

1984

## Disaster and the Social Order: Organization and Social Network

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<https://dx.doi.org/doi:10.21220/s2-6j3v-ve45>

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DISASTER AND THE SOCIAL ORDER:  
//  
ORGANIZATION AND SOCIAL NETWORK

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A Thesis

Presented to

The Faculty of the Department of Sociology  
The College of William and Mary in Virginia

In Partial Fulfillment

of the Requirements of the Degree of  
Master of Arts

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by

Patricia R. Francis

1984

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APPROVAL SHEET

This thesis is submitted in partial fulfillment of  
the requirements for the degree of

Master of Arts

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## DEDICATION

To my Mom and Dad who encourage me to believe that the sky is my limit:  
how lucky I am.

TABLE OF CONTENTS

	Page
ACKNOWLEDGMENTS . . . . .	v
LIST OF TABLES. . . . .	vi
ABSTRACT. . . . .	vii
INTRODUCTION. . . . .	2
RELATED LITERATURE. . . . .	11
RESEARCH DESIGN AND METHODOLOGY . . . . .	16
FINDINGS. . . . .	29
DISCUSSION. . . . .	55
APPENDIX. . . . .	60
BIBLIOGRAPHY. . . . .	71

## ACKNOWLEDGEMENTS

It is important to me that the completion of this thesis not be viewed as an individual accomplishment: as it was far from it. Without Dr. Kreps encouragement and contributions the sociological dimension of this thesis would have been impossible. Dr. Aday and Dr. Ito critically reviewed the work and their suggestions served to strengthen the final result. But it was my parents who actually provided me with the opportunity to actually finish the work.

During times when the responsibility of the research seemed overwhelming, Brad and Linda encouraged me to remain true to myself and not take life too seriously. The psychological support Jim and Cindy gave so freely was always appreciated and never taken for granted. As new-comers to my life, Kathy and Jackie have lost a little bit of themselves to me. Their perspectives and insights were reassuring and comforting at times when I was feeling most vulnerable and very uncomfortable. At the final stage, Susan and Charlie's editorial and technical assistance help to make the thesis a reality.

LIST OF TABLES

Table	Page
1. Taxonomy of Organized Responses. . . . .	9
2. Taxonomy: 1, 2, and 3 Element Forms of Association . . . . .	17
3. Social Network Forms of Association Formal Rationality - Collective Behavior Metric. . . . .	24
4. Organizational Forms for the Flood Formal Rationality - Collective Behavior Metric. . . . .	27
5. Regression: Number of Elements Present (EL-PRES) and Formal Rationality - Collective Behavior Metric (DYAD-PAT) with each other and Exogenous Variables. . . . .	45



## ABSTRACT

A theory, taxonomy, and model of dyadic social network relationships is developed from archival data which describe forms of association between emergent and established social units involved in a 1967 flood. Using Kreps' (1983) theory of organization, which draws on Weber's distinction between individual (historical) and general (transhistorical) ideal types, four individually necessary and collectively sufficient elements of organization--domain (D), tasks (T), human and material resources (R), and activities (A)--combine to represent a taxonomy of sixty-four possible forms of association. While making no assumption about their patterning in time and space, it is argued that the logically derived and empirically grounded taxonomy points to an underlying unity between goal oriented rational action and elemental forms of collective behavior. This unity is expressed by a metric which incorporates all of the transitivity among the four elements of organization and allows for the explanatory modeling of 465 forms of association emerging from 55 instances of organized response. Model findings highlight an inherent dialectic between forms of association at the origins of organization and forms of association at the maintenance of existing organization. The model also addresses the influence of structural dimensions of paired units and the forms of association that they comprise. The thesis closes with a discussion of the implications of research on the social order, particularly in the context of disasters.

DISASTER AND THE SOCIAL ORDER:

ORGANIZATION AND SOCIAL NETWORK

## INTRODUCTION

Concern with the phenomenon of organization has characterized the work of many social researchers. Although approaches to its study vary in terms of conceptualization and measurement (Perrow, 1979; Katz and Kahn, 1978; Pfeffer and Salancik, 1978; McKelvey, 1978, 1980), one key weakness restricts the development of knowledge: namely, researchers have not developed a clear, processual conception of what is being studied. Rather than deal with what is a basic definitional and taxonomic problem, researchers have been too quick to assume the existence of organization, perhaps because existence seems obvious or because related questions about origins and demise of organization are not of interest. While the student of organization can appreciate the difficulties involved in defining organization in processual terms, without the contribution of such an approach, the advancement of organizational theory is sure to be retarded.

It is this inherent need to overcome a static conception of organization that makes Kreps' (1983) work on organization and disaster so intriguing. Kreps' approach to organization is both structural and processual. Organization is defined by Kreps as a process through which four social properties (domain, tasks, resources, and activities) are individually necessary and collectively sufficient for organization

to exist. Kreps (1983) builds his interpretation of organization from four assumptions. He assumes that

instances of organization are observable things (Warriner, 1956, 1970); that these things are boundary spanning yet open systems (Bertalanffy, 1968; Dubin, 1978); . . . that they are important instances of the emergent structure of human populations; . . . (and) that collective representations of social actions are structural and have material as well as nonmaterial content (Coenen, 1981).

Unlike the approaches taken by most researchers in the field of complex organization (Hall, 1972; Scott, 1981; Perrow, 1979), Kreps extends his definition of organization to include process. Process is represented by the temporal ordering of the social properties of organization identified by Kreps. Organization is thus defined as both entity and, more importantly, as a process of initiating, maintaining, and suspending instances of disaster relevant structure of human populations. The four logically and empirically independent elements reflecting organization in structural terms according to Kreps, are: (1) domain, (2) tasks, (3) human and material resources, and (4) activities. Organization is defined by the co-presence in time and place of all four elements. Using a basic factorial design, the twenty-four logically possible patterns of these four elements become the means through which the interpretation of organization is achieved (see Table 1). Because natural disasters are generally sudden and short lived,-as are many of the patterns of organized disaster response, traditional conceptions of organization which assume relatively permanent social structures are inadequate. Thus, Kreps' attention to process is not simply one of personal choice. The

disaster context requires it (Kreps, 1978).

The following example, taken from one of Kreps' articles is perhaps the best way to communicate his framework. It relates to the disaster event that is the focus of the present thesis. It illustrates an A→R→D→T pattern at the origins of organization.

An evolving organization of evacuation becomes the domain of a city police department during a flood. Flood waters rise over a period of several days and are continuously monitored (long forewarning). Flooding eventually covers much of an urban area and virtually the entire downtown of its major city (diffuse in scope of impact). There are few deaths or injuries but extensive property damage (high magnitude of impact as documented by damages and losses). Major flood conditions prevail for over a week (long duration of prompt effects). The police department initially is involved in traffic control during the emergency period, but that action terminates with the complete inundation of central city streets. Several citizens with boats docked in the downtown area conjointly begin evacuating people from buildings. Their preliminary actions are independent of anything being done by the police department. In fact, police officials note that, at this point, they are looking for something to do. There has been no pre-planning for what follows. Having a few boats of their own, the police coordinate their evacuation actions with those of the private citizens (A). The need to evacuate the entire downtown area quickly becomes apparent. A large number of boats from private boat owners, the bureau of land management, the fire department, and the military are provided. The latter public bureaucracies also offer personnel to drive some of the boats and some citizen volunteers respond to the same need. By now, the majority of police personnel have become involved because they are available, in close proximity, and know where to take the evacuees (R). The following morning, local government leaders declare the downtown evacuation as the domain of the police department (D). This domain is questioned briefly but then accepted by fire department officials. The police then quickly develop a rather complex task structure--one that involves location, notification, dispatching, and refueling of boats, assignment of police personnel to all boats, and coordination of water and ground transportation to move evacuees to shelters (T). About 5000 people are evacuated during the next 3-4 days. The operation is maintained by the police department until the demand is met (Kreps, 1984a).

As illustrated by the above example, identification of the four

elements represents Kreps' attempt to codify structural properties of organization (Kreps, 1983). Drawing from Durkheim's classic notion of social facts (Durkheim, 1937, 1947; Lukes, 1972; Ritzer and Bell, 1982), domain and tasks are interpreted as collective representations of organized activities (Kreps, 1983a). The remaining structural properties of organization are human and material resources and activities: The elements are defined as follows.

(1) Domain is a collective representation of a community (broader system) function of an organized response (Thompson, 1967; Wenger, 1978). By collective representation, Kreps is referring to generalized (external to given individuals) information which indicates what is taking place and facilitates time and energy use in the performance of organized activities. Domain, therefore, has normative import, specifying both internal and external legitimations of identified spheres of activity. Although responses initiated by domain arguably reflect goal oriented rational action, it is critical to note that domain can be established at any point during the organized response.

(2) Tasks are collective representations of how a domain is accomplished. Although the number and range of tasks for any domain vary, the logical independence of tasks from domain is important to the notion that organization is a boundary spanning yet open system. Tasks most clearly reflect the boundary spanning or closed system information used in the structuring of human and material resources and activities. Though tasks may follow the establishment of domain, further implying goal oriented rational action, such a pattern can not be assumed. It

is only through the process in which the elements combine empirically that degrees of formal rationality can be shown.

(3) Human and material resources include people, their many capabilities, as well as material resources of various types. The aforementioned are, in effect, the "raw materials" of any organized response. Human and material resources may be accessible through facilitating relationships--or internally controlled by the response--further evidencing the system boundaries of organization. Resources may dominate the initiation of an organized response just as readily as do domains. Again, a process perspective allows for the determination of which of the four elements is pivotal.

(4) Activities are the interdependent actions of individuals, groups, and organizations which articulate the raw materials of organization (human and material resources) with collective representations (domain and tasks) of what is happening. Responses initiated by activities reflect perhaps an elemental form of organization, one often referred to in the disaster literature as collective behavior (Kreps, 1981).

Keeping in mind that all four elements must be present for organization to exist, Kreps' identification of individual instances of organization (in terms of the pattern type reflected by each instance) documents the conclusion that no single pattern of the elements can be assumed. This conclusion lends credibility to the logical and empirical independence of the elements. At this point Kreps invokes explicitly the Weberian concept of formal rationality to highlight a

continuum of goal oriented rational action to collective behavior at the origins of organization. Goal oriented rational action is represented by a  $D \rightarrow T \rightarrow R \rightarrow A$  pattern. Elemental collective behavior is represented by an  $A \rightarrow R \rightarrow T \rightarrow D$  pattern. These patterns, and the many permutations between them (such as that noted in the above illustration), capture much of the subtlety of organization in disaster. In effect, they represent a variety of means-ends relationships among the structural properties of organization (Merton, 1957; Coser, 1977). In other words, Merton (1957) implies in his work the existence of a "means-ends" framework through which social action in general can be understood. Kreps interprets the twenty-four patterns as reflecting a continuum (within the context of a disaster) of greater or lesser degrees of formal rationality and collective behavior, i.e., DTRA to ARTD. The pattern of initiation reflecting the greatest degree of formal rationality (DTRA) is dominated by "ends" with domain (perhaps established by formal charter of law), followed by the development of tasks (perhaps specified by planning), leading to the location and mobilization of appropriate human and material resources, resulting in the interdependent actions of direct participants. The pattern of initiation reflecting collective behavior (ARTD) is dominated by "means" with the activities of direct participants followed by the identification and mobilization of the major response related resources, leading to the development of tasks which represent and facilitate the response activity, and resulting in the establishment of a domain. From fifteen disaster events, Kreps



documents four hundred and twenty-three instances of organization. Twenty of the twenty-four possible patterns of initiation are documented at least once (see Table 1). Fifty-two of these instances are performed by emergent social units and the remainder of the responses by established social units of various types.

