The integration of interorganizational networks: domain consensus and interdependence in organizational dyads

Joseph John Molnar
Iowa State University

Follow this and additional works at: https://lib.dr.iastate.edu/rtd

Part of the Sociology Commons

Recommended Citation

This Dissertation is brought to you for free and open access by the Iowa State University Capstones, Theses and Dissertations at Iowa State University Digital Repository. It has been accepted for inclusion in Retrospective Theses and Dissertations by an authorized administrator of Iowa State University Digital Repository. For more information, please contact digirep@iastate.edu.
INFORMATION TO USERS

This material was produced from a microfilm copy of the original document. While the most advanced technological means to photograph and reproduce this document have been used, the quality is heavily dependent upon the quality of the original submitted.

The following explanation of techniques is provided to help you understand markings or patterns which may appear on this reproduction.

1. The sign or "target" for pages apparently lacking from the document photographed is "Missing Page(s)". If it was possible to obtain the missing page(s) or section, they are spliced into the film along with adjacent pages. This may have necessitated cutting thru an image and duplicating adjacent pages to insure you complete continuity.

2. When an image on the film is obliterated with a large round black mark, it is an indication that the photographer suspected that the copy may have moved during exposure and thus cause a blurred image. You will find a good image of the page in the adjacent frame.

3. When a map, drawing or chart, etc., was part of the material being photographed the photographer followed a definite method in "sectioning" the material. It is customary to begin photoing at the upper left hand corner of a large sheet and to continue photoing from left to right in equal sections with a small overlap. If necessary, sectioning is continued again — beginning below the first row and continuing on until complete.

4. The majority of users indicate that the textual content is of greatest value, however, a somewhat higher quality reproduction could be made from "photographs" if essential to the understanding of the dissertation. Silver prints of "photographs" may be ordered at additional charge by writing the Order Department, giving the catalog number, title, author and specific pages you wish reproduced.

5. PLEASE NOTE: Some pages may have indistinct print. Filmed as received.

University Microfilms International
300 North Zeeb Road
Ann Arbor, Michigan 48106 USA
St. John's Road, Tyler's Green
High Wycombe, Bucks, England HP10 8HR
MOLNAR, Joseph John, 1950-
THE INTEGRATION OF INTERORGANIZATIONAL NETWORKS: DOMAIN CONSENSUS AND INTERDEPENDENCE IN ORGANIZATIONAL DYADS.

Iowa State University, Ph.D., 1976
Sociology, general

Xerox University Microfilms, Ann Arbor, Michigan 48106
The integration of interorganizational networks: 
Domain consensus and interdependence in organizational dyads

by

Joseph John Molnar

A Dissertation Submitted to the 
Graduate Faculty in Partial Fulfillment of 
The Requirements for the Degree of

DOCTOR OF PHILOSOPHY

Department: Sociology and Anthropology
Major: Sociology

Approved:

Signature was redacted for privacy.

In Charge of Major Work

Signature was redacted for privacy.

For the Major Department

Signature was redacted for privacy.

For the Graduate College

Iowa State University
Ames, Iowa

1976
## TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Introduction</td>
<td>1</td>
</tr>
<tr>
<td>II</td>
<td>Theoretical Orientation</td>
<td>16</td>
</tr>
<tr>
<td>III</td>
<td>Methods</td>
<td>62</td>
</tr>
<tr>
<td>IV</td>
<td>Findings and Discussion</td>
<td>105</td>
</tr>
<tr>
<td>V</td>
<td>Summary and Implications</td>
<td>144</td>
</tr>
<tr>
<td></td>
<td>References</td>
<td>163</td>
</tr>
<tr>
<td></td>
<td>Acknowledgments</td>
<td>175</td>
</tr>
<tr>
<td></td>
<td>Appendix</td>
<td>176</td>
</tr>
</tbody>
</table>
CHAPTER I. INTRODUCTION

Chapter I will include (1) identification of the research problem; (2) a discussion of the significance of the research problem; and (3) the contributions of the thesis to the study of interorganizational relations.

The Research Problem

There is a need for greater understanding of the antecedents of integration in interorganizational networks. Integration has been studied on the societal level (Durkheim, 1933), in communities (Angell, 1951; 1968), and within individual organizational systems (Lawrence and Lorsch, 1967). Only recently has it been introduced to the study of interorganizational systems (Metcalfe, 1976).

Two types of integration, normative and functional, stem directly from a societal-level theory of social solidarity developed by Emile Durkheim in The Division of Labor. The direct counterparts to these concepts on the interorganizational level of analysis are domain consensus and interdependence. Domain consensus refers to shared definitions of responsibilities between organizations; interdependence refers to patterns of collaborative activity between organizations. The general objective of this dissertation is to examine the relationship between domain consensus and interdependence, and to relate these two types of integration to comparative properties of organizational dyads.

The model of integration developed here is a simple one, but one
that has received very little empirical attention (Angell, 1968). It is an elaboration of the general proposition that similarity is associated with normative integration, and that differences are associated with functional integration (Durkheim, 1933; Hawley, 1950). Normative integration is based on common values which unite the members of a social system and functional integration derives from interrelated activities and needs. An important question is how each type of integration operates in interorganizational systems, and to what extent the proposition generalizes across different units of analysis.

Two major approaches to the study of interorganizational relations are the comparative and the relational (Marrett, 1971). The comparative approach focuses on the similarities or differences of interacting organizations on certain attributes or dimensions. This approach should not be confused with the comparative study of organizations, which refers to studies of large numbers of organizations (Yarrow, 1961).

The relational approach focuses on the linkages between organizations. These properties reflect interaction between organizations, and include domain consensus and interdependence. A number of writers have suggested that domain consensus and interdependence (relational properties) are related to the comparative properties of the interacting organizations (Miller, 1958; Reid, 1969; Marrett, 1971). This study examines comparative properties as determinants of relational properties within organizational dyads, with the understanding that integration is reflected in the character of relations between elements of a system.
Importance of studying interorganizational relations

The study of interorganizational systems has received greater attention in recent years. Coleman (1972) describes the importance of organizations as actors in a society and the extensive power they wield in contrast to individuals as actors. The structure of relationships among collective actors is an emergent phenomenon of modern society and part of the process of rationalization that Weber (1947) termed Vergesellschaft. This process is reflected in the tendency for the web of governmental units to become increasingly interconnected under norms of administrative efficiency and comprehensive service. The advance of bureaucratic interconnectedness has created networks of greater scope than ever before thought possible. The networks have grown faster than the ability of individual members of a society to understand the complex influences exerted by these sets of collective actors. A similar phenomenon is occurring in the private sector, as demonstrated by the rise of complex financial and ownership arrangements associated with conglomerates in this country, and the global reach of multinational corporations. Benson (1975) has noted that interorganizational networks are a basic feature of modern society.

The focus of this study is on relationships among county-level government agencies responsible for managing natural resources. The dynamics and implications of the activities of local interorganizational networks may not be as dramatic as those on the state or federal levels, but the magnitude and value of resources these agencies oversee on a day-to-day basis makes the value of studying and understanding their...
activities as important as the other levels.

Several interrelated forces have tended to encourage integration among the activities of natural resource management agencies. The environmental movement has heightened concern for protecting natural resources by promoting a comprehensive view of natural systems and human activity (Morrison et al., 1972). New environmental legislation, particularly NEPA, has tended to expand existing interagency activity, and to create new linkages where none before existed (O'Riordan, 1976). Increasingly, interagency networks are seen as important mechanisms for protecting and managing a dwindling supply of natural resources.

It is important to study networks of resource managers because of the need to understand which factors lead to effective linkages between organizations, and to identify the outcomes of these linkages. Ogle (1972) described some of the situational factors that led to effective interagency working relationships among a network of resource agencies which included similarities and differences. The comparative properties of organizations that comprise a network may be important factors that impede or facilitate interorganizational activity. Many environmental problems exceed the scope of any one particular agency's responsibility, requiring a coordinated response by a number of interrelated groups.

The research problem is to understand the determinants of integration among agencies that manage natural resources. Are regularities in the structure of relationships among agencies in the network associated with the characteristics of the organizations that compose the network?

Normative integration is the degree to which the standards of a
group constitute effective norms for the behavior of its members (Landecker, 1951). Among organizations, normative integration is manifested in consensus over organizational domain. Domain consensus is manifested in congruence between specific expectations of organization set members and the intentions of a focal organization (Metcalfe, 1976). Some of these expectations may be culturally based, and hence include some aspects of cultural integration. Domain consensus is directly analogous to role consensus within a small group, and cultural and role expectations may be similarly intermingled. Some expectations for a role occupant stem from the role itself and others from her membership in a particular culture or society.

Functional integration refers to the exchange of services among members of a group, as well as a division of labor among members (Landecker, 1951). As the process of arranging transactions and coordinating tasks involves communication, communicative integration will be treated as a part of functional integration in this study. Functional integration is reflected in interdependence and deliberate coordination of the sometimes disparate activities of the members of an organization set (Metcalfe, 1976:339).

In the study of interorganizational relations, integration has been examined as a key outcome variable, particularly the degree to which relationships are cooperative, are coordinated, and involve the sharing or exchange of resources (Rogers and Molnar, 1975; White, 1974b). A central focus of the interorganizational relations literature has been the identification of factors that determine the occurrence, intensity,
and character of an organization's relations with other groups.

The study of integration in interorganizational relations focuses on properties of the relationships between organizations, particularly in reference to a limited set or network of organizations that defines the pattern of relationships to be considered. This study examines two types of integration, domain consensus and interdependence, in relationships between resource management agencies.

Units of analysis in interorganizational theory

The unit of analysis in the study of interorganizational relations varies widely. Units employed at the interorganizational level are the interorganizational field, the organization set or network, and the organizational dyad. A common unifying thread to this literature is the view of organizations as open systems as "systems within systems" (Haas and Drabek, 1973:85), or as "complexes of elements standing in interaction" (von Bertalanffy, 1968:33).

The most inclusive unit of analysis to date is called the interorganizational field (Warren, 1967; Rogers, 1974b). Warren views the interorganizational field as a structured situation in which the various organizations interact in such a way that their mutual influence tends to exceed the borders of the units involved. The configuration or network of organizations may present a variable context for the existence and activity of other organizations in the field (Emery and Trist, 1965; Turk, 1973).

A related, but more narrowly delimited unit of analysis is the
concept of organization set (Evan, 1965; 1966). An organization set is defined in terms of the network of interactions maintained by a single "focal organization" with other organizations in its environment; a group of organizations that share each other's presence in a common task environment. Evan (1965) suggests that organization sets may vary among different types of organizations under varying environmental conditions. The properties of the set also may have consequences for a given focal organization as a contextual variable representing the character of the organizational environment (Coleman, 1960; Emery and Trist, 1965).

Interorganizational fields and organization sets represent configurations of linkages among organizations. An intermediate system lying between the organization set and the individual organization is the organizational dyad or pair of organizations. The dyad is the nexus of interorganizational interaction. A central concern of interorganizational theory and research is the level and kind of linkage between two organizations. Simmel (1956:122) notes:

the simplest sociological formation, methodologically speaking, remains that which operates between two elements. It contains the scheme, germ, and material of innumerable more complex forms. . . . Not only are many general forms of sociation realized in it in a very pure and characteristic fashion; what is more, the limitation to two members is a condition under which alone several forms of relationship exist . . . occasionally these forms exist as much between two groups - families, states, and organizations of various kinds - as between two individuals.

The organizational dyad offers several advantages as a focus for investigation. First, the dyad is the most central interorganizational unit of analysis. Cooperation, conflict, exchange, and domain consensus
are directly manifested and observed in bilateral relations between or-

ganizations. Larger systems of interaction may be operative, but re-
source flows and communication occur in elemental form between indi-
vidual organizations, two at a time.

Second, because network properties are derived in most part from
relations between organizations, dyadic analysis permits the examination
of emergent properties of the group in relation to the interaction
properties of individual dyads (Blau, 1960). Frequently dyadic linkages
are aggregated to obtain field or set properties, such as clique struc-
ture and measures of cohesion and integration (Kemper, 1972; Rogers,
1974b). Aggregated dyadic properties may be variable properties of net-
works, and can be employed as contextual variables.

Third, the dyad permits the analysis of purely relational proper-
ties of organizations in conjunction with comparative properties of dy-
adic components. The similarity, complementarity, or congruence of
organizations may in large part determine the nature of relations between
them. The present study will more fully explore the implications asso-
ciated with the third advantage of the dyad in the study of interorganiza-
tional relations.

The number of previous studies that examined organizational dyads
is limited (Benson, 1975; Aldrich, 1974; Warren, 1974). None of the
reviewed studies examined the comparative properties of dyads and their
consequences for interdependence or domain consensus in interorganiza-
tional relationships.
Public and private organizations

Several writers have detailed the importance of differences between business firms and public agencies (Downs, 1967; Wamsley and Zald, 1973; Parsons, 1974; Molnar and Rogers, 1976). These differences argue for separate conceptualizations of the dynamics of public and private organizations. Each type presents a distinct context for theorizing and analysis.

Meyer (1975) identifies three consequences of neglecting the systematic differences between bureaus and firms. First, overgeneralization is associated with the extension of concepts from one organizational type to another that may possess wholly different purposes. Second, specialized forms of organizational behavior are associated with each type, reflecting dissimilar internal environments. Finally, certain questions of public policy rest on this distinction, particularly with respect to whether certain services are best provided by the public or private sectors (Wamsley and Zald, 1973; Rushing, 1974).

Differences between public and private sectors are clearly manifested in the dynamics of organizational domains. Business firms generally operate under unstable and competitive domain conditions. Bureaus operate with a relatively fixed clientele, where once established, continued existence and growth is all but assured. Public organizations attempt to carve out a relatively unoccupied domain in the totality of policy space (Downs, 1967:313). Unlike private organizations, bureaucratic domains are most vulnerable to change through the political process, particularly budget decisions, legislation, and executive order.
Private and public organizations each use characteristic methods to build environmental support for their domains. Private organizations use strategies such as advertising, technological innovation, and other means to build demand for their products and services. Public organizations, in contrast, acquire additional support in exchange for policy commitments to constituencies, by identifying their activities with important values held by client-support groups, and by building the prestige of the agency (Wildavsky, 1964; Perrow, 1961).

A differential climate for interorganizational relations exists within the public and private sectors. Relations between private organizations are supposed to operate under a competitive, free-market ethos. Too much contact between organizations is viewed as deleterious to the marketplace, and antitrust laws exist to regulate this activity. Public organizations operate under norms of administrative efficiency and consistency. Organizations are directed to work together to eliminate duplication and to deliver better, more comprehensive services. Inter-organizational relations are encouraged, and in many cases, mandated.

Noting these contextual differences between public and private organizations, this study considers only relations among public agencies. Domain consensus and interdependence are important concepts in the study of business organizations, but must be considered in light of a different set of operating assumptions and interpretations that will not be discussed here.
Significance of the Problem

The concept of integration is a potential starting point for the development of a comprehensive theory of interorganizational relations. Two key aspects of relations among goal-oriented collectivities are domain consensus and interdependence (Levine and White, 1961; Benson, 1975). Domain consensus reflects normative integration among organizations and is an important factor in explaining the outcomes of interorganizational systems. It is manifested in attributions of responsibility and probable action held by outside groups that are congruent with an organization's own claims and intentions. Domain consensus is an important guide for ordering the actions of participants in an interorganizational system.

Interdependence reflects the functional integration of an interorganizational network, as well as the structure of relations among organizations, which enables a network to operate as an effective unit. Exchanges of resources are associated with higher levels of commitment to relationships and the establishment of stable linkages among the elements of a network.

Integration is a significant means for predicting and understanding interorganizational activity. An integrated network presents a context in which interorganizational activity is more likely to occur and obtain desired outcomes. Very little empirical research has been directed to the study of integration in interorganizational systems (Metcalf, 1976).

Integration is of practical significance to decision-makers who must
relate the activities of their organizations to other groups, which are part of the larger system in which they operate. Many substantive problems exceed the scope of any single agency's responsibilities; some problems are not clearly defined as lying within any single agency's jurisdiction. Networks integrated by well-established working relations among organizations may more readily respond to complex problems by defining responsibilities and evolving comprehensive interorganizational responses.

Some resource management problems represent societal dilemmas or matters of state or national policy that are not resolvable at the local level. A subset of natural resource problems are definable within the scope of the activities of local resource management networks. The underlying significance of the research problem is the need for greater knowledge of the mechanisms that enable groups of agencies to function as networks. The problem, therefore involves identifying the structural conditions that counteract effective interagency working relations and responses to locally definable resource management problems.

Contributions of the Study

The study is considered to make seven contributions. First, it will review and interrelate previous conceptualizations of social integration, particularly normative and functional integration and their analogues on the interorganizational level of analysis, domain consensus and interdependence, and will attempt to clarify the different interpretations regarding the relationship between these two concepts.
Second, the empirical measures utilized in this research reflect greater specification of the concepts. Previous studies of domain consensus have been based on single item indicators (Braito, Paulson, and Klonglan, 1972; Vacin, 1972). No studies were found that used a multiple indicator approach. Most previous studies of interdependence among organizations have focused on a single aspect of interorganizational relations. This study will employ empirically derived summary indices of sets of indicators, developed through canonical correlation analysis.

Third, the organizational dyad has not been extensively employed as a unit of analysis in the study of interorganizational relations. Few studies have examined comparative properties in organizational dyads. This study focuses on the consequences of comparative properties for interorganizational relations.

Fourth, the methodological approach of canonical correlation is a technique only recently introduced to sociological analysis. It is a means for summarizing the relationship between theoretically meaningful sets of variables, permitting inferences to be drawn about the relationship between the abstract concepts represented by each set of variables.

Fifth, the research strategy undertaken, that of correlating sets of relational variables to sets of comparative attribute variables in organizational dyads, is unique to this study. Psychological research has examined the relationship between sets of attitudinal variables and sets of behavioral variables, and studies conducted by political scientists have examined attribute variables and relational properties in international relations. To the writer's knowledge, no research has
examined relationships between sets of attribute and relational variables in the context of interorganizational relations.

Sixth, a multivariate approach enables the combined assessment of the various categories of comparative properties to determine their aggregated contributions in explaining domain consensus and interdependence variables. No studies were found that related these variables to comparative organizational properties of interorganizational dyads.

Finally, the validity and usefulness of composites formed in canonical analysis will be assessed. The potential advantages and limitations of the technique will be summarized and recommendations will be made for future utilization of canonical correlation in sociological research.

Research Objectives

The objectives of this study are:

1) To develop the concept of social integration, linking it to domain consensus and interdependence in organizational dyads, and to relate these concepts to comparative organizational properties. The comparative organizational properties are: organizational output; output constituency; organizational decision-making; and decision-maker characteristics.

2) To develop specific sets of indicators for each type of integration and the four sets of comparative organizational properties.

3) To determine the relationship between domain consensus and interdependence, and the relationship between each type of integration and the four sets of comparative organizational property variables.
4) To examine the overall relationship between composite comparative property variables and composite domain consensus and interdependence variables.

5) To assess the validity and usefulness of canonical correlation as a research procedure.

**Organization of effort**

The theoretical orientation of this thesis will be developed in Chapter II. Theory and research on complex organizations and interorganizational relations, exchange theory, and social integration theory will be discussed and integrated. The concepts used in the study will be stated and hypotheses derived.

Chapter III will describe the methods and procedures used in the present research. The sample and data collection procedures will be described, and the empirical hypotheses presented. In addition, the measures and analysis strategy will be discussed in this chapter.

The empirical findings will be presented and the hypotheses evaluated in Chapter IV. The major findings and implications of the study will be discussed in Chapter V.
CHAPTER II. THEORETICAL ORIENTATION

Introduction

The purposes of this chapter are to develop a framework for analyzing two properties of interorganizational relationships, to identify major dimensions for comparing organizations, and to derive hypotheses that link relational and comparative properties. The chapter begins by introducing social integration theory as a context for studying interorganizational networks. Open system and exchange perspectives will be used to explain relationships within interorganizational networks. Hypotheses will be derived to link relational properties of organizational dyads to comparative properties of the dyads.

Complex organization defined

Bertrand (1972:45) identifies a complex organization as a large-scale social system whose parts are functionally related in terms of a common goal. Similarly, Parsons (1956:69) uses the primacy of orientation to the attainment of a specific goal as a defining characteristic that distinguishes an organization from other types of social systems. In this study, complex organization refers to a social unit oriented to the realization of specific goals (Etzioni, 1975:111). Other terms that refer to the same class of phenomena are "formal organization", "large-scale organization", and "bureaucratic organization" (Blau and Scott, 1962:4).

A complex organization is distinguished from other units of social
organization by its internal relations of authority and its orientation to a specified goal or purpose. A small group is not an organization because it does not contain formal authority relations. A community is not organized for the attainment of a specific goal. A complex organization, then, is a unique unit of social organization.

Social Integration Theory

Two basic theories of social integration are part of the sociological analysis of collectivities. These two explanations about how social organizations achieve and maintain unity are the normative and functional integration perspectives (Olsen, 1968:159). Angell (1968:382) refers to these perspectives as the "common orientation" and "interdependence" theories, respectively. Both have been directed toward explaining the cohesiveness of elements in a social system.

The best known discussion of the two theories of social integration is Durkheim's *The Division of Labor*. Durkheim (1933) argued that mechanical solidarity characterized primitive communal societies, while organic solidarity is associated with the increasing differentiation of modern societies and greater interdependence among specialized parts. He foresaw an evolutionary replacement of mechanical by organic solidarity in the development of modern society, but he later modified his approach to allow for the concurrent operation of the two processes. Many contemporary theorists argue that both normative and functional integration occur together as complementary processes because even cooperation based on common values requires a simple division of labor.
Normative integration

Common values and the homogeneity of individuals in a society are the basic elements of normative integration. A unit of social organization is normatively integrated to the degree that it has developed an adequate and internally consistent set of norms (Olsen, 1968:160). Normative integration grows out of likeness or homogeneity among elements. It also is called common value integration because its bonds are the shared orientation and outlooks of participants. The basic affinity that occurs among elements is explained in terms of their similar characteristics and traits.

Normative integration is central to the operation of a social system (Parsons, 1960). It is associated with norms that apply to persons in general, to collectivities, and to structured roles within collectivities and begins with the accumulation of norms through repeated interaction. Previous interactions provide the context for new interactions in which adjustment and reinterpretation of expectations take place; these new expectations are the starting point for further interaction (Turner, 1974). Parsons (1960) calls this structure-building process "institutionalization".

One of the most important sets of norms associated with organizations as collectivities are those pertaining to their regular activities and concerns, or domain. The process of establishing domain is the process of institutionalizing the set of norms associated with the organization's activities in a larger system.
Normative integration in a network of organizations is indicated by the level of consensus on norms regarding domain. Domain consensus represents agreement on an important subset of norms that govern the way organizations carry out their activities and their relationships with other groups. These ideas will be further developed in the discussion of open systems theory.

**Functional integration**

Functional integration is the degree to which there is mutual interdependence among the units of a collectivity (Landecker, 1951). It develops as complementary relationships among specialized and interdependent subparts and established and maintained through unified coordination (Olsen, 1968:161). Durkheim (1933) argued that as the number and complexity of different elements of a society increases, the web of interdependence among the parts increases. Reliable linkages among the elements permits further specialization, increasing the dependence of parts, one to the other, and the integration of the whole. Interdependence is the bonding process of functional integration.

The elements of a system may be interdependent; they also may possess mechanisms for insulating their activities from one another. The tendency for subparts to resist subordination and full specialization is called functional autonomy (Gouldner, 1959:110). A system may never become wholly unified because it must balance the integrative forces with the separate and stable characteristics of its subparts. The drive of the subparts to maintain and extend their functional autonomy
moderates the level of integration that occurs in the larger whole. Concerns for functional autonomy also limit the level of specialization a subpart is willing to undergo.

