (that is, an increase in the degree of out-ties to other organizations) were not supported. Hypotheses 3 to 7, instead, were supported by the results shown in Table 3. Consequently, it was suugested that status diversity and heterogeneity have, contrary to what is suggested by Blau (1977) different effects.

Increasing status diversity generates, indeed, an increase in the degree of out-ties to other organizations. A suggested interpretation of the differential effect is based on the different effects that the concept of salience and those of in or outbreeding biases have with respect to heterogeneity and status diversity and inequality. In the case of status diversity whether there is an inbreeding or an outbreeding bias is irrelevant, while this is not the case for heterogeneity. A similar process, albeit not that clear, occurs with respect to the effects of salience.

Inequality was the object of hypotheses 10 to 14. The results, shown in Table 4, with the exception of those for budget, support the expected relationship, at least following the most recent version (Blau and Schwartz, 1984).

Hypothesis 8, that predicts the effects of intersecting nominal parameters, was rejected or, at best, not confirmed. Hypothesis 9, that predicts the effects of consolidation among graduated parameters was tentatively not confirmed. The validity of this last test, however, is not high due to the statistical significance of the findings and the convergent way in which the hypothesis was tested.

Discussion

How, if in any way, are these findings related to the literature on interorganizational networks ? The results for heterogeneity show that its change does not seem to have the expected effects. Hence, when heterogeneity along the parameters public/private and type of activity increases, the rate of out-group associations does not increase. This is true, at least, with the present cross-sectional data. Notice that the increase in heterogeneity is exclusively due, given the measure and the distinctions employed, to a "balancing" of the sizes of sub-groups. The number of categories in this test (and all others up till now, for that matter) remains constant. It is always Public/Private or Primary Mental Health, Secondary Mental Health and No Mental Health. The real process of differentiation among organizations, as that for individuals evolves in a way in which not only the relative proportions get balanced or umbalanced, but in which the number of categories increases or is decreases.

The most important finding of the preceding section, however, is the one that confirms the hypotheses that the greater the relative inequality along a graduated parameter, the greater is the average status distance among the interacting organizations (along that parameter). The findings are startling and counter-intuitive, i.e. to the extent that the relationship has been denominated by Blau and Schwartz (1984) the "paradox of inequality". In what follows I will show that this paradox is not only relevant for understanding interorganizational relations but also not new, if seen from another point of view. In order to do so, however, some of the properties and characteristics of the Gini index have to be considered.

The formula presented in the previous chapter for the Gini coefficient is the one presented by Allison (1978):

$$G = \frac{\sum_{i=1}^{n} \left(\sum_{j=1}^{n} \left| S(i) - S(j) \right| \right)}{2 \bar{S} n^2}$$

The formula introduced in this work to measure relational inequality was an extension to multiple ties of the formula employed by Blau and Schwartz (1984) to measure relational inequality in marriages (one tie):

$$G_{rel} = \frac{\sum_{i=1}^{n} \left[\left(\sum_{j=1}^{k} \left| S(i) - S(j) \right| \right) / k \right]}{2 \, S \, \bar{n}}$$

The only significant difference between this formula and the one used by the above mentioned authors (and also by Fararo and Skvoretz, 1984) is that n, that is, the number of actors and not the number of ties (marriages) is in the formula. Actually this difference has no consequence whatsoever in the present context because both are constants and the following arguments are totally applicable.

The second formula, if applied to a totally connected network, that is a network where everybody is tied with everybody else, becomes identical to the first formula[23]. A totally connected network, as the one described, is what could be called the maximum potential network that can occur[24].

Consequently, the above noted equality, indicates that Blau's paradox of inequality can be phrased in a different way. That is, the greater the relative inequality of the potential network, the grater the actual inequality of the network. Or otherwise, the greater the potential relational inequality that the system can have, the greater the actual relational inequality attained. Phrased this way, some of the paradoxical properties are washed away. This, of course, implies seeing a community or a population in a relational way.

Expanding even further this relational interpretation of the Gini coefficient, it can be shown (Ray and Singer,

1973) that the Gini coefficient can be expressed in terms of proportions as:

$$1 - (2 / N \sum iP(i)) - 1/ N$$

Where N is the number of actors, i is the rank and P(i) is the proportion in rank (i). Hence, the Gini index is a function of the rank share products (iP(i)). All of which implies that the Gini is extremely similar to any other index of concentration (Taagepera and Ray, 1977; Allison, 1978; Theil, 1967). Indexes of concentration are all inter-related in one way or another (Taagepera and Ray, 1977) and they are in the last resort, always measures of complexity. The Gini coefficient measures what one could call a ranked complexity. However, as argued in Chapter 2, all complexity, if it is not redundancy, is ranked, whether in a more diffuse or a clearer way.

Hence, the paradox of inequality can now be stated as: the greater the complexity of the potential network, the greater the complexity of the actual network. Or if the reader wishes, in a way that is well known in many areas related to systems theory and particularly in the field of interorganizational networks, the greater the complexity of the environment, the greater the complexity of the interorganizational network.

I hope I have shown through this lengthy chain the connection that there exists between Blau's paradox of inequality and some of the earliest formulations of the open systems approach to organizations (e.g. Emery and Trist, 1965). Granted, the units and levels of analysis are different but paraphrasing Emery and Trist, one could state the paradox of inequality as the more turbulent the potential network, or the environment, the more turbulent is the actual network or the interorganizational field (Warren, 1967). The difference is that Blau's approach provides a more formalized and systemic approach than these other somewhat typological frameworks.

In fact, if seen in this context, the present research is the only study that has tested this sort of proposition in a systemic or global way, at a macro level. Consequently, it is extremely difficult to compare results. Besides, the majority of those other studies that have looked at the interorganizational level in a global way, as whole networks, usually have been descriptive (Galaskiewicz, 1979; Whetten, 1981).

The earlier findings, however, have not been necessarily contradictory. It was found, for example, that corporate interlock networks may evolve recruiting relatively more or less popular organizations to new boards (Galaskiewicz and Wasserman, 1981). No measure of the overall inequality in the network was performed but it could well have been the case that it increased. Indeed, at the interorganizational level, the paradox of inequality does not seem to be as counter-intuitive, to judge from the theoretical literature on exchange relations among organizations (Benson, 1975; Levine and White, 1971) as it seems to be for individual level interaction. Indeed, the notion that in order to secure their boundaries and ensure their own survival in a competitive environment organizations will use their resources to establish exchange relationships with other organizations (Levine and White, 1961; Galaskiewicz, 1979) is akin to the fact that graduated parameters are based on resources.

Besides, as shown when the propositions on status diversity were confirmed, the predictions do not imply that out-group or more distant associations predominate over in-group or less distant associations. The more inequality, the higher is the distance among associates, relative to the previous inequality. This does not mean that social heterophily predominates over social homophily. Hence, the findings are also consistent with the systems theory literature on loosely coupled systems. Indeed, in a very general sense, the argument that systems respond to the complexity of their environments by increasing their complexity while at the same time they are loosely coupled and hierarchically organized, is what is expressed in the relationship between social homophily with its in-ties and social heterophily with its out-ties[25].

Integration and cooperation among organizations have been obsessive preoccupations in all kinds of interorganizational literature (Tuite et al., 1972; Turk, 1970; Whetten, 1981). To the extent that the present findings confirm the hypothesis that increasing inequality increases the relative relational inequality, increasing inequality along graduated parameters would increase the probability of integration. I only say the probability of integration because a proper concept of integration should be based on density (Rytina and Morgan, 1982) and not just the distance among associates.

Notwithstanding this, as a matter of fact, inequality along graduated parameters increases the status distance among organizations that cooperate and exchange information with one another (although not necessarily reciprocate since it was forced in the data). If voluntary cooperation among different organizations depends on structural opportunities (Whetten, 1981), then inequality should promote the probability of voluntary cooperation. But it could also promote conflict, since it provides the structural opportunity for conflict to occur.

Cooperation and conflict would not constitute in this case a "zero sum game". More complexity could increase at the same time, the amount of cooperation and the amount of conflict. This would be consistent with earlier studies that have suggested that more complexity leads to more conflict that, in turn, would be solved by this same complexity (Coleman, 1957).

In any event, the findings are generally supportive of an extension of Blau's theory to the interorganizational level, showing that some structural process are similar at different levels of social organization. In particular, the structure of opportunity and constraints affects organizations as well as individuals. This is a truism for structural analysis, but all too often forgotten by researchers and theorists.

If nothing else, this dissertation should sensitize those who study interorganizational relations, as to the effects of the structure of opportunities and constraints that have a substantial effect on the characteristics of the actual pattern of connectedness in the network, and that has to be taken into account together with other variables.

SUMMARY AND CONCLUSIONS

Social organization presents different hierarchical levels. One of these levels of social structure is the interorganizational level.

The purpose of the present dissertation was to extend and test Blau's macro-structural theory at the interorganizational level. There is no agreement in the literature as to what theory should be employed to explain interorganizational behavior. The main theoretical approaches are: the political economy, the resource dependence, and the population ecology. In Chapter I it was shown that they all respond to at least a vague logic of conceptualizing organizations as purposive actors. Network models and techniques employed for their analysis were also reviewed, arguing that, in general, they do not allow the researcher to determine whether the observed relationships are random or not.

At the theoretical level, the notion of the organization as a purposive actor is an extension of the way much of sociology has seen individual action. There is no reason then, to assume -*a priori*- that Blau's theory is not applicable at the interoganizational level. Further, in so doing, a testable macro theory of interorganizational networks is available.

Blau's theory was introduced with its major axioms and theorems. The effects of heterogeneity, or the distribution of a population among many groups along a nominal parameter, were reviewed. The similar effects of inequality, or the distribution of a population along a graduated parameter, were also reviewed; as well as the effects of the intersection and consolidation among nominal and graduated parameters. Some of the major limitations of the theory were introduced in Chapter 2, in the context of its application to the organizational level of analysis.

Major findings tended to generally support Blau's theory with respect to the predictions on inequality but failed to confirm predictions with respect to heterogeneity. Consequently, in this cross-section of twelve Midwestern interorganizational networks, an increase in heterogeneity does not have a positive effect on the rate of out-group associations but an increase in relative inequality does increase the relative status distance among associates.

The lack of an effect of heterogeneity was interpreted to be the result of the complex relationships that exist between heterogeneity and salience of a parameter. The paradoxical effects of inequality were shown to be less paradoxical if the Gini coefficient is interpreted in a structural or relational way. In fact, these effects were shown to be very similar to the effects of well known statements from systems theory: the higher the complexity of the environment, the higher the complexity of a system. In so doing Blau's theory was again related to theories of interorganizational relations and open system theories of organizational behavior, as well as to the typical preoccupations of those theories: coordination and conflict.

The present research presents advantages and limitations. It probably raises more issues than it settles. For the first time Blau's theory is tested at the interorganizational level. For the first time, multiple ties in actual social networks are used as the dependent variables. In order to do so, a new technique that determines the randomness of the ties is used (in this way) for the first time with actual data.

Also, for the first time, structural measurement of variables such as power, influence and prestige is introduced. In fact, for the first time those variables that are mentioned in Blau's theory as typical cases of graduated parameters, are introduced as such in a test. For the first time also, a macro-structural theory is tested and offered as an explanation of interorganizational behavior and tested using twelve interorganizational networks.

Pioneering has its costs, however. Cross-sectional data is used to test propositions that refer to dynamic processes or dyachronic relationships. There are neither logical nor methodological reasons to expect that the results from a cross-section are generalizable to a longitudinal relationship. However, it is not the first time that this is done in sociology and it constitutes, anyway, a first approximation to a more valid test. The fact that major findings show the expected relationships calls then, for better tests.