The four elements allow for characterizing both organization and other things social that are not organization, i.e., social networks. The possible combinations of one, two, or three elements logically limits the number of unique social network pattern types to forty. This includes 24 three element forms, 12 two element forms, and 4 one element forms. These forty possible combinations of the elements represent social networks which are certainly important forms of association, but not organization as defined by Kreps. Indeed, each of Kreps' organizational forms (all four elements present) reflect, in process of development, various social network forms as well (one, two, and three elements present). In other words, social networks reflect the process of organization even as they do not become organization. Therefore, the identification of the elements, both present in and absent from the social network relationships of existing social units provides information essential to understanding the origins of organization. Each instance of organization documented by Kreps is related to a broader social environment of other responding social units. It is these social linkages that is the focus of my thesis. My analysis of them will contribute to the completion of a taxonomy reflecting the process of organization that is represented by

TABLE 1: Taxonomy of Organized Responses

<u>Organizational Forms</u>	<u>Kreps' Taxonomy Frequencies</u>	<u>Flood Event Taxonomy Frequencies</u>
D→T→R→A	165	13
D→T→A→R	6	*
D→R→A→T	28	3
D→R→T→A	53	14
D→A→R→T	2	*
D→A→T→R	1	*
T→R→A→D	22	1
T→R→A→D	4	*
T→A→D→R	*	*
T→A→R→D	*	*
T→D→R→A	1	*
T→D→A→R	*	*
R→A→D→T	16	4
R→A→T→D	11	4
R→D→T→A	66	9
R→D→A→T	12	3
R→T→D→A	6	1
R→T→A→D	12	*
A→D→T→R	2	*
A→D→R→T	*	*
A→T→D→R	2	*
A→T→R→D	4	*
A→R→D→T	6	*
A→R→T→D	4	*
TOTAL	423	55

\*Indicates Forms of Organized Response not yet located.

twenty-four organization patterns and forty social network patterns.

Like Kreps, I will utilize archival data provided by the Disaster Research Center at Ohio State University. In analyzing social networks for fifty-five instances of organization in one of the events studied by Kreps, I will examine all of the dyadic relationships related to each instance of organization (the performing focal unit is the referent in all cases) and characterize them in terms of the forty logically possible types of social networks (patterns of any one-4 types, two-12 types, and three -24 types of the four elements). Thus, my unit of analysis is the dyadic relationship as it is represented by the presence or absence of the four social properties of organization. The event I will study is a 1967 flood in a mid-sized northwestern city. Organized response patterns--one of which is the above example--have already been determined by Kreps (1983). I will be concerned with the dyadic relationships that characterize the social networks of each focal organization at either the initiation of organization or during the peak period of activity (maintenance).

The thrust of my thesis is twofold: (1) I will be adding information related to the development of a taxonomy of organization and social network forms of association that derives from Kreps' conception of organization; and (2) I will examine the organization-environment nexus as documented in the interviews, to assess further the internal and external processes of organization. In that regard, I will compare selected structural aspects of the focal organization and the other half of each dyadic pair as well as selected

characteristics of the broader network itself to assess possible links between Kreps' perspective and that of the "population ecologists" (discussed below).

Although my work is based upon Kreps' framework, my goal is not to replicate his work. Rather, I will extend his framework via an examination of a single disaster event; the case study of a 1967 flood. My primary goal, as indicated above, is taxonomic in nature. The value of the case study method for the development of a taxonomy lies in its attention to the description and exploration of the many components of a given social situation in as comprehensive and accurate manner as possible. Through description of the social network relationships documented by both my present and Kreps' past work, I will attempt to determine the logical interrelationships among the various elements (domain, tasks, resources, activities) present in and absent from each dyadic relationship engaged in by the focal organization.

#### RELATED LITERATURE

Recent literature on complex organizations and their environments suggests a growing consensus among researchers with reference to interactional relationships between focal organizations and other social units in their environments. Environmental factors are increasingly gaining acceptance as important variables which must be taken into account in order to understand organization. The focus of

some researchers is on interorganizational relationships as the key environmental factors (e.g., Levine and White, 1961; Benson, 1975). For example, some researchers suggest that organizational members compare their units with similar organizations, using the latter as a source of new ideas or resources (Warren, 1967; Marrett, 1971; Van Den Ven, Emmett, and Keeing, 1974; Aldrich, 1976). The need for additional ideas or resources may be unique to the situation at hand--as is typically the case in disaster environments--or created by law or policy (Hall, Clark, Giordane, Johnson, and Van Roekel, 1977). Interorganizational relationships reflect both presence and varying degrees of interdependence among organizations. Increased contact with other organizations has been shown to increase the likelihood of diffusion of innovation and other organizational changes (Czepiel, 1974).

Disaster contexts command attention to organization-environment relationships. Although focused concern with environmental conditions is a relatively recent development in the area of organizational research (Hall, 1977; Perrow, 1979), reference to environmental conditions have always characterized aspects of social theory. For example, Weber clearly used the social and cultural environment as a key explanatory tool in The Protestant Ethic and the Spirit of Capitalism. Environmental influences vary over time. Thus a dyadic relationship that is important at the initiation of organization may become insignificant during its maintenance. Weber asserts a stronger belief stating that "(n)orms and behaviors that work in one setting are

likely to be ineffective or even counterproductive in another." Within the context of a natural disaster, the term environment will refer to observable factors external to the organized response. Thus, environmental influences include such factors as weather conditions, proximity of military resources, or location of the organized response (is it at the local, state, and/or national level). But of primary interest here are the dyadic relationships that are a part of the social networks of each focal organization identified by Kreps.

Hall (1972) asserts that new organizations suffer in that they do not have established ties with the other organizations in their environment. Czepiel (1974) and Hall (1972) demonstrate the importance of social network relationships as propagators or terminators of organization. It is the author's belief that the study of dyadic relationships, representing the least complex units of social networks, provides a mechanism by which organization-environment relationships can be interpreted as elemental processes of organization. Thus, the comparisons of social network patterns can provide insights about both the social networks themselves and broader processes of organization of which they are a part.

Although organization itself is not well-defined, links between organizations and their environments are fundamental for what has come to be known as the population ecology perspective (Warriner, 1978; Hannan and Freeman, 1977; McKelvey, 1982). That perspective heavily from Durkheim's perspective on the division of labor and Darwin's theory of evolution. Warriner outlines nicely the core arguments of the

population ecology perspective. According to Warriner, organization is to be treated as the unit of analysis, but the focus of the population ecologists is on a population of "similar" organizations rather than the unit members of the population. Thus, Warriner is asserting that identification of similar and dissimilar organizations is essential for carrying out the population ecology perspective. And, most importantly, the environment surrounding the population is treated as fateful for both population and member units.

Hannan and Freeman (1977, 1984), Aldrich (1976, 1979), and McKelvey (1983) have been at the forefront in the development of the population ecology perspective. Hannan and Freeman (1977), responding to what they felt had been an inordinant amount of attention devoted to closed system processes in research, opted to study the process through which "different organizations are selected out to survive and grow." Just as perceptions of individuals are shaped by their experiences, so too are organizations shaped by their environments (Starbuck, 1976, 1983). Hannan and Freeman studied a variety of organizational types and the coping mechanisms used to ensure continuation of the organization in a competitive atmosphere. While they specify three components of an organizational blueprint (formal structure, patterns of activity, and normative order), they do not discuss how different blueprints come into being. Aldrich (1979) focuses most of his attention on variations of factors external or outside the control of the members of the population. Aldrich approaches organization as "loosely coupled systems that are subject to change because of error,

creativity, luck, conflict, as well as through planned innovation." Although Aldrich does not spell out what he means by organization, his logic applies directly to Kreps' forty social network forms of association. McKelvey's (1982) recent work suggests that further development of a core species concept of organization is needed. This need must be met by a concept simple enough to apply to all organizational types, yet flexible enough to reflect the unique nature of each. Through identification and exploration of taxonomy problems, McKelvey attempts to define a core species concept tied to levels of technical competence in both the autogenic (internal) and allogenic (external) organizational environments.

An integration of the population ecology perspective and the work of Kreps (1982, 1983) may provide a base from which the further development of a core species concept of organization can take place. Kreps implies that we can learn much about populations of organizations and their evolution by studying the actual processes through which organization is initiated, maintained, and suspended. His approach complements attempts by population ecologists to learn how populations of organizations establish and attempt to sustain "niches" in an environment of social units. Moreover, Kreps provides an elaborate "core species concept" which points to both autogenic (internal) and allogenic (external) dimensions of organization. Identification and analysis of the pattern types of the social networks of the responding focal organizations may provide a way of identifying more precisely "populations" of organizations responding to disaster.



## RESEARCH DESIGN AND METHODOLOGY

Upon his review of ninety-eight DRC interviews (and related documents) pertaining to the 1967 flood event, Kreps was able to document fifty-five instances of organized responses as well as their respective focal organizations (Kreps, 1983). The case illustration noted earlier is one of those fifty-five instances. In an attempt to document other forms of association for one event, I have identified the dyadic social relationships at both the initiation and maintenance of each organized response. Only dyads involving the focal organization have been examined. I have, accordingly, documented four hundred and sixty-five dyadic relationships through the course of my research. The volume of information available to me varies widely for each instance of organized response. Yet all of the social network relationships examined are alike in the sense that while social, they do not reflect instances of organization. That is to say, each relationship lacks at least one of the four elements identified by Kreps as necessary for organization to exist. Once again, the total possible forms of association is logically limited to forty. My research (discussed below) allowed an identification of thirty of the forty forms of association at least once (see Table 2).