Specialization encourages complementary dependence among parts, for the specialized needs of one unit must correspond to the specialized outputs of other units. Exchange theory appears to offer a mechanism for explaining interdependence and specifying when it occurs and how it is maintained. Interdependence alone, however, does not fully account for the operation of exchange processes. Normative structures provide the starting mechanisms for the exchange processes, and control their continued operation (Parsons, 1960).

The argument for the simultaneous operation of normative and functional integration is based on the notion of trust. Individuals must have some basis for engaging in initial exchanges. Normative mechanisms provide a means for entering into exchange relations that are not immediately rewarding, as well as a basis for participating in exchange systems where returns are indirect or delayed. The norm of reciprocity has been cited as a mechanism that provides the minimal grounds necessary for confidence and a willingness to initiate action (Gouldner, 1960).

Exchange Theory

Exchange theorists have viewed organizations as systems of interaction (Barnard, 1938; Whyte, 1948; Romans, 1950), and have proceeded on the premise that organizational systems can best be studied by analyzing the interactions among members. Similarly, studies of
interorganizational systems have focused on transactions among organizations (Levine and White, 1961; Adamek and Lavin, 1975; Rogers, 1974a; Molnar and Rogers, 1976).

Exchange theorists do not agree on the central aspects of the meaning and consequences of exchange relations. A major division in this perspective occurs between those emphasizing individualistic interpretations of exchange relations, and those who focus on collectivistic or structural interpretations of exchange relations (Ekah, 1974).

Some theorists have attempted to incorporate elements from both perspectives in explaining relations within and among collectivities (Blau, 1964; Coleman; 1964; 1966). Each recognizes interdependence as a key factor in maintaining group structure.

Collectivistic exchange

The idea that exchanges reinforce and integrate group structure was underscored in the work of Claude Levi-Strauss (1969:138): He stressed "it is the exchange which counts and not the things exchanged." For Levi-Strauss, the overriding importance of exchange lies in its consequences for the integration of group structure.

The collectivistic interpretation of reciprocity goes beyond the impulsion to return a benefit received. The obligation extends to benefiting another actor implicated in the exchange situation, i.e., A gives to C after receiving from B. An exchange relationship also may have implications for more than one individual or group of individuals, i.e., Actor A offers a benefit to the group BCD under the expectation that C will offer a similar benefit to the group ABD when A is a member.
Ekah (1974:55) states that these pooling or redistributive exchanges operate according to the law of extended credit. In a generalized exchange situation, the receipt of a benefit by one party is regarded as a benefit by all other parties and reciprocation is regarded as a credit by all of them.

Durkheim (1933) employed the concept of generalized exchange in focusing on functional integration in societies. Increasing interdependence enabled elements to specialize and become differentiated. In this perspective, social exchange processes generate integrative forces that provide a foundation for further specialization, and in turn, increasing interdependence. Interdependence implies that individuals share common sentiments of duty and responsibility, and provides confidence that some tasks will be performed by others. Generalized exchange and interdependence are the central mechanisms of functional integration.

The important contribution and emphasis of the collectivistic tradition in exchange theory is the residual over-arching bonds that are generated and renewed by individual transactions in an exchange system. Exchange processes emerge from patterns of social integration, and they also create and promote further integration through their reoccurrence. The collectivistic view of exchange thus argues that the instrumental value of the items exchanged is secondary to the integrative forces renewed and generated by the occurrence of exchange relations.
Individualistic approach

Theorists who take an individualistic approach to exchange relations tend to view society as a body of individuals that does not have an existence or emergent properties of its own. This viewpoint stresses the utilitarian, hedonistic orientation of actors in a social exchange situation. The most prominent individualistic exchange theorist is George C. Homans.

Homans and Schneider (1955) offered a critique and strong reaction to generalized exchange. They explicitly rejected the notions of indirect, generalized exchange, and focused on limited and direct exchanges among people engaged in face-to-face interaction. The authors state "We may call this an individual self-interest theory, if we remember that interests may be other than economic" (1955:15).

Arguing specifically for an emphasis on observable properties of interaction, Homans explicitly "rejected as having no final truth . . . Durkheim's assertion that society was an entity sui generis and that sociology was not a corollary of psychology" (1961:11).

There are many theoretical, conceptual, and logical difficulties embedded in Homans' arguments, as Turner (1974) and Ekah (1974) have ably pointed out. The critical aspect of Homans' image of society, however, is the linkage between institutional arrangements and the importance of pay-offs for individuals. Homans' principles deny the effectiveness of generalized exchange systems and the intrinsic rewards derived from participating in them.

Homans' limited and direct exchange refers mainly to individual-
level processes, and was not intended to encompass interaction between organizational entities or larger systems (Levine and White, 1961:599). Homans' theory is suggestive for larger systems, however, and the importance of both perspectives has been recognized by contemporary theorists attempting to described exchange processes among larger units of analysis.

**Synthesis**

Peter Blau's (1964) attempt to combine individualistic and collectivistic exchange theories largely emphasized the individualistic aspects of exchange (Ekah, 1974). Blau (1964) introduced collectivistic aspects of exchange relations in the notion of unspecified obligations of social exchange, differentiating social from economic exchange. The unstipulated returns for a favor received are recognized as distinct from the direct and limited exchange espoused by Homans. Blau, however, gives little credence to Gouldner's (1960) norm of reciprocity, stating that the fundamental starting mechanisms of patterned social interaction are found in the existential conditions of exchange (1964:192).

The notions of collectivistic exchange are represented in Blau's idea that social norms substitute indirect exchange for direct transactions between individuals (1964:259). Exchange transactions between the collectivity and individual members also replace some of the transactions between individuals. While he recognizes the importance of duration in exchange relations, a collectivistic position, Blau continues to emphasize self-interest motives as the basic mechanisms of social exchange.
Coleman (1964; 1966) presents a set of ideas regarding exchange relations within a collectivity, extending the exchange structuralism alluded to by Blau. Coleman bases his theory on the assumption that actors have a large set of votes on actions of varying interest to them. Through continued interaction, actors are able to barter their preferences on matters of various levels of interest to them. Rational actors pursuing selfish interests will delay and alter the expression of preferences on items of lesser utility, in expectations of outcomes on matters of greater utility. In reference to legislative activity this process is termed "logrolling".

The medium of exchange in Coleman's system is essentially power over actions, which include activity, interaction, and sentiments, a step higher in abstraction than Homans'. Coleman argues that the emergent properties of exchange systems are generated by observations of the long-term consequences of particular strategies of action. Individuals are socialized to norms insofar as they learn the relative distribution of outcomes associated with various actions.

Coleman locates the structural source of collective action in the generalized belief that compromising of interests will continue to occur in the future. Ongoing collective decisions are attributed to the continuity of rational self-interest in the actions of participating elements.

Generalized exchange systems contribute to group integration by giving participants a stake in the ongoing set of relationships, investing their continued cooperation for similar returns from other group members.
in the future. Distributive justice norms define the long-run expectations of participants and the kind of costs they may be expected to bear. It is the ongoing structure of exchanges, however, that creates and enhances the integration of a larger group or collectivity.

Generalized exchange is a central operating mechanism of integration, extending the implications of exchange relations beyond the immediate participants. In larger systems of interaction, not all members can engage in exchange transactions with all members on a continuous basis because of the number and complexity of relations involved. Some elements may exchange on an infrequent basis; others may be only indirectly linked. However, the knowledge that others enter into exchange relations when necessary, and are potentially capable of contributing their efforts when called upon to do so, is the integrating force of generalized exchange. A limited structure of interdependence may be the basis for more intensive and complete ties among group members on an occasional basis. Generalized exchange extends the effects of interdependence beyond the limited and direct benefits to immediate participants in transactions to the larger group or collectivity that could potentially benefit from similar exchanges.

Exchange process also operates in collectivities composed of organizations. The next section brings direct and generalized exchange principles to bear on some of the specific processes of interdependence among organizations.
Exchange and interorganizational relations

Exchange has been frequently employed as an underlying dynamic or inferred motive in relations between organizations (White, 1974b). Aiken and Hage (1968:912) observe that most studies of organizational interdependence essentially conceive of the organization as an entity that needs inputs and provides outputs, both of which link it to other organizations via the mechanisms of exchange transactions.

Exchange principles provide an explanation about how decision-makers evaluate the investment of organizational resources in relationships with other groups. The concepts of costs, benefits, and reciprocity have proven useful in accounting for interorganizational decisions (White, 1974a).

Levine and White (1961) developed one of the first exchange models of relations between organizations and defined exchange as:

any voluntary activity between two organizations which has consequences, actual or anticipated, for the realization of their respective goals and objectives (1961:586).

They specifically noted that current definitions of exchange are limited because they are economic and their referents are mainly individual or psychological phenomena not intended to encompass the interaction between organizations (Levine and White, 1961:586). They also broadened the time dimension for gratification beyond that of the immediate present and allowed for duration and continuity in exchange relationships.

Klonglan et al. (1972) described some major theoretical assumptions about exchange in interorganizational relations. They argued that previous studies assumed:
Organizations are faced with a situation of limited resources. Organizations must obtain resources from other units in the task environment. Drawing on outside resources reduces an organization's autonomy. Organizations prefer autonomy and engage in interaction only when resource needs cannot be met within the unit.

These assumptions are consistent with White's (1974a) observation that decision-making about control and allocation of resources in an interorganizational environment was a dimension common to all interorganizational research. Decisions on resource investment are directly related to the type and intensity of interaction between groups because time, staff, and facilities are the stuff of interorganizational relations. Decisions to interact are decisions to allocate these resources, and others, to a relationship (Rogers, 1974a).

A central concern in the study of interorganizational relations has been the search for factors that determine the level and kind of interaction between organizations. Emphasis has been placed on the need for organizations to achieve unity at a larger level of analysis, particularly in the delivery of health and other human services. Exchange relations and interdependence are one set of processes for achieving the desired linkages. Schermerhorn (1975) identifies three sources of incentive propelling organizations to seek relations with outside groups that may include exchange transactions. These are: imperative direction, system norms, and resource needs.

Relations between organizations may be imperatively directed when a powerful extraorganizational force demands this activity. Warren (1974) identifies this situation as an inclusive context for
decision-making, where a supraorganizational authority structure determines and governs interdependence.

The importance placed on interaction by other members of an interorganizational network may be a motivating force to interorganizational relations. When organizations subscribe to a common set of perceptions about the importance of interorganizational relations, these shared expectations may increase the permeability of organizational boundaries and facilitate interaction (Evan, 1966; Baker and O'Brien, 1971). The permeability of organizational boundaries has been studied in terms of the orientation of boundary personnel to interorganizational activity (Rogers and Molnar, 1976).

A third motivating condition for interorganizational relations is the need to secure and maintain reliable resources. Organizations sharing a common task environment become interdependent to extend their existing allocations and to obtain resources or outcomes otherwise unavailable if they were to act alone. Interdependence may be one solution to the dilemma of how to make resources stretch to meet increasing needs (Black and Kase, 1963:27).

Interdependence. Interdependence is defined as the extent to which the elements of an organizational dyad are linked by mutual resource commitments involving information exchange, resource exchange, and joint programs. Interdependence, or exchange relations among organization set members, is used to represent the functional integration of interorganizational networks. Exchange relations link the elements of a system in common or interrelated activities. At the simplest level,
functional integration involves the exchange of information between elements of a unit of social organization. On the interorganizational level, functional integration will be studied in terms of the organizational concept of interdependence.

Aiken and Hage (1968) employed the concept of interdependence to focus on the problem of interorganizational relations. They recognize a sequence of increasing commitment to an interorganizational relationship. Rogers (1974) has empirically demonstrated the incremental nature of resource investment in interorganizational relationships. Contact among boundary personnel is a less enduring form of relationship than exchange of resources, which may indicate some expectation of continuity or duration in a relationship. Aiken and Hage (1968) argue that joint programming is the most binding form of interdependence between organizations.

Ties of interdependence link organizations to larger systems or groups of organizations. Hage (1975) maintains that creating interdependence among organizations is a productive means for increasing the effectiveness of interorganizational service delivery systems. Bringing agencies together to share a new source of funding was associated with improvements in the level and kind of joint activity among the agencies he studied.

Interdependence also links organizations to larger systems through the processes of generalized exchange. Not all interorganizational relationships require the same level of interdependence, and some groups may be linked only indirectly. Indirect and nonreciprocated exchange
transactions tie individual organizations to the larger network through
the knowledge that other groups received subsequent benefits from these
exchanges, and that similar relationships will occur in the future. The
interdependencies that do occur also assure other groups that trans­
actions can and will occur in an orderly manner, and that interdepend­
ence can develop when the need arises.

Generalized exchange may be a particularly important aspect of
interdependence within networks of public agencies that are involved in
related aspects of a common substantive area. Public service norms may
facilitate the initiation of exchange relations and their maintenance
over time. Agencies may also be drawn into relationships when failures
to do so are publicly visible. Nonreciprocal or unequal exchanges may
be justified or accepted on the basis of contributions to the common
good, or simply as a means for resolving a commonly shared substantive
problem. Public service norms, therefore, coupled with the ties of ex­
change relations, may be important factors contributing to the integra­
tion of interorganizational networks.

This section has reviewed definitions and assumptions associated
with exchange between organizations. Some of the mechanisms that give
rise to exchange relations within interorganizational networks were
examined. An attempt to enlarge the generally limited treatment of ex­
change theory in interorganizational relations was made by discussing
interorganizational networks as generalized exchange systems.

By definition, exchange relations further the goal attainment of
interacting organizations; they also increase the integration of the
interorganizational network by generating and maintaining a structure of interdependence that unites the larger system.

The next section brings some of the formulations of systems theory to bear on the problem of integration in interorganizational networks.

Open Systems Theory

This section introduces interorganizational relations as the study of relations between organizational systems. The general problem of intersystem relations will be reviewed and the concept of domain introduced in terms of organizational boundaries. Finally, the relationship between domain consensus and interdependence will be discussed.

Complex organizations as open systems

The sociological interpretation of systems theory is best stated by Walter Buckley (1967, 1968). The central focus of systems theory is on the principles of organization, regardless of what it is that is organized (Buckley, 1968:36).

Thompson (1967:6) views complex organizations as sets of interdependent parts that make up unified wholes. Systems analysis emphasizes the continuous variation in specificity, ambiguity, and perceived legitimacy of normative systems and views organizations as interacting with environmental sectors, rather than as mere reactors (Haas and Drabek, 1973:85). Systems theory is concerned with problems of relationships, of structure, and of interdependence, rather than the constant attributes of objects (Katz and Kahn, 1966:18).
An organization is an open system because of its dependencies on outside groups; it cannot survive in isolation. Through environmental interaction, organizations acquire information and feedback in response to their actions, increasing order and organization in response to environmental conditions. Lawrence and Lorsch (1967) documented the effect of environmental conditions in generating organizational structure. Interorganizational contacts have been found to be an important determinant of the role performance of top administrators (Rogers and Molnar, 1976).

A major idea in systems theory is that organizations have boundaries that differentiate them from the environment (Aldrich, 1971:283). The boundary of an organization is characterized as the area where a lower interchange of energy and information occurs than in the system proper (Katz and Kahn, 1966:62). Boundaries define which set or pattern of events constitute appropriate system activities. Organizational boundaries may fluctuate situationally, but their dynamic nature nevertheless reflects a central tendency over time.

The phenomena and problems of interorganizational relations are part of the general class of boundary-relations problems that confront all types of social systems, including complex organizations (Evan, 1966:174). Thompson (1967) views relations between organizations primarily in terms of contacts between boundary personnel who provide the bridge or nexus between organizations. Guetzkow (1966) notes the importance of boundary roles for handling relations between organizations.

Organizational boundaries have been employed by some theorists in
a somewhat restricted manner, similar to the "front door" of the organization. The notion of boundary of interest here is that broader notion of limit which differentiates the activity of a particular organization from the activities of other groups in the environment. The term domain has come to be associated with this broader meaning of differentiation in organization-environment relations.

**Domain** Levine and White (1961) define domain as the specific goals an organization wishes to pursue and the functions it seeks to undertake in order to achieve these goals. In addition, organizational domains are often viewed as boundaries that define environmental relations between organizations; they are the normal performance ranges of organizational systems when considered in relation to other operating systems. Domain often is measured in terms of the population served, the technology employed, and the services rendered by an organization (Meyerson, 1975). Warren (1974:24) conceptualized domain as the organization's locus in the interorganizational field, including its manifest goals and its channels of access to task and maintenance resources. This study follows Levine and White, defining domain as the goals and functions an organization claims as properly its own.

The kind of services offered is one central criterion for distinguishing domains within a given substantive area (Levine and White, 1961). Some hospitals may treat infectious diseases; others may not. Some natural resource organizations may offer cost-sharing assistance; others may not.

The kinds of clients that comprise an organization's input and
receive its outputs represent another dimension of domain (Levine and White, 1961). Client characteristics may differentiate organizational domains, as a children's hospital is distinguished from a veteran's hospital. Some natural resource organizations deal predominantly with farmers, others may serve only sportsmen.

Domain provides an image of an organization's role in a larger system and serves as a guide for ordering action in certain directions and not in others (Thompson, 1967:29). Definitions of organizational domain are particularly important for organizations that make decisions based in part upon their expectations about what other organizations will or will not do in response to their actions (Levine and White, 1961:597).

**Domain consensus**

In this study, domain consensus refers to the existence of congruent expectations regarding mutual roles and responsibilities between the elements of an organizational dyad. Previous writers have defined consensus as the degree of agreement among members about the norms and values of a social system (Price, 1972; Tagiuri, 1965). These definitions emphasize normative consensus, i.e., agreement about what should be (Weirath, 1976:5).

Metcalfe (1976) argues that normative integration is reflected in the conformity of a focal organization's behavior with expectations held by other members of the organization set. Normative integration for an organizational dyad is reflected in the degree of consensus about each other's claims to domain.
Domain consensus is important for understanding how organizations work together. Consensus is manifested in conduct governed by beliefs, in situations in which conflict would occur or be of greater intensity, but for the existence of consensus (Shills, 1975:135). Domain consensus is one aspect of the normative integration of an interorganizational system. Norms about domain refer to the clients an organization should properly serve, the services it can legitimately offer, and the kinds of activities it should regularly engage in.

The distribution of beliefs about organizational domain forms a social structure, the parameters of which guide and order the actions of the several organizations which hold and maintain these images of group responsibility and perogative (Blau, 1974). Thus domain consensus permits the allocation of responsibility within an interorganizational network.

The importance of domain consensus for interorganizational relations underlies Warren's (1974:22) assertion that in interaction with other organizations, an organization acts to preserve or expand its domain, in anticipation of similar orientations on the part of other organizations. Domain consensus is an outcome of processes by which organizations achieve legitimation of their responsibilities and perogatives vis à vis other groups. It serves to protect and insulate organizations from encroaching on or interfering in each other's activities. As it is established over time, it facilitates new allocations of function and responsibility (Warren, 1974).

When deviations in mutual conceptions of role and responsibility
do occur, they may be a source of conflict in interorganizational sys-
tems (Goldman, 1966; Walton, 1972). Basic consensus on performance obli-
gations is important for public agencies, although networks can operate
quite effectively when there are limited differences of opinion (Etzioni,
1961:133). Domain consensus will be measured with the understanding
that a low level of consensus represents high dissensus, and the poten-
tial for specific conflicts to occur in the relationship.

**Domain consensus and interdependence**

Two alternative interpretations of the relationship between domain
consensus and interdependence can be found in the literature. One argues
that domain consensus is an antecedent condition of interdependence.
The other, that domain consensus is coextensive with interdependence.

Levine and White (1961) regard domain consensus as a prerequisite
to exchange relations, the developmental processes of interdependence.
The flow of elements between organizational systems requires an initial
definition of roles and responsibilities between the interacting groups
to provide order to their interrelated activities. A stable system of
exchange requires an *a priori* settlement of the alternative ways of de-
fining the rights and obligations of participants (Parsons, 1951:70;
Thompson, 1967).

Haurek and Clark (1967) found that positive evaluation and assess-
ments of legitimacy were important determinants of successful interorgan-
izational transactions. Several studies suggest that consensus on oper-
ating philosophies produces cooperative relations (Miller, 1958; Form
and Nosow, 1958; Hollister, 1970, and Braito et al., 1972). In
addition, others have found domain consensus to be associated with cooperative work relationships (Benson, 1975; Aldrich, 1976).

A second interpretation of domain consensus is that it is a continually elaborated outcome of ongoing relationships. A sounding-out process occurs between organizations attempting to establish a new relationship or alter an old one (Thompson and McEwan, 1958). Each organization must estimate the position of the other, and its willingness to redefine the relationship. The sounding-out process establishes the initial level of domain consensus in a relationship, and continues to operate in maintaining and elaborating mutually-held understandings regarding domain. Thus domain consensus is partly an outcome of the pattern of interaction that emerges.

A set of shared standards concerning the propriety of each organization's activities is more likely to emerge through the process of interaction. A minimum level of consensus is probably necessary for the initial success of a relationship, while continuing contacts between parties increases the number of areas in which expectations are established (Hunt, 1968). Domain consensus is more usefully conceptualized as a continually elaborated outcome of interaction between groups, where domain issues emerge, are clarified, and resolved.

Sequences of resolving decisions regarding the conditions of exchange and the responsibilities accruing to each party may produce a broader degree of domain consensus as mutual understanding and awareness increases (Goldman, 1966). Continued organizational interaction broadens the base of domain topics on which consensus exists, accumulating
structure and stability in the relationship. Continued relations between groups introduces redundancy, and consequently reliability, into the interorganizational linkage (Landau, 1969).

Roland Warren (1974) reported a strong positive relationship between domain consensus and cooperative interaction among the community decision organizations in the study. Warren argued that such interaction is at least a precondition of exchange. Domain consensus was found to be positively related to exchange relations in Vacin's (1972) study of rural development organizations.

Both of the above interpretations identify the importance of domain consensus as an initial condition for exchange relations. In addition to being an antecedent of exchange relations, domain consensus is a continually reaffirmed and adjusted outcome of interdependence between organizations.

Finally, interdependence may develop on the basis of calculated mutual advantage in the absence of domain consensus (Benson, 1975). Interdependence may then produce a tendency to domain consensus once activities are underway. In addition some networks may display high levels of interdependence despite low domain consensus because laws or formal regulations prescribe the interaction.

On the basis of this discussion, the first general hypothesis may be stated as follows:

G.H. 1: The relational property of domain consensus is related to the relational property of interdependence.

The next section introduces a series of comparative organizational
properties that may affect integration in interorganizational relationships.

Comparative Properties

Comparative properties refer to that dimension or continuum in which similarity and differences are polar opposites. Comparative properties are global dyadic properties reflecting the degree to which elements are similar along various dimensions or attributes (Marrett, 1971).

Normative integration, it was argued, is the result of basic similarities among the elements of a system. Organizations with similar characteristics or attributes may more readily achieve consensus over domains. Functional integration is premised on basic differences among the elements of a system. A direct implication of functional integration theory is that organizations that possess certain differences are more likely to develop interdependences on the basis of their complementarity.

This section examines the literature on similarities and differences as determinants of integration. The perspective that emphasizes similarity implies that differences are negatively related to integration; while the perspective emphasizing complementarity implies that differences are positively related to integration. These arguments will be reviewed, and each comparative property will be discussed and hypotheses relating the comparative property to domain consensus and interdependence will be presented.

The four sets of comparative properties are: organizational output,
output constituency, decision-making, and decision-maker properties. These four represent major sets of comparative properties that have received attention in the interorganizational literature.

**Similarity**

Similarity is the degree to which elements resemble or bear likeness to one another. It is a basis for association and the formation of groups. Individual functions, when in sufficient contact with one another, tend to stabilize and regulate themselves (Durkheim, 1933:4). Similarity initially produces association among elements and the potential for exchanges to occur. The Durkheimian evolutionary argument states that though similarity is the early basis of stability in social systems, as interdependence increases integration increasingly depends on differences and specialization of function, which maintains linkages among the elements.