In my opinion, the most significant problem encountered in this research, from an empirical point of view, relates to the number of cases. There are no studies in the literature that have 12 interorganizational networks as data but, still, the number of cases is very small. An attempt was made to solve that problem by means of offering a replication, using two different exchange dimensions as dependent variables. This practice somewhat improved the robustness of the findings but not the validity, as measured by statistical significance. Nonetheless some very relevant findings, such as those related to the effects of inequality were found to be statistically significant at standard levels of acceptance. Besides, the limited number of cases allowed a careful examination of the data.

The number of cases was crucial, however, in the limitations imposed on the number of variables that could be included in the regressions performed to test the results.

In this respect the tautologies involved in Blau's theory compel the researcher to be extremely careful with the statistical specification, so as not to end regressing two different mathematical (linear) transformations of the same variable. The task is even more difficult because the relationship between salience and heterogenity is not formally specified. Some formalizations that have been attempted were reviewed but they are still preliminary, and have not been tested. Unfortunately, given the data limitations mentioned above, these formalizations could not be tested here. They provided guidance but could not even offer much help in measurement issues because their assumptions, such as the equal bias in the biased net formalization, are not met in the present data. Further, proper measurement of concepts of salience or even average out-ties involves complexities that have not been dealt with in this research, nor in any empirical research performed until now for that matter (e.g. Blau and Schwartz, 1984).

At the theoretical level then, this calls for further work on the specification of relationships between the concepts of salience, heterogeneity and bias.

Some other findings in the present research, while not always statistically significant, call for further research and suggest theoretical elaboration. Budget size was a parameter whose effects were systematically different from all the other graduated parameters. Future research should examine this issue in more detail, as well as a related one,namely, what are the relationships of precedence among parameters ?

Contradictory findings between the present research and previous one as to the effects of the consolidation of parameters, call for further tests on the type of connectivity that predominates in the network. Networks with multiple ties tend not to be negatively connected, as marriage or dating networks are and this fact may have significant consequences. Unfortunately, the present findings are not conclusive because it is not only the case that different types of exchange connections are considered here but alos different levels of social organization. Network theorists and researchers could explore these differences, whether at the individual level or at the interorganizational level. Mergers between organizations are very much like marriages.

The findings provide general support for the statement that similar structural processes take place at different levels of social organization. This should call the attention of researchers in the field of interorganizational relations. And even of those working in the applied field. For researchers, this study should act as a reminder that structural processes take place in the interorganizational structure. While the differences between different structural approaches, such as the purposive actor orientation and the more teleological system oriented approaches have not been solved, research on interorganizational relations has predominantly paid attention to the purposive actor perspective. Blau's theory, as was argued in Chapter 2, is not teleologically oriented and offers a good opportunity for theoretical work trying to explain the processes that lead to the differential effects of parameters and other processes.

At the empirical level these findings call for more multi-level research to explain interorganizational relations. Research of that kind should be able to determine if, in fact, the structural processes found in the present work take place when other contexts are taken into account.

For those in the applied areas of interorganizational relations, the present findings call attention to the possible importance of ranked differentiation in the generation of opportunities for cooperation. These opportunities could also promote conflict, and more research is needed on the topic, but if structural opportunities are not provided ties will not develop. Mandated legal networks and budget networks sometimes tend to create structurally equivalent organizational actors. They may actually be increasing the tendency of similar organizations to interact with one another, generating some kind of local social closure, instead of promoting integration or cooperation.

Huxley wrote somewhere that what an individual becomes depends on what he inherits, what his circumstance has done to him, and what he chooses to do with his inheritance and his circumstance. As sociologists we should know that Huxley's "circumstance" is constituted by the set of socially structured alternatives. These alternatives, be it for individuals or for organizations, are dependent, among other things, on the distribution of attributes and resources in their populations and, in turn, how these populations are distributed along the parameters created by these resources.

NOTES

(1) But see Eisenstadt's argument that Weber anticipated and went beyond Levi-Strauss (1981).

(2) I am using the dichotomy British social anthropology vs. French structuralism to characterize the epistemological distinction as to whether social structure is assumed to be real (referring to actual social relations in society), or whether social structure is a system of logical relations imposed externally and a priori by the researcher. The latter is Levi-Strauss' notion (1963).

(3) Although not even service organizations in urban centers are totally exempt of the effects of spatial proximity as facilitator of interorganizational relations; see Boje and Whetten (1981).

(4)In sociology there have been some attempts to merge population ecology models with decision making models such as Olson's (1965) (Nielsen, 1978); more relevant to the point in case, however, seems to be the tradition led by J. Maynard Smith (1982) that explains evolution in terms of the theory of games. This approach has been considered by Dawkins (1976) to be one of the most important advances in evolutionary theory since Darwin.

(5) Which do not have to be partitions as Simon (1981) suggests-see Atkin (1981).

(6) This is not, of course, a simple issue and is very much related to the agency problem in microeconomics and contractual law and,in particular, to the "theory of the organ" in public and constitutional law, in which Jellinek - an intelectual father of Weber- has played a major role. However, "corporate actors" can be defined as a formally constituted and recognized grouping of individual actors, which may be treated as possessing superordinate goals, objectives, or purposesthat organize the contributions of persons to the corporate enterprise and direct the interests of the corporate actor vis-a-vis other corporate actors and persons (cf. Coleman, 1974; Laumann et al.; 1978).

(7) Blau's "emergence" is very similar to Boudon's: "an emergent effect is ...an effect which is not explicitly sought by the agents of a system and which results of their position of interdependence ...the interdependent system creates here an effect of 'overshooting ' " (1979: 59)

(8) Notice that these notions of position and role are related to Simmel's notions of human types (Levine, 1971). Blau's notion of position is such that the relational nature of positions and not exclusively the normative aspects are taken into account. In this sense the notion is similar to Nadel's (1957). His notion, however, is significantly different from an attempt to operationalize Nadel's concept, namely the structural equivalence approach (Lorraine and White, 1971; White, Boorman, and Breiger, 1976) because the latter considers useless the categorical approaches (normative?) to the notion of role (White et. al, 1976). This approach, however, establishes positions but not roles and it is population-specific (Winship and Mandel, 1984).

(9) Notice that the sign of the correlation is not relevant for nominal parameters because there is no meaningful ordering.

(10) Originally Blau (1977) had stated the opposite effect, that is that inequality reduces the likelihood of association between status-distant persons. Blau explains himself: "The original reasoning was that because status distance inhbibits associations-by assumption (which is empirically supported)- and because inequality is defined in terms of average status-distance, a plausible inference is that mean status-distance, just as status distance, has the effect of discouraging associations. But this argument looks at associations completely from the stand point of the individual and ignores the constraints the social structure imposes on the individual's choices of associates. Just as an increase in heterogeneity makes it more likely that chance encounters involve persons of different groups, an increase in inequality makes it more likely that chance encounters involves persons whose status is further apart" (Blau and Schwartz, 1984:15).
Actually I must say that the original statement had to be very unclear, as Blau himself admits, because I had interpreted it to say what the current phrasing says; and Skvoretz and Fararo (n/d) did too.

(11) Actually integration should be measured by density and

not by the mere relation of out-ties to in-ties (see Rytina, 1980)

(12) As Skvoretz (1983) notes, the absence of the treatment of this type of orientation towards outgroup relations may be due to the fact that Blau is concerned in explaining integration of a differentiated society. With outgroup orientations or "outbreeding" the issue does not pose major problems.

(13) Actually Marsden introduces an interesting distinction between nominal and graduated parameters that basically implies that there is an equal bias for all the outgroups in the case of nominal parameters and a differential one (based on social distance) for graduated parameters. His empirical example for occupation as a graduated parameter is faulty, however, since occupational correlates, i.e. income, prestige, etc., should be controlled in order to determine appropriately if occupation should be conceptualized as a graduated parameter.

(14) Mohr (1971) and the Aston group (Pugh et al.,1968; 1969; Ikson et al., 1971: Child, 1972) seem to be the only studies that contradict the assertion on the relevance of technology. Mohr, however, seems to confound systems of control with participativeness in decision making. Aldrich (1972) has persuasively argued on the questionable validity of the findings of the Aston group on technology. For a recent study on the effects of size and technology, see, for example, Marsh and Mammari (1981).

(15) These are types of measures. Many other actual measures exist. For reviews and examples see Burt (1982); Knoke and Burt (1983); Freeman (1977; 1979) and Mizruchi and Bunting (1981).

(16) A connection is negative if exchange in one relation is contingent on nonexchange in the other (Cook et al., 1983)

(17) This measure is not only appropriate because it determines the potential for control but because it can be calculated on sparse networks as opopssed to the distance based measures (Freeman, 1979)

(18) A geodesic from i to j is a path from i to j of minimum length, where length is the number of lines (see Harary, Norman and Cartwright (1965)

(19) Freeman (1977) has shown that this is the maximum

value that the central node can attain (see also Knoke and Kuklinski, 1982).

(20) The original version of Structure (version 2) calculates prominence only for symmetric matrices. Structure (version 3) attempts to calculate it for asymmetric matrices too. Structure (version 3) could not be implemented in the system, but the algorithms were implemented in Version 2. The program uses at the same time, the mathematical routines EISPACK and IMSL. The changes to Structure are available upon request.

(21) White's test is based on aregression that fits the residuals and the product of nR square. However, since the number of cases is small, visual inspection was also employed.

(22) The salience of the parameters in this study is consistently shown by a host of rates that relate densities that are produced as output of the computer program included in Appendix III; and as the result of earlier computer runs performed by Patterson A. Terry that looked at segregation indexes in the vein of Freeman (1978). The reason not one single straight forward index of salience could be used was that as Rytina (1980) has already noted, real data is very different from models. In this set of data there is practically always a different salience for each subcategory, for each dimension of exchange, for each city. But, to increase the problem, each subcategory has different saliences for the respective subcategories. This means that there are about N(N-1) saliences, with N being the number of subcategories, for each dimension along each parameter, in each city.

(23) If the reader requires assistance in the algebraic manipulation, notice that when every body is tied with everybody, the k in the formula for the relational Gini becomes n (or n-1) and becomes a constant that can be "taken out" of the sum. Since it is dividing, the denominator has now an n square term and becomes identical to the general formula for the Gini coefficient.

(24) I am using here by analogy terminology from Willer and Anderson (1982).

(25) At a merely speculative level it is worhtwhile to mention the unexpected findings with respect to budget. The results were not always statistically significant but they were consistent. Galaskiewicz (1979) in one of those few pieces of research somewhat relevant for the present

discussion, found that the network of exchange that dealt with money was the most important one. Further, he also showed that four blocks of organizations could be distinguished in the community under study. One of them was the block of social services. What has been called the potential network here is at best a subset of this block. Budgets, though, among public social service organizations (and those private based on grants) are generally allocated by processes that are partially external to what is considered to be the potential network in the present research. It could well be that the processes of inequality along the parameter budget that determine the structure of opportunities and constraints for these organizations are to be searched in a broader network. Of course, in the context of the present research none of this speculation is a "fact" nor can it be proven but I consider it worthwhile to engage in such speculations until new research findings become available.