Taxonomy Design

The data production requirements of this thesis are (1) to

TABLE 2: Taxonomy: 1,2, and 3 Element Forms of Association

<u>Three Element Forms</u>	<u>Frequency</u>	<u>Two Element Forms</u>	<u>Frequency</u>	<u>One Element Forms</u>	<u>Frequency</u>
D→T→R	4	D→T	3	D	2
D→T→A	1	D→R	1		
D→R→A	4	D→A	1		
D→R→T	*				
D→A→T	1				
D→A→R	3				
T→R→A	2	T→R	12	T	6
T→R→D	*	T→A	6		
T→A→D	*	T→D	*		
T→A→R	1				
T→D→R	1				
T→D→A	*				
R→A→D	3	R→A	93	R	192
R→A→T	9	R→D	2		
R→D→T	*	R→T	7		
R→D→A	3				
R→T→D	3				
R→T→A	8				
A→D→T	*	A→D	1	A	23
A→D→R	*	A→T	4		
A→T→D	*	A→R	63		
A→T→R	2				
A→R→D	*				
A→R→T	2				
Total	47		193		225

Total Sample = 465

\*Indicates forms of association not located in the flood event.

empirically document patterns of dyadic social network relationships at initiation and maintenance of fifty-five organized disaster responses (Kreps' original unit of analysis) and (2) to measure other variables characterizing the dyadic relationships for possible interpretation of the identified social network forms. The archival data provided by the DRC are not useful for testing anything but do provide a basis for developing taxonomy. Dyadic social network relationship patterns therefore can be ascertained from the interviews, as can broader social network characteristics. In this case, the interviews reveal the processes related to organized action and the various contexts in which it takes place (Kreps, 1981).

My research strategy involved a "mini-case study" approach in which I (1) recorded qualitative descriptions of what took place in each dyadic relationship involving a focal organization identified by Kreps (N=55: see Table 1); (2) selected the logically possible pattern which most closely described the social network relationships (see Table 2); and (3) identified broader social network characteristics of which the dyadic unit was a part. In other words, I made observer judgments about "forms of association" that were based on descriptions of the content of what happened in each dyadic relationship. I was therefore oriented to validity of forms of association through case descriptions of the content of social action.

The limitations of gathering the data are considerable. Clearly I do not know the population parameters of dyadic social network relationships for the event studied. Inherent difficulties associated

with studying both social processes and disasters, plus the inconsistency of quality and depth in the interviews and documents, imply that chances for measurement error are numerous and major. Because I am dealing with forms of association at initiation and maintenance of organized disaster responses, I assume the existence of organization of both units in each dyadic pair, i.e., the co-presence of Kreps' four organizational elements. Yet my unit of analysis is the forms of association which are not instances of organization as Kreps defines it, i.e., the co-presence of any one to three of the organizational elements represented by dyadic relationships. Therefore, judgements concerning the presence and absence of the elements are critical. I do not claim that my judgments of dyadic social network patterns are free of error. However, the information generated by these judgements is analytically relevant to understanding the development and evolution of organization.

#### Exploratory Modeling Design

As I stated earlier, Kreps (1983) documented fifty-five instances of organized response in the 1967 flood. The second aspect of my thesis involves an examination of the dyadic social network patterns (number of elements present and form types) as dependent variables. My approach is one of exploratory modeling rather than deductive hypothesis testing. The latter approach is, quite simply, premature given the level of development of Kreps' theory. Thus, I am not looking to confirm or disprove hypothetical statements concerning

dyadic relationships. Rather, by studying the various characteristics of dyadic relationships, the social units that form them, and the broader social networks of which they are a part, I hope to provide insights about the temporal ordering of 1-3 of the four elements (domain, tasks, resources, activities) as well as the number of elements present in the dyadic relationships. For example, just as patterns of organization reflect a formal rationality to collective behavior continuum, so too can patterns of dyadic social network relationships. And those patterns may also relate to the number of elements present in the relationship. I will also be sensitive to the comparisons of the structural dimensions of the social units involved in each dyad (N=465; see Table 2). Patterns of similarity-dissimilarity of the units themselves may very well relate to the "presence" of organization exhibited by their relationship. Finally, because each dyad is but one part of a broader network of interconnected social units, I will also represent that broader social network in the modeling to follow.

The primary objective of this modeling effort is to point to the complementarity of Kreps' processual perspective on organization and the evolutionary perspective offered by the population ecologists. For example, the 465 dyads discussed below did not become instances of organization as Kreps defines them. But they could have and they in fact varied in terms of their form and relative "presence" of organization. Both their forms and relative presence need to be explained. The population ecologists might suggest that the dyads were

not selected out to survive and develop as organization. If so, that too needs to be explained. Given the premise by population ecologists that structural similarity-dissimilarity is critical for determining the boundaries of populations of organizations, this dimension is given particular attention in the modeling to follow.

### Dependent Variables

As mentioned earlier, the core measurement problem of the study was to document the presence and absence of Kreps' four organizational elements and the patterning of those present, as they were reflected by the dyadic social network relationships. In doing so, two analytically distinct properties are identified: the social network patterns (DYAD-PAT) and the total number of elements present in each relationship (EL-PRES). The exploratory model examines these two properties from three different perspectives: characteristics of the dyad, structural similarity-dissimilarity of the focal unit and its' dyadic partner, and structural similarity-dissimilarity exhibited by the broader social network of which the dyads are a part. The dependent variables of the model and their measurement are presented below.

#### a.) Social Network Pattern Types (DYAD-PAT)

Determining the sequencing of the organizational elements is essential for interpreting the process of organization in terms of Weber's two notions of ideal types. DYAD-PAT provides a way in which

this interpretation can be accomplished. The social network pattern types are logically fixed at forty (see Table 2) and highlight Weber's notion of individual (historical) ideal types. The resulting taxonomy also addresses Simmel's distinction between content and form of social action. For the purposes of interpreting the "content" of such forms in terms of Weber's notion of transhistorical ideal types (modes of action), the unity of goal oriented rational action (formal rationality) and collective behavior can best be expressed by the metric provided by Kreps (1984).

Kreps arrayed the 24 organizational forms with values ranging from +3 to -3. The key requirements for constructing the metric was to capture all of the transitivityes from  $D \rightarrow T \rightarrow R \rightarrow A$  to  $A \rightarrow R \rightarrow T \rightarrow D$ . This was accomplished in the following way. At one end of the continuum is "perfect" formal rationality: where D precedes T, R, and A; T precedes R and A; and R precedes A. Given one point for each conforming transitivity,  $D \rightarrow T \rightarrow R \rightarrow A$  receives a score of six, while  $A \rightarrow R \rightarrow T \rightarrow D$  ("most elemental collective behavior") receives a score of zero. Kreps then subtracted a constant three from each type--to highlight the balancing of formal rationality and collective behavior at the midpoint of the metric--yielding a range of +3 to -3.

Using Kreps' same metric, the forty social network forms of association (any 1-3 elements) can also be arrayed with values ranging from +3 to -3. The usefulness of the metric again lies in its ability to capture all of the transitivityes for all forty forms and express them as falling on the same continuum of formal rationality and

collective behavior that Kreps used for organizational forms (all elements). This is accomplished in the following way on Table 3. One end of the continuum again reflects "perfect" formal rationality: where D precedes T and R; and T precedes R. Because each of these types points to the possibility of "perfect" formal rationality, each receives a score of six. Similarly, A, A→R, and A→R→T receive a score of zero. Although four element forms are not presented, they are implied at each level by the 3-element forms because all degrees of freedom are exhausted by them.

Again subtracting a constant three from each type, the resulting metric is +3 to -3. In the columns labeled Logical Metric and Number of Logical Forms, note that the strategy produces a conceptually grounded and normally distributed logical measure. The column labeled Empirical Instances points to the distribution of the 465 social network relationship patterns located for the 1967 flood. Each is expressed in terms of its metric score.

Implementation of this metric captures both individual and general ideal types reflected in Kreps' taxonomy. If the types are scored in terms of their cognation with the formal rationality-collective behavior continuum (e.g., D, D→T, D→T→R all receive a +3), the logically derived correlations between the number of elements present and the formal rationality-collective behavior score is zero. Thus the metric deals adequately with Weber's notion of ideal types, but is insensitive to the number of elements present in the dyadic relationships. I address this issue through the second variable.



TABLE 3: Social Network Forms of Association  
Formal Rationality - Collective Behavior Metric

<u>Organizational Forms</u>	<u>Logical Metric</u>	<u>Number of Logical Forms</u>	<u>Empirical Instances</u>
D			2
D→T	+3	3	3 (9)
D→T→R			4
T			6
D→R			1
T→D	+2	6	0 (9)
D→T→A			1
D→R→T			0
T→D→R			1
D→A			1
T→R			12
R→D			2
D→A→T	+1	8	1 (20)
D→R→A			4
T→R→D			0
T→D→A			0
R→D→T			0
D→A→R			3
T→R→A			2
T→A→D	0	6 (12*)	0 (11)
R→D→A			3
R→T→D			3
A→D→T			0
T→A			6
R→T			7
A→D			1
T→A→R	-1	8	1 (26)
R→A→D			3
R→T→A			8
A→T→D			0
A→D→R			0
R			192
R→A			93
A→T	-2	6	4 (300)
R→A→T			9
A→T→R			2
A→R→D			0
A			23
A→R	-3	3	63 (88)
A→R→T			2
Totals		(40)	(465)

\*The six forms at the midpoint are derived from each end of the continuum. The logical number of forms at the midpoint is therefore 12. The distribution for all 64 forms is 4, 9, 13, 12(24), 13, 9, 4.

b.) Number of Elements Present (EL-PRES)

The forty possible forms of association (see Table 2 or 3) represent a variety of "means-ends" relationships and these are highlighted by the above metric. These forty forms provide the empirical grounding by which much of the subtlety of social response to disaster is captured and address Simmel's notion of "forms" of social action. Measurement is achieved with the determination of the temporal ordering of 1, 2, or 3 elements in the dyadic relationships and each form is scored in terms of the metric. But, as implied by Table 3, the taxonomy of forms of association also can be measured in terms of number of elements present in each relationship. The actual number of elements were scored simply as follows: 1 = one element patterns (49.3%); 2 = two element patterns (41.5%); 3 = three element patterns (9.2%). Thus, the number of elements present (EL-PRES) is interpreted as reflecting the relative "presence" of organization. One goal of the exploratory modeling is to determine if presence of organization (EL-PRES) is related to form type (DYAD-PAT) as depicted by the formal rationality-collective behavior metric.