Regulation of activity among group members can occur only if group members are sufficiently familiar with each other's functions, needs, and are able to follow their variation in activity (Durkheim, 1933:5). Presumably, similarity of function is what makes elements initially aware and familiar with each other. Durkheim stressed the role of similarity in promoting normative integration, and of complementary differences in the maintenance of functional integration. Similarity among elements is a basic part of both forms of integration, though the functional type is based on differences evolved from initial association on the basis of similarities. From Durkheim's perspective, similarities are
the starting mechanisms that bring elements into association.

The ecological perspective incorporates the notion of similarities in explaining interdependence. However, as Guetzkow (1966:31) notes, little research has employed the concepts of human ecology for understanding the mutual relations of organizations and their environments. Commensalism and symbiosis are two types of interdependence within this perspective. Commensal interdependence is based upon supplementary similarities between units (Hawley, 1950:132). Interdependence based upon similarity is viewed as a protective or conservative type of linkage since the components are homogeneous with respect to one another.

Whettan (1974) employs commensalism as an explanatory principle in analyzing relationships among organizations sharing a common resource base. Division of labor among commensal linkages permits an orderly access to common resources by avoiding disruptive disputes over allocation criteria. The costs of such disputes may exceed the potential gains. Some important costs may include risking disruption in the reliable flow of resources and loss of favorable image among groups that are indirectly involved in the relationship.

**Complementarity**

Complementarity refers to productive differences among elements. Durkheim (1933:55) notes that differences, as likeness, can be causes of mutual attraction. Some group members may be sought out by others for the qualities they lack in themselves. The ecological interpretation of this condition is symbiosis, where interdependence is based upon complementary differences. Symbiosis is predicated on the existence of
interlocking needs which cannot be independently met (Hawley, 1950).

Gouldner (1960:172) has described the group-stabilizing functions of complementarity based on structures of interdependence. Actor A's rights are B's obligations and vice versa. A relationship based on complementarity also may involve intransitive rights and duties, and does not necessarily imply the existence of a mutually determined exchange relation. Gross (1956) concluded that both symbiosis and consensus operated to integrate the small groups he studied, but that symbiosis was a more powerful tie than consensus.

Commensalism refers to relationships based on shared needs for a common resource; symbiosis refers to relationships based on interlocking needs for different types of resources. Both are important factors in relations between organizations. Commensalism links organizations sharing common activities; symbiosis links organizations engaging in separate but related activities. This study focuses on commensalistic linkages and their consequences for interorganizational relations.

One important area of comparison for organizations is their domains. Two dimensions of domain similarity will be investigated in this study. These are organizational output and output constituency. A discussion of each type of domain similarity is followed by the hypotheses that the section develops.

Organizational output and domain consensus

Social integration theory argues that similarity is associated with normative integration, which is reflected in this study by domain consensus. Organizational output variables represent comparisons of
the types of services provided by the organizations in a dyad.

Organizations with similar domains are more likely to be aware of one another (Van de Ven et al., 1974). Those that offer similar services may have a greater stake in achieving domain consensus because each represents a salient part of the other's task environment (Dill, 1958). Conflict may be costly in terms of lowered effectiveness and loss of constituency support.

The pursuit of similar goals may foster a division of labor and responsibilities between interacting organizations (Reid, 1969). Similarity of function implies rights and obligations between groups; rights to operate in a given domain, and obligations to minimize intrusion on the domains of others. Reciprocally held rights and obligations tend to stabilize and structure ongoing interaction systems (Gouldner, 1960).

Some organizational functions may be determinant and a division of responsibilities easily assigned (Levine and White, 1961). Other functions may not be clearly separable and lines of demarcation between organizational activity may be open to question, particularly where organizations perform limited services in a broad problem area. Expectations may exceed an organization's capacity or authority to act or be involved. Conversely, agencies may claim broader responsibilities in a given problem area than those sharing similar services are willing to concede.

On the basis of the previous discussion, the following hypothesis may be stated:

G.H. 2: The comparative property of shared organizational output is related to the relational property of domain consensus.
Organizational output and interdependence

Functional integration theory suggests that organizations producing different outputs will possess complementary resource needs and capabilities, leading to stronger ties of interdependence. Some writers have viewed similarity as a source of avoidance in interorganizational relationships (Evan, 1966; White, 1974b). Organizations that offer similar services may regard each other as threatening, or as constraining their individual efforts to offer comprehensive services. Some interdependencies, however, may be unavoidable, and may be conflict issues in themselves. This commensalistic interpretation of interdependence emphasizes limitations on available resources.

An alternative argument states that similarity is a strong prerequisite for interdependence among organizations. Two organizations may become interdependent if each perceives that its own goals can be achieved more effectively with the assistance of the resources of the other (Reid, 1969). Organizations with similar domains are likely to encounter comparable resource needs and are more likely to be able to employ the resources that the other possesses. Similar resource needs increases the likelihood of exchange; competition or conflict also may occur, but are generally avoided as the costlier alternative to both parties.

The central importance of similar organizational outputs in generating interdependence is the underlying similarity of resource needs that it implies. Reid (1969) hypothesizes that the greater the similarity of mutually dependent goals, the greater the interdependence, and the greater the extent and stability of exchanges.
Sharing some functions may be more important than sharing others for the development of interdependence. The functions of an organization determine its degree of dependence on other groups for specific kinds of resources, as well as its capacity to make resources available to other groups. The exchange model explains interdependence largely in terms of the respective functions performed by the participating agencies (Levine and White, 1961:597).

The following general hypothesis may now be stated:

**G.H. 3:** The comparative property of shared organizational output is related to the relational property of interdependence.

**Output constituency and domain consensus**

An output constituency consists of clients that are acknowledged by an organization as being appropriate targets of the organization's activity (Warren, 1967). Organizations that share client groups may encounter greater incentives to establish common definitions of domain because conflicts may reduce effectiveness, and may interfere in relations with the client groups that are sources of support and legitimation.

One cost of a failure to achieve domain consensus for organizations that share client groups is the loss of favorable image among these groups, which in itself, is an important organizational resource (Perrow, 1961). The commensalistic argument views clients as a resource that is shared in common by organizations and requires a mechanism for ensuring orderly access to the resource. Domain consensus may be a mechanism for allocating the input resource of clients.
Organizations that share client groups, but offer sequentially related services, may have more clearly defined definitions of domain to ensure the orderly flow of inputs and outputs between groups. Domain consensus also may be important as a means for maintaining the separate identities of the organizations and for distinguishing their activities for client groups which may use services from both organizations. Thus domain consensus may be a means for preserving the functional autonomy of similar organizations whose activities are closely related (Gouldner, 1959).

On the basis of the preceding discussion, the following hypothesis can be formulated:

G.H. 4: The comparative property of shared output constituency is related to the relational property of domain consensus.

Output constituency and interdependence

The argument of the functional integration perspective states that differences are associated with interdependence. Organizations that do not share output constituencies may be less concerned with competition, and more readily develop interdependence. This line of reasoning seems less convincing than the contrary view that similarity is a source of interdependence, however.

Organizations with similar output constituencies are more likely to seek to increase their effectiveness through exchange of information, resources, and joint efforts with other organizations. Shared client groups may present a common pressure for unified effort and an integrated set of organizational responses to their specialized problems.
Organizations that serve different client systems may possess fewer potential resources for interchange than those that share similar client systems (Reid, 1969). Referral systems and coordination of financial and technical assistance may be sources of interdependence associated with common client systems. Little empirical research has investigated the importance of shared client groups.

Organizations with similar client groups may be more likely to be linked through their interrelated involvement with the clients (Levine and White, 1961). Client groups may come to expect consistency and continuity in the services they receive from interrelated organizations. In this manner shared output constituencies may exert a force toward integrated effort on the part of organizations that provide them with services.

A hypothesis summarizing these arguments may now be stated:

G.H. 5: The comparative property of shared output constituency is related to the relational property of interdependence.

Decision-making properties

Comparative decision-making properties are those that refer to the differences in the authority structure of interacting organizations. Decision-making properties describe the way authority is exercised in an organization. Interorganizational relations consists of decisions to allocate resources time, staff, and facilities to a relationship. Similar decision-making structures may facilitate the sequence of decisions associated with participation in interorganizational-relationships (Schmermerhorn, 1975).
The specific comparative decision-making properties are: autonomy, formalization, and decision-making context. The following subsections identify each specific dimension, then hypotheses are developed relating the general comparative property to domain consensus and interdependence.

**Autonomy**  
Autonomy is the degree to which a social system has the capacity for independent action. Autonomy has been frequently employed as a motive or inferred dynamic for explaining relations between organizations (White, 1974a). The amount and kind of control exerted on an organization by superordinate levels may have direct implications for the level and kind of linkages it maintains with outside groups. In addition, linkages with outside groups may be avoided because they further constrain a unit's capacity for independent action (Gouldner, 1959).

**Formalization**  
Formalization is the degree to which the norms of a social system are explicit (Price, 1972:107). Aiken and Hage (1969) refer to formalization as the codification of activities within an organization and the range of variability permitted within job classifications. Reidel (1970) reported that a high level of formalization, in terms of uniform work plans and schedules, kept resource managers responsive to their own agencies and hindered interagency working relationships.

**Decision context**  
The relationship of interacting groups to an over-arching authority structure influences the kinds of linkages that can occur (Warren, 1967). Elements that share a subordinate relationship to a common authority may be constrained to a predetermined
pattern of relationship. In addition, relationships with groups outside the structure may be subject to review by the higher authority. The inclusiveness of a decision-making context refers to the extent to which a higher authority governs interaction between groups (Warren, 1967).

Two types of inclusive decision-making structures are the unitary and federative contexts (Warren, 1967:402). A unitary context is one where the units are deliberately organized for the accomplishment of inclusive goals. The top of the structure makes decisions and has final authority over the units. A federative structure is one where the units involved have their individual goals, but there is some formal organization for the accomplishment of inclusive goals.

Both types of inclusive decision-making structures were identified among the organizations in this study. The units in this study which are elements of the State Conservation Commission comprise a unitary decision-making context. The various units are interrelated toward the achievement of larger Commission objectives, rather than toward their own subgoals (Warren, 1967:404). Federal agencies in this study constitute a federative context for decision-making. The various units are oriented to individual goals, but an inclusive structure unites the agencies in pursuit of broader rural development goals. The agencies share the common authority structure of the USDA, as well as membership in a local Rural Development Committee which meets periodically to review broader concerns and activities shared by the group.

Each individual property is argued to represent the general comparative property of organizational decision-making. The two following
sections relate the general comparative property to domain consensus and interdependence.

**Decision-making properties and domain consensus**

Organizations with similar levels of autonomy may more readily establish mutually acknowledged boundaries of activities. Differences in autonomy indicate disparities in the kinds of decisions that can be made and the level at which they are processed. Differences may also present limitations on the ability of groups to alter their activities with respect to one another and to develop reliable definitions of domain.

Organizations with similar levels of formalization may more readily establish domain consensus because of the similar kinds of decision-processes each must enter into to support a relationship, as well as the similar level of predictability of response to each other's actions. Braito et al. (1972) found a positive relationship between formalization and the amount of domain consensus accorded an organization by other members of its organization's set.

Units that comprise an inclusive context for decision-making share a common authority to settle questions regarding the division of labor over inclusive goals. An inclusive structure permits new allocations of authority and responsibility to be carried out in a stable fashion, and the new arrangements justified on the basis of common purposes and goals. Relationships between USDA agencies and between Conservation Commission units are defined as inclusive decision-making contexts in this study.

The early history of the USDA agencies was characterized by a high
level of conflict over domain. The consolidation of the agencies under the common USDA structure was a means for achieving and enforcing resolution of these conflicts (Hardin, 1952). Consequently, agencies within an inclusive decision-making context should possess a high degree of domain consensus because questions of domain are anticipated and administered by a higher authority.

Similar intraorganizational structures for decision-making and resource allocation may provide a common basis for understanding among boundary personnel who are faced with similar constraints and operating procedures. The duration and complexity of intraorganizational decision-processes may affect the relative ability of two organizations to divide responsibility where one's activities are closely controlled and the other's are relatively unconstrained. The adjustment and definition of domains may be increasingly successful as organizations share similar decision-making structures and processes.

In keeping with the preceding discussion, the following hypothesis may now be stated:

G.H. 7: The comparative property of decision-making is related to the relational property of domain consensus.

**Decision-making and interdependence**

A positive relationship between formalization and various related aspects of interdependence has been a consistent finding in interorganizational research (Aiken and Hage, 1968; Paulson, 1974; Molnar and Rogers, 1976). Differences in formalization may affect interdependence because agencies with highly formalized intraorganizational decision-
making structures may have readily available mechanisms for managing relations with outside groups. Other agencies that are not highly formalized may be reluctant to participate in situations where the rules and regulations of a counter organization are a major consideration in interaction or where their own internal decision processes are not well-established in regard to interorganizational relationships.

Dissimilar levels of autonomy among interacting groups may limit the kinds of relationships that can develop. The duration and amount of decision-making required for an organization with low autonomy may inhibit interaction with other groups that possess greater flexibility. However, organizations with low autonomy also may be directed to seek and maintain relations with outside groups (Rogers and Molnar, 1975). Groups with high autonomy may avoid interdependencies with groups that would serve as a constraint on their independent actions, particularly if the relationship would be partially structured by a third-party's rules and regulations.

Interdependencies are more likely to occur among organizations sharing an inclusive decision-making structure. Organizations that share a common over-arching authority structure are more likely to engage in exchange relations because of the underlying common purpose to their activities. Membership in the inclusive structure also ensures duration and continuity to relationships that develop among participating groups. In addition, interdependencies may offer little or no threat to individual units because budgets are fixed at higher levels, and shared system goals increase potential returns for both units.
Decision-making is a central or fundamental aspect of interorganizational relationships (White, 1974b; Schermerhorn, 1975). Interaction between groups is a product of intraorganizational decision-making processes that support commitment and participation in linkages with other groups. Douds and Rubenstein (1966) argued that structural differences between organizations or units are associated with low levels of interface communication that affects the kind of interdependence that can develop and be maintained.

In light of the discussion of specific decision-making properties and the general comparative dimension, the following hypothesis may be stated.

G.H. 8: The comparative property of decision-making is related to the relational property of interdependence.

**Decision-maker characteristics**

Comparative decision-maker characteristics are those that refer to the personal attributes of those in boundary-spanning positions. Organizations that are linked by compatible boundary-spanning personnel may be linked more effectively than those whose personnel are dissimilar in their personal characteristics. Similar decision-makers engage in more effective communication and problem-solving in interorganizational relationships (Walton, 1972).

Four comparative decision-maker characteristics are: time-in-position, education, professional activity, and age. These represent major dimensions of interpersonal comparison that have been discussed in the literature on interunit relations.
**Time-in-position**  The comparative property of time-in-position refers to differences in the length of time administrators have held their current positions. Thomas et al. (1972) found newness to position to be positively related to two of the three interunit conflict dimensions he investigated, specifically, distrust and perceived overstatement of needs.

**Education**  The comparative property of education refers to differences in the level of education achieved by individual administrators. Education is an important indicator of social class. Ogle (1972) found informal interaction among the resource managers he studied to be stratified by social class. Educational differences may affect informal relationships among administrators, an important aspect of interorganizational activity.

**Professional activity**  The comparative property of professional activity refers to differences in the level of participation in occupationally-related voluntary associations. Aiken and Hage (1968) indicate that professionalism is related to interorganizational relations in terms of the number of joint programs. Professionalism is associated with identification with a broader community of individuals who share similar occupational orientations.

**Age**  The comparative property of age refers to differences in the chronological ages of decision-makers. Thomas et al. (1972) reported age to be negatively related to three aspects of interunit conflict. Differences in age may be associated with differences in occupational orientation and create communication barriers. Older individuals
often entered their occupations with lower levels of education, and relate to their current positions in terms of experience and long-term organizational involvement. Younger individuals may have arrived at their current positions through educational attainment and have discrepant perspectives on purposes and methods of activity, particularly in those areas that are not well-defined.

The next two sections relate the general comparative property of decision-making characteristics to domain consensus and interdependence.

**Decision-maker characteristics and domain consensus**

Boundary-spanning roles are often heuristic roles that involve relationships with other groups that are not well-defined or formally structured. Effective performance of these roles is associated with accumulated experience (Walton, 1972). Because awareness of the responsibilities and potential of other groups is acquired over time, differences in time in office may be associated with discrepancies in knowledge and expectations regarding domain.

Education may be related to the ability of the boundary spanners to evaluate and comprehend the specialized activities of other groups. Differences in education may be associated with discrepant images of the potential activities of outside groups.

Professionals may more accurately anticipate the domain of a given counter organization because of their greater familiarity with the range of activities and responsibilities in a given substantive area. Boundary personnel may more readily establish interorganizational ties if their
counterparts possess similar personal characteristics. The responsibilities and prerogative of interacting groups may be more readily established if boundary personnel possess similar perspectives and values regarding substantive problems and the means that are to be employed to solve them. Similarity in tenure, professionalism, education, and age may promote similar definitions of organizational roles and responsibilities. Differences may be associated with disparate perspectives regarding the nature of organizational activities and the potential activities of other groups.

On the basis of this discussion, the following hypothesis may be formulated:

G.H. 8: The comparative property of decision-maker characteristics is related to the relational property of domain consensus.

Decision-maker characteristics and interdependence

Though interdependence between organizations transcends relations between individual role incumbents, some linkages may depend on a familiarity with informal procedures and alternative lines of action. Differences in time in office may be associated with a lesser ability of boundary personnel to initiate and manage interdependence.

Educational differences also may affect the ability of boundary personnel to effectively represent their organizations. When activities are not well-defined or when educational differences are correlated with differences on other personal dimensions, managing interdependence may be additionally difficult.
Individuals with similar levels of professionalism may more effectively participate in new activities with outside groups because of their prior extraorganizational ties. Professionalism was positively related to interdependence in Aiken and Hage's (1968) study.

A number of studies have cited similarity in the qualifications and status of boundary personnel as one of several bases for interdependent activity among agencies (Reidel, 1970; Ogle, 1972; Thomas et al., 1972). Boundary personnel with similar personal characteristics may more readily reach agreement over the terms of exchanges, and coordinate their interrelated organizational activities.

On the basis of this general discussion, and the discussion of specific decision-maker characteristics, the following hypothesis may be stated:

G.H. 9: The comparative property of decision-maker characteristics is related to the relational property of interdependence.

Figure 2.1 diagrams the relationships expressed in the first nine hypotheses.

**Combined effect of comparative properties**

Each of the four sets of comparative properties has been argued to be related to domain consensus and interdependence. To assess the combined and independent effects of comparative properties, composite variates representing each set will be entered in regression equations predicting composite domain consensus and interdependence variables.

None of the individual relationships between the specific variables
Figure 2.1. Diagram of hypothesized relationships
that compose the four sets of comparative properties will be stated in hypothesis form and tested. The relationships between the individual variables and domain consensus and interdependence were discussed to lend support for examining the relationship between each set and the two dependent variables.

It is hypothesized that the four composite comparative property variables, considered together, will predict each composite dependent variable.

G.H. 10: The organizational output, output constituency, decision-making, and decision-maker comparative properties together predict the relational property of domain consensus.

G.H. 11: The organizational output, output constituency, decision-making, and decision-maker comparative properties together predict the relational property of interdependence.

The independent and combined effects of the comparative properties will be assessed in multiple regression analysis. The last hypothesis examines comparative properties as a control variable in the relationship between the two types of integration.

**Comparative properties controlled**

The collective properties have been hypothesized as collectively predicting domain consensus and interdependence. However, the relationship between domain consensus and interdependence may in fact be largely due to a common comparative property antecedents.

Comparative properties are considered to be antecedent variables because they are relatively enduring characteristics of the organizational
dyad, that are not dependent upon circumstances for their activation (Rosenberg, 1968:76). An antecedent variable does not explain away the relationship: It clarifies the influences which precede it.

If the relationship cancels out under control, it can be concluded that both variables are the consequences of a common cause, i.e., comparative properties. The antecedent variables are actually extraneous variables in this case (Rosenberg, 1968:72).

The following hypothesis states that domain consensus and interdependence are independently related, apart from their common comparative property antecedents.

G.H. 12: Domain consensus is related to interdependence, controlling comparative properties.

Chapter III describes the research procedures that will be employed in examining the hypotheses developed in this chapter.
CHAPTER III. METHODS

The purpose of this chapter is to describe the research procedures for collecting and analyzing the data used to test the hypotheses developed in the previous chapter. The major headings in this chapter are: (1) Sample and Data Collection Procedures; (2) Formation of Dyads; (3) Variable Measures; (4) Multiple Indicator Approaches; and (5) Statistical Procedures.

Sample and Data Collection Procedures

Past interorganizational research has focused on relations among business organizations (Lawrence and Lorsch, 1967), public agencies (Rogers, 1974a), voluntary associations (White, 1968), and relationships among mixed sets of combinations of the above (Hunt and Hunt, 1971). This dissertation will focus on relations among public agencies involved in natural resource management.

The population to which this research is intended to generalize is nonmetropolitan public agencies that are involved in the protection and management of natural resources.

Data for this study were collected within the framework of a larger research project "Organizations and Agencies for Resource Protection and Management", Agricultural Experiment Station project 2042, directed by Dr. David L. Rogers. Interviews were conducted with 39 county-level administrators in five Northeast Iowa counties during May and June of 1976. Figure 3.1 shows the location of the study counties. The counties
Figure 3.1. Counties in the study area
were selected on the basis of the unique character of their natural re-
sources. Additional criteria for selection related to the congruence
of their boundaries with a Resource Conservation and Development project
area and a State Regional Planning area. The specific counties were:
Howard, Winneshiek, Allamakee, Fayette, and Clayton.

The major criteria for selecting agencies for the study were:
(1) that an agency have at least county-wide responsibility; and (2) that
it be involved in managing natural resources or have programs that re-
lated to the use of natural resources. The twelve agencies studied
were: Agricultural Stabilization and Conservation Service (ASCS);
Farmer's Home Administration (FHA); Soil Conservation Service (SCS);
County Extension Service (CES); County Conservation Board (CCB); County
Engineer's Office (CEO); Fish and Game Enforcement (FGE); District
Forester Unit (DFU); State Park Ranger (SPR); State Forest Administrative
Unit (SFA); Fish Management Biologist Unit (FMB); and Wildlife Biologist
Unit (WBU). In each agency, the top administrator was selected for the
interview.

Not every agency had a local unit in each of the counties studied,
therefore, the number of units studied was 39. In instances where an
agency had multicounty responsibilities, it was included in the county
where its base of operations was located. Units of the FHA, FGE, DFU,
FMB, and WBU were so classified. A District Forester operated in two of
the study counties, but his office was located outside the study area.
The interview in this situation was conducted within the context of the
county where the agency was most active and with which the respondent
was most familiar. A brief description of each of the agencies studied follows.

**Agricultural Stabilization and Conservation Service**

The ASCS is a U.S. Department of Agriculture (USDA) agency organized on a county basis. It provides cost-share funds to landowners who install permanent soil and water conservation practices on their land. Long-term agreements also are possible and provide cost-share funds to support soil and water conservation measures. A proportion of these funds (about 5 percent) are allocated to the Soil Conservation Service for technical assistance. The Forest Incentive Program is designed to encourage timber production practices in designated counties, and the District Forester provides planning and technical assistance for this program. The ASCS also administers price support programs on selected commodities. Elected county committeemen and appointed state committeemen set local and state policies and make cost-share allocation decisions on the local level. The ASCS also disburses special disaster funds to farmers and landowners whose lands have been damaged by drought or floods.

**Farmer's Home Administration**

The Farmer's Home Administration is a USDA agency that provides housing loans for private individuals in small towns and cities, as well as industrial loans. In addition, the FHA provides financial assistance to farmers and rural groups for developing water supply and sewage systems. Resource Conservation and Development loans are made to public bodies and to nonprofit corporations for open space acquisition, recreation
development and water supply projects. FHA soil and water loans support a variety of activities including farm pond construction and repair, land treatment practices, and the establishment of approved forestry practices. Recreation loans are made to assist eligible farmers who wish to convert all or part of their land to income-producing recreation enterprises. FHA county supervisors provide planning and management assistance to recipients of all categories of loans. A three-member county committee determines eligibility and the maximum amount of funds that can be borrowed.