APPENDIX I

PERCENTAGE NONRESPONSE

		Variable						
City	N	1	2	3	4	5	6	7
		%	%	%	%	%	%	%
1	37	0	13.5	5.4	10.8	2.7	2.7	14.5
2	47	2.1	6.4	10.6	4.3	6.4	11.0	15.0
3	38	0	5.3	13.2	5.3	10.5	13.2	18.8
4	38	7.9	7.9	5.3	2.6	13.2	5.3	13.2
5	42	4.3	2.4	11.9	4.8	0	7.2	11.9
6	44	6.8	11.4	9.1	4.5	6.8	11.4	13.7
7	44	0	0	6.8	0	0	6.7	22.7
8	32	18.8	15.6	12.5	21.9	21.9	3.1	12.4
9	41	2.4	9.8	24.4	2.4	0	4.8	12.2
10	31	6.5	6.5	6.5	0	0	0	3.2
11	44	11.4	6.8	27.3	4.5	9.1	2.3	6.8
12	41	14.6	14.6	9.8	9.8	9.8	4.8	12.2

APPENDIX II

QUESTIONS

Which agencies have the most influence over decisions about human services in this community? (WRITE IN ID NUMBER, RECORD ONLY THOSE SPONTANEOUSLY MENTIONED)

Which agencies send people to your agency for services? (WRITE IN ID NUMBER, RECORD ONLY THOSE SPONTANEOUSLY MENTIONED)

Which agencies have the most prestige? (WRITE IN ID NUMBER, RECORD ONLY THOSE SPONTANEOUSLY MENTIONED)

With which agencies do you exchange opinions, information and ideas? (WRITE IN ID NUMBER, RECORD ONLY THOSE SPONTANEOUSLY MENTIONED)

Which agencies does your agency rely on to deliver your own services/programs to clients? (WRITE IN ID NUMBER, RECORD ONLY THOSE SPONTANEOUSLY MENTIONED)

We are interested in knowing about any informal cooperative relationships your agency has with other agencies in this community (HAND YELLOW CARD). This card lists some of the common types of cooperative relationships social services agencies develop on an informal basis. By informal relationships we mean relationships that have no formal basis...that is, there isn't a written agreement or contract, probably very little, if any, money changes hands and most of the problems that arise or changes that are made are worked out by mutual adjustment. Using the list on the yellow card as examples of inter-agency cooperation, please identify any agencies with which your agency works on any sort of informal cooperative basis. (AFTER RESPONDENT IDENTIFIES AGENCIES, PROBE TO REVIEW COMPREHENSIVENESS OF LIST USING TYPES OF RELATIONSHIPS IDENTIFIED ON YELLOW CARD. RECORD ID NUMBERS)