Independent Variables

a.) Characteristics of the Focal Organization

and Its Dyad

Four measures are included in the model. Three represent characteristics of the dyadic relationships and are measured as dummy variables. DYADO records the dyadic origins of the dyadic

relationships. Emergent or uncertain origins were coded 0 (43.9%). Origins established prior to the event were coded 1 (56.1%). The thought here was that relationships established prior to the event might be different from emergent ones relative to what took place and how during the emergency. Second, the social space dimension of the dyadic relationships (DYAD-SS) was recorded as follows: 0 = same level, i.e., both dyadic units represented have within local, state, or national linkage (40.2%); 1 = different levels, i.e., the two units represent different levels of response- local/state, state/national, etc. (59.8%). The third, NAT-SNR, examines the nature of the social network relationship using the focal unit as the referent. Each dyadic relationship was coded 0 if the focal unit and its' dyadic partner engaged in interdependent and reciprocal action (29%). If the focal unit was dependent in some manner upon the dyadic partner, the response was coded 1 (71%). One issue here was whether dependency relates in some fashion to the penetration of organizational boundaries, perhaps as reflected by more elements of organization represented by the dyadic relationship. Finally, the pattern of initiation of organization by the focal organization (ORG-PAT) was coded in terms of Kreps' original formal rationality-collective behavior metric. The logic of using the metric is the same as that used for DYAD-PAT, but, of course, in this case full organization had been achieved (see Table 4). Kreps (1983) points to formal rationality as a closed system strain toward boundary maintenance. It was felt that this might also be reflected by less pronounced links (e.g., fewer elements of organization present)

TABLE 4: Organizational Forms for the Flood:  
Formal Rationality - Collective Behavior Metric

<u>Organizational Forms</u>	<u>Logical Metric</u>	<u>Number of Forms</u>	<u>Empirical Instances</u>
D→T→R→A	+3	(1)	13
D→T→A→R D→R→T→A T→D→R→A	+2	(3)	14
D→R→A→T D→A→T→R T→R→D→A T→D→A→R R→D→T→A	+1	(5)	12
D→A→R→T T→R→A→D T→A→D→R R→D→A→T R→T→D→A A→D→T→R	0	(6)	5
T→A→R→D R→A→D→T R→T→A→D A→D→R→T A→T→D→R	-1	(5)	4
R→A→T→D A→T→R→D A→R→D→T	-2	(3)	5
A→R→T→D	-3	(1)	0
Totals		<u>(24)</u>	<u>55</u>

with other social units.

b.) Structural Similarity-Dissimilarity: Dyad

Three measures are included in the exploratory model. For each measure a dummy variable was created. First, comparability of size (SIZ-COM) was recorded using the size of the focal organization as the referent. Dyadic relationships involving social units different in size were coded 0 (49.2%). Dyadic relationships involving social units of the same size were coded 1 (50.8%). Second, the comparability of the domains of the two units (DOM-COM) was recorded as follows: 0 = same domains (12.4%); 1 = different domains (87.5%). The domain of the focal unit served as the point of reference for this variable. Finally, comparability of routine (non-disaster) activities performed by the focal unit and its dyadic partner was recorded using the routine activities of the focal unit as a referent (DYAD-COM). Dyadic partners performing same kinds of activities were coded 0 (29%). Dyadic partners performing the different kinds of activities were coded 1 (71%). In all cases we examine the extent to which similarity-dissimilarity of size, domain, and routine activity reflect linkages with identifiable populations of social units.

c.) Structural Similarity-Dissimilarity :

Broader Social Network

There are two variables in this last block. The first, a dummy variable, was created to measure the degree of isolation/integration of

the focal unit at maintenance of the organized response (NOFML). Focal units not having discernible links to the broader social environment were coded 0 (25.6%). Focal units having one or more links were coded 1 (74.4%). Second, a three level ordinal scale of comparability between the dyadic social network domains (DSN-COM) was recorded using qualitative information obtained through the DRC interviews. Dyadic partners operating within the broader social network of domain comparability were coded 1 (11%). Dyadic participants operating in a broader network having some of the same and some different disaster domains (mixed) were coded 2 (49%). Dyadic partners operating in social networks having dissimilar domains were coded 3 (40%). Again, the general effort here was to see if patterns of similarity-dissimilarity between the dyad and the broader social networks of which the dyadic participants are a part predicts not only different forms of association, but also different populations of social units performing them.

## FINDINGS

The findings will be presented in two parts as they relate, respectively, to the taxonomy and exploratory model building tasks of the thesis. Table 2 provides, in summary form, the data which informs one of these tasks. It shows that thirty of the forty social network forms of association were located for the 1967 flood; and provides marginal totals for each of the forms located. Table 3 positions each

of them on the formal rationality-collective behavior continuum (metric) developed by Kreps. I begin by discussing the taxonomy because the modeling is dependent on its prior construction.

#### Taxonomy of Social Network Forms of Association

As indicated in Table 2, the vast majority (89%) of dyadic relationships involved either one (48%) or two (41%) elements of organization. And most of these linkages were limited to instances of resource mobilization (R), interdependent actions (A), or combinations of both (R→A or A→R). In other words, fully 89% of the dyadic relationships were limited to the resources and activities dimensions of organization, as Kreps defines them. Thus social unit autonomy in terms of collectively represented domains and tasks is not permeated for the vast majority of social network forms of association in the 1967 flood. The following two examples of one and two element forms illustrate the nature of most of the uncovered social network dyadic relationships. The term "focal organization" references the social unit enacting an instance of organization, as originally identified by Kreps from his earlier analysis of archival materials.

##### A. Local Fire Department (Focal Organization) and the Bureau of Land Management

Local fire department personnel worked closely with the local police department on several emergency domains. Some members of the community believed the two departments functioned as a single emergency

unit; but they did not. Both were emergency relevant public bureaucracies and each maintained a separate identity throughout the emergency period.

The police department was not involved in the evacuation operation I am about to describe. The focal organization in this relationship was the local fire department. The department responded to the needs of a local hospital threatened by flood waters. Hospital patients had to be evacuated and the fire department assumed the evacuation domain. The organized response pattern depicting this evacuation operation, as identified by Kreps, was  $R \rightarrow D \rightarrow T \rightarrow A$ . Kreps termed the response task structure as simple (four or fewer tasks) and noted contingencies related only to the activities element. During both the initiation and maintenance phases of the organized response, the fire department engaged in emergent social relationships with local and state disaster relevant units of various types. There is no evidence to suggest that this response was pre-planned by the fire department. The operation was suspended after all of the patients had been evacuated to an Army hospital near the city.

The Bureau of Land Management was the other unit involved in the dyadic relationship and that relationship involved only a single element of organization. The local fire department and the Bureau of Land Management had very different domains in routine circumstances. The fire department attended to emergency situations generally involving fire. The Bureau of Land Management was a public bureaucracy and did not necessarily involve itself in any emergency situations.



The two dyadic participants normally have linkages with different groups and/or agencies operating in their respective social environments. The fire department was larger than the Bureau. Although the Bureau of Land Management did not perform any disaster relevant domain during the flood, the fire department's relationship with the Bureau was very important.

The social network pattern reflecting this dyadic relationship is the R form. The presence of a single element suggests that the social relationship is not particularly complex. However, the simplicity of the social network pattern cannot be assumed to also reflect the degree of impact a particular element has on an organized response. In this case, rising flood waters soon convinced skeptical members of the community that they were confronting a very dangerous situation. In an attempt to reduce the threat to human life, disaster relevant groups and agencies functioning in the community began to concentrate on evacuating individuals in immediate danger as well as groups of people extremely vulnerable to any emergency situation, e.g., patients in hospitals. In this case, a local hospital increasingly threatened by the flood requested evacuation assistance. The fire department heard the request and responded to it via walkie talkie. The previous provision of these resources (R) proved invaluable when the disaster area totally lost telephone and electrical service. Because the walkie talkies had been distributed to several disaster relevant groups and/or agencies, they provided the only means of communication between the various disaster groups for several days.

Five lives were lost during the flood. But because several thousand people were rescued, fed, clothed, and housed, the evacuation and shelter programs were considered to be very successful. Although I can only speculate, it appears that if the groups and/or agencies had been unable to use the walkie talkies to communicate emergency relevant needs, the toll of human suffering would have been much higher. Certainly the mobilization and coordination efforts would have taken much longer. In sum, the provision of this single resource early in the emergency period--one reflected by a simple social network of the R form--was instrumental to the success of an organized response.

B. The Municipal Utilities System (Focal Organization)  
and the Local Police Department

The focal organization in this dyadic relationship was the Municipal Utilities System (MUS) serving the flooded community. Under normal conditions, the MUS was responsible for the maintenance of the local water filtration station as well as telephone and electrical service. During the flood, however, their primary concern shifted from maintenance of service to restoration of essential personnel and resources. The organized response pattern capturing the domain of the MUS to restore essential services was termed by Kreps as  $D \rightarrow T \rightarrow R \rightarrow A$ . Kreps determined that the response task structure was complex (more than four tasks) and identified contingencies related to the resource and activities elements of organization.

As an emergency relevant public bureaucracy, the MUS operated as a

self contained emergency unit during the initiation phase of its response. By the maintenance phase (all elements present) the MUS was involved in emergent relationships with local, state, and national emergency relevant groups and/or agencies. The MUS employees had received some emergency training prior to the disaster. This training, combined with the mechanical expertise of the MUS employees and the large network of contacts, resulted in the restoration of services which had been impaired by the flood.

The local Police Department was the second half of this particular dyadic relationship. The dyadic pair was routinely related in the sense that both the MUS and the police department were city agencies. Yet each approached their particular domain and field situations independently of the other. Both departments were similar in size (over fifty members) and engaged in relationships with some of the same groups and/or agencies functioning in the larger social environment. The two local public bureaucracies had an established and working relationship prior to the flood. They therefore engaged in frequent communication and cooperation as a matter of routine. Because of their past record of association, it was not a surprise to find the two departments assisting each other throughout the emergency situation. Their relationship during the disaster conditions was reciprocal in nature. However, the reciprocity occurred only during the maintenance phase of the MUS organized response because it operated as a relatively self contained unit during the initiation phase of the response.

The dyadic social network relationship pattern reflecting the

relationship between the local Municipal Utilities System and the local police department during the emergency is judged the R-T form. The flood waters inundated the central business district as well as the outlying communities resulting in the loss of telephone and electrical service. These services were provided to the community by the Municipal Utilities System. And it was their domain to attempt repair and restoration of the lost services. Even with assistance from MUS employees of neighboring communities, the demand confronting the MUS employees was immense. As the situation became worse, communication between evacuation shelters, military units, etc., became much more difficult. For the police department, who had assumed a domain of evacuation, communication was a crucial factor affecting many facets of their own and other disaster relevant action. The MUS provided police headquarters with telephone service for as long as environmentally possible.

After telephone service became impossible to maintain, attention and repair of damaged utility equipment became the primary focus of the MUS. Meanwhile, members of the police department found themselves out in the field directing evacuation operations from rescue boats. The nature of their operations took them into neighborhoods, thus providing them with an opportunity to identify emergency situations relevant to the MUS. The police department, equipped with walkie talkies provided by the Bureau of Land Management, contacted the MUS on a regular basis concerning this kind of information.