Soil Conservation Service

The Soil Conservation Service (SCS) provides technical assistance to individuals, groups, and governmental bodies. At the county level, this USDA agency is linked to state soil conservation districts. These districts are administered by the Iowa State Department of Soil Conservation. The districts receive state soil conservation funds, in addition to federal funds. Local policies and priorities are established by local district commissioners. The District Conservationist's direct supervisor is an Area Conservationist, who possesses a staff with broader engineering and planning capability who can be consulted for special problems. The SCS provides financial and technical assistance for conservation land treatment and watershed protection. The SCS soil survey is a resource inventory that provides basic planning data. Soil treatment practices, design of small water impoundments, and water drainage management are major SCS activities.
Cooperative Extension Service

The fourth USDA agency is the Extension Service. Its central goal or mission is education. County Extension directors assist residents, particularly farmers, in interpreting problems, and apply technology based on research by Land Grant universities, the USDA, and other sources. Extension Home Economists provide assistance for home and family problems, and the 4-H youth development programs are designed to help young people develop effective citizenship. Area office specialists are available to assist county agents with specific needs or problems and to provide special services. Extension personnel work with other USDA agencies in supplying information on conservation-oriented farming practices, particularly with regard to plowing practices and the application of pesticides. In addition, Extension conducts programs to familiarize interested residents with trends and problems in the use of land resources.

County Conservation Board

County Conservation Boards have been established in 97 Iowa counties and in four of the five counties in the study area. The Executive Officer carries out policies established by a three-member park board and makes day-to-day decision regarding the management of county lands and parks. The State Conservation Commission oversees planning activities and large expenditures by the county boards. It assists in providing broad uniformity and direction to local county operations. Conservation Boards also provide water recreation, including canoeing and swimming. Some boards maintain environmental education programs, often in conjunction with local school systems.
**County Engineer Office**

County Engineers are responsible for the design and maintenance of county roads and bridges, as well as the enforcement of county planning and zoning regulations. The Engineer's Office is also responsible for enforcing county sanitation ordinances, particularly landfill and sewage disposal regulations. The County Engineer's activities frequently involve the provision of access to public recreation facilities, stream channelizations, and waterway diversions.

**Fish and Game Enforcement**

Fish and Game Officers are employed by the Iowa Conservation Commission. As deputized peace officers, they are responsible for enforcing the state's fish and wildlife laws, including licensing, capture limits and other regulations. They often refer pollution problems, stream management abuses, and other situations to the properly responsible agency. Fish and Game Officers may be the most visible symbol of resource management to the general public. An experienced officer is designated as a senior or "lead" officer to provide direction in multicounty areas. Some of their other duties include field surveys, hunter safety programs and investigations, and local public relations.

**District Forester**

The objective of the Forestry Section of the Iowa Conservation Commission is to foster environmental protection and to ensure economic and social benefits from trees, forest lands, and related resources. Eleven forestry units are distributed across the state. District Foresters
assist landowners and local groups through applied forestry practices, particularly the development of forestry management plans. Foresters are responsible for the technical phases and inspections of ASCS cost-share forestry practices, including tree-planting, and timber-stand improvement. A state tree farm program provides management assistance to landowners involved in continued production of a forest crop. The District Forester collaborates with other sections of the Conservation Commission in forest management matters on state lands. The Forester also provides technical assistance on ASCS loans that involve wooded areas or windbreak construction, particularly for the purpose of preserving wildlife habitat.

**State Park Ranger Unit**

The State Park Ranger is charged with preserving and maintaining state parks and preserve areas. Park rangers are stationed at the state's larger holdings and oversee the maintenance and security of these areas. Three district supervisors direct the park ranger force throughout the state. Rangers are responsible for maintaining the parts as refuges for fish and wildlife, as well as providing recreation opportunities for the general public.

**State Forest Administrative Unit**

The Yellow River State Forest is a 6,000-acre multiple-use area. The manager's responsibilities include management of game and forested acreage, operation of a sawmill, and the maintenance and supervision of recreational facilities. The forest serves as a research and
demonstration area for state land management practices. The unit also provides forest management training seminars for resource management personnel.

**Fish Management Biologist Unit**

The goal of the Fish Management Biologist Unit is to improve fishing and to bring about a greater harvest of fish from existing waters through the latest scientific fish management techniques. Fish Management Biologists provide a variety of services to other sections of the Conservation Commission as well as to private landowners. They participate in the planning and management of trout-stocking programs, private farm pond planning, and fish population management. The Mississippi River presents special problems in terms of pollution management, commercial fishing supervision, and dredge spoils management. These units are directly responsible to the Fisheries section of the Iowa Conservation Commission.

**Wildlife Biologist Unit**

The Wildlife Biologist Unit's goals are to provide wildlife management activities in the form of land and water management, the recreational harvest of animals, and to provide state and private technical assistance. The Wildlife Biologist Unit is particularly concerned with the maintenance of wildlife habitats on private land. Its major objective is to offer the greatest opportunities for game harvest without jeopardizing the many species involved. The 20 Wildlife Management Biologist Units in the state engage in investigative studies of animal populations to set realistic game seasons. The Wildlife Section of the Iowa
Conservation Commission manages lands designated as game management areas that provide game protection, as well as controlled opportunities for hunting and trapping.

The Formation of Dyads

The group of agencies in each of the five counties was defined as an organization set (Evan, 1965). An organization was included in a particular set for one of three reasons: (1) its jurisdiction was limited to that county; (2) its jurisdiction was multicounty, but the base office was located in the study county; (3) the base office was located outside the study area, but included one or more study counties; here the agency was then included in a set where it was most active and with which the respondent was most familiar.

Each organization set was combinatorially arranged to form all possible organizational dyads. A set of $N$ organizations forms $(N(N - 1))/2$ dyads. Thus the 4 agencies in Howard County formed 6 dyads, the 9 in Winneshiek formed 36 dyads, the 6 in Allamakee formed 15 dyads, and the 10 agencies in Fayette and in Clayton Counties each formed 45 dyads. From the total sample of 39 organizations 147 organizational dyads were defined.

Table 3.1 shows the distribution of dyad types. The lower triangular matrix of relationships is that of all nonredundant organizational dyads. The number indicates how frequently each type of relationship occurred in the sample. Some relationships occur more often than others because of the uneven distribution of agencies within the study area.
Table 3.1. Distribution of organizational dyads in sample

<table>
<thead>
<tr>
<th></th>
<th>ASCS</th>
<th>FHA</th>
<th>SCS</th>
<th>EXT</th>
<th>CCB</th>
<th>CPZ</th>
<th>FGE</th>
<th>DFU</th>
<th>SPR</th>
<th>SFA</th>
<th>FMB</th>
<th>WBU</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASCS</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FHA</td>
<td>3</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SCS</td>
<td>5</td>
<td>3</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CES</td>
<td>5</td>
<td>3</td>
<td>5</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CCB</td>
<td>4</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CPZ</td>
<td>4</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FGE</td>
<td>4</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>4</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DFO</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>SPR</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>SFA</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>FMB</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>WBU</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

The unit of analysis or case in this study is the dyad. The dyad A-B consists of the data for organization A followed by the data for organization B. Relational and comparative dyadic variables are derived from combined operations on both sets of variables. The next section describes these operations.
Variable Measures

This section will explain how dyadic properties are derived and the procedures for measuring specific variables. A rationale for the measurement of each variable will be presented, particularly in the context of interorganizational research. The operational measures, scoring system, and range for each variable also will be discussed.

**Dyadic scoring procedures**

Dyadic variables in this study represent either a comparative property of the two organizations that comprise the dyad, or a relational property of the linkage between the dyadic elements. In the case of comparative variables, or those that represent similarity, analysis is based on the absolute value of the difference between the scores on a particular variable for dyadic element A and dyadic element B. Mathematically, the dyad score D is computed by the following formula:

\[ D = A - B \]

Thus, a score of 2 for A and 5 for B is associated with a dyadic D score of 3 \((3 = 2 - 5)\). This measure captures the comparative property of similarity as a general nondirectional concept (Vincent, 1975:174).

Relational properties are those that refer to the interaction or linkage between elements (Coleman, 1960). Relational properties also refer to mutual evaluations among elements. The relational properties referring to interaction are computed by summing the reports of interaction in a relationship. A's reports of interaction with element B are added to B's reports of interaction with element A forming a measure of
the total interaction in a relationship. Relational properties of evaluation are derived by summing deviations in mutual evaluations within dyadic relationships.

In this study, relational properties are asserted to be a consequence of relative differences between organizations on their comparative properties.

**Domain consensus**

Domain consensus was previously defined at the extent to which congruent expectations regarding roles and responsibilities exist between a given organization and any member of its organization set. Braito et al. (1972) measured domain consensus with a single-item indicator referring to the extent to which an organization should be involved in an interorganizational effort among health organizations. Vacin (1972) employed a similar measure in a study of rural development organizations.

Three measures of domain consensus in an organizational dyad will be used in this study. Each refers to a separate natural resource problem area, selected as potentially involving any or all the agencies in the study. Respondents were asked to project their own organization's involvement in each of the situations, as well as the involvement of each of the other organizations in the county. The three questions were as follows:

**Domain1 - housing development** - A private land development firm reveals its plans for a large summer cottage and recreation area adjacent to one of the county's major rivers. To what extent should each of the following groups be involved in planning, managing, facilitating, or assessing the impact of this project?
Domain 1: Feedlot Construction - Plans are announced for a large-scale feedlot facility to be built on previously undeveloped land in the county. To what extent should each of the following groups be involved in planning, managing, facilitating, or assessing the impact of this project?

Domain 2: Scenic River System - A portion of a river system in your county is designated as a scenic area by the Federal government, and a sum of money is set aside for its development. To what extent should each of the following groups be involved in planning, managing, facilitating, or assessing the impact of this project?

The respondents rated their own involvement, and the involvement of other organizations, in terms of a five-level Likert response framework. The responses were: "to a very little extent", "to a little extent", "to some extent", "to a great extent", and "to a very great extent". The responses were coded 1 to 5, respectively.

The questions permit the examination of the extent to which common definitions of responsibility and activity exist in a given organizational dyad. The derivation of a score on a single question for a dyad consisting of organizations A and B is described as follows. A^a is the score associated with A's own rating. A^b is A's rating of B. B^a is B's own rating, and B^b is B's rating of A.

<table>
<thead>
<tr>
<th>Rated Organizations</th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>A</td>
<td>A_a</td>
</tr>
<tr>
<td>B</td>
<td>B</td>
<td>B_b</td>
</tr>
</tbody>
</table>

The formula for the computation of the domain consensus indices is

\[ A_a - B_a + B_b - A_b. \]

The absolute value of the difference between
A's assessment of his organization's own involvement minus B's assessment of A's involvement is added to the corresponding absolute value of the difference between B's own rating and A's rating of B. The total represents the domain consensus score for that item.

Comparisons between $A_a$ and $B_b$, and $A_b$ and $B_a$ are also possible differences, but not considered relevant for this study. Sound reasons may exist for differential levels of involvement in a given problem area for different organizations. The measure captures deviations in expectations of involvement, and not actual levels of involvement. The notion of congruent expectations is central to the concept of domain consensus.

The sum of the deviations in expected involvement was obtained for each of the three items. The theoretical range for each index is 0 to 8. Scores were recoded to associate a high score with high consensus and a low score with low consensus about organizational domain. The three indices were treated as indicators of the concept of domain consensus.

**Interdependence**

**Joint programs** Thompson and McEwan (1958) state that a joint program is the case where two organizations act as one to attain certain goals. Aiken and Hage (1968) employed the number of joint programs as a measure of interdependence between organizations. Rogers (1974b) used the number of joint programs as an indicator of reciprocal relations in interorganizational networks. Aiken and Hage argue that joint programs represent a more permanent interorganizational relationship than do other measures.
Each of the organizational units was asked the following question concerning its relationship with other members of the organization set.

What is the actual number of joint programs that your organization shares with each of the following groups?

The reports of organization A's joint programming with organization B and B's reports of programs with A were summed to form an index. Each joint program was scored 2, because reports from both organizations were summed.

This variable reflects a difficulty common to much sociometric research; intransitivity in reports of interaction. In this study, discrepant reports were assumed to be random, and nonsystematic. Consequently, the sum of the number reported by both groups was utilized as an indicator.

The distribution on this variable was extremely skewed (i.e., 60.5 percent reported no joint programs). A few organizations specified their joint activities in great detail and were associated with high scores of 8 and 9. The relatively small sample size would exaggerate the effect of these extreme values in statistical analysis. As a result, these scores were considered to be outlying values that did not fairly represent the relationship. They were recoded to the value 5 to alleviate skewness in the distribution (5 was the next occurring actual value).

The range of the joint programming variable is 0 to 5. A score of 0 indicates that no joint programming was reported in the relationship, a score of 5 indicates that 5 or more joint programs were reported. A
high score indicates a high level of joint programming in a dyadic relationship.

**Resource exchange** In this study resource exchange is defined in terms of the frequency of resource exchange. Marrett (1971) states that the frequency of exchange is one indicator of the intensity of interorganizational relations. Finley (1969) employed resource exchange as a measure of interorganizational relations. Rogers (1974b) included resource exchange as one step in a scale of intensity of relations between groups.

Administrators were asked the following question about their relationship with other groups.

In the past year, how many times did your organization loan or provide resources (funds, facilities, or personnel) to each of the following groups.

Weekly or more reports were coded 50; otherwise the actual number of times was recorded. The mutual reports of organization A extending resources to B and B to A were summed to form an index of total resource interdependence. The actual range of the sum of these reports was 0 to 100. A high score equals a high frequency of resource flows between organizations.

**Information exchange** Information exchange was defined in terms of the intensity of information flows between organizations. Levine and White (1961) include information as one of several possible elements of exchange. Rogers (1974b) included information exchange as one step in a scale of the intensity of interorganizational relations. The question relating to information exchange was:
In the past year, how many times did your organization provide information to each of the following groups through personnel letters, reports, or other documents.

Weekly or more reports were coded 50; otherwise the actual number of times was recorded. The mutual reports of A providing information to B and B to A were summed to form an index of total information interdependence. The actual range of this measure was 0 to 100. A high score equals a high frequency of information flow between organizations.

The first empirical hypothesis may now be stated:

E.H. 1.1: The set of domain consensus variables is related to the set of interdependence variables.

Organizational output

Organizational output variables are those that represent whether or not dyads share particular services, the similarity of the products two organizations provide to their environment. Aldrich (1974) had administrators rate the service duplication of the employment service in his study of its relations with other manpower organizations. Warren (1972) utilized a variable termed domain overlap in his study of community decision organizations that was developed through judgmental coding of qualitative data. The set of indicators in this study consists of a series of dummy variables representing whether a pair of agencies shared or did not share each individual service.

Respondents were asked:

Please indicate which of the following categories describes the activities your organization is involved in.

The categories included: regulatory activities, cost-sharing,
technical assistance, planning assistance, information assistance, financial assistance, and management-development activities (of land). Responses were coded 1 for yes, 0 for no.

Dummy variables indicating individual shared activities were formed by comparing each activity of organization A with the corresponding activity of organization B. If both were engaged in an activity, a score of one was assigned; if one or neither were involved, a score of zero was assigned. Each variable is dichotomous, having a range of 0 to 1.

The empirical hypotheses may now be stated:

E.H. 2.1: The set of organizational output variables is related to the set of domain consensus variables.

E.H. 3.1: The set of organizational output variables is related to the set of interdependence variables.

Output constituency

Output constituency variables are those that reflect whether or not dyads share particular client groups, the similarity of the groups that receive the products an organization provides to its environment. No studies were found that employed a measure of client group similarity. Respondents were asked:

Please indicate which of the following categories describes the groups your organization serves.

The categories included farmers, private industry, recreational user, nonfarm landowners, park-users, homeowners, and local agencies. Positive responses were coded 1, negative responses were coded 0.

If both organizations A and B indicated that they served a particular client group, a score of 1 was assigned to the dyad. If only one or
neither organization served the group, a score of 0 was assigned. Each client group was included in the set of variables as a dummy variable coded 0 to 1. The variables are dichotomous having a range of 0 to 1.

The empirical hypotheses state:

E.H. 4.1: The set of output constituency variables are related to the set of domain consensus variables.

E.H. 5.1: The set of output constituency variables are related to the set of interdependence variables.

**Decision-making variables**

**Autonomy**

Autonomy refers to the degree to which an organization is free to make decisions with respect to its own operations. Inkson et al. (1970) measured autonomy by counting the number of types of decisions that could be made inside the organization. Previous studies have measured autonomy by counting the number of extraorganizational sources of new programming efforts (Molnar and Rogers, 1976). In this study, autonomy was measured by eight interview items reflecting the kind of decision-making that occurred in the organization.

a. Our unit's decisions are limited by specific requirements set by higher administrative units.
b. Most planning for our unit takes place in higher administrative units.
c. Regulations established by higher administrative units limit what we can do with other units.
d. Our superiors rarely issue explicit directions for our activities (reverse coded)
e. Our unit is free to develop new projects with other organizations (reverse coded)
f. Our activities and accomplishments are closely monitored by higher administrative levels.
g. Higher administrative units provide a large amount of programming direction.
h. Our unit has authority to develop its own programs. (reverse coded)
Each item was responded to in terms of a seven-level Likert response framework. The responses were scored: 1 = strongly disagree; 2 = disagree; 3 = slightly disagree; 4 = undecided; 5 = slightly agree; 6 = agree; 7 = strongly agree. Responses were recoded on the indicated items to provide consistency in direction.

The items were examined for internal consistency in the sample of 39 individual organizations. The eight items employed here demonstrated an internal consistency reliability of .81 (Cronbach, 1951).

A score was derived for each dyad by summing individual item differences across the eight items. Summing absolute differences across items is a dyadic measurement procedure recommended by Cronbach (1958).

The theoretical range of the dyad score is 0 to 48. A score of zero would occur when there is no difference across eight items. A score of 48 is associated with maximal differences in autonomy (8 x |7 - 1| = 48).

The actual range of the autonomy dyad score was 1 to 27. A high score indicates a high difference in organizational autonomy.

**Formalization**  Formalization refers to the degree to which rules and procedures used in decision-making occur in written form. Aiken and Hage (1968) measured formalization in terms of job codification and the variability permitted within classifications. A measure similar to the one in this study was used by Molnar and Rogers (1976), though it differs by one item, "written operating policies" instead of "office procedure manual". Both items were included in the study, but the choice for the index was made on empirical grounds, i.e., maximum reliability. In this study, the extent to which written policies are detailed is the measure
of formalization. Three items were used to measure this variable.

a. In terms of expected behavior and activities, which of the
categories best describes your written job descriptions?
b. In terms of expected behavior and activities, which of the
categories best describes your written personnel policies?
c. In terms of expected behavior and activities, which of the
categories best describes your written operating policies
and guidelines?

The response categories and codes were: 0 = does not exist; 1 = very
general; 2 = somewhat general; 3 = somewhat detailed; and 4 = very de-
tailed.

These items demonstrated an internal consistency reliability of .79
in the individual sample of 39 agencies (Cronbach, 1951).

Scores were derived for each dyad by summing the differences across
individual items, as recommended by Cronbach (1958). The theoretical
range for this variable is 0 to 12. The actual range is 0 to 8. A high
score indicates a high difference in formalization, a low score, low
differences in formalization.

Decision-making context Warren (1967) introduced a typology of
decision-making contexts based on the relative inclusiveness of the
structure in which relations took place. The four types of context are:
(1) unitary; (2) federative; (3) coalitional; and (4) social choice.
No studies were found that examined decision-making context as an inter-
organizational variable. The measure in this study contrasts the more
inclusive unitary and federative contexts with the less inclusive coaliti-
tional and social choice contexts.

A unitary context of decision-making is one where units are organ-
ized for the deliberate achievement of the inclusive goals. A federative
context is one where individual units have their own goals but there is some formal organization for the purpose of accomplishing inclusive goals.

Relationships among the several units of the Conservation Commission were defined as a unitary context for decision-making. Dyads composed of relationships between Fish and Game Enforcement, District Forester Unit, State Forest Administrative Unit, Park Ranger Unit, Fish Management Biologist Unit, and the Wildlife Biologist Unit were classified as unitary contexts.

The Federal agencies in each study county are members of a Rural Development Committee that constitutes a formal interagency structure for decision-making. In addition, each of these agencies is tied to the U.S. Department of Agriculture, though they are separately administered. These agencies are: Soil Conservation Service, Farmer's Home Administration, Agricultural Stabilization and Conservation Service, and the Extension Service.

Relationships in which both organizations were federal agencies or both were state agencies were defined as constituting an inclusive decision-making context. A dummy variable representing inclusive decision-making context was developed by assigning a score of 1 to dyads of Federal-Federal agency relations, and State-State agency relations, and a score of zero to all others. A dichotomous item, the range is 0 to 1.

The decision-making variables that have been discussed may now be empirically related to domain consensus and interdependence.

E.H. 6.1: The set of decision-making variables is related to the set of domain consensus variables.
E.H. 7.1: The set of decision-making variables is related to the set of interdependence variables.

Decision-maker variables

**Tenure**  Tenure refers to the administrator's length of time in his current position. Respondents were asked the following question:

> How long have you held your present position in your organization?

The actual number of years were recorded. Those in position less than one year were assigned a score of 1. The score assigned each dyad represents the absolute value of the difference in tenure in current position. The actual range was 0 to 27.

**Professional activity**  Professional activity was defined as the level of extraorganizational involvement in professional voluntary associations. This variable was measured by asking:

> Do you belong to any professional associations? Which ones?

The number of professional involvements were counted and summed to form an index of professional activity. The dyad score represents the difference in level of professional activity. The actual range of this variable was 0 to 8.

**Education**  Education refers to the level of formal schooling. Respondents were asked the following question:

> Please indicate the highest level of formal achievement that you have achieved.

Response categories and codes were: 1 = high school; 2 = some college; 3 = college degree; 4 = graduate work; 5 = graduate degree. The
dyad score reflects the difference in level of education between administrators. The theoretical range of this variable is 0 to 4. The actual range is 0 to 4.

**Age**  
Age refers to the respondents chronological age. Respondents were asked:

What is your age?

The actual number of years was recorded. The dyad score represents the difference in age of administrators. The actual range of this variable is 0 to 36.

The comparative property of decision-maker characteristics is composed of the following variables: tenure, professional activity, education, and age. The following hypotheses may now be presented.

E.H. 8.1: The set of decision-maker variables is related to the set of domain consensus variables.

E.H. 9.1: The set of decision-maker variables is related to the set of interdependence variables.

The next section surveys some of the major approaches to the analysis of multiple indicators in sociological research.

**Multiple Indicator Approaches**

This section briefly reviews a series of approaches to combining indicators and assessing the relationship between sets of indicators. A major distinction in categorizing methods of combining sets of indicators is between internally defined composites and composites defined in terms of a second criterion variable or set of variables.
Internally defined composites

Internally defined composites are formed according to the structure of relationships within a set of variables. Three variations on this approach are: simple composites, factor analysis, and Guttman scaling.

Simple composites Simple composites or scales, assume a linear additive model among a set of interval-level indicators, and assumes that all are equally representative of a concept, and that all should receive equal weight in a composite. The internal consistency reliability of a set of indicators is a frequently employed means for assessing the assumptions of equal utility and equal weight (Cronbach, 1951).

Factor analysis Factor analysis is a family of statistical techniques that determine the minimum number of constructs (factors) necessary to account for the interrelationships among a group of variables (Brown, 1970). The proportion of the total variance in a set of variables accounted for by a factor is the common factor variance. Assuming that a single principle component describes a set, the remaining variance is considered to represent error or extraneous variance. The factor score coefficients or loadings of each item on the factor are then used as weights to compute the composite measure (Nie et al., 1975). Factor analysis assumes the existence of a commonly-shared dimension of variance in order to develop a composite that best represents that variance.