APPENDIX III

COMPUTER PROGRAM EMPLOYED FOR PART OF THE ANALYSIS

The program produces choice and tie-account tables, calculates densities, ratios of densities, segregation indexes for different categories, on the basis of the number of choices and the number of ties (ties have forced reciprocation). A relational Gini coefficient is also calculated. It was written and developed by Patterson A. Terry.

```
      PROGRAM BINOM(OUTPUT,TAPE1,TAPE2,TAPE3,TAPE4)
      IMPLICIT INTEGER(A-Z)
      REAL CHMAT(19,19,2),CHMATX(5,18,2),DMAT(19,19,2),
     1DMATX(5,18,2),PCHMAT(19,19,2),PCHMATX(5,18,2),PMAT
     2(6,19,19,2),RMAT(6,19,19,2),STATUS(48),PRESTAT(48)
      DIMENSION CHRMAT(48),CMAT(18),IMAT(47,47),IRMAT(99),
     1UID(48)
      RESTART=ENDFLG1=ENDFLG2=NCITIES=NSETS=Ø
      NCHAR=5
      NCHP=NCHAR+1
 1    CALL READ1(CITYID1,NCITYID,OCITYID,NCITIES,NCHAR,NCHP,
     1NUID,UID,CHRMAT,CMAT,IRMAT,ENDFLG1,PRESTAT)
      CALL
      READ2(CITYID1,NCITYID,OCITYID,NSETS,NCHAR,NCHP,UID,NUID,
     1ENDFLG1,ENDFLG2,IRMAT,CMAT,CHRMAT)
      DO 2 Z=1,NSETS
      CALL CHSET(CHMAT,CHRMAT,NCHAR,NCHP,NUID,PRESTAT,STATUS,
     1UID)
      CALL PCHDSET(CHMAT,CMAT,DMAT,NCHAR,NCHP,NSETS,NUID,
     1PCHMAT)
      CALL RPSET1(CHMAT,DMAT,NCHAR,NCHP,PCHMAT,PMAT,RMAT)
      CALL RPSET2(CHMAT,CHMATX,DMAT,DMATX,NCHAR,NCHP,PCHMAT,
     1PCHMATX,RMAT)
      CALL RPSET3(CHMAT,CHMATX,DMAT,DMATX,NCHAR,NCHP,PCHMAT,
     1PCHMATX,PMAT)
      CALL WRITE1(CHMAT,CHMATX,CMAT,DMAT,DMATX,NCHAR,NCHP,NUID,
     1 OCITYID,PCHMAT,PCHMATX,STATUS,UID,Z)
 2    CALL WRITE2(NCHAR,NCHP,PMAT,RMAT)
      IF(ENDFLG2.EQ.1)GO TO 999
```

```
      NSETS=Ø
      REWIND 3
      GO TO 1
999   STOP
      END


      SUBROUTINE READ1(CITYID1,NCITYID,OCITYID,NCITIES,NCHAR,
     1NCHP,NUID,UID,CHRMAT,CMAT,IRMAT,ENDFLG1,PRESTAT)
      IMPLICIT INTEGER(A-Z)
      DIMENSION CHRMAT(48),CMAT(NCHAR),IRMAT(99),UID(48)
      REAL PRESTAT(48)
      DO 1 I=1,NCHAR
  1   CMAT(I)=Ø
      LASTID=I=1
 1Ø   READ(1,1Ø1,END=51)CITYID1,UID(I),CHRMAT(I),PRESTAT(I)
1Ø1   FORMAT(2I2,3X,I2,5X,F9.3)
      IF(UID(I).LT.LASTID)THEN
          BACKSPACE 1
          NCITYID=CITYID1
          CITYID1=OCITYID
          GO TO 52
      ENDIF
      IRMAT(UID(I))=I
      CMAT(CHRMAT(I))=CMAT(CHRMAT(I))+1
      OCITYID=CITYID1
      LASTID=UID(I)
      I=I+1
      GO TO 1Ø
 51   ENDFLG1=1
 52   NUID=I-1
      NCITIES=NCITIES+1
      RETURN
      END


      SUBROUTINE READ2(CITYID1,NCITYID,OCITYID,NSETS,NCHAR,
     1NCHP,UID,NUID,ENDFLG1,ENDFLG2,IRMAT,CMAT,CHRMAT)
      IMPLICIT INTEGER(A-Z)
      DIMENSION CMAT(NCHAR),IMAT(47,47),IRMAT(99),LINE(8),
     1UID(48),CHRMAT(NUID),FMT1(3)
      NCID=RESTART=Ø
      ENCODE(3Ø,1ØØ1,FMT1)NUID
1ØØ1   FORMAT('(',I2,'I1)')
  3     DO 4 I=1,NUID
      DO 4 J=1,NUID
  4     IMAT(I,J)=Ø
      LASTID=Ø
      NSETS=NSETS+1
 1Ø    READ(2,1Ø1,END=28)CITYID2,ID,(LINE(I),I=1,8)
```

```
101   FORMAT(2X,2I2,5X,8(I2,5X))
      IF(ID.LT.LASTID)THEN
          BACKSPACE 2
          IF(CITYID2.EQ.OCITYID)GO TO 30
          GO TO 29
      ENDIF
 12    DO 13 I=1,8
      IF(LINE(I).EQ.0)GO TO 14
 13    IMAT(IRMAT(ID),IRMAT(LINE(I)))=1
 14    IF(ID.GT.LASTID)LASTID=ID
      GO TO 10
 28    ENDFLG2=1
 29    RESTART=1
 30    DO 31 I=1,NUID
 31    WRITE(3,FMT1)(IMAT(I,J),J=1,NUID)
      IF(RESTART.EQ.0)GO TO 3
      REWIND 3
      RETURN
 99    STOP
      END


      SUBROUTINE CHSET(CHMAT,CHRMAT,NCHAR,NCHP,NUID,PRESTAT,
     1STATUS,UID)
      IMPLICIT INTEGER(A-Z)
      REAL CHMAT(19,19,2),STATUS(NUID),PRESTAT(NUID),CNT
      DIMENSION CHRMAT(NUID),IMAT(47,47),UID(48),
     1FMT1(3)
      DO 1 I=1,NCHP
      DO 1 J=1,NCHP
      DO 1 K=1,2
  1     CHMAT(I,J,K)=0
      DO 2 I=1,NUID
  2     STATUS(I)=0
      ENCODE(30,1001,FMT1)NUID
 11    FORMAT('(',I2,'I1)')
      DO 3 I=1,NUID
  3     READ(3,FMT1)(IMAT(I,J),J=1,NUID)
      DO 10 I=1,NUID
       CNT=0
        DO 8 J=1,NUID
        IF(IMAT(I,J) .EQ. 0.AND. IMAT(J,I).EQ.0)GO TO 8
         CNT=CNT+1
  8        CONTINUE
      DO 9 J=1,NUID
      IF(IMAT(I,J).EQ.0.AND.IMAT(J,I).EQ.0)GO TO 9
         STATUS(I)=STATUS(I)+(PRESTAT(I)-PRESTAT(J))/CNT
      IF(IMAT(I,J).EQ.0)GO TO 9
      CHMAT(NCHP,NCHP,1)=CHMAT(NCHP,NCHP,1)+1
      IF(IMAT(J,I).EQ.1)THEN
```

```
        CHMAT(NCHP,NCHP,2)=CHMAT(NCHP,NCHP,2)+.5
      ELSE
        CHMAT(NCHP,NCHP,2)=CHMAT(NCHP,NCHP,2)+1
      ENDIF
      CHMAT(NCHP,CHRMAT(J),1)=CHMAT(NCHP,CHRMAT(J),1)+1
      CHMAT(CHRMAT(I),NCHP,1)=CHMAT(CHRMAT(I),NCHP,1)+1
      CHMAT(CHRMAT(I),CHRMAT(J),1)=CHMAT(CHRMAT(I),CHRMAT
     1(J),1)+1
      IF(IMAT(J,I).EQ.1)THEN
        IF(CHRMAT(I).EQ.CHRMAT(J))THEN
          CHMAT(CHRMAT(I),CHRMAT(J),2)=CHMAT(CHRMAT(I),
     1CHRMAT(J),2)+.5
        ELSE
          CHMAT(CHRMAT(I),CHRMAT(J),2)=CHMAT(CHRMAT(I),
     1CHRMAT(J),2)+1
        ENDIF
      ELSE
        CHMAT(CHRMAT(I),CHRMAT(J),2)=CHMAT(CHRMAT(I),
     1CHRMAT(J),2)+1
        IF(CHRMAT(I).NE.CHRMAT(J))THEN
          CHMAT(CHRMAT(J),CHRMAT(I),2)=CHMAT(CHRMAT(J),
     1CHRMAT(I),2)+1
        ENDIF
      ENDIF
 9      CONTINUE
10     CONTINUE
      DO 20 I=1,NCHAR
      DO 19 J=1,NCHAR
19     CHMAT(I,NCHP,2)=CHMAT(I,NCHP,2)+CHMAT(I,J,2)
20     CHMAT(NCHP,I,2)=CHMAT(I,NCHP,2)
      RETURN
      END


      SUBROUTINE PCHDSET(CHMAT,CMAT,DMAT,NCHAR,NCHP,NSETS,
     1NUID,PCHMAT)
      IMPLICIT INTEGER(A-Z)
      REAL CHMAT(19,19,2),DMAT(19,19,2),PCHMAT(19,19,2)
      DIMENSION CMAT(NCHAR)
      DO 1 I=1,NCHP
      DO 1 J=1,NCHP
      DO 1 K=1,2
 1      DMAT(I,J,K)=0
      PCHMAT(NCHP,NCHP,1)=REAL(NUID*(NUID-1))
      PCHMAT(NCHP,NCHP,2)=PCHMAT(NCHP,NCHP,1)/2
      DO 10 I=1,NCHAR
      PCHMAT(I,I,1)=REAL(CMAT(I)*(CMAT(I)-1))
      PCHMAT(I,I,2)=PCHMAT(I,I,1)/2
      PCHMAT(I,NCHP,1)=REAL(CMAT(I)*(NUID-1))
      PCHMAT(I,NCHP,2)=PCHMAT(I,I,2)+REAL(CMAT(I)*(NUID-
```

```
     1CMAT(I)))
      PCHMAT(NCHP,I,1)=REAL(NUID*CMAT(I)-CMAT(I))
      PCHMAT(NCHP,I,2)=PCHMAT(I,NCHP,2)
      DO 9 J=1,NCHAR
      IF(I.NE.J)PCHMAT(I,J,1)=PCHMAT(I,J,2)=REAL(CMAT(I)*
     1CMAT(J))
 9        CONTINUE
10       CONTINUE
20       DO 30 K=1,2
      DMAT(NCHP,NCHP,K)=CHMAT(NCHP,NCHP,K)
     1                        /(PCHMAT(NCHP,NCHP,K))
      DO 30 J=1,NCHAR
      IF(PCHMAT(NCHP,J,K).NE.0)THEN
          DMAT(NCHP,J,K)=CHMAT(NCHP,J,K)/PCHMAT(NCHP,J,K)
      ENDIF
      IF(PCHMAT(J,NCHP,K).NE.0)THEN
          DMAT(J,NCHP,K)=CHMAT(J,NCHP,K)/PCHMAT(J,NCHP,K)
      ENDIF
28       DO 30 I=1,NCHAR
      IF(PCHMAT(I,J,K).NE.0)THEN
          DMAT(I,J,K)=CHMAT(I,J,K)/PCHMAT(I,J,K)
      ENDIF
30       CONTINUE
      RETURN
      END


      SUBROUTINE RPSET1(CHMAT,DMAT,NCHAR,NCHP,PCHMAT,PMAT,
     1RMAT)
      IMPLICIT INTEGER(A-Z)
      REAL CHMAT(19,19,2),DMAT(19,19,2),P(6),PK,PS,PCHMAT
     1(19,19,2),PMAT(6,19,19,2),RMAT(6,19,19,2)
      DIMENSION K(6),N(6)
      DO 10 I=1,NCHAR
      DO 9 J=1,NCHAR
      IF(I.EQ.J)THEN
        DO 5 Y=1,6
        DO 5 X=1,2
 5          RMAT(Y,I,J,X)=PMAT(Y,I,J,X)=0
        GO TO 9
      ENDIF
      DO 8 X=1,2

      IF(DMAT(J,NCHP,X).NE.0)THEN
        RMAT(1,I,J,X)=DMAT(I,NCHP,X)/DMAT(J,NCHP,X)
      ENDIF
      IF(DMAT(NCHP,J,X).NE.0)THEN
        RMAT(2,I,J,X)=DMAT(NCHP,I,X)/DMAT(NCHP,J,X)
      ENDIF
      IF(DMAT(J,J,X).NE.0)THEN
```

```
        RMAT(3,I,J,X)=DMAT(I,I,X)/DMAT(J,J,X)
      ENDIF
      IF(DMAT(I,J,X).NE.Ø)THEN
        RMAT(4,I,J,X)=DMAT(I,I,X)/DMAT(I,J,X)
      ENDIF
      IF(DMAT(J,I,X).NE.Ø)THEN
        RMAT(5,I,J,X)=DMAT(I,I,X)/DMAT(J,I,X)
      ENDIF
      IF(DMAT(J,J,X).NE.Ø)THEN
        RMAT(6,I,J,X)=DMAT(I,J,X)/DMAT(J,J,X)
      ENDIF

      K(1)=INT(CHMAT(I,NCHP,X))
      N(1)=INT(PCHMAT(I,NCHP,X))
      P(1)=DMAT(J,NCHP,X)

      K(2)=INT(CHMAT(NCHP,I,X))
      N(2)=INT(PCHMAT(NCHP,I,X))
      P(2)=DMAT(NCHP,J,X)

      K(3)=INT(CHMAT(I,I,X))
      N(3)=INT(PCHMAT(I,I,X))
      P(3)=DMAT(J,J,X)

      K(4)=INT(CHMAT(I,I,X))
      N(4)=INT(PCHMAT(I,I,X))
      P(4)=DMAT(I,J,X)

      K(5)=INT(CHMAT(I,I,X))
      N(5)=INT(PCHMAT(I,I,X))
      P(5)=DMAT(J,I,X)

      K(6)=INT(CHMAT(I,J,X))
      N(6)=INT(PCHMAT(I,J,X))
      P(6)=DMAT(J,J,X)

      DO 8 Y=1,6
      CALL MDBIN(K(Y),N(Y),P(Y),PS,PK,IER)
      PMAT(Y,I,J,X)=PS
      IF(IER.NE.Ø)WRITE(4,1Ø1)K(Y),N(Y),P(Y),PS,PK,IER,I,J,X
1Ø1   FORMAT(2I4,3F8.5,I6,4X,3I3)

  8     CONTINUE
  9     CONTINUE
 1Ø    CONTINUE
      RETURN
      END

      SUBROUTINE RPSET2(CHMAT,CHMATX,DMAT,DMATX,NCHAR,NCHP,
```

```
     1PCHMAT,PCHMATX,RMAT)
      IMPLICIT INTEGER(A-Z)
      REAL CHMAT(19,19,2),CHMATX(5,18,2),DMAT(19,19,2),