The preceding descriptions illustrate the reciprocal relationship

between the MUS and the police department. The two departments exchanged resources. In the case of the MUS, resources refers to the mechanical expertise possessed by the employees maintaining telephone service for the police department for as long as possible. In terms of the police department, resources refers to the information they were able to provide to the Utility identifying emergency situations to which the MUS otherwise might not have been able to respond. Therefore, the first organizational element present in the relationship between the Municipal Utilities System and the local police department was resource (R).

The Utility came to rely upon the police department for this kind of information because it was essential to its domain performance. The police department quickly developed an internal task structure which involved locating potential and actual emergency situations of relevance to the MUS. Via walkie talkies, the police notified the MUS of all such situations. The MUS, in turn, dispatched and coordinated its own personnel accordingly. Thus the second organizational element reflected in this dyadic social network relationship was a boundary spanning task structure (T), but one that was self contained in its enactment. Moreover, the two units never established a joint domain (D) or engaged in interdependent actions (A) which articulated that collective representation.

The predominance of R, A, R→A, and A→R forms of association highlight Starbuck's (1983) notion of the "action generation" mode of organization during the maintenance state. Here domains and tasks

dominate the interpretation of what is happening and what should be done. Relationships with other social units relate to resources and activities because, from the perspective of the participants in the social units involved, respective domains and tasks are relatively fixed. In more structural terms, Kreps characterizes action generation as a closed system strain toward administrative rationality--a strain which reveals continuities between "means" and "ends" of action.

The implication to be drawn is that most dyadic relationships reflect routine restructuring of the elements of organization from the perspective of the social units involved. That is to say, from the perspectives of the enacting units, a closed system strain toward administrative rationality suggests that participants are oriented to "means" rather than "ends" of action. The ends themselves are largely unquestioned and therefore vary little. Although far less frequent, forms of association also occur where both ends and means are relevant. The following example illustrates such a circumstance and points to the increasing "presence" of organization (3 element forms), as Kreps defines the term.

C. Local Council of Churches/Civil Air Patrol (Focal Organization) and the Council of Churches in another city

The focal organization of this dyadic relationship was an instance of emergent organization involving the local Council of Churches and the Civil Air Patrol. Operating as a single unit during the flood, the

unit established an organized evacuation program which came to be known as KID-E-VAC. The KID-E-VAC program involved the evacuation of fifty-five local children to another city. Kreps characterized the organized response pattern of KID-E-VAC as  $R \rightarrow D \rightarrow T \rightarrow A$  and identified contingencies related to each of the four elements. My reading of the archives suggests that element problems related, in part, to the fact that what was involved here was an emergent organization--one composed of two already existing units.

The initiation of the KID-E-VAC program by the Council of Churches and the Civil Air Patrol was not completely spontaneous. Both groups possessed different but complementary resources essential to any evacuation program. To be specific, the local Council of Churches was an interdenominational unit which had pooled their resources in the past to promote community wide projects. As a result, the Council represented as extensive personal contact network. Part of that network involved links between council members in the flooded city (City A) and members of an autonomous council of churches in City B. The Civil Air Patrol cadets had emergency training and were prepared to move into action upon notification. Although the evacuation was not pre-planned, the cadets were familiar with emergency administrative procedures and used that expertise to manage the airborne evacuation.

The emergent nature of the KID-E-VAC program dictated that all ensuing dyadic relationships were also emergent. Thus, the focal organization engaged in new relationships with local and state groups and/or agencies during the initiation and maintenance phases of the

organized response. Once the program was fully operating (all elements present) the focal organization expanded its interorganizational relationships to include national as well as local units. The reasons for the eventual suspension of this response are not clear from the archival descriptions.

The second half of the dyadic relationship was an autonomous Council of Churches in city B. Thus, although city A and city B have Council of Churches normally affiliated at the national and international level, each operates within its own geographical area. As members of the world wide Council of Churches, the Councils in city A and B have similar domains in normal circumstances. Yet each Council attended to different emergency relevant domains during the flood. The focal organization was involved in the physical evacuation of the children from city A to city B (evacuation domain as identified in Kreps' taxonomy of domains). The Council in city B was instrumental in the provision of food, clothing, and shelter for the evacuated children (providing basic needs domain as identified by Kreps' taxonomy of domains). While the two domains were separate--analytically as determined by Kreps, in communications as collectively represented by direct participants, and spatially and temporally as dictated by circumstances of the event--there is no doubt that the enactment of these respective domains was intimately related. The dyadic social network which captures the relationships between the Council of Churches/Civil Air Patrol in city A and the Council of Churches in city B is judged by me as the D→A→R pattern. The process was as follows.



The president of the Council of Churches in city A was on vacation when the flood hit his city. For a time he was unable to secure passage into the disaster area and was stranded at an Air Force base in city B. Although geographically distant, various groups and organizations within city B were directly involved in providing disaster relief to victims of the flood. Several of these units had representatives at the Air Force base to meet refugees that were being evacuated by military and civilian aircraft. During his stay at the Air Force base the president of city A's Council met an old friend who had recently been transferred from city A to city B. The friend was a member of the Council of Churches in city B.

Both men were very concerned about the welfare of the flood victims. And, in an attempt to notify disaster relevant groups and/or agencies in city A of available housing in city B, the two flew into the disaster area. Upon their arrival the two men began to spread information about available food, clothing, and shelter. While trying to transmit the information via radio, they discovered that the Civil Air Patrol had been toying with the idea of evacuating children from the flooded city. In a single evening Civil Air Patrol representatives, the two Council of Churches officials, and a few others discussed the problems of evacuating children and established an emergent evacuation domain called KID-E-VAC to be performed jointly by the CAP and the Council of Churches in city A. The establishment of that domain was contingent upon the agreement by the Council of Churches in city B to enact its own domain related to the provision of

food, clothing, and shelter for the evacuated children. Thus, the initial element represented by this dyadic relationship was domain (D)--in this case collective representations pointing to the continuity and discontinuity between the two distinct spheres of action. Continuity of domain was collectively represented by participation as a common concern for the well-being of the children and the need to work conjointly to that end. Discontinuity is represented by Kreps' taxonomic distinction between evacuation and providing basic needs, and the fact that participants represented domain performance as related but distinct. This example therefore highlights the subtleties of the domain concept and the need to address them taxonomically. The subsequent actions occurring within each site were at once interdependent within each response and across the two responses. This suggests that activities (A), as defined by Kreps, was the second element of organization represented by the dyadic relationship.

Beyond the evacuation itself, a major portion of the work surrounding the movement of the children from city A to city B concerned their registration. The relevant information was gathered in city A and transmitted to city B. The information was received by the Council of Churches in city B. This information became critical to the assignment of the children to temporary shelters and otherwise providing for them. Thus resources (R) in the form of information concerning shelter and other provisions represented the final element of organization reflected in this dyadic relationship.

There was no interpenetration of tasks as this element is defined

by Kreps. It is worth noting that the KID-E-VAC program was criticized for its failure to obtain medical releases during the registration of the children. Although the question of legal liability was eliminated when medical releases had been obtained, this oversight is one indication that a formalized and boundary spanning task structure outlining specific responsibilities did not exist. Rather, each set of dyadic participants had a general idea of their respective domains and their performances were influenced more by improvisation than by a collectively represented task agenda that linked the two responses.

In sum, the idea of evacuating the children from the disaster area was initially considered during an informal meeting. The resulting program, referred to as KID-E-VAC, was jointly enacted by the Civil Air Patrol and the local Council of Churches in city A. Their responsibility for the program was recognized and legitimated by everyone attending the meeting. One of the individuals at the meeting was a member of the Council of Churches in another city. He offered to provide for the children in his city. This is how the dyadic social network relationship between the Civil Air Patrol/Council of Churches and the Council of Churches in another city began. While both dyadic participants were striving toward a common value (concern for the children), domain resolution was fundamental to this dyadic relationship. While the Civil Air Patrol/Council of Churches in city A were involved with the registration of the children, the Council of Churches in city B was securing food, clothing, and shelter for them in a safe location. Diverse as the actions were, all contributed to the

well-being of the children. These interdependent actions (A) constitute the second organizational element represented by this relationship. Processing the registration information contributed directly to the successful care of the children in city B. The transmission of this information from the focal organization to the Council of Churches in city B was followed by the mobilization of provisions to meet the basic needs of the children. Thus the final element represented by this dyadic relationship was resource(R).

Although far less frequent (only about 10% of the 465 cases), the three element forms of association point clearly to the interrelationships between means and ends of action in the enactment of organization. They also indicate that when the existence of organization cannot be assumed--i.e., when origins is at issue--that it is just as important to document the absence as it is the presence of organization. Kreps' core species concept, and the processual taxonomy he derives from it, allows for a determination of both presence and absence in the manner of alternative forms of association. Case materials from this single event highlight very well the range of organization and social network forms of association in the taxonomy.

Relative presence of organization is captured, at least in part, by the number of elements evidenced in each dyadic relationship. But Kreps' framework allows for a comparison of the patterning of these elements in terms of a continuum of formal rationality ( $D \rightarrow T \rightarrow R \rightarrow A$ ) to collective behavior ( $A \rightarrow R \rightarrow T \rightarrow D$ ). The relationship between these two dimensions of the process of organization is examined in the

exploratory model to follow.

### Exploratory Modeling of Social Network Forms of Association

The model findings depict relationships among nominal and ordinal variables representing two related dependent variables (formal rationality-collective behavior metric score and number of elements of organization present in the dyadic relationship) and three sets of independent variables representing (characteristics of the focal organization and its dyadic relationships, structural similarity-dissimilarity of the dyadic partners, and structural similarity-dissimilarity of the broader social network of which the dyads are a part). Means, standard deviations, and correlation scores for all model variables are found in Appendix 1. Table 5 reports the findings from step-wise multiple regression techniques. The following discussion of findings, i.e., the summary of Table 5, will be organized in terms of a set of statements that relate to statistically significant relationships in the model. The statements will be explored in terms of (1) Kreps' perspective on organization and (2) the perspective on organization of the population ecologists.

#### Number of Elements Present in the Dyad (EL-PRES)

- 1a. The greater the relative presence of organization (EL-PRES), the greater the strain toward formal rationality in their patterning (DYAD-PAT).
- 1b. The greater the relative presence of organization (EL-PRES), the less the strain toward collective behavior in their patterning (DYAD-PAT).