Guttman scaling Guttman scaling assumes an internal step-wise or sequential ordering among dichotomized variables. Guttman analysis is centrally evaluated by the reproducibility of a set of items. Reproducibility is the degree to which the scale score is a predictor
of the response pattern which it represents (Edwards, 1948).

**Externally defined composites**

Externally defined multiple indicator composites are formed according to the structure of relationships between sets of variables. Generally, the sets of variables are theoretically meaningful as representing abstract concepts, and the researcher desires a means for deriving a consistent estimate of the relationship between the two concepts. A number of approaches have been suggested for combining indicators and estimating relationships, particularly in reference to overidentified path models (Meyer and Younger, 1974). Four approaches to combining multiple indicators are: Costner's consistency, Joreskog's maximum-likelihood, canonical correlation, and block regression.

**Costner's consistency** Costner (1969) explores the relationship between abstract variables by analyzing the relationship between observable indicators of two concepts. The approach is centrally directed to assessing whether or not particular variables are inadequate for testing the implications of a relationship between sets of indicators because of artifactual measurement error (Costner, 1969:246). The technique provides a means for assessing the presence of differential bias, or common variation external to the postulated conceptual relationship. In addition, the method generates a number of estimates of the unknown coefficient that describes the relationship between sets. The method is limited because no techniques exist for testing the statistical significance of the estimates, nor of deciding which estimate is to be chosen.
as representing the relationship. Hauser and Goldberger (1971) have partially removed the first limitation through the maximum likelihood estimation method.

**Joreskog's maximum likelihood**

Joreskog (1973) has introduced a general method for estimating unknown coefficients in multiple indicator relationships. The technique uses maximum likelihood procedures, which are related to factor analysis and covariance structure models. Coefficient estimates are derived and tests made regarding the goodness-of-fit of a specified model in describing the relationship between sets of variables. These procedures are important innovations in the study of multiple indicator relationships because of their generalizability and flexibility in testing models based on a variety of assumptions.

A major disadvantage of this technique is its statistical sophistication and the dearth of literature regarding its practical application and implementation in sociological research.

**Canonical correlation**  
Canonical correlation will be more fully described in a following section because it is employed in this study. One basic goal of canonical analysis is to use the observable multivariate relationship between sets of indicators to make inferences about the unobservable relationship between the abstract variables (Meyer and Younger, 1974:194). This approach overcomes some of the limitations associated with Costner's consistency by providing a statistical test of a specified model between sets of variables, as well as a single,
empirically derived estimate of that relationship. Van Valey (1971) compared results obtained through Costner's consistency procedure and canonical correlation, finding similar results, though the canonical estimates were more conservative.

**Block regression** In block regression analysis, a composite independent variable is defined on the basis of the linear combination of the indicators created by regression analysis. This technique enables the effect of a set of variables to be summarized in a multiple correlation coefficient: statistical control is achieved through multiple-partial correlations and sequential F-tests. Coleman (1976) employed compound block regression variables to analyze indirect effects of sets of variables that would otherwise be unobtainable through standard methods. This study employs block regression techniques to verify the results of canonical analysis, and to overcome some of the limitations of canonical analysis that are associated with multiple independent variable sets.

This section has briefly reviewed the major approaches to combining sets of indicators and assessing the relationship between sets of indicators. Two of these approaches will be employed in the present study: canonical correlation and simple composites. Canonical correlation assesses the nature of the relationship between sets of variables and summarizes the internal structure of that relationship. Simple composites help overcome some of the limitations of canonical correlation in describing the combined and separate effects of multiple sets. The next section describes these approaches.
Two general statistical procedures will be employed in testing the hypotheses developed in Chapter II. Canonical correlations will be employed to evaluate the hypotheses relating sets of variables, and to develop composites representing each set. Multiple regression analysis will be used to determine the independent effects of composite variates in relation to composite domain consensus and interdependence variables. The formation of composites will be described in a final section.

Canonical correlation

Canonical correlation is a general technique for determining the relationship between two sets of variables. Canonical correlation is the general case of multiple regression analysis with k independent variables and m dependent variables. Multiple regression is the case where m = 1.

The basic idea for canonical correlation is that, through least squares analysis, two linear composites are formed, one for the independent variables \( X_k \), and one for the dependent variables \( Y_m \). The correlation between these two composites is the canonical correlation \( R_C \). The square of the canonical correlation, also termed the eigenvalue, is an estimate of the variance shared by the two composites. Lyttkens (1972) provides a concise summary of the statistical derivations of canonical correlation.

Canonical correlation is similar to factor analysis in that the variance structure of a set of variables contains as many dimensions as there are variables in the set (Stewart and Love, 1968). The first
canonical factor, however, is the best linear function of the first set of variables, given a similarly optimized linear function of the second set. In factor analysis, variance is optimized within sets, in canonical correlation variance is optimized between sets. The correlation between canonical variates or composites is the maximum possible between two sets of variables (Hotelling, 1935).

Canonical correlation produces partial coefficients that are analogous to unstandardized regression coefficients. However, the correlations of the original variable to the resulting canonical variate present a more readily interpretable indication of the relative contribution of the original in determining the canonical variate (Nie et al., 1975). Item-to-variate correlations may be interpreted in the same way that factor loadings are interpreted in factor analysis, since factor loadings are the correlations between the original variables and the derived factors (Pohiman, 1975). The item-to-variate loadings also indicate the importance of a particular variable in determining the relationship with another set. The technique maximizes the relationship between sets of variables; variables that are more heavily weighted play a larger part in determining that relationship.

Canonical correlation is a data reduction technique. Where theory leads to a global hypothesis, a direct test by means of an overall index is appropriate. Analytic treatment of separate variables and separate components introduces a large number of significance tests, with the result that no single statement regarding significance can be taken at face value and the study becomes purely exploratory (Cronbach, 1958:366).
Canonical correlation provides a means for examining a broad hypothesis in a multivariate manner, leading to inferences about the overall pattern of relationships between sets of indicators.

Assumptions of canonical correlation

Canonical correlation is the general case of multiple regression analysis. As such, the assumptions of the two approaches are related. Four basic assumptions of regression analysis are: a linear model, an additive model, uncorrelated independent variables, and interval variable measurement. These assumptions are somewhat different in canonical analysis, however.

Assuming a linear statistical model means that the researcher is willing to believe that the data are best described by a straight line, and the relationships described do not involve sudden changes of state, i.e., they are continuous, and the relationships are not curvilinear. Canonical correlation assumes a linear model for both dependent and independent variables.

An additive statistical model means that variables affect each other in an arithmetic manner, and do not involve multiplicative or interaction effects. Canonical correlation assumes that additive combinations of variables best describe the relationships.

The assumption of uncorrelated independent variables is important in regression analysis. This assumption is necessary because regression coefficients are unstable when independent variables are intercorrelated; multicollinearity may distort actual relationships (Gordon, 1968). This assumption is not as critical in canonical analysis because variable weights are not tested for significance, and a variable's contribution
may be represented in other ways. In small or medium-sized samples, where variables within sets are highly intercorrelated, item-to-variate correlations have lower standard errors, and most accurately represent a variable's contribution to a relationship (Darlington et al., 1973:442).

Multiple regression requires an interval-level dependent variable. In contrast, canonical correlation may employ nominal-level or dummy variables in either independent or dependent sets, or both (Darlington et al., 1973:439). In canonical analysis, variable sets may contain indicators that are continuous, categorical, or mixed. Thus the data in this study meet the measurement assumptions of canonical correlation.

The assumptions of canonical correlation are similar to those of regression in that both develop variable weights according to a linear additive model. The canonical procedures permit a greater level of flexibility in combining levels of measurement, and are associated with strategies to compensate for distortions stemming from multicollinearity.

**Hypothesis testing and interpretation**

Canonical correlation represents a test of the independence between two sets of variables. Wilks (1932) has defined the likelihood-ratio statistic $L$ ($\lambda$) for testing the null hypothesis that two sets are mutually independent, i.e., whether each variable in one set is uncorrelated with each variable in the other set. Bartlett (1941) has shown that a transformation of $L$ approximates the chi-square distribution with $(k \times m)$ degrees of freedom; $k$ and $m$ are the number of variables in each set. The chi-square test is used in this study to test hypotheses relating sets of variables. If a second set of canonical variates is
generated, the degrees of freedom are \([(k - 1) \times (m - 1)]\).

Four major considerations may be identified in the evaluation of hypotheses linked to canonical correlation. These are: (1) the statistical significance of the correlation; (2) the internal consistency of variates; (3) the direction of relationship; and (4) the existence of more than one significant set of canonical variates.

**Statistical significance**  
Canonical correlations are associated with Wilks' lambda values that are mathematically transformed to chi-square values to test hypotheses about the relationship between sets of variables. In this study, the transformed chi-square value will be reported, and the .05 level of probability employed as a criterion for hypothesis testing. The actual probability value will be reported for each canonical correlation. The first set of canonical variates will be presented for all relationships; additional canonical factors will be reported only if they are significant at the .05 level.

**Internal consistency**  
The variables in each set of indicators are argued to be multiple indicators of an abstract concept. The variables in each set should be consistently related to the composite of which they are weighted components. Item-to-variate correlations should be all positive, or all negative, but nevertheless, all in the same direction. Homogeneous item-to-variate correlations are particularly important within dependent variable sets. Sign reversals among independent variables, however, may be interpretable.

Though all item-to-variate correlations may relate to the composite canonical variate in a consistent direction, variability may exist
in the strength of these correlations. Some indicators may be more heavily weighted in a relationship than others. The differential weighting of component variables is a consideration in interpreting the meaning of a canonical variate, and the nature of the relationship between two canonical variates. Cautious interpretation is warranted in situations where the number of variables is small and a dependent variable item-to-variate correlation is near zero.

If consistent item-to-variate correlations are not present for a dependent variable, the canonical variate is uninterpretable and the hypothesis remains an open question. Interpretation can be supplied where inconsistencies exist only among independent variables.

**Direction of relationship** The canonical correlation coefficient \( R_c \) is a multiple correlation coefficient and is not associated with a sign indicating direction of relationship. The direction of relationship between two sets of indicators must be inferred by observing the item-to-variate correlations within each set. If both sets are positively signed, a positive relationship between sets can be inferred. If one set is negatively signed, and the other set of item-to-variate correlations is positively signed, a negative relationship can be said to exist between the variable sets (Darlington et al., 1973). Interpreting the direction of relationship is relevant only if the canonical correlation is significant and the dependent variable set item-to-variate correlations are internally consistent.

**Multiple significant variates** Canonical analysis may produce more than one set of statistically significant variates representing
the relationship between two sets of variables. The second canonical factor is based on analysis of the residual variance unexplained by the first factor, and the canonical correlation of the second set is always less than the first. Canonical variates in the second set are orthogonal (uncorrelated) with variates in the first set.

Meyer and Younger (1974) argue that the existence of a second significant canonical factor indicates that more than one source of common variation affects both sets of indicators. The resulting canonical correlation is an inconsistent estimate of the true relationship between the abstract concepts represented by each set, even though multiple dimensions of relationships may be substantively meaningful. When more than one dimension of shared variation is found to exist in a set, and the dependent variable is internally consistent, the second dimension may be interpreted. If the dependent variable is not internally consistent, the relationship may be considered to be extraneous, or due to some common source of error variance.

By inspecting the internal consistency and strength of each canonical correlation, inference can be cautiously made about the relationship between two sets of variables, and the meaning of additional dimensions of common variance.

The existence of a second significant canonical factor may preclude accepting a hypothesis relating two sets of variables, particularly if dependent variates are deemed uninterpretable.

Figure 3.2 shows the decision-matrix that will be employed in testing the hypotheses developed in Chapter II. The process can be
<table>
<thead>
<tr>
<th>Internally Consistent Variates</th>
<th>Single Set of Variates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dependent</td>
<td>Independent</td>
</tr>
<tr>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>ACCEPT/INTERPRET</td>
</tr>
<tr>
<td></td>
<td>No</td>
</tr>
<tr>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>REJECT</td>
</tr>
<tr>
<td></td>
<td>No</td>
</tr>
</tbody>
</table>

Figure 3.2. Hypothesis-test decision-matrix for canonical correlation

summarized as follows: (1) only statistically significant canonical variates will be considered; (2) internal consistency of variates will be examined; (3) the direction of relationship will be determined by inspecting the signs or polarity of each variate; and (4) the nature and importance of any additional canonical factors will be considered.
Formation of composites

The researcher is confronted with a dilemma when data analysis shifts from the relationship between sets of variables to simultaneous consideration of relationships among multiple sets of variables. Cooley and Lohnes (1962:201) introduce procedures for multiple partial correlations, but the technique is limited because it does not offer a means for assessing the significance of the independent effects of individual sets, nor of isolating these effects. Also, significance tests do not exist for the generalized partial canonical correlations produced by these procedures.

A more frequently employed method of statistical control is regres- sional analysis. Multiple independent variable sets can be analyzed in relation to a single composite dependent variable or in relation to each individual dependent variable. Where dependent variables are many, or represent multiple dimensions of a concept, individual analyses may be unwieldy, and composite variables present a distinct advantage. In this study, canonical variates are used as composites representing each independent variable set. A linear, additive model will be assumed for constructing dependent variable composites for regression analysis.

Additive model The additive model assumes that all the variables in a set are equally important. If the variables are not of equal metric or measurement scale, they require standardization prior to addition. Standardization is conversion of the original variables to z-scores. A z-score is the deviation of the raw score from the mean expressed in standard deviation units. The formula for computing a z-score is:
\[ z = \frac{x - \bar{x}}{s} \]. Z-scores have a mean of zero and a standard deviation of 1.

The additive model for computing domain consensus and interdependence composites is: \( X_z = x_1 + x_2 + x_3 \). The standardized scores are summed to form the composite.

The internal consistency reliability of the domain consensus composite was .46 (Cronbach, 1951). This is a low level of reliability, but little research has been devoted to measuring this concept, and it must be considered the best available. The interdependence composite demonstrated a reliability coefficient of .73, an acceptable level.

**Canonical variate** A second method for computing composite variables in this study is that involving canonical correlations. Composite independent variables are a product of the canonical correlation procedures that tested the first nine hypotheses. These variates will be used as independent variables in regression equations.

The model for deriving a canonical composite \( X_c \) is:

\[ X_c = c_1 x_1 + c_2 x_2 + c_3 x_3 \] where \( c_1, c_2, \) and \( c_3 \) are weights derived in canonical correlation analysis. The standardized variables are multiplied by each weight to obtain the composite.

Canonical variates will be employed as independent variables in regression analyses in order to assess the individual and combined effects of comparative properties on domain consensus and interdependence.
Multiple regression

Multiple regression analysis is a method of analyzing the collective and separate contributions of two or more independent variables to the variation of a single dependent variable (Kerlinger, 1973:3). The combined and incremental contributions of independent variables are major interests in this study.

The composites formed through canonical correlation analysis will be employed as independent variables predicting composite domain consensus and interdependence variables. The F-ratio is the appropriate statistic for examining the overall contribution of the independent variables in explaining the dependent variable as indicated by the $R^2$, or total explained variance. The F-ratio is given by the following formula:

$$ F = \frac{[R^2/k]}{[(1-R^2)/(n-k-1)]} $$

$R^2$ is the total explained variance, $n$ is the sample size, and $k$ is the number of independent variables (Kerlinger, 1973:63).

Sequential F-tests will be employed to examine the incremental effects of particular canonical variates. Sequential F-tests compare full and reduced regression models. The full model contains the variable(s) of interest and the control variable(s). The reduced model contains only the control variable(s). The sequential F-test is as follows:

$$ F = \frac{[(R^2_{f}-R^2_{r})/(k_{f}-k_{r})]}{[(1-R^2_{f})/(n-k_{f}-1)]} $$

(Kerlinger, 1973:71).

The sequential F-test answers the following question: Does the addition of a variable or variables add significantly to the regression or the
Calculating incremental $R^2$'s and using the sequential F-test to evaluate them enables the researcher to assess the relative efficacies of different variables in the regression equation. In this study, sequential F-tests will be used to assess the independent effect of comparative properties on domain consensus and interdependence, and the relationship between domain consensus and interdependence controlling comparative properties.

The multiple regression analyses test three related sets of empirical hypotheses. The first set refers to the overall combined effect of composite comparative property variates on each dependent variable; the second set to the sequential or incremental effects of comparative properties, controlling for the alternate type of integration; and finally, hypotheses specifying the incremental effect of each type of integration, controlling the comparative properties.

**Combined effect** These hypotheses test the combined effect of comparative properties on the dependent variable by applying the F-test to the total variance explained in each dependent variable.

The direct effect hypotheses are:

- E.H. 10.1: Comparative properties together predict domain consensus.

**Integration controlled** The combined effects of comparative properties after the alternate type of integration is in the equation are specified in the next two empirical hypotheses. Domain consensus
Figure 3.3. Diagram of hypothesized control relationships
and interdependence are employed as control variables to assess the combined independent effect of the comparative properties.

E.H. 10.2: Comparative properties together predict domain consensus controlling interdependence.

E.H. 11.2: Comparative properties together predict interdependence controlling domain consensus.

Comparative properties controlled These hypotheses refer to the effects of domain consensus and interdependence on each other, after the comparative properties are in the equation. A sequential F-test examines the increment of explained variance associated with each type of integration.

E.H. 12.1: Interdependence predicts domain consensus controlling comparative properties.


Methodological comparison It is of some interest to compare the results of canonical correlation to the results obtained in regression with canonical variates, and both to results obtained in block regression analysis. Block regression analysis enters a set of variables as a group, and the effect of the group is reflected in the multiple correlation coefficient. Canonical correlation coefficients and multiple correlation coefficients are directly comparable. The comparisons should show the three types of results to be similar in magnitude and significance. Based on these comparisons, some observations will be made on the utility of the canonical correlation approach and the use of canonical variates in regression analysis.
CHAPTER IV. FINDINGS AND DISCUSSION

The objective of this chapter is to test the hypotheses developed in Chapter II. Each of the first nine hypotheses will be examined in the order in which they were presented. Domain consensus and interdependence will be examined first, then each will be examined in relation to the four sets of comparative properties. After each relationship has been discussed, the overall results of the canonical analyses will be reviewed and summarized.

Regression analysis will be used to examine the independent effect of each set of comparative properties. The composites developed in canonical analysis will be employed as independent variables and used to predict composite domain consensus and interdependence variables. Regression analysis will be used to examine the last six empirical hypotheses described in Chapter III. A final section will compare the results obtained in canonical correlation to alternative regression approaches. Bivariate correlations and complete regression results are available in the Appendix.

Canonical Correlation Analysis

This section presents the canonical correlations corresponding to each hypothesized relationship, as well as item-to-canonical variate correlations, and significance levels. The hypotheses will be evaluated according to the procedures described in Chapter III.
Domain consensus and interdependence

General Hypothesis 1  The relational property of domain consensus is related to the relational property of interdependence.

Empirical Hypothesis 1.1  The set of domain consensus variables is related to the set of interdependence variables. The hypothesis was initially evaluated by applying the chi-square test to the canonical correlation, which is equal to .369 (Bartlett, 1941). The chi-square of 25.75 with 9 degrees of freedom was significant at the .002 level of probability (Table 4.1). Inspecting the item-to-variate correlations, each set was internally consistent in sign. The hypothesis relating domain consensus and interdependence variables was accepted.

The negative signs associated with the interdependence variables indicated a negative relationship between sets. Because canonical correlations are always positive, the direction of relationship must be inferred from the signs attached to the elements in the canonical variates (Darlington et al., 1973). It was concluded that domain consensus was negatively related to interdependence.

The pattern of item-to-variate correlations indicated that the domain consensus variate predominantly represented the domain variable related to scenic river development (Domain$_3$), followed by the feedlot construction variable (Domain$_2$). The housing development variable (Domain$_1$) was of lesser importance in this relationship. The interdependence variate predominantly represented resource exchange, and almost equally represented joint programs and information exchange.

The negative relationship found between domain consensus and
Table 4.1. Item-to-variate correlations and canonical correlation between domain consensus variables and interdependence variables

<table>
<thead>
<tr>
<th>Variable sets</th>
<th>Item-to-variate correlations</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>I</td>
<td>II</td>
</tr>
<tr>
<td><strong>Domain consensus</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Domain&lt;sub&gt;1&lt;/sub&gt;</td>
<td>.111</td>
<td></td>
</tr>
<tr>
<td>Domain&lt;sub&gt;2&lt;/sub&gt;</td>
<td>.583</td>
<td></td>
</tr>
<tr>
<td>Domain&lt;sub&gt;3&lt;/sub&gt;</td>
<td>.926</td>
<td></td>
</tr>
<tr>
<td><strong>Interdependence</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Joint programs</td>
<td>-.344</td>
<td></td>
</tr>
<tr>
<td>Resource exchange</td>
<td>-.974</td>
<td></td>
</tr>
<tr>
<td>Information exchange</td>
<td>-.320</td>
<td></td>
</tr>
<tr>
<td><strong>Canonical correlation R&lt;sub&gt;c&lt;/sub&gt;</strong></td>
<td>.369</td>
<td></td>
</tr>
<tr>
<td><strong>Eigenvalue R&lt;sub&gt;c&lt;/sub&gt;&lt;sup&gt;2&lt;/sup&gt;</strong></td>
<td>.136</td>
<td></td>
</tr>
<tr>
<td><strong>Chi-square</strong></td>
<td>25.750</td>
<td></td>
</tr>
<tr>
<td><strong>Degrees of freedom</strong></td>
<td>9</td>
<td></td>
</tr>
<tr>
<td><strong>Probability</strong></td>
<td>.002</td>
<td></td>
</tr>
</tbody>
</table>

No additional canonical factors were generated at the .05 level of significance.
and interdependence is contrary to most previous theory and research on this relationship, though some previous research implicitly anticipates this finding. Warren (1974) found relatively low levels of specific domain consensus between pairs of organizations. He argued that the agencies in his study relied on a broader interorganizational consensus, on the values and norms of interorganizational behavior, to provide a framework for working out domain problems. Agencies in this study also may rely on a broader value consensus to support the contingencies of interdependent working relationships.

These results suggest that the more intensive the interdependence in a dyad, the greater the discrepancies in mutual expectations regarding domain. Agencies that work together are more likely to possess broader expectations and awarenesses of each other's potential for action or involvement. However, the expectations held by outsiders for an organization's involvement in a given problem may not be offset by a counteracting familiarity with an organization's workload capacity, budget limitations, or lack of administrative authorization to act in certain situations. Administrators may be more cautious in committing their own agency's limited resources to additional involvements than they are in their expectations for the involvements of other groups. These ideas are supported in part by the finding that administrators assigned a mean rating of 2.9 to their own involvement across situations, and a mean rating of 3.0 to the expected involvement of other groups, on a five-point scale. Administrators tended to expect more from other agencies than they were willing to commit their own groups to.
The negative relationship between domain consensus and interdependence may be explained in part by the tendency of agencies to rate the involvement of outside groups as greater than their own, and to increase their expectations for another group if they are more familiar with its activities and potential.

The findings also are contrary to the arguments of functional integration theory that stated that normative and functional integration are positively interrelated processes. In this study normative integration, defined in terms of domain consensus, was negatively related to functional integration. The degree of interdependence between agencies was not related to share definitions of each other's activities, but in fact, differences were magnified the more intensive the contacts between groups. As organizations become more involved in each other's activities, their own outside perspectives may be manifested in divergent expectations over how another organization should accomplish its tasks, or what it is capable of doing. If indeed ties of interdependence are transitional replacements of ties based on common values, increasing interdependence may allow greater divergencies in perspective to exist between groups.

Interdependence may generate expectations on matters that would not ordinarily be exposed to outside influence. The resulting dissensus over domain may be tolerated because the relationship may be an established linkage directed by law or authority, or one that has come to be expected by the consumers of both organization's services. Thus the option to reduce interaction even though dissensus is present may not be available.
When organizations are interdependent, each is more involved in the other's affairs. The findings show that mutual expectations increasingly diverge as organizations increase their mutual involvements, and that mutual expectations tend to converge with lower levels of interdependence.