     1DMATX(5,18,2),PCHMAT(19,19,2),PCHMATX(5,18,2),
     2RMAT(6,19,19,2)
      DO 1Ø I=1,NCHAR
      DO 5 X=1,2
      CHMATX(2,I,X)=CHMAT(I,NCHP,X)-CHMAT(I,I,X)
      PCHMATX(2,I,X)=PCHMAT(I,NCHP,X)-PCHMAT(I,I,X)
      CHMATX(3,I,X)=CHMAT(NCHP,I,X)-CHMAT(I,I,X)
 5      PCHMATX(3,I,X)=PCHMAT(NCHP,I,X)-PCHMAT(I,I,X)

      CHMATX(1,I,1)=CHMAT(NCHP,NCHP,1)-CHMAT(I,NCHP,1)
      PCHMATX(1,I,1)=PCHMAT(NCHP,NCHP,1)-PCHMAT(I,NCHP,1)
      CHMATX(4,I,1)=CHMAT(NCHP,NCHP,1)-CHMAT(I,NCHP,1)
                   -CHMAT(NCHP,I,1)+CHMAT(I,I,1)
      PCHMATX(4,I,1)=PCHMAT(NCHP,NCHP,1)-PCHMAT(I,NCHP,1)
                    -PCHMAT(NCHP,I,1)+PCHMAT(I,I,1)
      CHMATX(5,I,1)=CHMAT(NCHP,NCHP,1)-CHMAT(NCHP,I,1)
      PCHMATX(5,I,1)=PCHMAT(NCHP,NCHP,1)-PCHMAT(NCHP,I,1)
      CHMATX(1,I,2)=CHMAT(NCHP,NCHP,2)-CHMAT(I,I,2)
      PCHMATX(1,I,2)=PCHMAT(NCHP,NCHP,2)-PCHMAT(I,I,2)
      CHMATX(4,I,2)=CHMAT(NCHP,NCHP,2)-CHMAT(I,NCHP,2)
      PCHMATX(4,I,2)=PCHMAT(NCHP,NCHP,2)-PCHMAT(I,NCHP,2)
      CHMATX(5,I,2)=CHMAT(NCHP,NCHP,2)-CHMAT(I,I,2)
1Ø     PCHMATX(5,I,2)=PCHMAT(NCHP,NCHP,2)-PCHMAT(I,I,2)

      DO 2Ø Y=1,5
      DO 2Ø I=1,NCHAR
      DO 2Ø X=1,2
      IF(PCHMATX(Y,I,X).EQ.Ø)THEN
           DMATX(Y,I,X)=Ø
           GO TO 2Ø
      ENDIF
      DMATX(Y,I,X)=CHMATX(Y,I,X)/PCHMATX(Y,I,X)
2Ø     CONTINUE

      DO 3Ø I=1,NCHAR
      DO 3Ø X=1,2
      IF(DMATX(1,I,X).NE.Ø)THEN
           RMAT(1,I,NCHP,X)=DMAT(I,NCHP,X)/DMATX(1,I,X)
      ENDIF
      IF(DMATX(5,I,X).NE.Ø)THEN
           RMAT(2,I,NCHP,X)=DMAT(NCHP,I,X)/DMATX(5,I,X)
      ENDIF
      IF(DMATX(4,I,X).NE.Ø)THEN
           RMAT(3,I,NCHP,X)=DMAT(I,I,X)/DMATX(4,I,X)
      ENDIF
      IF(DMATX(2,I,X).NE.Ø)THEN
           RMAT(4,I,NCHP,X)=DMAT(I,I,X)/DMATX(2,I,X)
```

```
      ENDIF
      IF(DMAT(3,I,X).NE.0)THEN
          RMAT(5,I,NCHP,X)=DMAT(I,I,X)/DMATX(3,I,X)
      ENDIF
      IF(DMATX(4,I,X).NE.0)THEN
          RMAT(6,I,NCHP,X)=DMATX(2,I,X)/DMATX(4,I,X)
      ENDIF
      IF(DMAT(I,NCHP,X).NE.0)THEN
          RMAT(1,NCHP,I,X)=DMATX(1,I,X)/DMAT(I,NCHP,X)
      ENDIF
      IF(DMAT(NCHP,I,X).NE.0)THEN
          RMAT(2,NCHP,I,X)=DMATX(5,I,X)/DMAT(NCHP,I,X)
      ENDIF
      IF(DMAT(I,I,X).NE.0)THEN
          RMAT(3,NCHP,I,X)=DMATX(4,I,X)/DMAT(I,I,X)
      ENDIF
      IF(DMATX(3,I,X).NE.0)THEN
          RMAT(4,NCHP,I,X)=DMATX(4,I,X)/DMATX(3,I,X)
      ENDIF
      IF(DMATX(2,I,X).NE.0)THEN
          RMAT(5,NCHP,I,X)=DMATX(4,I,X)/DMATX(2,I,X)
      ENDIF
      IF(DMAT(I,I,X).NE.0)THEN
          RMAT(6,NCHP,I,X)=DMATX(3,I,X)/DMAT(I,I,X)
      ENDIF
30     CONTINUE
      RETURN
      END


      SUBROUTINE RPSET3(CHMAT,CHMATX,DMAT,DMATX,NCHAR,NCHP,
     1PCHMAT,PCHMATX,PMAT)
      IMPLICIT INTEGER(A-Z)
      REAL CHMAT(19,19,2),CHMATX(5,18,2),DMAT(19,19,2),
     1DMATX(5,18,2),P(6,2),PCHMAT(19,19,2),PCHMATX
     2(5,18,2),PK,PS,PMAT(6,19,19,2)
      DIMENSION K(6,2),N(6,2)
      DO 10 I=1,NCHAR
      DO 10 X=1,2

      K(1,1)=INT(CHMAT(I,NCHP,X))
      N(1,1)=INT(PCHMAT(I,NCHP,X))
      P(1,1)=DMATX(1,I,X)

      K(2,1)=INT(CHMAT(NCHP,I,X))
      N(2,1)=INT(PCHMAT(NCHP,I,X))
      P(2,1)=DMATX(5,I,X)

      K(3,1)=INT(CHMAT(I,I,X))
      N(3,1)=INT(PCHMAT(I,I,X))
```

```
      P(3,1)=DMATX(4,I,X)

      K(4,1)=INT(CHMAT(I,I,X))
      N(4,1)=INT(PCHMAT(I,I,X))
      P(4,1)=DMATX(2,I,X)

      K(5,1)=INT(CHMAT(I,I,X))
      N(5,1)=INT(PCHMAT(I,I,X))
      P(5,1)=DMATX(3,I,X)

      K(6,1)=INT(CHMATX(2,I,X))
      N(6,1)=INT(PCHMATX(2,I,X))
      P(6,1)=DMATX(4,I,X)

      K(1,2)=INT(CHMATX(1,I,X))
      N(1,2)=INT(PCHMATX(1,I,X))
      P(1,2)=DMAT(I,NCHP,X)

      K(2,2)=INT(CHMATX(5,I,X))
      N(2,2)=INT(PCHMATX(5,I,X))
      P(2,2)=DMAT(NCHP,I,X)

      K(3,2)=INT(CHMATX(4,I,X))
      N(3,2)=INT(PCHMATX(4,I,X))
      P(3,2)=DMAT(I,I,X)

      K(4,2)=INT(CHMATX(4,I,X))
      N(4,2)=INT(PCHMATX(4,I,X))
      P(4,2)=DMATX(3,I,X)

      K(5,2)=INT(CHMATX(4,I,X))
      N(5,2)=INT(PCHMATX(4,I,X))
      P(5,2)=DMATX(2,I,X)

      K(6,2)=INT(CHMATX(3,I,X))
      N(6,2)=INT(PCHMATX(3,I,X))
      P(6,2)=DMAT(I,I,X)

      DO 10 Y=1,6
      DO 10 W=1,2
      CALL MDBIN(K(Y,W),N(Y,W),P(Y,W),PS,PK,IER)
      IF(W.EQ.1)PMAT(Y,I,NCHP,X)=PS
      IF(W.EQ.2)PMAT(Y,NCHP,I,X)=PS
 10   IF(IER.NE.0)WRITE(4,101)K(Y,W),N(Y,W),P(Y,W),PS,
     1PK,IER,I,J,X
101   FORMAT(2I4,3F8.5,I6,4X,3I3)

      RETURN
      END
```

```
      SUBROUTINE WRITE1(CHMAT,CHMATX,CMAT,DMAT,DMATX,
     1NCHAR,NCHP,NUID,OCITYID,PCHMAT,PCHMATX,STATUS,UID,Z)
      IMPLICIT INTEGER(A-Z)
      REAL CHMAT(19,19,2),DMAT(19,19,2),DMATX(5,18,2),
     1     PCHMAT(19,19,2),STATUS(NUID),TSTATUS
      DIMENSION CMAT(NCHAR),UID(48)
      TSTATUS=0
      WRITE(4,101)OCITYID,Z
101   FORMAT(1HT,25X,'CMAT VECTOR FOR CITY',I3,', SET',
     1I3,////)
      WRITE(4,102)(CMAT(I),I=1,NCHAR)
102   FORMAT(11I4,/////)
      WRITE(4,103)OCITYID,Z
103   FORMAT(' STATUS VECTOR FOR CITY',I3,', SET',I3,/)
      DO 10 I=1,NUID
         TSTATUS=TSTATUS+STATUS(I)
 10    WRITE(4,104)OCITYID,UID(I),STATUS(I)
1041   FORMAT(10X,2I2,5X,F9.3)
         TSTATUS=TSTATUS/(2*NUID)
      WRITE(4,1041)TSTATUS
141   FORMAT(5X,'TOTAL',9X,F9.3)
      WRITE(4,105)OCITYID,Z
105   FORMAT(1HT,30X,'TABLES FOR CHOICES, CITY',I3,', SET',
     1I3,///)
      X=1
      CALL WRITE1A(CHMAT,CHMATX,DMAT,DMATX,NCHAR,NCHP,PCHMAT,
     1PCHMATX,X)
      WRITE(4,107)OCITYID,Z
107   FORMAT(1H1,26X,'TABLES FOR TIES, CITY',I3,' SET',I3)
      X=2
      CALL WRITE1A(CHMAT,CHMATX,DMAT,DMATX,NCHAR,NCHP,PCHMAT,
     1PCHMATX,X)
      RETURN
      END


      SUBROUTINE WRITE1A(CHMAT,CHMATX,DMAT,DMATX,NCHAR,NCHP,
     1PCHMAT,PCHMATX,X)
      IMPLICIT INTEGER(A-Z)
      REAL CHMAT(19,19,2),CHMATX(5,18,2),DMAT(19,19,2),
     1DMATX(5,18,2),PCHMAT(19,19,2),PCHMATX(5,18,2)
      DIMENSION NUMBER(33),FMT1(3),FMT2(3)
      ENCODE(30,1001,FMT1)NCHP
1001   FORMAT('(I10,',I2,'(3X,F9.5))')
      ENCODE(30,1002,FMT2)NCHP
1002   FORMAT('(9X,',I2,'(10X,I2),/)')
      ELVN=19
      DO 1 I=1,ELVN
  1     NUMBER(I)=I
```

```
      WRITE(4,101)
101   FORMAT(//,30X,'ACTUAL CHOICE COUNT MATRIX',/)
      WRITE(4,FMT2)(NUMBER(I),I=1,NCHAR),ELVN
      DO 12 I=1,NCHAR
 12   WRITE(4,FMT1)I,(CHMAT(I,J,X),J=1,NCHAR),CHMAT(I,
     1NCHP,X)
      WRITE(4,FMT1)ELVN,(CHMAT(NCHP,J,X),J=1,NCHAR),CHMAT
     1(NCHP,NCHP,X)
      WRITE(4,102)
102   FORMAT(//,28X,'POSSIBLE CHOICE COUNT MATRIX',/)
      WRITE(4,FMT2)(NUMBER(I),I=1,NCHAR),ELVN
      DO 14 I=1,NCHAR
 14   WRITE(4,FMT1)I,(PCHMAT(I,J,X),J=1,NCHAR),PCHMAT(I,
     1NCHP,X)
      WRITE(4,FMT1)ELVN,(PCHMAT(NCHP,J,X),J=1,NCHAR),PCHMAT
     1(NCHP,NCHP,X)
      WRITE(4,103)
103   FORMAT(//,33X,'CHOICE DENSITY MATRIX',/)
      WRITE(4,FMT2)(NUMBER(I),I=1,NCHAR),ELVN
      DO 16 I=1,NCHAR
 16   WRITE(4,FMT1)I,(DMAT(I,J,X),J=1,NCHAR),DMAT(I,NCHP,X)
      WRITE(4,FMT1)ELVN,(DMAT(NCHP,J,X),J=1,NCHAR),DMAT
     1(NCHP,NCHP,X)
      WRITE(4,104)
104   FORMAT('T',//,35X,'CHMATX MATRIX',//)
      DO 22 I=1,NCHAR
 22    WRITE(4,105)I,(CHMATX(Y,I,X),Y=1,5),CHMAT(I,I,X)
105   FORMAT(I10,6(3X,F10.5))
      WRITE(4,106)
106   FORMAT(//,35X,'PCHMATX MATRIX',//)
      DO 23 I=1,NCHAR
 23   WRITE(4,105)I,(PCHMATX(Y,I,X),Y=1,5),PCHMAT(I,I,X)
      WRITE(4,107)
107   FORMAT(//,35X,'DMATX MATRIX',//)
      DO 24 I=1,NCHAR
 24   WRITE(4,105)I,(DMATX(Y,I,X),Y=1,5),DMAT(I,I,X)
      RETURN
      END


      SUBROUTINE WRITE2(NCHAR,NCHP,PMAT,RMAT)
      IMPLICIT INTEGER(A-Z)
      REAL PMAT(6,19,19,2),RMAT(6,19,19,2)
      ELVN=19
      DO 10 I=1,NCHAR
      WRITE(4,101)I
101   FORMAT(1H1,20X,'RATIOS, PROBABILITIES FOR CHARACT
     1ERISTIC ',I2,//)
      WRITE(4,102)
102   FORMAT(/,50X,'FOR CHOICES',/)
```

```
      DO 2 J=1,NCHAR
      IF(I.EQ.J)GO TO 2
      WRITE(4,103)J,(RMAT(Y,I,J,1),Y=1,6),(PMAT(Y,I,J,1),
     1Y=1,6)
103   FORMAT(I10,4X,6(F8.5,1X),10X,6(F8.5,1X))
  2     CONTINUE
      WRITE(4,103)ELVN,(RMAT(X,I,NCHP,1),X=1,6),(PMAT(Y,I,
     1NCHP,1),Y=1,6)
      WRITE(4,105)
105   FORMAT(//,53X,'FOR TIES',/)
      DO 6 J=1,NCHAR
      IF(I.EQ.J)GO TO 6
      WRITE(4,103)J,(RMAT(X,I,J,2),X=1,6),(PMAT(Y,I,J,2),
     1Y=1,6)
  6     CONTINUE
      WRITE(4,103)ELVN,(RMAT(X,I,NCHP,2),X=1,6),(PMAT(Y,I,
     1NCHP,2),Y=1,6)
 10    CONTINUE
      WRITE(4,101)ELVN
      WRITE(4,102)
      DO 22 I=1,NCHAR
 22    WRITE(4,103)I,(RMAT(X,NCHP,I,1),X=1,6),(PMAT(Y,
     1NCHP,I,1),Y=1,6)
      WRITE(4,105)
      DO 26 I=1,NCHAR
 26    WRITE(4,103)I,(RMAT(X,NCHP,I,2),X=1,6),(PMAT(Y,
     1NCHP,I,2),Y=1,6)
      RETURN
      END
```