As reflected in the two regressions and their Pearson correlations ( $r=.218$ ), DYAD-PAT and EL-PRES are positively related. Part of the

TABLE 5: Regression: Number of Elements Present (EL-PRES) and Formal Rationality - Collective Behavior Metric (DYAD-PAT) with Each other and Exogenous Variables

<u>Dependent Variables</u>	<u>Dependent Variables</u>			
	<u>EL-PRES</u>		<u>DYAD-PAT</u>	
	<u>BETA</u>	<u>F</u>	<u>BETA</u>	<u>F</u>
DYAD-PAT	.145	9.1***		
EL-PRES			.135	9.1***
<u>Exogenous Variables</u>				
<u>Characteristics of Focal Organization and Its Dyadic Partner</u>				
ORG-PAT	-.024	N.S.	.062	1.9*
DYADO	.024	N.S.	.156	11.3***
DYAD-SS	-.059	N.S.	.060	1.9*
NAT-SNR	-.023	N.S.	-.032	N.S.
<u>Structural Similarity - Dissimilarity: Dyad</u>				
SIZ-COM	-.039	N.S.	.016	N.S.
DOM-COM	-.095	3.0*	-.222	18.5***
DYAD-COM	-.098	3.4**	-.006	N.S.
<u>Structural Similarity - Dissimilarity: Broader Social Network</u>				
NOFML	.019	N.S.	-.023	N.S.
DSN-COM	-.100	2.9**	-.062	N.S.
	<u>Constant</u>	2.307	-.661	
	<u>R2</u>	.106	.166	

\* p is less than .05

\*\* p is less than .01

\*\*\* p is less than .001

N.S. is not statistically significant

## Variable Designations

Dependent Variables

DYAD-PAT	Dyadic Social Network Pattern
EL-PRES	Number of Elements Present

Exogenous VariablesCharacteristics of Focal  
Organization and Its  
Dyadic Partner

ORG-PAT	Organized Response Pattern
DYADO	Dyadic Origins
DYAD-SS	Dyadic Social Space
NAT-SNR	Nature of the Social Network Relationship

Structural Similarity -  
Dissimilarity: Dyad

SIZ-COM	Size Comparability
DOM-COM	Doamin Comparability
DYAD-COM	Dominant Doamin Comparability

Structural Similarity -  
Dissimilarity: Broader  
Social Network

NOFML	Nature of Organizational Links at Maintenance
DSN-COM	Dyadic Social Network Comparability

explanation for this positive relationship is statistical (see Table 3). Recalling the marginals on DYAD-PAT and EL-PRES (and their means), the reader will note that DYAD-PAT is skewed to the collective behavior end of the continuum and EL-PRES is skewed to fewer elements (1 or 2). Among the three element forms, DYAD-PAT is relatively evenly balanced between formal rationality and collective behavior. However, for one and two element forms, the distribution is skewed toward collective behavior. This suggests that some of the positive relationship between DYAD-PAT and EL-PRES is a function of an outlier effect. That is to say, there are many DYAD-PAT outliers (high end) of EL-PRES but very few DYAD-PAT outliers at the one and two element end (low end) of EL-PRES.

In order to interpret this key relationship in terms of Kreps' perspective and that of the population ecologists, I begin by assuming that the skewed distributions are not a function of measurement error but represent the reality of dyadic relationships in the disaster setting. It is critical to note at the outset that there are two points of reference to be kept separate in the discussion to follow. The first is maintenance of organization, as represented by the existing social units that are involved in each dyad. The second is origins of organization, as represented by the number of elements present, and their patterning, in the dyadic relationship. This distinction is fundamental to any interpretation of the findings. Keeping this distinction in mind, the findings suggest that in terms of Kreps notion of origins, the greater the relative presence of



organization represented by the dyadic relationships (as measured by the number of elements present) the greater the evidence of goal oriented rational action or formal rationality (measured by the formal rationality-collective behavior metric). Conversely, the fewer the elements present, the greater the evidence of collective behavior at origins. However, any interpretation of origins makes little sense without first referencing the units who compose each dyad.

Kreps equates a closed system strain with formal rationality and an open system strain with collective behavior at the origins of organization. Once origins are complete (all four elements of organization present), organization makes the transition to the maintenance state (i.e., a social unit can be said to exist). Maintenance of existing organization, then, is the system state of the units composing each dyad. Kreps argues that at the maintenance state, formal rationality-collective behavior translates as "means oriented" (administrative) versus "ends oriented" (substantive) rationality. Thus, from the perspective of the units involved in each dyad, a closed system strain means that the existing units are oriented to boundary maintenance. This suggests that collective representations of ends (D and T) should vary little when a closed system strain predominates. In Starbuck's (1983) terms, the dyadic units are in an "action generation mode," one oriented to means (A and R) rather than ends (D and T) of action. Conversely, the open system strain at maintenance reflects, in Starbuck's terms, a "problem solving mode," one oriented to ends (D and T) rather than means (A and R) of action. Here boundary maintenance is

transcended because the viability of the units may be at issue. In both cases we are talking about a possible restructuring of elements of existing organization at the maintenance state. Thus, by Kreps' and Starbuck's logic, instances of dyadic relationships depicting activities and resource elements should be higher where inertial boundary maintenance prevails; and instances of dyadic relationships depicting domain and task elements should be lower in that same circumstance.

Referencing the dyadic units, then, whose participants are involved with maintenance of existing organization, my data suggests the importance of the "action generation mode." Here, there is a closed system strain toward boundary maintenance, with fewer elements present that are means related (A and R) in relationships between social units. Stated another way, my data point to the importance of routine restructuring of existing organization (the dyadic members) at the maintenance state. This is one very good explanation for the predominance of fewer elements of the A, R, A→R, and R→A types in the marginals on Tables 2 and 3. With respect to the origins of new organization referenced by the dyadic relationship, however, an important dialectic surfaces. A closed system strain toward boundary maintenance by the members of the dyads translates as collective behavior (elemental structuring) from Kreps' perspective on the origins of organization represented by their relationship. In other words, the dialectic lies in the fact that elemental structuring (A, R, A→R, R→A) is represented by the collective behavior end of the continuum as

defined by Kreps. Conversely, the far less frequent ends related restructuring (D and T, of the "problem solving mode" as defined by Starbuck) of dyad members reflects goal oriented rational action or formal rationality as defined by Kreps.

My data show only quite modest amounts of ends (D,T) restructuring of the existing units composing the dyads; or formal rationality at the origins of organization represented by their relationship. It appears, however, that at the level of three element forms the tension (dialectic) between maintenance of existing organization and the creation of new (emergent) organization becomes quite dramatic. The marginals reveal that for the 47 three element forms--forms that are more formally rational (ends dominated) and forms that are more toward collective behavior (means dominated)--are about equally balanced. The mutual relationship between DYAD-PAT and EL-PRES indicates that as dyadic social network relationships move closer to organization as defined by Kreps, there is somewhat greater evidence of the closed system strain toward potential formal rationality. I suggest, therefore, that boundary maintenance of a not yet existing unit becomes more important as the enactment of new organization becomes more evident.

I move from Kreps' framework to the population ecology perspective via a look at the remaining independent variables in the regression equation as they relate respectively to EL-PRES and DYAD-PAT. Let me remind the reader that most of the dyads involve one (49.3%) or two (41.5%) of the elements of organization. From the population ecology

perspective on the maintenance of existing organization versus the origins of new organization, one could say that most dyadic relationships are not selected out to evolve toward Kreps' definition of organization. One reason for this lack of selection has already been given above: namely a closed system strain at the maintenance state of the existing units in the dyad militates against such evolution. Thus, new organization is constrained by autogenic forces of existing organization. Perhaps this is another way of expressing the "liability of newness" that population ecologists are so fond of talking about. Additional factors relating to the relative presence or absence of organization will be examined with the EL-PRES equation. The following statements summarize the statistically significant findings.

#### EL-PRES Equation

1. The greater the dissimilarity in the domains of the social units represented in the broader social network of the focal organization (DSN-COM), the fewer the elements present in the dyadic relationship (EL-PRES).
2. Where the member units involved in the dyad have different routine activities types (DYAD-COM), there are fewer elements present in the dyadic relationship (EL-PRES).
3. Where the member units involved in the dyad are enacting different disaster relevant domains (DOM-COM), there are fewer elements present in the dyadic relationship (EL-PRES).

These findings suggest that social unit comparability of the specific dyadic relationship, and of the broader social network of the

focal unit, is a necessary condition for new (emergent) organization. In ecological terms, comparability of social units (types, domains, actions) reflects the systemic (interdependent) character of ecological organization. Where the social environment of the focal unit is more dissimilar vis a vis what it is doing, the systemic character is less in evidence, ecological niche is less secure, and boundary maintenance is a very important matter. Note that from the population ecology perspective, the referent is the population of social units not the individual social unit. The idea of population reflects "species" similarity and survivorship in an environment of other competing populations of social units. So, for a given social unit, operating in a dissimilar environment, niche maintenance is an important matter relative to its membership in a different population of social units.

Under conditions of greater comparability, the chance for the development of new forms of organization from the old is greater. This might be termed ecological succession. Under conditions of domain (function) comparability, the systemic space available (niche width) for occupancy by member units of a given population sets limits on the number there can be. Although the parameters for niche width are unknown (e.g., how many resources, how much demand for the domain), what may be in evidence here is a relationship between emergent organization in Kreps' terms and the hierarchical character of ecological organization. Thinking of hierarchy as successive aggregations of units into more inclusive levels, ecologists argue that one basis of hierarchy is economy in the acquisition and

distribution of scarce resources. In an elementary way, case description C (which involves three elements) illustrates the hierarchy of ecological organization.

Another way to conceive of this point would be to think of community as a unit of ecological organization composed of various subunits--organizations--which in turn have other subunits, and so on down to the smallest unit. Ecologists point to the importance of hierarchy in all of this as well as the dominance of certain functions (usually economic-sustenance related). Communities reflecting dominant functions and hierarchical arrangements are said to be reflecting efficiencies in the acquisition of scarce resources (essential to viability) and also in their distribution. Perhaps when routines are disrupted by disaster, evidence of the variety of new (emergent) forms of association, suggest attempts to create hierarchical arrangements among populations of social units (designated by comparability of domain) to meet disaster generated demands on the system.

On the other hand, these three element dyads do not become organization as Kreps defines the term. The reasons why, of course, are unknown. Although the correlation with DYAD-PAT suggests that with more elements present, the closed system strain toward formal rationality and boundary maintenance becomes more evident, this strain does not result in new forms of organization succeeding the old (the two members of the dyad). One explanation may be that, from the standpoint of participants in the existing units involved in the dyad, such circumstances would compromise the status of the units as

identifiable organization. This suggests that there is an autogenic (closed system) dynamic within the member units which countervails the allogenic dynamics (disaster events) which generated the new forms in the first place.

I now move to the DYAD-PAT regression. Here the equation addresses factors pointing to formal rationality-collective behavior, again from the twin perspective of the origins of new organization versus the maintenance of the old. In addition to the positive relationship with EL-PRES, which has already been discussed, the following statements summarize the key relationships.