Two interpretations were offered for the theoretical relationship between domain consensus and interdependence. One argued that domain consensus is an antecedent condition of interdependence, the other, that domain consensus is coextensive with interdependence. Both conditions may very well apply to the relationship, but domain consensus was negatively related to interdependence in this study. A common general definition of mutual activities may be important for initial interaction, but more intensive relationships may generate differences based on each organization's own interests and perspectives. Familiarity appeared to lead to dissensus over domain among the organizations in this study.

In addition, domain consensus and interdependence may be negatively coextensive, that is, changes in one may produce concomitant changes in the other. More intensive interdependence blurs organizational boundaries and may create dissensus over domain. A decrease in interdependence may involve the establishment of new limits and distance between groups, and increase the level of domain consensus.

Though interdependence may complicate shared definitions of domain, the mutual investment in the relationship is an assurance that specific issues will be resolved in orderly manner when they arise. One interpretation of the findings suggests that domain consensus may be initially
important for interdependence, but more intensive relations between
groups may activate latent expectations for domain, creating less specific
domain consensus. Disagreements over domain are then resolved in the
context of shared commitment to the relationship.

**Organizational output and domain consensus**

**General Hypothesis 2**    The comparative property of shared organ­
izational output is related to the relational property of domain con­
sensus.

**Empirical Hypothesis 2.1**    The set of organizational output vari­
ables is related to the set of domain consensus variables. The canonical
correlation between these sets is .362 and is significant at the .03
level of probability (Table 4.2). The item-to-variate correlations,
though not entirely consistent within the organizational output variable,
indicated a negative relationship between shared organizational output
and domain consensus. The hypothesis relating organizational output and
domain consensus was accepted.

Although item-to-variate correlations were not entirely consistent
within the set of organizational output variables, the inconsistent cor­
relations were close to zero, and therefore, the variate was interpreted
to represent an overall dimension of shared organizational output. Tech­
nical assistance and information assistance were minimal components of
this factor. Cost-sharing and financial assistance were most heavily
represented; dyads that shared these services tended to have lower levels
of domain consensus. Organizations that offered these services may have
Table 4.2. Item-to-variate correlations and canonical correlation between organizational output variables and domain consensus variables

<table>
<thead>
<tr>
<th>Variable sets</th>
<th>Item-to-variate correlations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>I</td>
</tr>
<tr>
<td><strong>Organizational output</strong></td>
<td></td>
</tr>
<tr>
<td>Regulatory</td>
<td>-.293</td>
</tr>
<tr>
<td>Cost-sharing</td>
<td>-.761</td>
</tr>
<tr>
<td>Technical assistance</td>
<td>.075</td>
</tr>
<tr>
<td>Planning assistance</td>
<td>-.216</td>
</tr>
<tr>
<td>Information assistance</td>
<td>.078</td>
</tr>
<tr>
<td>Financial assistance</td>
<td>-.585</td>
</tr>
<tr>
<td>Management-development</td>
<td>-.239</td>
</tr>
<tr>
<td><strong>Domain consensus</strong></td>
<td></td>
</tr>
<tr>
<td>Domain&lt;sub&gt;1&lt;/sub&gt;</td>
<td>.238</td>
</tr>
<tr>
<td>Domain&lt;sub&gt;2&lt;/sub&gt;</td>
<td>.501</td>
</tr>
<tr>
<td>Domain&lt;sub&gt;3&lt;/sub&gt;</td>
<td>.964</td>
</tr>
<tr>
<td>Canonical correlation R&lt;sub&gt;c&lt;/sub&gt;</td>
<td>.362</td>
</tr>
<tr>
<td>Eigenvalue R&lt;sup&gt;2&lt;/sup&gt;&lt;sub&gt;c&lt;/sub&gt;</td>
<td>.131</td>
</tr>
<tr>
<td>Chi-square</td>
<td>34.505</td>
</tr>
<tr>
<td>Degrees of freedom</td>
<td>21</td>
</tr>
<tr>
<td>Probability</td>
<td>.032</td>
</tr>
</tbody>
</table>
more narrowly defined their activities to the application of funds, while other groups may have had higher expectations of their involvement. Dissensus also may stem from outsider expectations that confined these groups to their specific cost-sharing and financial assistance activities, and did not anticipate the involvements that administrators projected for their own groups.

Organizations that are involved in the delivery of similar types of services are more likely to be aware of each other's activities and to have expectations about another's involvements in various problem areas. Because administrators may tend to expect more from other groups than from their own, the greatest deviations in expectation occurred among those with whom they were most closely associated and aware; organizations that shared similar services.

It was argued that similar goals and functions foster a division of labor between organizations. This was not found to be the case. Organizations that shared services, particularly those related to the disbursement and application of funds were associated with lower levels of domain consensus. Organizations that shared services were more likely to have discrepant mutual expectations about domain than organizations that offered different services.

Organizational output and interdependence

General Hypothesis 3 The comparative property of shared organizational output is related to the relational property of interdependence.
Empirical Hypothesis 3.1  The set of organizational output variables is related to the set of interdependence variables. The canonical correlation of .636 was significant at the .0001 level and the hypothesis was supported (Table 4.3). The item-to-variate correlations were consistent within the dependent set, and were generally consistent within the organizational output variate.

The technical assistance variable was inconsistently correlated within the organizational output variables. Due to its small magnitude, however, this inconsistency was discounted and the global hypothesis accepted. The remaining correlations generally indicated that organizations which shared a particular type of output are more likely to be interdependent than those who did not share common outputs.

The theoretical argument of Reid (1969) is supported by these findings. Organizations with similar function may be more interdependent because of similar resource needs. Similar activities and service concerns increase the likelihood that a common basis for interaction will be encountered. In addition, organizations that share similar services also may share similar goals. Their activities may more readily become interdependent because of the potential increase in mutual goal attainment that may be obtained through interrelated effort.

Output constituency and domain consensus

General Hypothesis 4  The comparative property of shared output constituency is related to the relational property of domain consensus.

Empirical Hypothesis 4.1  The set of output constituency variables is related to the set of domain consensus variables. The
Table 4.3. Item-to-variate correlations and canonical correlation between organizational output variables and interdependence variables

<table>
<thead>
<tr>
<th>Variable sets</th>
<th>Item-to-variate correlations</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>I</td>
<td>II</td>
<td></td>
</tr>
<tr>
<td>Organizational output</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regulatory</td>
<td>.043</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost-sharing</td>
<td>.704</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Technical assistance</td>
<td>-.157</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Planning assistance</td>
<td>.338</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Information assistance</td>
<td>.184</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Financial assistance</td>
<td>.670</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Management-development</td>
<td>.528</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interdependence</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Joint programs</td>
<td>.366</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resource exchange</td>
<td>.979</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Information exchange</td>
<td>.345</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Canonical correlation $R_c$</td>
<td>.636</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eigenvalue $R_c^2$</td>
<td>.404</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chi-square</td>
<td>93.332</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Degrees of freedom</td>
<td>21</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Probability</td>
<td>.0001</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
canonical correlation of .348 is not significant and the hypothesis cannot be accepted (Table 4.4). The shared output constituency variable set is not related to domain consensus.

The domain consensus variate was internally consistent, while different types of client groups received different weights in the output constituency variate. Agencies that provided services to farmers and local agencies tended to have a higher level of domain consensus than those who provided services to recreational users and nonfarm landowners. The relationship is not, however, supported by the canonical correlation.

Expectations the organizations held of each other's activities were not affected by the sharing of client groups. The previous finding, however, suggests that the kinds of services shared, particularly those involving the distribution of funds, are important considerations for domain consensus.

Output constituency and interdependence

General Hypothesis 5 The comparative property of shared output constituency is related to the relational property of interdependence.

Empirical Hypothesis 5.1 The set of output constituency variables is related to the set of interdependence variables. The canonical correlation of .552 was significant at the .0001 level (Table 4.5). The hypothesis relating output constituency variable to interdependence was accepted.

A second set of canonical variates also were significantly related by a canonical correlation of .473. The presence of a second canonical
Table 4.4. Item-to-variate correlations and canonical correlation between output constituency variables and domain consensus variables

<table>
<thead>
<tr>
<th>Variable sets</th>
<th>Item-to-variate correlations</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>I</td>
<td>II</td>
</tr>
<tr>
<td><strong>Output constituency</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Farmers</td>
<td>.464</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Private industry</td>
<td>-.001</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recreational users</td>
<td>-.279</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nonfarm landowners</td>
<td>-.110</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Park-users</td>
<td>-.087</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Homeowners</td>
<td>-.053</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Local agencies</td>
<td>.256</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Domain consensus</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Domain$^1$</td>
<td>.280</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Domain$^2$</td>
<td>.860</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Domain$^3$</td>
<td>.711</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Canonical correlation</strong></td>
<td>$R_c$</td>
<td>.348</td>
<td></td>
</tr>
<tr>
<td><strong>Eigenvalue</strong> $R^2$</td>
<td></td>
<td>.121</td>
<td></td>
</tr>
<tr>
<td><strong>Chi-square</strong></td>
<td></td>
<td>26.677</td>
<td></td>
</tr>
<tr>
<td><strong>Degrees of freedom</strong></td>
<td></td>
<td>21</td>
<td></td>
</tr>
<tr>
<td><strong>Probability</strong></td>
<td></td>
<td>.182</td>
<td></td>
</tr>
</tbody>
</table>
Table 4.5. Item-to-variate correlations and canonical correlation between output constituency variables and interdependence variables

<table>
<thead>
<tr>
<th>Variable sets</th>
<th>Item-to-variate correlations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>I</td>
</tr>
<tr>
<td><strong>Output constituency</strong></td>
<td></td>
</tr>
<tr>
<td>Farmers</td>
<td>.366</td>
</tr>
<tr>
<td>Private industry</td>
<td>-.241</td>
</tr>
<tr>
<td>Recreational users</td>
<td>.246</td>
</tr>
<tr>
<td>Nonfarm landowners</td>
<td>-.362</td>
</tr>
<tr>
<td>Park-users</td>
<td>-.072</td>
</tr>
<tr>
<td>Homeowners</td>
<td>-.235</td>
</tr>
<tr>
<td>Local agencies</td>
<td>.272</td>
</tr>
<tr>
<td><strong>Interdependence</strong></td>
<td></td>
</tr>
<tr>
<td>Joint programs</td>
<td>.123</td>
</tr>
<tr>
<td>Resource exchange</td>
<td>.957</td>
</tr>
<tr>
<td>Information exchange</td>
<td>.439</td>
</tr>
<tr>
<td>Canonical correlation $R_c$</td>
<td>.552</td>
</tr>
<tr>
<td>Eigenvalue $R_c^2$</td>
<td>.305</td>
</tr>
<tr>
<td>Chi-square</td>
<td>90.825</td>
</tr>
<tr>
<td>Degrees of freedom</td>
<td>21</td>
</tr>
<tr>
<td>Probability</td>
<td>.0001</td>
</tr>
</tbody>
</table>
factor does not preclude accepting the empirical hypothesis because both interdependence variates were internally consistent, though the first variate emphasized resource exchange, and the second joint programming.

The first output constituency variate weighted the output constituencies of farmers, recreational users, and local agencies; it negatively weighted private industry, nonfarm landowners, and homeowners. Providing services to farmers, recreational users, and agencies was a central cluster of outputs associated with interdependence among the agencies in this study, while those that shared industrial and nonfarm client groups tended to have lower levels of interdependence.

The second factor may represent shared client groups in general, the effects of which are residual to serving particular types of client groups. This variate was associated with higher item-to-variate correlations, indicating that the effects of individual variables were more clearly represented by the factor. Sharing other local agencies, nonfarm landowners, and farmers were the most important aspects of this variate, while sharing park-users as a client groups was minimally important.

Thus two variates appear to explain the relationship between shared output constituency variables and interdependence. The first variate identified specific clusters of output constituencies and was related to an interdependence variate stressing resource exchange as a central component. The second output constituency variate reflected a more general dimension of sharing client groups, and was significantly related to an interdependence variate stressing joint programming.

The findings are consistent with the argument that sharing particular
types of client groups may produce pressures for interdependence, as well as increasing the likelihood that a common basis for interdependence will be encountered.

Sharing certain types of clients seems to be most important for determining resource exchange among organizations, while sharing client groups in general seems to be most important for determining more structured forms of interdependence, such as joint programming.

**Decision-making and domain consensus**

**General Hypothesis 6** The comparative property of organizational decision-making is related to the relational property of domain consensus.

**Empirical Hypothesis 6.1** The set of decision-making variables is related to the set of domain consensus variables. The canonical correlation of .308 was significant at the .02 level (Table 4.6). The sixth hypothesis relating decision-making variables to domain consensus can be accepted.

The decision-making variate most heavily weighted differences in autonomy, though formalization differences and shared decision-making context were also important. The domain consensus variate was predominantly represented by the first domain variable, giving near zero weights to the remainder. The pattern of weighting reflected some degree of distortion in the representation of the dependent variables and the relationship must be cautiously interpreted.

Domain consensus was related to differences in the way decision-making processes were constrained within each organization. Organizations that were different in their level of autonomy and level of
Table 4.6. Item-to-variate correlations and canonical correlation between decision-making variables and domain consensus

<table>
<thead>
<tr>
<th>Variable sets</th>
<th>Item-to-variate correlations</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>I</td>
<td>II</td>
</tr>
<tr>
<td>Decision-making</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Formalization</td>
<td>.322</td>
<td></td>
</tr>
<tr>
<td>Autonomy</td>
<td>.805</td>
<td></td>
</tr>
<tr>
<td>Context</td>
<td>.416</td>
<td></td>
</tr>
<tr>
<td></td>
<td>no additional canonical factors were generated at the .05 level of significance</td>
<td></td>
</tr>
<tr>
<td>Domain consensus</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Domain₁</td>
<td>.964</td>
<td></td>
</tr>
<tr>
<td>Domain₂</td>
<td>-.073</td>
<td></td>
</tr>
<tr>
<td>Domain₃</td>
<td>.198</td>
<td></td>
</tr>
<tr>
<td>Canonical correlation Rₖ</td>
<td>.308</td>
<td></td>
</tr>
<tr>
<td>Eigenvalue R₆^2</td>
<td>.095</td>
<td></td>
</tr>
<tr>
<td>Chi-square</td>
<td>19.657</td>
<td></td>
</tr>
<tr>
<td>Degrees of freedom</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Probability</td>
<td>.020</td>
<td></td>
</tr>
</tbody>
</table>
formalization, but shared a common authority structure, had the highest domain consensus. The presence of one highly structured member in a dyad appeared to be conducive for establishing domain expectations in the relationship; low autonomy and high autonomy agencies tended to have higher levels of domain consensus.

Organizations with similar decision-making structures tended to have lower levels of domain consensus. Administrators tended to have less congruent expectations with groups that were similar to their own. The results may reflect differences in the relative abilities of agencies to anticipate each other's constraints and capabilities, as well as the tendency of administrators to distinguish their own agency's activities from the activities of similar groups.

**General Hypothesis 7**  The comparative property of organizational decision-making is related to interdependence.

**Empirical Hypothesis 7.1** The set of decision-making variables is related to the set of interdependence variables. The canonical correlation of .601 is associated with a probability of .001 (Table 4.7). A significant relationship was found between the set of decision-making variables and the set of interdependence variables.

The interdependence variate was internally consistent, though joint programming and information exchange were most heavily weighted. The decision-making variate largely represented the inclusive decision-making context variable, and the weightings of formalization and autonomy differences were minimized. Other aspects of decision-making had little effect on the intensity of relationships among the agencies in this study.
Table 4.7. Item-to-variate correlations and canonical correlation between decision-making variables and interdependence variables

<table>
<thead>
<tr>
<th>Variable sets</th>
<th>Item-to-variate correlations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>I</td>
</tr>
<tr>
<td>Decision-making</td>
<td></td>
</tr>
<tr>
<td>Formalization</td>
<td>.024</td>
</tr>
<tr>
<td>Autonomy</td>
<td>.126</td>
</tr>
<tr>
<td>Context</td>
<td>.929</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Interdependence</td>
<td></td>
</tr>
<tr>
<td>Joint programs</td>
<td>.927</td>
</tr>
<tr>
<td>Resource exchange</td>
<td>.543</td>
</tr>
<tr>
<td>Information exchange</td>
<td>.782</td>
</tr>
<tr>
<td>Canonical correlation $R_c$</td>
<td>.601</td>
</tr>
<tr>
<td>Eigenvalue $R^2_c$</td>
<td>.361</td>
</tr>
<tr>
<td>Chi-square</td>
<td>71.918</td>
</tr>
<tr>
<td>Degrees of freedom</td>
<td>9</td>
</tr>
<tr>
<td>Probability</td>
<td>.0001</td>
</tr>
</tbody>
</table>
An important conclusion is that interdependence most frequently occurred among agencies that shared a common authority structure. A shared authority structure provides a context for decision-making in which interdependence may be more readily legitimized, and in some cases, formally structured as part of the agencies' regular activities. Such interdependence may be encouraged and supported by higher administrative levels; it is also less likely to constitute a threat to each agency's activities or structure of resource allocations.

Though decision-making context was very important, the arguments for formalization and autonomy were not supported by the findings. Differences in the amount and nature of decision-making that was available to administrators was of little importance in determining interdependence. A common authority appears to legitimize, support, and enforce a large part of the interdependence that occurred among the organizations in this study.

**Decision-maker characteristics and domain consensus**

**General Hypothesis 8** The comparative property of decision-maker characteristics is related to the relational property of domain consensus.

**Empirical Hypotheses 8.1** The set of decision-maker variables is related to the set of domain consensus variables. The canonical correlation between decision-maker variables and domain consensus was .236, but was not statistically significant (Table 4.8). Decision-maker characteristics were not related to domain consensus, and the hypothesis was not accepted.
Table 4.8. Item-to-variate correlations and canonical correlation between decision-maker variables and domain consensus

<table>
<thead>
<tr>
<th>Variable sets</th>
<th>Item-to-variate correlations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>I</td>
</tr>
<tr>
<td>Decision-maker</td>
<td></td>
</tr>
<tr>
<td>Tenure</td>
<td>-.464</td>
</tr>
<tr>
<td>Professional activity</td>
<td>.156</td>
</tr>
<tr>
<td>Education</td>
<td>.695</td>
</tr>
<tr>
<td>Age</td>
<td>.475</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Domain consensus</td>
<td></td>
</tr>
<tr>
<td>Domain\textsubscript{1}</td>
<td>.218</td>
</tr>
<tr>
<td>Domain\textsubscript{2}</td>
<td>-.793</td>
</tr>
<tr>
<td>Domain\textsubscript{3}</td>
<td>.314</td>
</tr>
<tr>
<td>Canonical correlation $R_c$</td>
<td>.236</td>
</tr>
<tr>
<td>Eigenvalue $R_c^2$</td>
<td>.056</td>
</tr>
<tr>
<td>Chi-square</td>
<td>14.773</td>
</tr>
<tr>
<td>Degrees of freedom</td>
<td>12</td>
</tr>
<tr>
<td>Probability</td>
<td>.254</td>
</tr>
</tbody>
</table>
The domain consensus variate was internally inconsistent. The decision-maker variate negatively weighted differences in tenure, and positively weighted educational and age differences. Professional activity was not an important aspect of this factor.

No identifiable pattern of relationship emerged between the decision-maker variables and domain consensus. The characteristics of boundary personnel appeared to have little affect on mutual expectations for involvement among the organizations in this study.

Decision-maker characteristics and interdependence

General Hypothesis 9 The comparative property of decision-maker characteristics is related to the relational property of interdependence.

Empirical Hypothesis 9.1 The set of decision-maker variables is related to the set of interdependence variables. The canonical correlation of \( r = 0.779 \) was not statistically significant (Table 4.9). The hypothesis relating decision-maker characteristics to interdependence cannot be accepted.

The interdependence factor was internally consistent. The decision-maker variate negatively weighted professional activity differences, and positively weighted age differences.

Differences in age appeared to facilitate relations between groups, and differences in professionalism to impede the processes of interdependence. However, tenure and education differences were of little importance, and the overall relationship was not significant.

Previous research has shown professionalism to be an important aspect
Table 4.9. Item-to-variate correlations and canonical correlation between decision-maker variables and interdependence variables

<table>
<thead>
<tr>
<th>Variable sets</th>
<th>Item-to-variate correlations</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>I</td>
<td>II</td>
<td></td>
</tr>
<tr>
<td>Decision-maker</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tenure</td>
<td>.130</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Professional activity</td>
<td>-.899</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td>.081</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>.470</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interdependence</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Joint programs</td>
<td>.885</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resource exchange</td>
<td>.490</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Information exchange</td>
<td>.840</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Canonical correlation</td>
<td>( R_c ) = .279</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eigenvalue ( R_c^2 )</td>
<td>.078</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chi-square</td>
<td>14.541</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Degrees of freedom</td>
<td>12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Probability</td>
<td>.267</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
of relations between organizations. The canonical variate weighting shows it to be an important aspect of the relationship, but because the other variables had little effect, the overall relationship did not account for a significant proportion of variation between sets.

**Summary of canonical correlations**

Figure 4.1 diagrams the statistically significant canonical correlations associated with the first nine hypotheses. The domain consensus and interdependence variable sets were negatively related. Shared organizational output was negatively related to domain consensus; but was positively related to interdependence. Shared output constituency was related only to interdependence. Two dimensions of relationship were found. One reflected clusters of different types of services, and a second reflected shared client groups in general. Decision-making properties were related to domain consensus; they also were strongly related to interdependence. Decision-maker characteristics were not related to either dependent variable set. In general, the comparative properties were most strongly related to interdependence.

The next section examines empirical hypotheses related to the overall and independent effects of the comparative properties and the two dependent variables. Multiple regression analysis will be used to assess the last six empirical hypotheses.
Figure 4.1 Hypothesized relationships supported by canonical correlations
This section examines the last three general hypotheses developed in Chapter II. The composites formed for each set of independent variables in the preceding canonical analysis will be employed as independent variables in multiple regression analysis. Composite domain consensus variables and interdependence variables will be regressed on canonical variate composites representing each set of independent variables. Significant F-ratios are hypothesized, and the independent effects of each composite variate may be observed in sequential multiple correlation coefficients.

The canonical analysis of organizational output and interdependence identified two dimensions of common variance between sets. For the purposes of regression analysis, these two variates will be considered together, and only their combined effects presented.

The six empirical hypothesis will each be presented and evaluated. A discussion will follow interpreting the overall pattern of relationships among domain consensus, interdependence and comparative properties.

Multiple regression analysis - domain consensus

**General Hypothesis 10**  
The organizational output, output constituency, decision-making, and decision-maker comparative properties together predict the relational property of domain consensus.

**Empirical Hypothesis 10.1**  
The comparative properties together predict domain consensus. The combined comparative property composite variables explained 18.4 percent of the domain consensus variance, a
statistically significant amount (Table 4.10). The empirical hypothesis was accepted.

**Empirical Hypothesis 10.2** The comparative properties predict domain consensus controlling interdependence. Table 4.10 shows the incremental explained variance of .126 associated with the comparative properties after the interdependence variate is entered in the regression equation. The comparative properties made a significant contribution after interdependence and the hypothesis was accepted.

In addition, the combined effects of the comparative properties and interdependence explained 21 percent of the domain consensus variance. The results show that the combined comparative properties made significant independent and incremental contributions to the explanation of domain consensus variance, though only a relatively small proportion of the overall domain consensus variance was accounted for.

**Multiple regression analysis - interdependence**

**General Hypothesis 11** The organizational output, output, constituency, decision-making and decision-maker comparative properties together predict the relational property of interdependence.