APPENDIX IV

COMPONENTS OF INDEXES OF INTERSECTION AND CONSOLIDATION AND THEIR RELIABILITY (Cronbach's alpha).

Index	Components (bivariate measure)	Deleted	Alpha
Pub/Pri	PP-power PP-influ PP-budget PP-prest	PP-size	.52
Activity	A-power A-influ A-budget A-size	A-prest	.41
Status Groups			
Budget	B-power B-influ B-prest B-pub-pri B-activ	B-size	.87
Size	S-power S-influ S-prest S-pub-pri S-activ	S-budget	.57
Power	P-influ P-budget P-prest P-pub-pri P-activ	P-size	.83
Influence	I-power I-buget I-size I-pub-pri I-activ	I-prest	.65
Prestige	Pr-power Pr-budget Pr-size Pr-pub-pri Pr-activ	Pr-influ	.80

REFERENCES

ADAMEK, R.J. and B.F. LAVIN
1974- "Interorganizational exchange: a note on the scarcity hypothesis" In A. Negandhi (ed.) Interorganization Theory. Kent, pp.196-209, Ohio: Kent State University.

AIKEN, M. and J. HAGE
1968- "Organizational Interdependence and Intra-organizational structure" American Sociological Review, 33:912-33.

ALBA, R.
1973- "A graph-theoretic definition of a sociometric clique" Journal of Mathematical Sociology, 3: 113-26.

ALBA, R. and C. KADUSHIN
1976- "The intersection of social circles: a new measure of social proximity in networks" Sociological Methods and Research, 5: 77-102.

ALBA, R. AND G. MOORE
1983- "Elite Social Circles" in Burt, R. and Minor, M. Applied Network Analysis: a methodological introduction. Beverly Hills, Cal.: Sage.

ALDRICH, H.E.
1971- "An organization-environment perspective on cooperation and conflict between organizations in the manpower system. In A. Negandi (ed.),Interorganization Theory, pp.49-71. Kent, Ohio: Kent State University.

ALDRICH, H. E.
1972- "Technology and organizational structure: a re-examination of the findings of the Aston group" Administrative Science Quarterly, 17: 26-49.

ALDRICH, H. E.
1976- "Resource dependence and interorganizational relations" Administration and Society, 7: 419-53.

ALDRICH, H. E.
1979- Organizations and Environments. Englewood Cliffs, NJ: Prentice-Hall.

ALDRICH, H.E. and J. PFEFFER
1976- "Environments of organizations" Annual Review of Sociology, 2: 79-106.

ALLEN, T.H.F. and T. B. STARR
1982- Hierarchy. Chicago: University of Chicago Press.

ALLISON, P. D.
1978- "Measures of Inequality" American Sociological Review, 43: 865-79.

ALTHUSSER, L.
1970- For Marx. NY: Vintage.

ALTHUSSER, L. and E. BALIBAR
1970- Reading Capital. NY: Pantheon.

ARABIE, P.; S. BOORMAN and P.R. LEVITT
1978- "Constructing blockmodels: how and why" Journal of Mathematical Psychology, 17: 21-63.

ATKIN, R.
1977- Combinatorial Connectivities in Social Systems. Basel: Birkhauser.

ATKIN, R.
1981- Multidimensional Man. London: Penguin.

BAUMLER, J. V.
1971- "Defined criteria of performance in organizational control" Administrative Science Quarterly,16: 340-9.

BELL, D. V.
1975- Power, Influence and Authority. NY: Oxford University.

BELL, W.
1978- "How to spin a social theory" Contemporary Sociology, 7: 692-95.

BENIGER, J.R.
1983- Trafficking in Drug Users. Cambridge, Mass.: Cambridge University Press.

BENSON, J.K.
1975- "The interorganizational network as political economy" Administrative Science Quarterly, 20: 229-49.

BERGER, J.; T. L. CONNER and M. H. FISEK (eds.)
1974- Expectation States Theory. Cambridge, Mass.: Winthrop.

BERGER, J.; S. J. ROSENHOLTZ and M. ZELDITCH
1980- "Status Organizing Processes" Annual Review of Sociology, 6: 479-508.

BERKOWITZ, S. D.
1982- An Introduction to Structural Analysis: the network approach to social research. Butterworths. Toronto.

BESHERS, J.M. AND E.O. LAUMANN
1967- "Social distance: A network approach" American Sociological Review, 32: 225-36.

BLAU, P. M.
1972- "Interdependence and Hierarchy in Organizations" Social Science Research, 1: 1- 24.

BLAU, P. M.
1974- On the Nature of Organizations. NY: Wiley.

BLAU, P. M.
1975- "Introduction: Parallels and Contrasts in Structural Inquiries" in P. M. Blau (ed.) Approaches to the Study of Social Structure, pp. 1-20. New York: Free Press.

BLAU, P. M.
1977- Inequality and Heterogeneity. NY: Free Press.

BLAU, P. M.
1980- "Contexts, units, and properties in sociological analysis" In H. M. Blalock (ed.) Sociological Theory and Research, pp. 51-65. NY: Free Press.

BLAU, P. M.
1981- "Introduction: Diverse Views of Social Structure and Their Common Denominator" in P. M. Blau and R. K. Merton (eds.) Continuities in Structural Inquiry, pp. 1-26, Beverly Hills: Sage.

BLAU, P. ET. AL.
1982- "Heterogeneity and Intermarriage". American Sociological Review, 47: 45-62.

BLAU, P., C. BEEKER, K. FITZPATRICK
1984- "Intersecting Social Affiliations and Intermarriage" Social Forces 62: 585-606.

BLAU, P. M. and R. A. SCHOENHERR
1971- The Structure of Organizations. NY: Basic.

BLAU, P. and J. SCHWARTZ
1984- Crosscutting Social Circles. NY: Academic.

BLAU, P. M. and R. SCOTT
1962- Form Organizations. S. Francisco, Cal.: Chandler.

BLUM, T.
1984- "Racial Inequality and Salience : An Examination of Blau's Theory of Social Structure" Social Forces, 62: 607-617.

BOGARDUS, E. S.
1925- "Measuring social distance" Journal of Applied Sociology, 9: 299-308.

BOGARDUS, E. S.
1933- "A social distance scale" Sociology and Social Research, 17: 265-71.

BOJE, D.M. and D. A. WHETTEN
1981- "Effects of organizational strategies and constraints on centrality and attributions of influence in inter-organizational networks" Administrative Science Quarterly, 26: 378-95.

BONACICH, P.
1967- "Associational contiguity: a critique" American Sociological Review, 32: 813-15.

BONACICH, P.
1980- "The common structure semigroup: an alternative to the Boorman and White joint reduction" American Journal of Sociology, 86: 159-66.

BONJEAN, C.M. and D.M. OLSON
1964- "Community Leadership: directions of research" Administrative Science Quarterly, 9: 278-300.

BOUDON, R.
1981- The Logic of Social Action. London: Routledge and Kegan Paul.

BOUDON, R.
1982- The Unintended Consequences of Social Action. London: Macmillan.

BOURDIEU, P.
1966- "Condition de classe et position de classe" Archives Europeenes de Sociologie, VII: 201-29.

BOURDIEU, P.
1981- "Men and machines" in K. Knorr-Cetina and A. V. Cicourel (eds.) Advances in Social Theory and Methodology, pp. 304-18. Boston: Routledge and Kegan Paul.

BOYD, J.P.
1983- "Structural similarity, semigroups and idempotents" Social Networks, 5: 193-234.

BOYLE, R. P.
1969-" Algebraic Systems for Normal and Hierarchical Sociograms" Sociometry, 32: 99-119.

BREIGER, R.L.; S. BOORMAN and P. ARABIE
1975- "An algorithm for clustering relational data, with applications to social network analysis and comparison with multidimensional scaling" Journal of Mathematical Psychology, 12: 328-83.

BRITTAIN, J. W. AND J. H. FREEMAN
1980- " Organizational Proliferation and Density Dependent Selection" In J. Kimberly and R. Miles (eds.). The Organizational Life Cycle, pp. 291-337. San Francisco: Jossey-Bass.

BRODBECK, M.
1973- "Methodological individualisms: Definition and Reduction" in J. O'Neil (ed.) Modes of Individualism and Collectivism. NY: St. Martin

BURNS, T. and W. BUCKLEY
1976- Power and Control. Beverly Hills, Cal. : Sage.

BURT, R. S.
1976- "Positions in networks" Social Forces, 55:93-122.

BURT, R. S.
1977- "Power in a social topology" Social Science Research, 6: 1-83.

BURT, R. S.
1977- "Positions in multiple network systems, Part I: a general conception of stratification and prestige in a system of actors cast as a social topology" Social Forces, 56: 106-31.

BURT, R. S.
1980- "Models of Network Structure" Annual Review of Sociology, 6:79-141.

BURT, R. S.
1982- Toward a Structural Theory of Action: Network Models of Social Structure, Perception, and Action. New York: Academic Press.

BURT, R. S. and M. J. MINOR
1983- Applied Network Analysis. Beverly Hills, Cal.: Sage.

BURT, R. S.
1983- "Cohesion versus structural equivalence as a basis for network subgroups" in R. S. Burt and M. Minor Applied Network Analysis: a methodological introduction. Beverly Hills, Cal.: Sage.

CAPLOW, T.
1964- Principles of Organization. NY: Harcourt-Brace.

CARLSSON, G.
1958- Social Mobility and Class Structure. Lund: CWK Gleerup.

CARRINGTON, P.J. and G. HEIL
1981- "Cobloc: a hierarchical method for blocking network data" Journal of Mathematical Sociology, 8: 103-132.

CARROLL, G.
1984- "Organizational Ecology" Annual Review of Sociology, 10: 71-93.

CASSTEVENS, T. W.
1980- "Birth and death processes of governmental bureaus in the U.S." Behavioral Science, 25:161-65.

CHAZEL, F.
1974- "Pouvoir, cause et force" Revue Fracaise de Sociologie, XV, 4: 450-57.

CHILD, J.
1972- "Organization structure and strategies of control: a replication of the Aston study" Administrative Science Quarterly, 17: 163-77.

CLEGG, S
1979- The Theory of Power and Organization. London: Routledge & Kegan Paul.

COLEMAN, J. S.
1957- Community Conflict. NY: Free Press.

COLEMAN, J. S.
1974- Power and the Structure of Society. NY: Norton.

COLEMAN, J. S.
1975- "Social Structure and a Theory of Action". in P. M. Blau (ed.) Approaches to the Study of Social Structure, pp. 76-93. NY: Free Press.

COLEMAN, J. S.
1982- The Assymetric Society. NY: Syracuse University Press.

COLLINS, R.
1981- "Micro-translation as a theory building strategy" in K. Knorr-Cetina and A. V. Cicourel (eds.) Advances in Social Theory and Methodology, pp. 81-108. Boston: Routledge and Kegan Paul.

COOK, K.
1977-"Exchange and power in networks of interorganizational relations" Sociological Quarterly, 18: 62-82.

COOK, K. ; R. EMERSON; M. GILLMORE and T. YAMAGISHI
1983-"The distribution of power in exchange networks: theory and experimental results" American Journal of Sociology, 89: 275-305.

CRONBACH, L. J.
1959- "Coefficient alpha and the internal structure of tests" Psychometika, 16: 297-334.

CROZIER, M. and E. FRIEDBERG
1977- L'Acteur et le Systeme. Paris: Seuil.

DAVIS, J.
1967-"Clustering and structural balance in graphs" Human Relations, 20: 181-7.

DAVIS, J. and S. LEINHARDT
1972- "The structure of positive interpersonal relations in small groups" In J. Berger et al. (ed.) Sociological Theories in Progress. Boston: Houghton Mifflin.

DAWKINS, R. D.
1976a- The Selfish Gene. Oxford: Oxford University Press.

DAWKINS, R. D.
1976b- "Hierarchical Organization: a candidate principle for ethology" In P.P.G. Bateson and R. A. Hinde (eds.) Growing Points in Ethology, pp. 7-54. NY: Cambridge University Press.

DOREIAN, P.
1969- "A Note on the Detection of Cliques in Valued Graphs". Sociometry, 32: 237-42.

DOWNS, A.
1967- Inside Bureacracy. Boston: Little-Brown.

EISENSTADT, S.N.
1981- "Some Observations on Structuralism in Sociology, with Special and Paradoxical Reference to Max Weber" in P.M. Blau and R.K. Merton (eds.) Continuities in Structural Inquiry, pp. 165-78. Beverly Hills, Cal.: Sage.

EMERSON, R. M.
1962- "Power-dependence relations" American Sociological Review, 27: 31-41.

EMERY, F.E. and E. L. TRIST
1965- "The causal texture of organizational environmnets" Human Relations, 18: 21-32.

ETZIONI, A.
1975- A Comparative Analysis of Complex Organizations. NY: Free Press.