#### DYAD-PAT Equation

1. Where the member units involved in the dyad are enacting different disaster relevant domains (DOM-COM), there is a strain toward collective behavior represented by the patterning of the elements of organization (DYAD-PAT).
2. When the dyadic relationship is emergent rather than established prior to the event (DYADO), there is a strain toward collective behavior represented by the patterning of the elements of organization (DYAD-PAT).
3. Where the focal unit exhibits a strain toward formal rationality at its own initiation of organization (ORG-PAT), there is a strain toward collective behavior represented by patterning of the elements of organization in the dyadic relationship (DYAD-PAT).
4. Where the dyadic relationship involves a mixing of the levels (local, state, national) of disaster response (DYAD-SS), there is a strain toward formal rationality represented by the patterning of the elements of organization (DYAD-PAT).

Statement 1 points again to the system state of maintenance of the units involved in the dyads, wherein the domains and tasks of these

units are insulated from allogenic forces and the units are leaning toward the "action generation mode". This point was examined in the earlier discussion of EL-PRES and the EL-PRES-DYAD-PAT relationship. Statement 2 points to the same kind of boundary maintenance, here when a new relationship is being established. Statement 3 seems consistent as well and suggests, once again, that formal rationality at the origins of the focal organization translates as a closed system strain toward boundary maintenance. Thus all three statements point directly to the maintenance state of the member units.

Statement 4 is puzzling but may reflect again the hierarchical character of ecological organization. There is an implicit hierarchy from local to national levels of disaster response and some rather obvious efficiencies in the acquisition and allocation of scarce disaster relevant resources when this hierarchy operates. Although DYAD-SS does not correlate with any of the other independent variables, there are many cases where extra-local (allogenic) units are active in the impacted community. This active involvement seems to be related to the "problem solving mode" from the standpoint of maintenance of units involved in the dyadic relationship. But as possible members of the broader populations of social units, perhaps this is further evidence of "natural selection" at work.

#### DISCUSSION

Disaster is a useful context for studying social organization because it forces attention on the processual aspects of action and order. In keeping with the basic thrusts of this thesis, the process



of organization was examined via a taxonomy and model of forty forms of association involving any 1-3 elements of organization, as defined by Kreps. The forms are grounded in terms of the content of dyadic relationships between focal units previously identified by Kreps and other social units in the social networks of each. The taxonomy points to the relative existence of organization revealed by these forty forms in terms of the presence or absence of what Kreps defines as four individually necessary conditions of organization. It also points to varying degrees of formal rationality-collective behavior, as that continuum is expressed in the manner of a metric. The taxonomy emphasizes both the content and the form of the dyadic social network relationships and points analytically to both maintenance of existing organization and origins of new organization as both relate to disaster.

The exploratory model both expands upon Kreps' framework and relates it to the perspectives on organization being developed by the population ecologists. The modeling highlights a central distinction between maintenance and origins as system states of organization and suggests that patterns of similarity-dissimilarity among dyads, and within the broader social networks of all responding units, are fateful for the development of organization in disaster.

By organization Kreps means an aggregation of defined parts (domain, tasks, resources, activities) whose relationship in time and space make it possible to characterize the whole (Bertalanffy, 1968; Dubin, 1978). In an important sense my work suggests that, in

isolation, the individual parts tell us more about organization than Kreps' earlier work would imply. My work also suggests that the perspective of the population ecologists can be enhanced by a core species concept of organization.

A disaster event commands non-routine response (organized and not organized) from impacted social systems. Merton (1957) reminds us to consider the social milieu as it influences social action. His admonition is reinforced by my study and the earlier work of Kreps (1983, 1984). Both indicate that there is an important dialectic of action and order in disaster, one that captures both the maintenance of existing organization and the origins of new organization. Past disaster research (Fritz, 1961; Turner, 1967; Barton, 1969; Dynes, 1970) suggests that disasters involve non-routine and urgent domains and considerable improvisation in their enactment. It follows then, that flexibility about the relationship between means and ends of action is an inevitable fact of life in disaster. And the presence-absence of organization can not be a presumption, but must be a matter of core conception and empirical location. Because the majority of dyadic relationships involved A, R, A→R, R→A or means oriented forms, I conclude that boundary maintenance among existing units is a fundamental aspect of the process of organization. The irony is that boundary maintenance by "existing" units reveals an important dialectic: namely elemental forms of collective behavior at the origins of organization.

In terms of Kreps' model of organization, the greater the relative

presence of organization exhibited by dyadic relationships as measured by the number of elements present, the greater the closed system strain toward goal rational action or formal rationality. That is to say, as "process" comes closer to "thing" the same closed system strain toward boundary maintenance which characterizes members of the dyad is revealed by their relationship.

The work of the population ecologists suggests that as populations of social units compete for scarce resources they carve out niches related to disaster domains. Exploration of the systemic space available for occupancy by member units of a given population (niche width) might identify equally effective but quite different forms of performing various domains. The question of survivability of the enacting units focuses attention on the restructuring of the organizational elements. Note again that the referent for the organizational ecologists is the population of social units rather than any one unit. My data suggests a condition of dyadic and broader social network comparability increases the chances for new forms of organization to evolve from the old. But the fact that three element forms do not become organization, as Kreps defines the term, reveals still another puzzle about action and order.

Where the unit of analysis is the population, the survivorship of the individual unit is not fateful or analytically central. Rather the emphasis is on variation (random or purposive), selection, and retention by some "species" of unit. Where the level of analysis is the individual unit, however, its survivorship is fateful and

analytically central. The ecologists are population based and maintain a neo-Darwinian evolutionary perspective on species change. Kreps is more unit based and maintains a more Lamarckian developmental perspective on the "life" and "death" of individual units. Kreps articulates a core species concept from a process perspective on the origins, maintenance, and suspension of the unit. He derives a taxonomy of forms from that core species concept. The population ecologists are trying to derive a core species concept as well and have, as yet, no taxonomy of forms (species) save common sense notions of units (e.g., firms of various types). The links between evolutionary and developmental perspectives in biology appear to be muddled. Perhaps we can do better in sociology. There is no doubt that the problem is taxonomic.

The immediate objective of Kreps' work is to contribute to the merging of collective behavior and organizational perspectives on action and order in the disaster context. I believe that such a merging can also resonate with the evolutionary perspective of the population ecologists. Although sociology abounds with research specialties where issues of action and order are central, Kreps' theory on organization may bridge the variability of the topics addressed. I believe that the sixty-four forms of association reveal the underlying process of organization without having to presume its existence. Understanding the context, and, most fundamentally, the process of action and order is, I think, the unique domain of sociology.

APPENDIX 1: Means, Standard Deviation and  
Correlations of Model Variables

	1	2	3	4	5	6	7	8	9	10	11
1. DYAD-PAT	1.00	.22	-.24	.03	-.15	-.02	-.02	-.33	-.20	.05	-.26
2. EL-PRES		1.00	-.09	-.06	-.11	-.03	-.08	-.23	-.22	*	-.24
3. DYADO			1.00	.09	.19	-.12	-.04	.24	.19	.06	.31
4. DYAD-SS				1.00	-.02	.06	.03	*	*	.04	.02
5. NAT-SNR					1.00	-.11	*	.23	.19	*	.36
6. ORG-PAT						1.00	.06	-.09	.01	.02	.03
7. SIZ-COM							1.00	.10	.13	-.02	.08
8. DOM-COM								1.00	.43	.08	.48
9. DYAD-COM									1.00	.06	.48
10. NOFML										1.00	-.47
11. DSN-COM											1.00
Mean	-1.78	1.60	.56	.60	.71	4.43	.51	.88	.71	1.92	2.29
Std. Dev.	1.22	.66	.50	.49	.45	1.43	.50	.33	.45	.46	.65

\*Indicates measures of less than .00.

## Variable Designations

Dependent Variables

DYAD-PAT	Dyadic Social Network Pattern
EL-PRES	Number of Elements Present

Exogenous VariablesCharacteristics of Focal  
Organization and Its  
Dyadic Partner

ORG-PAT	Organized Response Pattern
DYADO	Dyadic Origins
DYAD-SS	Dyadic Social Space
NAT-SNR	Nature of the Social Network Relationship

Structural Similarity -  
Dissimilarity: Dyad

SIZ-COM	Size Comparability
DOM-COM	Doamin Comparability
DYAD-COM	Dominant Doamin Comparability

Structural Similarity -  
Dissimilarity: Broader  
Social Network

NOFML	Nature of Organizational Links at Maintenance
DSN-COM	Dyadic Social Network Comparability

## APPENDIX 2: Data Sheet

## Dyadic Social Network Relationships

<u>ITEM</u>	<u>COLUMNS</u>
<u>DYAD NUMBER</u>	3 (1-3) _____
<u>RESPONSE NUMBER</u>	2 (4-5) _____
<u>DOMAIN ELEMENT</u>	1 (6) _____
1 = PRESENT	
2 = ABSENT	
3 = UNCERTAIN	
<u>TASK ELEMENT</u>	1 (7) _____
1 = PRESENT	
2 = ABSENT	
3 = UNCERTAIN	
<u>RESOURCE ELEMENT</u>	1 (8) _____
1 = PRESENT	
2 = ABSENT	
3 = UNCERTAIN	
<u>ACTIVITIES ELEMENT</u>	1 (9) _____
1 = PRESENT	
2 = ABSENT	
3 = UNCERTAIN	
<u>SOCIAL NETWORK PATTERN</u>	2 (10-11) _____
1 = D	
2 = T	
3 = R	
4 = A	
5 = DT	
6 = DR	
7 = DA	
8 = TD	
9 = TR	
10 = TA	

11 = RD  
 12 = RT  
 13 = RA  
 14 = AD  
 15 = AT  
 16 = AR  
 17 = DAT  
 18 = DAR  
 19 = DTR  
 20 = DTA  
 21 = DRT  
 22 = DRA  
 23 = TRD  
 24 = TRA  
 25 = TDA  
 26 = TDR  
 27 = TAR  
 28 = TAD  
 29 = RDA  
 30 = RDT  
 31 = RAT  
 32 = RAD  
 33 = RTD  
 34 = RTA  
 35 = ATR  
 36 = ATD  
 37 = ART  
 38 = ARD  
 39 = ADR  
 40 = ADT  
 41 = UNCERTAIN

DESCRIPTION OF  
DYADIC RELATIONSHIP

DYADIC SOCIAL SPACE

1 (12) \_\_\_\_\_

1 = LOCAL  
 2 = STATE  
 3 = NATIONAL  
 4 = LOCAL, STATE  
 5 = LOCAL, NATIONAL  
 6 = STATE, NATIONAL  
 7 = LOCAL, STATE, NATIONAL  
 8 = UNCERTAIN