**Empirical Hypothesis 11.1** The comparative properties together predict interdependence. Table 4.10 shows the regression of composite comparative properties variables on interdependence. The combined comparative properties explained 47.2 percent of the interdependence variance, a significant amount. The empirical hypothesis was accepted.
Table 4.10. Multiple regression results showing combined and incremental effects of comparative properties on domain consensus and interdependence

<table>
<thead>
<tr>
<th>Relationship</th>
<th>Explained variance ($R^2$)</th>
<th>Multiple correlation ($R$)</th>
<th>F-value</th>
<th>Degrees of freedom</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Domain consensus</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Combined effect of comparative properties on domain consensus</td>
<td>.184</td>
<td>.429</td>
<td>7.932***</td>
<td>4/141</td>
</tr>
<tr>
<td>Incremental effect of comparative properties on domain consensus controlling interdependence</td>
<td>.126</td>
<td>.429</td>
<td>5.582***</td>
<td>4/140</td>
</tr>
<tr>
<td>Combined effect of comparative properties and interdependence on domain consensus</td>
<td>.210</td>
<td>.459</td>
<td>7.46***</td>
<td>5/140</td>
</tr>
<tr>
<td><strong>Interdependence</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Combined effect of comparative properties on interdependence</td>
<td>.472</td>
<td>.687</td>
<td>25.008***</td>
<td>5/140</td>
</tr>
<tr>
<td>Incremental effect of comparative properties on interdependence controlling domain consensus</td>
<td>.432</td>
<td>.450</td>
<td>23.781***</td>
<td>5/139</td>
</tr>
<tr>
<td>Combined effect of comparative properties and domain consensus on interdependence</td>
<td>.495</td>
<td>.703</td>
<td>22.681***</td>
<td>6/139</td>
</tr>
</tbody>
</table>

***p < .001 level.
Empirical Hypothesis 11.2  The comparative properties together predict interdependence controlling domain consensus. The incremental explained variance associated with the combined comparative properties was .432, a statistically significant proportion (Table 4.10). The hypothesis relating comparative properties to interdependence controlling domain consensus was accepted.

In addition, the combined effects of the comparative properties and domain consensus explained 49.5 percent of the interdependence variance, a statistically significant amount (Table 4.10). The combined comparative properties made both independent and incremental contributions to the explained interdependence variance, showing comparative properties to be a major factor in explaining interdependence.

Multiple regression analysis - controlling comparative properties

General Hypothesis 12  Domain consensus is related to interdependence, controlling comparative properties.

Empirical Hypothesis 12.1  Interdependence predicts domain consensus controlling comparative properties. Entering interdependence after the comparative properties produced an incremental explained variance of .027 (Table 4.11). The interdependence variate significantly added to the prediction of domain consensus after comparative properties, and the empirical hypothesis was accepted.

Empirical Hypothesis 12.2  Domain consensus predicts interdependence controlling comparative properties. Regressing the domain consensus composite variate on interdependence after the comparative properties was associated with an incremental explained variance of .023
Table 4.11. Multiple regression results showing incremental effects of domain consensus and interdependence, after comparative properties

<table>
<thead>
<tr>
<th>Relationship</th>
<th>Explained variance ($R^2$)</th>
<th>Multiple correlation (R)</th>
<th>F-value</th>
<th>Degrees of freedom</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incremental effect of interdependence on domain consensus controlling comparative properties</td>
<td>0.027</td>
<td>0.030</td>
<td>4.78*</td>
<td>1/140</td>
</tr>
<tr>
<td>Incremental effect of domain consensus on interdependence controlling comparative properties</td>
<td>0.023</td>
<td>0.016</td>
<td>6.33**</td>
<td>1/139</td>
</tr>
</tbody>
</table>

* $p < .05$ level.
** $p < .01$ level.

(Table 4.11). Domain consensus significantly predicted interdependence after the comparative properties and the hypothesis was accepted.

The results showed domain consensus and interdependence to have concurrent effects on one another. Controlling the combined comparative properties did not completely explain away the relationship, though they accounted for a substantial part of it.

Discussion

Domain consensus The regression analysis showed that comparative properties were the major determinants of domain consensus. The comparative properties predicted domain consensus as a group; they also
predicted domain consensus when controlling for interdependence. Inter­
dependence had a small but statistically significant effect on domain
consensus after the comparative properties. Figure 4.2 diagrams the
relationships supported in regression analysis.

Three sources of variation were found to be important in explaining
domain consensus. The comparative properties explained 12.6 percent of
domain consensus variance after interdependence; interdependence ex­
plained 2.7 percent after the comparative properties; comparative proper­
ties and interdependence overlapped 6.7 percent in explaining domain con­sensus variance \((12.6 + 2.7 + 6.7 = 21.0)\). Comparative properties and
interdependence together explained 21.0 percent of the domain consensus
variance. In conclusion, the comparative properties had the most impor­tant independent effects on domain consensus, even after the fact that
more were represented.

Domain consensus appeared to be largely an outcome of the structural
conditions that bring organizations together. Comparative properties
strongly determined the impact one organization's activity had on another.
Organizations with similar domains and similar decision-making structures
appeared to be more likely to encounter each other's presence in the course
of their regular activities. The data showed that increased proximity
of organizations was associated with less domain consensus; the intensity
of relations between groups explained a small amount of this variation, the
majority stemmed from structural conditions of similarity and differ­
ences between interacting groups.
Figure 4.2. Diagram of control relationships supported by regression analysis: Incremental multiple correlations
Interdependence The regression analyses show that both the comparative properties and domain consensus had independent effects on interdependence. The comparative properties independently explained 43.2 percent of the interdependence variance; domain consensus independently explained 2.3 percent of the interdependence variance. The comparative properties and domain consensus shared an overlapping variance of 4 percent in predicting interdependence. The comparative properties and domain consensus together explained 49.5 percent of the interdependence variance (43.2 + 2.3 + 4 = 49.5).

These findings show the comparative properties to be very important determinants of interdependence, as well as of domain consensus. Comparative properties played an important role in predicting both types of integration in interorganizational relationships.

Common expectations about domain may be important in establishing relationships between groups. The findings show that deviations in specific expectations about domain increase as organizations become more interdependent. There is more variability in mutual expectations over domain as organizations increase the intensity of their involvements with one another. Groups then have greater mutual awareness of each other's interests and activities; they are more likely to develop sets of expectations for each other based on their own interests. The shared activities of interdependence, however, provide a framework or context for the divergent expectations to exist, and they may become sources of innovation in the relationship.

Large deviations in expectation also may be a source of conflicts,
but the shared investment in interdependence is an incentive to resolve the conflicts. Another form of conflict resolution is to lessen the interdependence, thus drawing new boundaries between organizations and creating new domain consensus.

These results have implications for the question of the ordering of domain consensus and interdependence. Both domain consensus and interdependence exert independent effects on one another, controlling for the comparative property variates. If one or the other relationship had vanished under control for comparative properties, it might have been argued that the remaining relationship was a causal one, i.e., it remained after control for comparative properties. If both relationships had vanished, it might have argued that the link between relational properties was due to common structural conditions and they actually had little independent effect on one another. However, the findings of this study suggest that domain consensus and interdependence are coextensive; each had a part in determining the other. Comparative properties are a context in which relationships occur. The properties of these relationships have independent effects on each other, even though they are largely determined by the structural conditions of similarities and differences. Expectations about domain play a role in initiating and maintaining interdependence; the ensuing transactions also have an impact on domain consensus.
Methodological comparison

This section compares canonical correlations and multiple correlation coefficients obtained in two ways: Regressing canonical variates on composite dependent variables, and regressing original variable sets on composite dependent variables. Canonical variate composites are weighted sums obtained in canonical correlation analysis; the dependent variables are unweighted sums of standardized variables.

Reading across Table 4.12, canonical coefficients are always larger than the multiple correlation coefficients, reflecting the relationship-maximizing function of the technique. However, the significance levels of the canonical correlations are almost always equal or less than the multiple correlation coefficients from regression.

Canonical correlations are tested for statistical significance according to the Chi-square distribution. The Chi-square values are referenced to the number of degrees of freedom obtained by taking the product of the number of variables in the first set time the number of variables in the second set. As the number of variables increase, canonical significance tests become more conservative at a much faster rate than do regression F-ratio tests, which are referenced to number of independent variables. Thus the canonical correlations were always greatest in magnitude, but they had compensating, more stringent statistical standards to meet.

The coefficient based on canonical variate composites were always smaller in magnitude than the other coefficients, but were associated with higher levels of statistical significance. The variates were tested
Table 4.12. Summary comparison of canonical correlation coefficients and multiple correlation coefficients obtained in regression on canonical variates and on original variable sets: Results for domain consensus and interdependence

<table>
<thead>
<tr>
<th>Canonical variate</th>
<th>Domain consensus</th>
<th></th>
<th>Interdependence</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Canonical</td>
<td>Composite</td>
<td>Set</td>
<td>Canonical</td>
</tr>
<tr>
<td>Organizational output</td>
<td>.362*</td>
<td>.299***</td>
<td>.325*</td>
<td>.636***</td>
</tr>
<tr>
<td>Output constituency</td>
<td>.348</td>
<td>.282***</td>
<td>.312*</td>
<td>.552***</td>
</tr>
<tr>
<td>Decision-making properties</td>
<td>.308*</td>
<td>.163*</td>
<td>.182</td>
<td>.601***</td>
</tr>
<tr>
<td>Decision-maker characteristics</td>
<td>.236</td>
<td>.030</td>
<td>.094</td>
<td>.279</td>
</tr>
<tr>
<td>Domain consensus</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>.369***</td>
</tr>
<tr>
<td>Interdependence</td>
<td>.369**</td>
<td>.290***</td>
<td>.298*</td>
<td>--</td>
</tr>
</tbody>
</table>

* p < .05 level.

** p < .01 level.

*** p < .001 level.
with 1 degree of freedom on the F distribution, but were composites that maximized the variance of a set of variables in relation to the dependent variable. A weakness of canonical composites is the "prepackaged" variance these composites represent, and the less stringent statistical tests that are applied to them because they are used as single variables, not the several variables they represent.

This weakness may have a strength, however, when canonical variates are used as control variables. It may be desirable to remove as much variation as possible between two variable sets in order to examine the relationship of the dependent variable to a third variable, or variable set. Canonical composites may be particularly useful when referenced to a single, ultimate dependent variable that can be used to define the variates for the overall analysis.

The canonical correlation that was most discrepant from its regression counterparts was that for decision-maker characteristics and domain consensus (.236 versus .030 and .044). The organizational output and interdependence coefficient also was much greater than the multiple correlation coefficients (.636 versus .444 and .471), though in neither case did significance level differ.

One canonical correlation was not completely borne out by regression analysis in terms of statistical significance. The decision-making properties were statistically related to domain consensus in canonical analysis, but the domain consensus variate was somewhat inconsistent. The relationship was accepted, noting the distortion within the canonical variate. The regression of the set of individual variables on domain
consensus did not verify these results. In future analyses, it may be advisable to be particularly cautious in evaluating relationships that are premised on internal consistency within one or more variable sets, especially when the relationship is only marginally significant in a statistical sense.

The inconsistencies between approaches showed that in terms of statistical significance, canonical correlation was generally a more conservative technique than either regression approach. For example, the canonical correlation between output constituency and domain consensus was not significant; the composite regression was significant at the .001 level, and the variable set at the .05 level. In addition, the canonical correlation between decision-maker characteristics and interdependence was not significant, while both regression composites were. One observation is that the canonical correlation technique is more sensitive to the number of variables that comprise a relationship, and is less likely to exaggerate the importance of relationships that are inflated due to the sheer number of variables involved.

The rank ordering of coefficients according to magnitude was consistent within the regressions for each dependent variable. However, differences in ranking occurred among interdependence predictors, in which canonical analysis reversed the decision-making and organizational output variable sets.

In summary, canonical correlations were generally consistent with multiple correlations. Infrequent inconsistencies were generally on the conservative side, in terms of hypothesis testing.
Several advantages appear to accrue with the canonical correlation approach. The approach provides greater insight into the relationship between sets of variables than multiple regression because the structure of the relationship between two sets is displayed in the coefficients associated with each set. The nature of the dependent variable can be observed, as well as the relative importance of each independent variable.

As composites, canonical variates effectively package the shared variation between sets, but may exaggerate the importance of a finding when a single composite represents the shared variation of several variables. One strategy may be to only employ sets that have an equal number of indicators and to apply a smaller probability level to hypothesis tests.

Canonical variates are composites that are very similar to the compound block variables obtained in regression analysis. They are more accurate composites because they do not involve the intermediate step of developing composite dependent variables, and the loss of information this may entail. They share the disadvantage of being narrowly defined in terms of their relationship to a dependent set, but may have utility in decomposing hidden partial effects in regression analysis (Coleman, 1976).

A major disadvantage of canonical correlation is the difficulty of analyzing multiple sets of variables when it is desirable to decompose the independent effects of each set. This is a general problem of sociological research, and not one strictly limited to canonical analysis. The present study resolved the dilemma by combining the dependent variable sets in a traditional manner. Future studies may not find this approach convenient nor meaningful.
CHAPTER V. SUMMARY AND IMPLICATIONS

The purpose of this chapter is to summarize the first four chapters and to discuss the theoretical, methodological, and practical implications of the study.

Summary

Chapter I - Introduction

Interorganizational networks are an increasingly important aspect of modern society. The sociological study of organizations is shifting its focus of attention from the individual organization to collections of organizations sharing interrelated concerns in a common substantive area. The set of organizations considered in this study were responsible for related aspects of natural resource management.

An important property of interorganizational networks is the degree to which they are integrated. Two types of integration were identified: normative and functional. Normative integration is reflected in domain consensus; functional integration in interdependence. Both unify the elements of a network: domain consensus through shared definitions of role and responsibility; interdependence through exchanges of information, resource, and joint activities.

Domain consensus and interdependence are most directly observed in the dyadic relationships between the elements of an interorganizational network. The dyad is the nexus of interorganizational interaction. Consequently, the dyad was the unit of analysis employed in this study.
The similarities and differences of the organizations comprising organizational dyads were identified as comparative properties. The study asked the question: Are regularities in the structure of relationships among the agencies in a network associated with the characteristics of the organizations that compose the network?

Five research objectives were identified:

(1) To develop the concept of social integration linking it to domain consensus and interdependence in organizational dyads, and to relate these concepts to comparative organizational properties.

(2) To develop specific sets of indicators for each type of integration and the four sets of comparative organizational properties.

(3) To determine the relationship between domain consensus and interdependence indicators, and the relationship between each type of integration and the four sets of comparative organizational property variables.

(4) To examine the overall relationship between composite comparative property variables and composite domain consensus and interdependence variables.

(5) To assess the validity and usefulness of canonical correlation as a research procedure.

Chapter II - Theoretical orientation

Three major theoretical perspectives that have been employed in the study of interorganizational networks were reviewed in this study. These were: social integration theory, exchange theory, and open systems theory. Social integration theory includes two major types of integration
that unify collectivities; normative and functional. Normative integration is based on common values and its counterpart on the interorganizational level is shared definitions of organizational roles and responsibilities, or domain consensus. Functional integration is based on ties of interdependence, which is reflected in exchanges of information, resources and joint programs in interorganizational dyads.

Exchange theory has been frequently employed as a means for explaining the dynamics of interorganizational relations. Collectivistic exchange processes operate to supplement limited and direct exchanges among organizations. Common substantive concerns and public service norms underwrite relationships among agencies that would not otherwise occur if only limited and direct exchange processes were operative. Collectivistic exchanges explain how networks may be integrated even though some relationships are only infrequently activated.

Open systems theory describes relations between open organizational systems. Organizations have boundaries that define their regular set of activities, or domain. Domain consensus was discussed in terms of mutually acknowledged boundaries between organizational systems.

Comparative properties refer to the similarities and differences of interacting organizations. Hypotheses were derived relating the two forms of integration first to each other, then to each set of comparative properties. The hypotheses are listed below:

G.H. 1 The relational property of domain consensus is related to the relational property of interdependence.

G.H. 2 The comparative property of organizational output is related to the relational property of domain consensus.
Chapter III - Methods

Networks of county-level organizations involved in various aspects of natural resource management comprise the focus of this study. The twelve types of agencies in the study included four USDA agencies, six state Conservation Commission agencies, and two county government agencies.

Five contiguous counties in Northeast Iowa defined the study region where personal interviews were conducted with 39 administrators. The 147 interorganizational dyads were derived by combinatorially arranging the organizations in each county to represent all relationships.
Two major dependent variables were used in the study: domain consensus and interdependence. Domain consensus indicators were derived by summing deviations in mutual assessments of involvement in three hypothetical resource management situations. Interdependence indicators were derived by summing the mutual reports of information exchange, resource exchange, and joint programming.

Comparative properties were defined in two ways. Difference scores represented the absolute value of differences on variables that approximated interval measures. Other dichotomous variables were defined in terms of sharing a common service area, client group, or authority structure.

Canonical correlations were used to evaluate the nine empirical hypotheses relating each set of comparative property indicators to sets of domain consensus and interdependence indicators. Canonical correlations also produced weighted composites for each set of variables that were employed in regression analysis to test the last three general hypotheses. These specified the independent effect of the combined comparative properties on domain consensus and interdependence, as well as the relationship between domain consensus and interdependence, controlling on comparative properties.

Chapter IV - Findings

A total of 11 of the 15 empirical hypotheses were accepted. Of the 9 canonical correlation hypotheses 5 were accepted, and all regression hypotheses were accepted. A brief summary of each analysis is presented.
Canonical correlation The canonical correlations showed that domain consensus and interdependence were negatively interrelated. Agencies that were more intensively involved developed greater deviations in their mutual expectations for activity in hypothetical resource management situations.

Domain consensus was negatively related to shared organizational output. Organizations that shared similar services had greater discrepancies in their mutual expectations for involvement in the three hypothetical situations.

Domain consensus was related to comparative decision-making properties. Autonomy and formalization differences were related to domain consensus, while organizations that shared a common authority structure tended to have higher levels of domain consensus. Domain consensus was not related to shared output constituency nor to comparative decision-maker characteristics.

Interdependence was positively related to shared organizational output and shared output constituency. Organizations with similar domains had higher levels of information exchange, resource exchange, and joint programming.

Decision-making properties were also related to interdependence, particularly a variable representing shared decision-making contexts. Sharing a common authority structure was an important determinant of interdependence among the organizations in this study. Finally, interdependence was not related to comparative decision-maker characteristics, though differences in professional activity were an important aspect
of the relationship.

Multiple regression The regression analysis showed that the set of comparative properties had independent effects on domain consensus, controlling interdependence; and that comparative properties had independent effects on interdependence, controlling domain consensus. In addition, domain consensus and interdependence were shown to have independent effects upon one another, controlling the comparative properties. It was concluded that domain consensus and interdependence were strongly determined by antecedent comparative properties, but that the two types of integration had independent effects upon one another, over and above the influence of comparative properties.

The nature of the relationship between domain consensus and interdependence was discussed, concluding that each had concomitant effects of the other. An increase in interdependence was likely to be associated with a decrease in domain consensus. Likewise, an increase in domain consensus was likely to be associated with a decrease in interdependence.

The next section discusses some of the implications of the study.

Implications

Theoretical implications

Social integration theory The findings of this study were generally inconsistent with the arguments of social integration theory. In contrast to what was expected, similarities were associated with functional integration, or interdependence; and differences were associated with normative integration, or domain consensus.
Social integration theory has been most frequently discussed in reference to societal level processes; apparently integration operates in a somewhat different manner on the interorganizational level. Organizations are goal-seeking entities, a property which distinguishes them from other units of analysis. The goal-seeking orientation of organizations is reflected in an emphasis on exchange transactions; relationships occur for a purpose and are not intrinsically valuable in themselves. Consequently, common values may have lesser importance in integrating interorganizational networks than exchange relations and interdependent activities.

The emphasis on functions in interorganizational relationships explains the importance of similarity as an antecedent of interdependence. Organizations may participate in exchanges with similar groups because they share an interest in the outcomes the other group will obtain through the exchange relation. Exchanges may be less likely to occur between organizations with unrelated purposes because neither has a stake in the outcomes the other will obtain from the relationship.

The notion of involvement in another's outcomes also relates to the finding that exchanges were more common between organizations which acted as subsystem components of a larger suprasystem. A common authority structure provides an important set of common purposes for interdependence, and may even require certain types of interdependence among the units.

One aspect of social integration theory that was supported by the findings is the idea that functional integration is a transitional
replacement of normative integration. The findings showed that the
greater the functional integration, the less the normative integration.
Mutual conceptions of organizational role and responsibility became less
consistent as interdependence increased. The findings lend support to
the observation that too much domain consensus can act as a conservative
force, stabilizing and insulating the separate functions of a set of
organizations. A high level of domain consensus also may reflect assump-
tions about the separateness of the activities of network participants,
and their potential for mutual involvement.

As relationships become more interdependent, they may be character-
ized by increasingly divergent mutual conceptions of organizational
domain. Heightened interdependence increases the likelihood that differ-
entiated interests and expectations regarding domain will become apparent.
A high degree of interdependence also tends to lead to a recognition
among participants of the importance of preserving the existing order in
the relationship. The importance of protecting investments in a rela-
tionship may outweigh the costs of divergent expectations, and act as
an incentive to resolve differences or to avoid confronting them.

In sum, the major implication for social integration theory is
that interdependence is the major form of integration in interorganiza-
tional networks, and that consensus serves as a conservative, insulating
function in interorganizational relationships. A certain amount of dis-
sensus may be an important source of innovation in dyadic relationships,
and a means for activating a network's response to emerging substantive
problems.
Exchange theory  Exchange theory provided a context for understanding the process of interdependence and its maintenance over time. The findings support the importance of exchange as a major integrative mechanism in interorganizational networks.

Exchange relations create ties of commitment and investment in interorganizational relationships. Failures to participate or fulfill exchange relationships at one point in time may preclude similar relationships in the future. The principles of generalized exchange help explain how transactions that occur only infrequently help integrate interorganizational networks. A limited structure of exchange ensures that relationships can be activated when needed, and that order exists in an ongoing pattern of relationships.

Generalized exchange processes may also be coupled with public service norms that encourage interdependence among agencies offering similar services or serving similar client groups. These broader values may explain the interdependencies that develop and continue to operate despite low domain consensus. The costs of nonreciprocal exchange transactions may be attributed to common service concerns, or absorbed with the understanding that other groups will withstand similar costs in the future.

In summary, the principles of exchange theory contribute to explanation of some of the findings, in particular the relationship between domain consensus and interdependence.

Open systems theory  The major implications for open systems theory lie in the negative relationship between domain consensus and interdependence. Organizations that were less interdependent had
clearly defined boundaries between them, and a high level of domain consensus, and conversely high interdependence was associated with lower levels of domain consensus. Interdependence decreases the clarity and fixedness of organizational boundaries; as the number of jointly determined activities increases, groups generate increasingly differentiated and complex expectations for each other's activities, increasing the likelihood of dissensus.

Mutual investments in a relationship are incentives to resolve or avoid confronting divergent expectations. In addition, dissensus over domain may be reduced by decreasing interdependence, and thus establishing new organizational boundaries.

Similarity increases the likelihood that mutual goal attainment will be advanced by interdependence, as well as the likelihood that divergent perceptions of domain will be present. Organizations with dissimilar domains are separated from one another and possess well-defined sectors of activity, and hence, have high domain consensus. In this study organizations with similar domains were less likely to share congruent definitions of their domains, but were more likely to share activities that transcended organizational boundaries.

Similarity increases the likelihood that groups will encounter common interests and become interdependent; both similarity and interdependence blur organizational boundaries and expose differentiated organizational interests. Thus both similarity and interdependence are associated with lower levels of domain consensus which may be tolerated in these relationships because mutual investments in joint outcomes are
An important implication underlying all three perspectives is that interorganizational relations should not be viewed so much as cooperation-building endeavors, but as continuing processes of conflict discovery and resolution. Organizational systems come together with divergent sets of interests and perspectives. Any lines of concerted action that emerge from these relationships occur through the resolution of conflict and the definition of common or mutually offsetting interests in the relationship.

Methods

The implications of this study for methods of studying interorganizational relations are of three basic types: unit of analysis, measurement, and statistical analysis.