EVAN, W.M.
1966- "The organization set: toward a theory of interorganizational relations" In J.D. Thompson (ed.) Approaches to Organizational Design. Pittsburg: University of Pittsburg.

EVERETT, M.G.
1982- "Graph theoretic blockings K-plexes and K-cutpoints" Journal of Mathematical Sociology, 9: 1-14.

EVERETT, M.G.
1983- "Ebloc: a graph theoretic blocking algorith for social networks" Social Networks, 5: 323-46.

FARARO, T. J.
1970- " Strictly Stratified Systems" Sociology, 4: 85-113.

FARARO, T.J.
1981- " Biased networks and social structure theorems" Social Networks, 3: 137-59.

FARARO, T.J. and M.H. SUNSHINE
1964- A Study of a Biased Friendship Net. Syracuse, NY: Syracuse University Press.

FIENBERG, S.E. and S. WASSERMAN
1980- "Methods for the analysis of data from multivariate directed graphs" Proc. of the Conference on Recent Developments in Statistical Methods and Applications, pp. 137-61. Taipei, Taiwan: Institute of Mathematics, Academia Sinica.

FIENBERG, S.E. and S. WASSERMAN
1981- "Categorical data analysis of single sociometric relations" Sociological Methodology 1981, pp. 156-92.

FIENBERG, S.E.; M. M. MEYER and S. WASSERMAN
1981- "Analysing data from multivariate directed graphs: an application to social networks" In v. Barnett (ed) Interpreting Multivariate Data , pp. 289-305. London: Wiley.

FREEMAN, J. AND M.,HANNAN.
1983- "Niche Width and the Dynamics of Organizational Populations". American Journal of Sociology. 88: 1116-45.

FREEMAN, J.; G. CARROLL and M.T. HANNAN
1983- "Age dependence in organizational death rates" American Sociological Review, 48: 692-710.

FREEMAN, L. C.
1977- " A Set of Measures of Centrality Based on Betweenness" Sociometry, 40: 35-41.

FREEMAN, L. C.
1978/79- " Centrality in Social Networks Conceptual Clarification" Social Networks 1: 215-239

FREEMAN, L. C.
1983- "Spheres, cubes and boxes: Graph dimensionality and network structure" Social Networks, 5: 139-57.

FRIEDKIN, N. E.
1984- "Structural cohesion and equivalence explanations of social homogeneity" Sociological Methods and Research, 12: 235-61.

GALASKIEWICZ, J.
1979- Exchange Networks and Community Politics. Beverly Hills: Sage.

GALASKIEWICZ, J. and K. R. KROHN
1984- "Positions, roles and dependencies in a community interorganization system" Sociological Quarterly, 25: 527-50.

GALASKIEWICZ, J and P. MARSDEN
1978- "Interorganizational resource networks: formal patterns of overlap" Social Science Research, 7: 89-107.

GALASKIEWICZ, J. and S. WASSERMAN
1981- "A study of change in a regional corporate network" American Sociological Review, 46: 475-84.

GOETSCHY, J.
1981- "Le pouvoir est-il une relation ou la propriete d'un systeme?" Sociologie du Travail, 4: 448-466.

GOODE, W. J.
1975- "Homans' and Merton's Structural Approach" in P. M. Blau (ed.) Approaches to the Study of Social Structure, pp. 66-75. NY: Free Press

GOODE, W. J.
1978- The Celebration of Heroes. Berkeley: University of California.

GROFMAN, B. and G. OWEN
1982- "A game theroetic approach to measuring degree of centrality in social networks" Social Networks, 4: 213.

HALL, R. H.
1977- Organizations: Structure and Process. Englewood Cliffs, NJ: Prentice-Hall.

HALL, R. H.; J.P. Clark et al.
1977- "Patterns of interorganizational relationships" Administrative Science Quarterly, 22: 457-74.

HALL, R. H. and C. R. TITTLE
1966- "Bureacracy and its correlates" American Journal of Sociology, 72: 267-72.

HANNAN, M.T. and J. FREEMAN
1977- "The population ecology of organizations" American Journal of Sociology, 82: 929-64.

HARARY, F.
1959- "Status and contra-status" Sociometry, 22: 23-43.

HARARY, F.; R. NORMAN and D. CARTWRIGHT
1965- Structural Models. NY: Wiley.

HARARY, F. and M. F. BATELL
1981- "What is a system?" Social Networks, 3: 28-40.

HEIDER, F.
1959- The Psychology of Interpersonal Relations. NY: Wiley.

HEISE, D.R.
1979- Understanding Events: Affect and the Construction of Social Action. NY: Cambridege University Press.

HEYDEBRAND, W.V.
1973- "The study of organizations" In W.V. Heydebrand (ed.) Comparative organizations: Results of Empirical Research. Englewood Cliffs, NJ: Prentice-Hall.

HEYDEBRAND, W.V.
1981- "Marxist Structuralism" in P.M. Blau and R. K. Merton (eds.) Continuities in Structural Inquiry, pp. 81-120, Beverly Hills, Cal.: Sage.

HICKSON, D. J.; C. HINNINGS; R. SCHNECK and N. PENNINGS.
1971- "A strategic contingencies theory of intraorganizational power" Administrative Science Quarterly, 16: 219-32.

HOLLAND, P. W. AND S. LEINHARDT
1977- " Social Structure as a Network Process" Zeitschrift fur Soziologie, 6: 386-402.

HOLLAND, P. W. AND S. LEINHARDT
1981- "An exponential family of probability distributions for directed graphs" Journal of American Statistical Association, 76:33-50.

HOMANS, G. C.
1975- "What Do We Mean by Social "Structure"? in P. M. Blau (ed.) Approaches to the Study of Social Structure, 53-65. NY: Free Press.

HREBINIAK, L.G.
1974- "Job technology, supervision and work group structure" Administrative Science Quarterly, 19: 395-410.

INKSON, J; D.S. PUGH and D.C. PHEYSEY
1970- "Organization context and structure: an abbreviated replication" Administrative Science Quarterly, 15: 318-29.

JACKSON, P. M.
1983- The Political Economy of Bureacracy. Totowa, NJ: Barnes and Noble.

KADUSHIN, C.
1968- "Power, influence and social circles" Americann Sociological review, 32: 685-99.

KANISS, P.C.
1981- Evolutionary Change in Hierarchical Systems: A General Theory. Ithaca, NY: Cornell University.

KATZ, L.
1960- "A new status index derived from sociometric analysis" in J.L. Moreno (ed.) The Sociometry Reader. Glencoe: Free Press.

KIMBERLY, J.
1976- "Organizational size and the structuralist perspective: a review, critique and proposal" Administrative Science Quarterly, 21: 571-97.

KNOKE, D. and D.L. ROGERS
1979- "A blockmodel analysis of interorganizational relations" Sociology and Social Research, 64: 28-52.

KNOKE, D. and J. R. WOOD
1981- Organized for Action. NJ: Rutgers University Press.

KNOKE, D. AND J. H. KUKLINSKI
1982- Network Analysis. Beverly Hills, Cal.: Sage.

KNOKE, D. AND R. S. BURT
1983- " Prom . S. Burt and M. J. Minor (eds.) Applied Network Analysis, pp. 195-222. Beverly Hills, Cal.: Sage.

KNORR-CETINA, K.
1981- "Introduction: The micro-sociological challenge of macro-sociology: towards a reconstruction of social theory and methodology" in K. Knorr-Cetina and A. V. Cicourel (eds.) Advances in Social Theory and Methodology, pp. 1-32. Boston: Routledge and Kegan Paul.

KOCHEN, and K. DEUTCH
1980- Decentralization: Sketches Toward a Rational Theory. Cambridge, Mass.: Oelgeschlager, Gunn & Hain.

KOESTLER, A.
1967- The Ghost in the Machine. NY: Macmillan.

KOHN, M.L. and C. SCHOOLER
1978- "The reciprocal effects of the substantive complexity of work and intelectual flexibility: a longitudinal assesment" American Journal of Sociology, 84: 24-52.

KOHN, M. L.
1981- "Personality, occupation, and social stratification" Research in Social Stratification and Mobility, 1: 267-97.

LAUMANN, E.O.
1966- Prestige and Association in an Urban Community. Indianapolis: Bobbs-Merrill.

LAUMANN, E.O. and L. GUTTMAN
1966- "The relative associational contiguity of occupations in an urban setting" American Sociological Review, 31: 169-78.

LAUMANN, E.O. and F. U. PAPPI
1976- Networks of Collective Action. NY: Academic.

LAUMANN, E.O.; J. GALASKIEWICZ and P.V. MARSDEN
1978- "Community Structure as interorganizational linkages" Annual Review of Sociology, 4: 455-484.

LAUMANN, E. O. AND P. MARSDEN
1982- " Microstructural Analysis in Interorganizational Systems" Social Networks, 4: 329-48.

LAUMANN, E. O. and R. SENTER
1976- "Subjective social distance, occupational stratification, and forms of status and class conciousness: a replication and extension" American Journal of Sociology, 81: 1304-38.

LAZARSFELD, P.F. and H. MENZEL
1961- "On the relation between individual and collective properties" in A. Etzioni (ed.) A Sociological Reader on Complex Organizations, pp. 499-517. 2nd. Ed.(1969) NY: Holt Rinehart and Winston.

LEACH, E.
1981- "British Social Anthropology and Levi-Straussian Structuralism" in P. M. Blau and R. K. Merton (eds.) Continuities in Structural Inquiry, pp. 27-50. Beverly Hills: Sage.

LEHMAN, E.W.
1975- Coordinating Health Care: Explorations in Interorganizational Relations. Beverly Hills, Cal.: Sage.

LEIK, R. K. AND R. NAGASAWA
1970- " A Sociometric Basis for Measuring Social Status and Social Structure". Sociometry, 33: 55-78.

LEVI-STRAUSS, C.
1963- Structural Anthropology. NY: Basic.

LEVI-STRAUSS, C.
1969- The Elementary Structures of Kinship. Boston: Beacon.

LEVINE, D.N. (ed)
1971- On Individuality and Social Forms (Georg Simmel). Chicago: University of Chicago Press.

LIEBERT, R. and A. IMERSHEIN (eds.)
1977- Power, Paradigms, and Community research. Beverly Hills, Cal.: Sage.

LORRAINE, and H.C. WHITE
1971- "Structural equivalence of individuals in social networks" Journal of Mathematical Sociology, 1: 49-80.

LUKES, S.
1974- Power: A Radical View. NY: Macmillan.

LUHMANN, N.
1982- The Differentiation of Society. NY: Columbia.

MADDALA, G. S.
1983- Limited-Dependent and Qualitative Variables in Econometrics. Cambridge, Mass.: Cambridge University Press.

MARCH, J. and H. SIMON
1959- Organizations. NY: Wiley.

MARCUS, P. and A. W. SHELDON
1983- Interagency Delivery of Mental Health Services to the Aged. Final Report to NIMH. East Lansing: Michigan State University.

MARCUS, P. and K. SMITH
1980-"Networks of employment services for hispanics in seven Michigan cities" Research proposal submitted to the Employment and Training Administration, U.S. Department of Labor.

MARSDEN, P.V.
1981- "Models and methods for characterizing the structural parameters of groups" Social Networks, 3: 1-27.

MARSDEN, P.V.
1983- "Restricted access in networks and models of power" American Journal of Sociology, 88: 686-717.

MARSDEN, P.V. and E. O. LAUMANN
1977- "Collective action in a community elite" In R. J. Liebert and A. W. Imershein (eds.) Power, Paradigms , and Community Research, pp. 199-250. Beverly Hills, Cal., Cal.: Sage.