DYADIC ORIGINS

1 (13) \_\_\_\_\_

1 = EMERGENT  
 2 = ESTABLISHED  
 3 = UNCERTAIN



RELEVANCE OF DYAD AT INITIATION

1 (14) \_\_\_\_\_

- 1 = YES
- 2 = NO
- 3 = UNCERTAIN

RELEVANCE OF DYAD AT MAINTENANCE

1 (15) \_\_\_\_\_

- 1 = YES
- 2 = NO
- 3 = UNCERTAIN

DOMAIN PROBLEMS

1 (16) \_\_\_\_\_

- 1 = YES
- 2 = NO
- 3 = UNCERTAIN

TASK PROBLEMS

1 (17) \_\_\_\_\_

- 1 = YES
- 2 = NO
- 3 = UNCERTAIN

RESOURCE PROBLEMS

1 (18) \_\_\_\_\_

- 1 = YES
- 2 = NO
- 3 = UNCERTAIN

ACTIVITIES PROBLEMS

1 (19) \_\_\_\_\_

- 1 = YES
- 2 = NO
- 3 = UNCERTAIN

ACTIVITY TYPE OF FOCAL ORGANIZATION

2 (20-21) \_\_\_\_\_

- 1 = HAZARD-VULNERABILITY ANALYSIS
- 2 = MAINTENANCE OF STANDBY HUMAN AND MATERIAL RESOURCES
- 3 = DISASTER PREPAREDNESS, PLANNING, AND TRAINING
- 4 = PUBLIC EDUCATION
- 5 = HAZARD MITIGATION - STRUCTURAL
- 6 = HAZARD MITIGATION - NONSTRUCTURAL
- 7 = INSURANCE
- 8 = ISSUANCE OF PREDICTIONS AND WARNINGS

- 9 = DISSEMINATION OF PREDICTIONS  
AND WARNINGS
- 10 = EVACUATION
- 11 = MOBILIZATION OF EMERGENCY  
PERSONNEL AND RESOURCES
- 12 = PROTECTIVE ACTION
- 13 = SEARCH AND RESCUE
- 14 = MEDICAL CARE
- 15 = PROVIDING VICTIM BASIC NEEDS  
(FOOD, CLOTHING, SHELTER)
- 16 = DAMAGE AND NEEDS ASSESSMENT  
AND INVENTORY OF AVAILABLE  
RESOURCES
- 17 = DAMAGE CONTROL
- 18 = RESTORATION OF ESSENTIAL  
PERSONNEL AND RESOURCES
- 19 = PUBLIC INFORMATION
- 20 = TRAFFIC CONTROL
- 21 = LAW ENFORCEMENT
- 22 = LOCAL GOVERNANCE
- 23 = COORDINATION AND CONTROL  
(ORGANIZATION OF EMERGENCY  
PERSONNEL AND RESOURCES)
- 24 = RECONSTRUCTION OF PHYSICAL  
STRUCTURES
- 25 = RE-ESTABLISHMENT OF PRODUCTION,  
DISTRIBUTION, AND CONSUMPTION  
ACTIVITIES (ECONOMIC FUNCTIONING)
- 26 = RESUMPTION OF OTHER SOCIAL  
INSTITUTIONS
- 27 = DETERMINATION OF RESPONSIBILITY  
AND LEGAL LIABILITY FOR THE  
EVENT
- 28 = RECONSTRUCTION PLANNING
- 29 = OTHER

ACTIVITY PATTERN TYPE

2 (22-23) \_\_\_\_\_

- 1 = DTRA
- 2 = DTAR
- 3 = DRAT
- 4 = DRTA
- 5 = DATR
- 6 = DART
  
- 7 = TRAD
- 8 = TRDA
- 9 = TADR
- 10 = TARD

11 = TDRA  
12 = TDAR

13 = RADT  
14 = RATD  
15 = RDTA  
16 = RDAT  
17 = RTDA  
18 = RTAD

19 = ADTR  
20 = ADRT  
21 = ATDR  
22 = ATRD  
23 = ARDT  
24 = ARTD

TYPE OF FOCAL ORGANIZATION

1 (24) \_\_\_\_\_

1 = EMERGENCY RELEVANT PUBLIC BUREAUCRACY  
2 = OTHER PUBLIC BUREAUCRACY  
3 = EMERGENCY RELEVANT VOLUNTARY AGENCIES  
4 = SPECIAL INTEREST GROUPS  
5 = PRIVATE FIRMS  
6 = EMERGENCY GROUPS OF INDIVIDUALS  
7 = EMERGENCY GROUPS OF OTHER GROUPS  
AND ORGANIZATIONS  
8 = MILITARY UNIT  
9 = OTHERS

RESPONSE TASK STRUCTURE F/O

1 (25) \_\_\_\_\_

1 = SIMPLE  
2 = COMPLEX  
3 = UNCERTAIN

INITIATION OF ORGANIZED DISASTER RESPONSE

1 (26) \_\_\_\_\_

1 = SELF CONTAINED  
2 = BOUNDARY SPANNING LOCAL  
3 = BOUNDARY SPANNING STATE  
4 = BOUNDARY SPANNING NATIONAL  
5 = BOUNDARY SPANNING - LOCAL, STATE  
6 = BOUNDARY SPANNING - LOCAL, NATIONAL  
7 = BOUNDARY SPANNING - STATE, NATIONAL  
8 = BOUNDARY SPANNING - LOCAL, STATE,  
NATIONAL

9=UNCERTAIN

IF BOUNDARY SPANNING AT INITIATION OF  
RESPONSE, LINKS ARE

1 (27) \_\_\_\_\_

- 1 = ESTABLISHED PRIOR TO DISASTER  
BY PLANNING
- 2 = EMERGENT
- 3 = ESTABLISHED AND EMERGENT
- 4 = UNCERTAIN
- 5 = NOT APPLICABLE

NUMBER OF ORGANIZED LINKS AT INITIATION

1 (28) \_\_\_\_\_

- 0 = NONE
- 1 = 1-3
- 2 = MORE THAN 3
- 3 = UNCERTAIN

MAINTENANCE OF ORGANIZED DISASTER RESPONSE

1 (29) \_\_\_\_\_

- 1 = SELF CONTAINED
- 2 = BOUNDARY SPANNING LOCAL
- 3 = BOUNDARY SPANNING STATE
- 4 = BOUNDARY SPANNING NATIONAL
- 5 = BOUNDARY SPANNING - LOCAL, STATE
- 6 = BOUNDARY SPANNING - LOCAL, NATIONAL
- 7 = BOUNDARY SPANNING - STATE, NATIONAL
- 8 = BOUNDARY SPANNING - LOCAL, STATE,  
NATIONAL
- 9 = UNCERTAIN

IF BOUNDARY SPANNING AT MAINTENANCE,  
LINKS ARE

1 (30) \_\_\_\_\_

- 1 = ESTABLISHED PRIOR TO DISASTER  
BY PLANNING
- 2 = EMERGENT
- 3 = ESTABLISHED AND EMERGENT
- 4 = UNCERTAIN
- 5 = NOT APPLICABLE

NUMBER OF ORGANIZATIONAL LINKS  
AT MAINTENANCE

1 (31) \_\_\_\_\_

- 0 = NONE
- 1 = 1-3
- 2 = MORE THAN 3
- 3 = UNCERTAIN

EVIDENCE OF PRE-PLANNING PRIOR TO RESPONSE 1 (32) \_\_\_\_\_

- 1 = NO PRE-PLANNING
- 2 = PRE-PLANNING EVIDENCED
- 3 = UNCERTAIN

REASON FOR SUSPENSION OF ORGANIZED RESPONSE 1 (33) \_\_\_\_\_

- 1 = DEMAND MET, ACTIVITIES TERMINATED
- 2 = LOSS OR DEPLETION OF HUMAN MATERIAL RESOURCES
- 3 = ABSORPTION OF DOMAIN AND TASKS BY ANOTHER ENTITY
- 4 = NOT SUSPENDED AT TIME OF THE INTERVIEW
- 5 = UNCERTAIN

SIZE OF FOCAL ORGANIZATION - ESTABLISHED OR EMERGENT 1 (34) \_\_\_\_\_

- 1 = 9 OR FEWER MEMBERS
- 2 = 10-20 MEMBERS
- 3 = 21-50 MEMBERS
- 4 = OVER 50 MEMBERS
- 5 = UNCERTAIN

PRE-DISASTER HORIZONTAL DIFFERENTIATION OF FOCAL ORGANIZATION 1 (35) \_\_\_\_\_

- 1 = LESS THAN 5 SUBUNITS
- 2 = 5 OR MORE SUBUNITS
- 3 = UNCERTAIN
- 4 = NOT APPLICABLE

PRE-DISASTER VERTICAL DIFFERENTIATION OF FOCAL ORGANIZATION 1 (36) \_\_\_\_\_

- 1 = 3 OR FEWER RANKS IN AUTHORITY STRUCTURE
- 2 = MORE THAN 3 RANKS IN AUTHORITY STRUCTURE
- 3 = UNCERTAIN
- 4 = NOT APPLICABLE

PRE-DISASTER ORGANIZATION - ENVIRONMENT RELATIONSHIPS OF FOCAL ORGANIZATION 1 (37) \_\_\_\_\_

- 1 = SELF CONTAINED
- 2 = BOUNDARY SPANNING LOCAL
- 3 = BOUNDARY SPANNING STATE

- 4 = BOUNDARY SPANNING NATIONAL
- 5 = BOUNDARY SPANNING - LOCAL AND  
EXTRA-LOCAL
- 6 = UNCERTAIN
- 7 = NOT APPLICABLE

NUMBER OF PRE-DISASTER ORGANIZATION - 1 (38) \_\_\_\_\_  
ENVIRONMENT LINKS OF FOCAL ORGANIZATION

- 0 = NONE
- 1 = 1-3
- 2 = 4-6
- 3 = 7-10
- 4 = MORE THAN 10
- 5 = UNCERTAIN
- 6 = NOT APPLICABLE

COMPARABILITY OF DOMINANT DOMAIN 1 (39) \_\_\_\_\_

- 0 = DIFFERENT DOMAIN FROM FOCAL ORGANIZATION .
- 1 = SAME DOMAIN AS FOCAL ORGANIZATION
- 2 = UNCERTAIN

COMPARABILITY OF FOCAL ORGANIZATION TYPE 1 (40) \_\_\_\_\_  
AND COUNTERPART TYPE

- 0 = DIFFERENT
- 1 = SAME
- 2 = UNCERTAIN

COMPARABILITY OF SIZE OF FOCAL ORGANIZATION TYPE 1 (41) \_\_\_\_\_  
AND COUNTERPART TYPE

- 0 = DIFFERENT
- 1 = SAME
- 2 = UNCERTAIN

SOCIAL NETWORK COMPARABILITY OF DOMAINS 1 (42) \_\_\_\_\_

- 1 = DOMAINS ARE DIFFERENT
- 2 = DOMAINS ARE THE SAME
- 3 = DOMAINS ARE MIXED
- 4 = UNCERTAIN

NATURE OF RELATIONSHIP

1 (43) \_\_\_\_\_

- 1 = RECIPRICAL
- 2 = DEPENDENT
- 3 = INTERDEPENDENT
- 4 = UNCERTAIN

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