Unit of analysis Using the dyad as the unit of analysis in examining interorganizational relations appears to be a fruitful approach to the development of generalizations about the structure of these relationships. The procedures for defining dyads in this study necessarily excluded some important interorganizational relationships that did not conform to the political boundaries of the county. Defining organization sets in terms of county boundaries is a convenient, if not somewhat artificial, means of defining the limits of the interorganizational field. Future studies may develop sets of procedures that permit relationships to be systematically defined in a broader interorganizational field. This study examined all possible relationships in a narrowly-defined field; a judgmental approach may be required to select
relationships to be studied in a broader unit of analysis.

An advantage of the dyad in the study of interorganizational rela-
tions is that it is the elemental form of these relationships. Inter-
organizational linkages have infrequently been subjected to direct
scrutiny: Analyses have generally been directed to the overall network
or the individual organization. In addition, comparative properties have
been a neglected class of variables in interorganizational research.
Dyadic analysis is the most direct means of assessing the consequences
of comparative properties in interorganizational relationships.

A major disadvantage of dyadic analysis is the multidimensional
nature of comparative properties which include differences as well as
the level or total amount of a property in a relationship and the inter-
action between level and differences. These measurement complexities
are a major disadvantage of dyadic analysis.

Measurement  Dyadic properties in this study were of two types:
differences reflecting comparative properties of the dyad; and variables
that represented a common property of the dyad as a whole.

The variables that were most successful in explaining the dependent
variable sets were those that represent derived dyadic properties such
as shared services, shared client groups, and shared authority structure.
Variables involving difference scores generally did not substantially
contribute to the explanation of the relational variables.

Future studies may more gainfully employ other aggregate or derived
dyadic properties of organizational dyads. In addition, this study was
limited to differences on a particular variable, for example,
formalization. Another approach may be to examine the sum of formalization measures, that is, the total amount of formalization in a relationship. The level of a property in a dyad may be equally important as discrepancies.

The lack of a single dyadic measurement procedure that combines level, differences, and level-differences interaction is a major problem in sociometric research. The problem may be conceived in terms of a two-way analysis of variance, where the dependent variable is not based on differences, for example, an exchange score.

Factor D is the difference score for a dyad. Factor S is the sum of the dyad element scores. D*S is an interaction term. The variance of the exchange score may be attributable to differences on the variable (D), to the combined level of the variable in a dyad (S), or to an interaction between differences and level (D*S).

It may not be feasible to combine difference, level, and interaction terms in a single measure. It may be more meaningful, however, to simultaneously examine all three types of dyadic properties as separate variables. This study focused on differences as the basic aspect of comparative properties in dyadic relationships: Greater specification of additional dyadic properties may prove useful in future research on inter-organizational relationships.

Statistical analysis Canonical correlation was employed to summarize the relationships between sets of dyadic variables. The technique appears to be a useful tool in sociological analysis, but is accompanied by certain limitations and interpretative difficulties.
A major advantage of canonical analysis is that it is a parsimonious method of summarizing the relationship between sets of variables in a single statistical decision, or test. Canonical analysis also provides information about the structure of relationships between two sets of variables that may provide insights into the theoretical meaning of the relationship. Item-to-variate correlations show the importance of particular variables in determining a relationship.

Canonical correlation also is an efficient means for ascertaining the relationship between concepts associated with sets of multiple indicators, particularly with respect to the unidimensionality of the relationship between sets of indicators. In addition, the weights obtained through canonical analysis provide a means for developing composites that may be employed to summarize and represent a set of variables in other analyses.

The major disadvantages of canonical correlation are that the method statistically maximizes the relationship between two sets of variables and weak relationships may be inflated by statistical artifact. Caution must be exercised in interpreting and accepting hypotheses based on canonical correlations when the results are weak or equivocal, though the conservative statistical tests associated with the procedure compensate for these disadvantages.

One strategy for minimizing the chance occurrence of artifactual findings in canonical correlation is to employ cross-validation procedures. Cross-validation refers to the process of determining a relationship on data collected from two or more samples independently drawn from the same
population (Brown, 1970:129).

Cross-validation might have proceeded in this study by drawing a subsample of organizational dyads and developing composite weights and canonical correlations. The weighted composites would then be computed for the remainder of the sample and the canonical correlations compared. The canonical correlations should not differ markedly. If they did, it would indicate that relationships may be spuriously inflated. Cross-validated canonical correlations are then better estimates of the true degree of relationship.

Cross-validation was not employed in this study due to the small sample size. A small cross-validation sample may overstate variable errors that are randomized in the larger group. Generally, cross-validation of canonical correlations should be performed on subsamples of at least 100.

Another disadvantage of canonical analysis lies in the lack of statistical tests for judging the importance of individual variables within a set. It must be remembered that the purpose of canonical analysis is to provide a summary measure of the relationship between two sets of variables and some indication of the structure of that relationship. If the researcher desires a test of the importance of individual variables, composite dependent variables should be formed and regression analysis performed on the individual independent variables, either individually or in sets.

Finally, the results of the regression analysis demonstrated that the three ways of treating independent variable sets were not strictly
comparable across a fixed set of dependent variables. The regression analyses were most similar, while the canonical correlations results were greatest in magnitude. The canonical correlations were very similar to the individual regression analysis, in terms of statistical significance.

The major methodological implication is that the researcher should be cognizant of the possibility that her results may vary across composite formation approaches. Canonical composites may be used to effectively demonstrate the independent effect of a set of variables, but distorted dependent variable set weightings in the canonical analysis suggest that subsequent regression results should be cautiously interpreted.

Practical implications The major practical considerations that emerge from this study relate to inducing change in interorganization networks. Two major themes are: the awareness of sources of potential conflicts, and the importance of authority structures in interorganizational relations.

Interorganizational decision-makers are most likely to encounter discrepant expectations for their activities emanating from groups to which they are most closely linked, particularly in problem areas that do not fit any one agency's specific set of responsibilities. Organizations that are closely linked may be most aware of each other's potential for action or involvement, but may not fully appreciate the constraints that underlie another's reluctance to undertake certain activities or involvements. Greater interaction may increase mutual awareness of limitations, but it may also increase performance expectations within
those constraints.

The findings suggest that organizations that are more intensely involved with each other have more divergent expectations regarding each other's potential activity in problems that may confront the network. Limitations on manpower and other resources may be an important constraint on an agency's participation in an interorganizational relationship. Conveying an accurate set of expectations about the level and kind of commitments a group may be expected to make to interagency efforts may be an important consideration in establishing new relationships and activities.

A second important practical consideration for interorganizational relationships is related to the importance of a shared authority structure in determining interdependence. Interorganizational relationships of lasting duration are more likely to occur if superordinate authority structures have authorized the resource allocations necessary to support the efforts. This is particularly important for local units that operate under tight budgetary controls, not only of money, but of time and equipment. Local decision-makers may be convinced of the necessity of interdependent efforts, but often they must seek special authorization for such activity. In addition, they may find that though superordinate levels support interagency activity, such efforts are not equally rewarded in evaluation processes. The organizational returns for a unit's activities with other groups are frequently much less than those for its regular activities, even though the interorganizational effort may have equal or greater substantive importance.
Interorganizational activity is strongly influenced by intraorganizational reward structures. Activities with other units may be viewed as supplementary to ongoing responsibilities, and only a certain level may be viewed as appropriate for a unit's regular activities. A given agency's integration in a network may be limited by its capacity to participate in the network, as determined by the nature of its endeavors and the level of outside involvement it is permitted to undertake.

The findings suggest that activities that span two overarching authority systems should be accompanied by some form of acknowledgment or legitimation by the broader structures. If linkages are to survive the tenure of the boundary personnel who first instituted them, the relationships must be recognized and supported by superordinate groups.

Efforts to implement some form of systematic change in an interorganizational network should be informed by prior knowledge of the structure of interdependence and authority that underlies relations among the organizations involved. A network may be more effectively activated to respond to a particular problem or situation if the problem is defined in terms of existing interdependencies and responsibilities, which extend ongoing relationships to the new activity.

To induce new relationships or patterns of interaction among organizations, authority structures are centrally important for legitimizing and supporting the new activities. Incentives to participate in the new pattern of interaction must accrue from the change to make the structure of relationships self-sustaining. Further research may systematically examine the value of these assertions about the dynamics of interorganizational networks.
REFERENCES

Adamek, Raymond J. and Bebe F. Lavin

Aiken, Michael and Jerald M. Hage

Aldrich, Howard

Angell, Robert C.

Baker, F. and G. O'Brien

Barnard, Chester I.

Barth, Ernest

Bartlett, M. S.

Benson, J. Kenneth
Bertalanffy, Ludwig von

Bertrand, Alvin

Black, B. J. and H. M. Kase

Blau, Peter M.

Blau, Peter M. and W. Richard Scott

Braito, Rita, Steve Paulson and Gerald Klonglan

Brown, Frederick G.

Buckley, Walter

Coleman, James C.

Cooley, William W. and Paul R. Lohnes

Costner, Herbert L.

Cronbach, L. J.

Darlington, Richard B., S. L. Weinberg and H. J. Walberg

Dill, William R.

Douds, Charles F. and A. H. Rubenstein
1966 "Some models of Organization Interfaces in the R & D Process." Evanston, Ill.: Department of Industrial Engineering and Management Science, Northwestern University. (MimeoGraph)

Downs, Anthony

Durkheim, Emile

Edwards, A. L.

Ekah, Peter P.

Emerson, Richard M.

Emery, F. E. and L. Trist
Etzioni, Amitai  

Evan, William M.  

Finley, James R.  

Form, William, and S. Nosow  

Goldman, Ralph M.  

Gordon, Robert A.  

Gouldner, Alvin M.  

Gross, E.  

Guetezkow, Harold  

Haas, J. Eugene and Thomas E. Drabek  
Hage, Jerald

Halpert, Burton R.

Hardin, Charles M.

Haurek, E. W. and J. P. Clark

Hauser, R. M. and A. S. Goldberger

Hawley, Amos H.

Hollister, C. David

Homans, George C.

Homans, George C. and David M. Schneider

Hotelling, H.
1935 "The most predictable criterion." Journal of Educational Psychology 26:139-142.
Hunt, R. G.

Hunt, Raymond G. and Gregory W. Hunt

Inkson, J. H. K., D. S. Pugh, and D. J. Hickson

Jacobson, Alvin L.

Joreskog, Karl G.

Katz, Daniel and Robert L. Kahn

Kemper, Theodore D.

Kerlinger, Fred N.

Kerlinger, Fred N. and Elazar J. Pedhazur

Klonglan, Gerald E., Steven K. Paulson and David L. Rogers

Landau, Martin
Landecler, Werner S.

Lawrence, P. R. and Lorsch, J. W.

Levine, Sol and Paul E. White

Levine, Sol, Paul E. White, and B. D. Paul

Levi-Strauss, Claude

Lyttkens, Ejnar

Malinowski, Bronislaw

Marrett, Cora Bagley

Metcalfe, J. L.

Meyer, Lawrence S. and Mary Sue Younger

Meyer, Marshall W.

Miller, Walter B.
1958 "Inter-institutional conflict as a major impediment to delinquency prevention." Human Organization 17:20-23.
Molnar, Joseph and David L. Rogers

Morrison, Denton E., K. E. Hornbach and W. K. Warriner

Nie, Norman, D. H. Bent and C. H. Hull

Ogle, Richard E.

Olsen, Marvin E.

O'Riordan, Timothy

Parsons, Talcott

Paulson, Steven K.

Perrow, Charles
Pohlman, John T.

Price, James L.

Reid, William

Reidel, Carl H.

Rogers, David L.

Rogers, David L. and Joseph J. Molnar
1975 Interorganizational Relations Among Development Organizations: Empirical Assessment and Implications for Interorganizational Coordination. Ames, Iowa: Center for Agricultural and Rural Development, Iowa State University.

Rosenberg, Morris

Rushing, William

Schermerhorn, John R.
Shills, Edward

Simmel, George

Stewart, Douglas and William Love

Tagiuri, Renato

Thomas, Kenneth W., R. E. Walton and J. M. Dutton

Thompson, James F.

Turk, Herman

Turner, Jonathan H.

Vacin, Gary Lee

Van de Ven, Andrew H., D. C. Emmett and Richard Koenig, Jr.
Van Valey, T. L.

Vincent, Jack E.

Walton, Richard E.

Wamsley, Gary L. and Meyer N. Zald

Warren, Roland L.
1967 "The interorganizational field as a focus for investigation." Administrative Science Quarterly 12:397-419.

Weber, Max

Weirath, Tom

Whettan, David A.

White, Paul E.
Whyte, William F.  

Wildavsky, Aaron B.  

Wilks, S. S.  

Winklepleck, Judy M.  
ACKNOWLEDGMENTS

I wish to thank the following:

My parents, who have given me much;

Dr. David L. Rogers, who has been a patient guide and mentor;

My fellow graduate students, particularly Kathryn Spiker, Ken Barb, and a host of others, who have been concerned and supportive throughout.
APPENDIX
Table A.1. Means, standard deviations, and ranges for individual dependent and independent variables

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean</th>
<th>Standard deviation</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Domain consensus</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Domain₁</td>
<td>6.027</td>
<td>1.286</td>
<td>1 - 8</td>
</tr>
<tr>
<td>Domain₂</td>
<td>5.959</td>
<td>1.253</td>
<td>2 - 8</td>
</tr>
<tr>
<td>Domain₃</td>
<td>5.925</td>
<td>1.198</td>
<td>2 - 8</td>
</tr>
<tr>
<td><strong>Interdependence</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Joint programs</td>
<td>.911</td>
<td>1.400</td>
<td>0 - 6</td>
</tr>
<tr>
<td>Resource exchange</td>
<td>6.616</td>
<td>18.890</td>
<td>0 - 100</td>
</tr>
<tr>
<td>Information exchange</td>
<td>15.500</td>
<td>25.148</td>
<td>0 - 100</td>
</tr>
<tr>
<td><strong>Organizational output</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regulatory activity</td>
<td>.137</td>
<td>.345</td>
<td>0 - 1</td>
</tr>
<tr>
<td>Cost-sharing assistance</td>
<td>.041</td>
<td>.199</td>
<td>0 - 1</td>
</tr>
<tr>
<td>Technical assistance</td>
<td>.238</td>
<td>.454</td>
<td>0 - 1</td>
</tr>
<tr>
<td>Planning assistance</td>
<td>.260</td>
<td>.440</td>
<td>0 - 1</td>
</tr>
<tr>
<td>Information assistance</td>
<td>.390</td>
<td>.489</td>
<td>0 - 1</td>
</tr>
<tr>
<td>Financial assistance</td>
<td>.021</td>
<td>.142</td>
<td>0 - 1</td>
</tr>
<tr>
<td>Management-development</td>
<td>.130</td>
<td>.345</td>
<td>0 - 1</td>
</tr>
<tr>
<td><strong>Output constituency</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Farmers</td>
<td>.226</td>
<td>.420</td>
<td>0 - 1</td>
</tr>
<tr>
<td>Private Industry</td>
<td>.178</td>
<td>.384</td>
<td>0 - 1</td>
</tr>
<tr>
<td>Recreational users</td>
<td>.137</td>
<td>.345</td>
<td>0 - 1</td>
</tr>
<tr>
<td>Nonfarm landowners</td>
<td>.164</td>
<td>.372</td>
<td>0 - 1</td>
</tr>
<tr>
<td>Park-users</td>
<td>.062</td>
<td>.241</td>
<td>0 - 1</td>
</tr>
<tr>
<td>Homeowners</td>
<td>.102</td>
<td>.305</td>
<td>0 - 1</td>
</tr>
<tr>
<td>Local agencies</td>
<td>.295</td>
<td>.457</td>
<td>0 - 1</td>
</tr>
<tr>
<td><strong>Decision-making properties</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Autonomy</td>
<td>12.678</td>
<td>4.859</td>
<td>1 - 27</td>
</tr>
<tr>
<td>Formalization</td>
<td>3.101</td>
<td>1.569</td>
<td>0 - 8</td>
</tr>
<tr>
<td>Decision context</td>
<td>.274</td>
<td>.448</td>
<td>0 - 1</td>
</tr>
<tr>
<td><strong>Decision-maker characteristics</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tenure</td>
<td>5.562</td>
<td>5.243</td>
<td>0 - 27</td>
</tr>
<tr>
<td>Professional activity</td>
<td>1.267</td>
<td>1.687</td>
<td>0 - 8</td>
</tr>
<tr>
<td>Education</td>
<td>1.206</td>
<td>1.069</td>
<td>0 - 4</td>
</tr>
<tr>
<td>Age</td>
<td>11.226</td>
<td>8.819</td>
<td>0 - 36</td>
</tr>
</tbody>
</table>
Table A.2. Correlations between individual domain consensus and interdependence variables and individual independent variables

<table>
<thead>
<tr>
<th>Variable^a</th>
<th>$D_1$</th>
<th>$D_2$</th>
<th>$D_3$</th>
<th>Joint programs</th>
<th>Resource exchange</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain consensus</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Domain$_1$</td>
<td>1.00</td>
<td>.18</td>
<td>.19</td>
<td>.07</td>
<td>-.04</td>
<td>-.01</td>
</tr>
<tr>
<td>Domain$_2$</td>
<td>.18</td>
<td>1.00</td>
<td>.26</td>
<td>.00</td>
<td>-.18</td>
<td>.05</td>
</tr>
<tr>
<td>Domain$_3$</td>
<td>.19</td>
<td>.26</td>
<td>1.00</td>
<td>-.14</td>
<td>-.35</td>
<td>-.16</td>
</tr>
<tr>
<td>Interdependence</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Joint programs</td>
<td>.07</td>
<td>.00</td>
<td>-.14</td>
<td>1.00</td>
<td>.40</td>
<td>.49</td>
</tr>
<tr>
<td>Resource exchange</td>
<td>-.04</td>
<td>-.18</td>
<td>-.35</td>
<td>.40</td>
<td>1.00</td>
<td>.52</td>
</tr>
<tr>
<td>Information exchange</td>
<td>-.01</td>
<td>.05</td>
<td>-.16</td>
<td>.49</td>
<td>.52</td>
<td>1.00</td>
</tr>
<tr>
<td>Organizational output</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regulatory activity</td>
<td>-.01</td>
<td>-.03</td>
<td>-.11</td>
<td>.00</td>
<td>.02</td>
<td>.03</td>
</tr>
<tr>
<td>Cost-sharing assistance</td>
<td>-.09</td>
<td>-.10</td>
<td>-.28</td>
<td>.14</td>
<td>.45</td>
<td>.14</td>
</tr>
<tr>
<td>Technical assistance</td>
<td>.14</td>
<td>.08</td>
<td>.00</td>
<td>-.14</td>
<td>-.20</td>
<td></td>
</tr>
<tr>
<td>Planning assistance</td>
<td>-.01</td>
<td>-.03</td>
<td>-.08</td>
<td>.28</td>
<td>.19</td>
<td>.01</td>
</tr>
<tr>
<td>Information assistance</td>
<td>.11</td>
<td>.08</td>
<td>.00</td>
<td>.09</td>
<td>.07</td>
<td>-.15</td>
</tr>
<tr>
<td>Financial assistance</td>
<td>.03</td>
<td>-.15</td>
<td>-.19</td>
<td>.18</td>
<td>.41</td>
<td>.12</td>
</tr>
<tr>
<td>Management-development</td>
<td>.15</td>
<td>-.08</td>
<td>-.07</td>
<td>.15</td>
<td>.32</td>
<td>.07</td>
</tr>
<tr>
<td>Output constituency</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Farmers</td>
<td>.05</td>
<td>-.10</td>
<td>-.14</td>
<td>.24</td>
<td>.26</td>
<td>.04</td>
</tr>
<tr>
<td>Private industry</td>
<td>.00</td>
<td>.03</td>
<td>-.03</td>
<td>.12</td>
<td>-.08</td>
<td>-.13</td>
</tr>
<tr>
<td>Recreational users</td>
<td>.10</td>
<td>.11</td>
<td>.06</td>
<td>.15</td>
<td>.17</td>
<td>-.01</td>
</tr>
<tr>
<td>Nonfarm landowners</td>
<td>.08</td>
<td>.06</td>
<td>.01</td>
<td>.21</td>
<td>-.12</td>
<td>-.13</td>
</tr>
<tr>
<td>Park-users</td>
<td>.22</td>
<td>.03</td>
<td>.06</td>
<td>.00</td>
<td>-.04</td>
<td>.08</td>
</tr>
<tr>
<td>Homeowners</td>
<td>.03</td>
<td>.03</td>
<td>.00</td>
<td>.04</td>
<td>-.10</td>
<td>-.15</td>
</tr>
<tr>
<td>Local agencies</td>
<td>.03</td>
<td>-.05</td>
<td>-.11</td>
<td>.30</td>
<td>.23</td>
<td>.03</td>
</tr>
<tr>
<td>Decision-making properties</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Autonomy</td>
<td>.22</td>
<td>-.08</td>
<td>.09</td>
<td>.01</td>
<td>.14</td>
<td>.00</td>
</tr>
<tr>
<td>Formalization</td>
<td>.07</td>
<td>-.10</td>
<td>.00</td>
<td>.12</td>
<td>-.04</td>
<td>-.02</td>
</tr>
<tr>
<td>Decision context</td>
<td>.17</td>
<td>.13</td>
<td>-.03</td>
<td>.50</td>
<td>.32</td>
<td>.47</td>
</tr>
<tr>
<td>Decision-maker characteristics</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tenure</td>
<td>-.03</td>
<td>-.05</td>
<td>-.11</td>
<td>.05</td>
<td>.09</td>
<td>-.02</td>
</tr>
<tr>
<td>Professional activity</td>
<td>-.09</td>
<td>-.06</td>
<td>.02</td>
<td>-.23</td>
<td>-.15</td>
<td>-.21</td>
</tr>
<tr>
<td>Education</td>
<td>.11</td>
<td>-.16</td>
<td>.04</td>
<td>.05</td>
<td>.02</td>
<td>-.01</td>
</tr>
<tr>
<td>Age</td>
<td>-.01</td>
<td>-.10</td>
<td>.04</td>
<td>.12</td>
<td>.03</td>
<td>.10</td>
</tr>
</tbody>
</table>

^aCorrelations of absolute value .16 or greater are significant at the .05 level.
Table A.3. Regression of domain consensus and interdependence on comparative property composites (standardized beta coefficients)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Domain consensus</th>
<th>Interdependence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organizational output</td>
<td>-.267***</td>
<td>.172*</td>
</tr>
<tr>
<td>Output constituency</td>
<td>-.234**</td>
<td>(I) .221*</td>
</tr>
<tr>
<td>Organizational decision-making</td>
<td>.217**</td>
<td>.469***</td>
</tr>
<tr>
<td>Decision-maker characteristics</td>
<td>.081</td>
<td>.124</td>
</tr>
</tbody>
</table>

\[
R = .429 \hspace{1cm} .689 \\
R^2 = .184 \hspace{1cm} .472 \\
F-value = 4.745*** \hspace{1cm} 25.008***
\]

* \( p < .05 \).
** \( p < .01 \).
*** \( p < .001 \).
Table A.4. Regression of domain consensus and interdependence on comparative property composites and alternate integration composite (standardized beta coefficients)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Standardized beta</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Domain consensus</td>
</tr>
<tr>
<td>Organizational output</td>
<td>-.190*</td>
</tr>
<tr>
<td>Output constituency</td>
<td>-.178*</td>
</tr>
<tr>
<td></td>
<td>(II) .111</td>
</tr>
<tr>
<td>Organizational decision-making</td>
<td>.259**</td>
</tr>
<tr>
<td>Decision-maker characteristics</td>
<td>-.094</td>
</tr>
<tr>
<td>Domain consensus</td>
<td>--</td>
</tr>
<tr>
<td>Interdependence</td>
<td>-.202*</td>
</tr>
</tbody>
</table>

| R          | .459 | .703 |
| R²         | .210 | .495 |
| F-value    | 7.463*** | 22.681*** |

* p .05.
** p .01.
*** p .005.