MARSH, R.M. and H. MAMMARI
1981- "Technology and size as determinants of the organizational structure of Japanese factories" Administrative Science Quarterly, 26: 33-57.

MARTIN, R.
1975- The Sociology of Power. London: Routledge & Keagan.

MAYNARD SMITH, J.
1982- Evolution and the Theory of Games. NY: Cambridge University.

McFARLAND, D. AND D.J. BROWN
1973- "Social distance as a metric: a systematic introduction to smallest space analysis" in E. O. Laumann (ed.) Bonds of Pluralism: the form and substance of urban social networks, pp. 213-53. NY: Wiley.

McKELVEY, B.
1982- Organizational Systematics. Berkeley: University of California.

McPHERSON, M.
1983- "An ecology of affiliation" American Sociological Review, 48: 519-33.

MERTON, R. K.
1975- "Structural Analysis in Sociology" in P. M. Blau (ed.) Approaches to the Study of Social Structure, pp. 21-52. NY: Free Press.

MESSNER, S. F.
1980- "Blau's theory of occupational differentiation" Sociology of Work, 7: 395-424.

MILLER, J. G.
1965- "Living Systems: Basic concepts" Behavioral Science, 10: 193-237.

MILLER, J. G.
1976- "The nature of living systems" Behavioral Science, 21: 295-319.

MIZRUCHI, M.S.
1982- The American Corporate Network. Beverly Hills, Cal.: Sage.

MIZRUCHI, M.S. and D. BUNTING
1981- "Influence in corporate networks: an examination of four measures" Administrative Science Quarterly, 26: 475-90.

NADEL, S.F.
1957- The Theory of Social Structure. NY: Free Press.

NAGEL, E.
1961- The Structure of Science. NY: Harcourt-Brace.

NAMENWIRTH, J.Z.; R. L. MILLER and R. P. WEBER
1981- "Organizations have opinions: a reconsideration of publics" Public Opinion Quarterly, 45: 463-76.

NAVILLE, P.
1961- "Classes sociales et classes logiques" Annee Sociologique, Paris: PUF.

NIELSEN, F.
1978- "A population ecology model of collective action" Paper presented to the meetings of the Southern Sociological Society in New Orleans.

NUNALLY, J. C.
1979- Psychometric Theory. NY: Mc.Graw Hill.

OLSON, M.
1965- The Logic of Collective Action. Cambridge, Mass.: Harvard University.

OSSOWSKI, S.
1963- Class Structure in the Social Consciousness. London: Routledge and Kegan Paul.

PATTEE, H. (ed.)
1973- Hierarchy Theory: The Challenge of Complex Systems. NY: Braziller.

PAULSON, S. K.
1976- "A theory and comparative analysis of interorganizational dyads" Rural Sociology, 41: 311-29.

PEAY, E. R.
1974- " Hierarchical Clique Structures" Sociometry, 37: 54-65.

PENNINGS, J.M.
1980- Interlocking Directorates. San Francisco: Jossey-Bass.

PERROW, C.
1961- "Organizational prestige: some functions and dysfunctions" American Journal of Sociology, 66:335-49.

PERROW, C.
1967- "A framework for the comparative analysis of organization" American Sociological Review, 32 : 156-63.

PERROW, C.
1970- Organizational Analysis: A Sociological View.

PFEFFER, J.
1981- Power in Organizations. Boston: Pitman.

PFEFFER,J. AND G. SALANCIK
1978- The External Control of Organizations: a Resource Dependence Perspective. NY: Harper and Row.

PHILLIPS, D. P. and R. H. CONVISER
1972- "Measuring the structure and boundary properties of groups: some uses of information theory" Sociometry, 35: 235-54.

POULANTZAS, N.
1975- Classes in Contemporary Capitalism. London: New Left.

PUGH, D. S.; D.J. HICKSON et al.
1968- "Dimensions of organization structure" Administrative Science Quarterly, 13: 65-91.

PUGH, D. S.; D.J. HICKSON et al.
1969- "The context of organization structures" Administrative Science Quarterly, 14: 91-114.

RADCLIFFE-BROWN, A.R.
1957- A Natural Science of Society. Gencoe,Ill.: Free Press.

RAPOPORT, A.
1979- "A probabilistic approach to networks" Social Networks, 2:1-18.

RAPOPORT, A. and W.J. HORVATH
1978- "A Study of a large sociogram" General Systems, xxiii: 41-50. (reprint from Behavioral Science, 6: 279-91, 1961).

ROBERTS, F.S.
1979- "Graph theory and the social sciences" In R. J. Wilson and K. W. Beineke (eds.) Applications of Graph Theory. NY: Academic.

ROGERS, D. L.
1974- "Sociometric analysis of interorganizational relations: application of theory and measurement" Rural Sociology, 39: 487-503.

ROGERS, M.
1974- "The bases of power" American Journal of Sociology, 79: 1418-33.

ROSSI, I.
1981-" Transformational Structuralism: Levi-Strauss' Definition of Social Structure" in P. M. Blau and R.K. Merton (eds.) Continuities in Structural Inquiry, pp. 51-80, Beverly Hills, Cal.: Sage.

ROURKE, F. E.
1976- Bureaucracy, Politics, and Public Policy. Boston: Little-Brown.

RYTINA, S.
1980- "Differentiation Reconsidered". Ph.D. Dissertation, University of Michigan.

RYTINA,S.
1982- "Structural constraints on Intergroup Contact: size, proportion and Intermarriage" in P. Marsden and N. Lin Social structure and network analysis, pp. 81-100. Beverly Hills, Cal.: Sage.

RYTINA, S. AND D. MORGAN.
1982- "The Arithmetic of Social Relations: The Interplay of Category and Network" American Journal of Sociology 88: 88-113.

SAMPSON, R. J.
1984- "Group Size, Heterogeneity, and Intergroup Conflict: A Test of Blau's Inequality and Heterogeneity" Social Forces, 62: 618-639.

SAUSSURE, F. de
1959- Course in General Linguistics. NY: Philosophical Society.

SCHELLING, T.C.
1977- Micromotives and Macrobehavior. NY: Norton.

SCHMIDT, S. and T. A. KOCHAN
1977- "Interorganizational relationships: patterns and motivations" Administrative Science Quarterly, 22: 220-34.

SCHWARTZ, J. and C. WINSHIP
1980- "The welfare approach to measuring inequality" Sociological Methodology 1980, pp. 1-36.

SCOTT, W. R.
1981- Organizations: Rational, Natural, and Open Systems. NJ: Prentice-Hall.

SEIDMAN, S.B.
1983- "Internal cohesion of LS in graphs" Social Networks, 5:97-108.

SEIDMAN, S.B. and B.L. FOSTER
1978- "A graph-theoretic generalization of the clique concept" Journal of Mathematical Sociology, 6: 139-54.

SIMON, H.
1973- "The organization of complex systems" In H. Pattee (ed.) Hierarchy Theory, pp. 1-29. NY: Braziller.

SIMON, H.
1981- The Sciences of the Artificial 2nd.Ed. Cambridge, Mass.: MIT.

SKVORETZ, J.
1982- "Comment on Fararo's 'biased networks and social structure theorems'" Social Networks, 3: 313-15.

SKVORETZ, J.
1983- "Salience, heterogeneity and consolidation of parameters" American Sociological Review, 48: 360-75.

SKVORETZ, J. and T. J. FARARO
1983- "Salience, inequality and consolidation of parameters: formalizing Blau's primitive theory.Part ii" Unpublished paper, University of South Carolina.

SOROKIN, P.
1927- Social Mobility NY: Free Press.

SPAETH, J. L.
1979- "Vertical differentiation among occupations" American Sociological Review, 44: 746-62.

TAAGEPERA, R. and J. L. RAY
1977- "A Generalized Indes of Concentration" Sociological Methods and Research, 5: 367-84.

TAYLOR, M.
1969- "Influence structures" Sociometry, 32: 491-502.

THEIL, H.
1967- Economics And Information Theory. Chicago: Rand McNally.

THOMPSON, J. D.
1967- Organizations in Action. NY: McGraw-Hill.

TURNER, J.
1984- Societal Stratification. NY: Columbia University.

TURK, H.
1970- "Interorganizational Networks in Urban Society" American Sociological Review, 35: 1-19.

TURK, H.
1973- Interorganizational Activation in Urban Communities. Washington: American Sociological Association.

TURK, H.
1977- Organizations in Modern Life. San Francisco: Jossey-Bass.

WALLACE, W.L.
1981- "Hierarchic Structure in Social Phenomena" in P.M. Blau and R.K. Merton (eds.) Continuities in Structural Inquiry, pp. 191-234. Beverly Hills, Cal.: Sage.

WALLACE, W.L.
1983- Principles of Scientific Sociology. NY: Aldine.

WARRINER, C.K.
1981- "Levels in the Study of Social Structure" in P.M. Blau and R.K. Merton (eds.) Continuities in the Study of Social Structure, pp. 179-90. Beverly Hills, Cal.: Sage.

WARWICK, D.P.
1975- A Theory of Public Bureaucracy. Cambridge, Mass.: Harvard.

WEBER, M.
1964- The Theory of Social and Economic Organization. NY: Free-Press.

WEBSTER, J.R.
1979- "Hierarchical Organization of Ecosystems" in Theoretical Systems Ecology, pp.119-29. NY: Academic.

WELLMAN, B.
1983- "Network analysis: some basic principles" Sociological Theory 1983: 155-200.

WHETTEN, D.A.
1981- "Interorganizational relations: a review of the field" Journal of Higher Education, 52: 1-28.

WHITE, D. and K. P. REITZ
1983- "Graph and semigroup homomorphisms on networks of relations" Social Networks, 5: 193-234.

WHITE, H.C.; S. BOORMAN and R. BREIGER
1976- "Social structure from multiple networks. I Blockmodels of roles and positions" American Journal of Sociology, 81: 730-80.

WHITE, H.
1980- "A heteroskedasticity-consistent covariance matrix estimator and a direct test for heteroskedasticity" Econometrica, 48: 817-38.

WHITE, P. E.
1974- "Intra and inter-organizational studies: do they require different conceptualizations ?" Administration and Society, 6:107-52.

WHITE, P. E., S. LEVINE and G. J. VLASAK
1971-"Exchange as a conceptual framework for understanding interorganizational relationships: application to non-profit organizations" In A. Negandhi (ed.) Interorganization Theory, pp. 196-209. Kent, Ohio: Kent State University.

WHITE, P.E. and G.J. VLASAK
1973- Substantive Problems in Interorganizational Relationships in Health. Mimeo.

WHYTE,L. L.; A.G. WILSON and D. WILSON (Eds.)
1969- Hierarchical Structures. NY: Elsevier.

WILLIAMSON, O.
1975- Markets and Hierarchies. NY: Free Press.

WINSHIP, C. and M. J. MANDEL
1984-"Roles and positions: a critique and extension of the blockmodelling approach" Sociological Methodology 1983/1984, pp. 314-44.

WOODWARD, J.
1965- Industrial Organization: Theory and Practice. NY: Oxford University.

WRONG, D.
1979- Power: Its Forms, Bases and Uses. NY: Harper & Row.

WU, L. L.
1984- "Local blockmodel algebras for analyzing social networks" Sociological Methodology 1983/1984, pp. 272-313.

ZALD, M. N.
1970- "Political economy: a framework for comparative analysis" In M. N. Zald (ed.) Power in Organizations. Nashville, Ten.: Vanderbilt University.