

The Ohio State University
Disaster Research Center

MISCELLANEOUS REPORT #2

LABORATORY SIMULATION STUDIES OF
ORGANIZATIONAL BEHAVIOR UNDER STRESS

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DRC STAFF REPORT (No. 1)

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I. INTRODUCTION

In September, 1963, a Disaster Research Center was established to study organizational behavior under stress. Two different settings for such a study were selected which resulted in two sponsorships: a. The field phase, where emphasis is on sending a team into communities immediately after they have experienced a major disaster (sponsored by the Office of Civil Defense), and b. The laboratory phase, where units of organizations are studied in a laboratory setting under more controlled conditions where stress situations can be manipulated. It was originally felt that work in both of these settings simultaneously would serve to strengthen each approach.

After nearly a year, it is very clear that the concurrent work with the field phase has proved to be of much value to the laboratory phase. Having some of our staff members in the field immediately after an actual disaster has occurred has provided them with insights into organizational functioning under stress that could have been obtained in no other way. It has also become clearly apparent to all staff members at the Disaster Research Center that the efforts of those associated with the laboratory phase have been of considerable importance to the field phase, especially in conceptual development.

The remainder of this report is divided into two major sections. First, a brief summary of the activities most related to the laboratory phase of the project are presented. An initial draft of an article outlining the theoretical developments of the project is then presented.

II. GENERAL ACTIVITIES

Since the Disaster Research Center was established a year ago, we have initiated a variety of activities. Among those most related to the laboratory phase of the project are the following:

A. Analysis of Literature: Over 200 research reports dealing with community and organizational response to disasters have been analyzed. Though only a few of the reports deal with organizational response in analytic terms, descriptions of organizational functioning in actual disaster situations have provided valuable insights into organizational functioning under stress. A monograph reporting this analysis is in process.

B. Consultation and examination of other simulation projects:

Shortly after the DRC was established, Professor Haas visited several places where simulation efforts were underway or were being planned. Among the more important of these were: System Development Corporation, San Diego State College, University of California, Los Angeles, Stanford University, and the University of Washington.

During December, 1963, the DRC was visited by Sidney and Beatrice Rome of SDC, who described to our staff the simulation work in which they are currently engaged. Dr. Richard Emerson, from the University of Cincinnati, conducted a seminar in March at the Center and gave a public lecture on his research on team performance under stress.

In April, three members of our staff attended a simulated disaster exercise at Olmsted Air Force Base near Harrisburg, Pennsylvania, conducted by the Disaster Control Group of the Air Force Logistics Command. We found that

their efforts at "realist simulation" were helpful to us in clarifying certain problems in simulation. At present we plan to observe future simulations of this type and are exploring the possibilities of cooperating with the Disaster Control Group of AFLC in the design and systematic study of simulated disasters on AFLC bases.

C. Laboratory construction: Construction of the Behavioral Sciences Laboratory for the study of small groups has been nearly completed. Both audio and video systems are now operable, though a few technical refinements remain to be corrected. Delivery problems with some of the special television equipment have been the main reason for delay. The audio system has been used for some time in pilot studies currently in progress.

D. Pilot studies: We decided to use students in a series of pilot studies for two major reasons. First, we wanted to thoroughly test the specialized lab equipment and to familiarize all of our research staff with its use. Second, we felt that many theoretical and methodological refinements were necessary before we went into the expense of a simulation using segments of on-going organizations.

During Spring Quarter, we utilized students enrolled in Haas's graduate level sociology class. As part of the required work of the class, all students were assigned to one of four discussion groups which met once a week to discuss an article ranging from four to ten pages. These groups met in the laboratory for one hour each week. They were told that they were meeting there to assist in the testing of the laboratory. In the one hour period they were to prepare a one page critique of the assigned article. They were informed that

one-third of their grade for the course would be based on the group work and that everyone in the group would obtain the same grade.

Each session was audio tape recorded and observed. Patterns of interaction which gradually became stabilized were noted. A variety of experiments were completed with the equipment, e. g. various microphone positions, amplification levels, etc. were tried.

After each group had spent six sessions in the lab, Haas presented to the class a very negative evaluation of the group work thus far completed. "I have finally had time to read these critiques. They are not very well done, in fact, they are mediocre. I don't know why, but this is honestly the worst class I have ever had ----- etc." This lasted for about five minutes at the end of one class period.

Instead of the usual short article an entire research monograph was assigned for the following week and "in an effort to help all of you raise your grade this critique will count more. Since the assignment is a little longer let's have a four to five page critique."

The groups were carefully watched the following day and changes in interaction patterns were in many cases marked. A "debriefing session" was held the following day after all students completed a short questionnaire. In all cases the students indicated that they perceived the situation as real stress. While some were suspicious that an experiment of some type was going on, none associated the assignments, especially the "stress assignment" with any type of experiment. Meetings with each individual group were also held privately which aided in clarifying certain relationships between group members.

Many of the concepts which we were formulating were clarified through observations of these groups. A similar experiment composed of seven groups is currently in progress. All indications are that this experiment will be as successful as the last, especially in assisting us in the refinement of our methodological techniques.

E. Future simulations: Much staff time has been spent in making preliminary analysis of a variety of organizations. All of the local emergency organizations (police, fire, Red Cross, etc.) have been surveyed. Most (61) of the local suburban police and fire units were contacted and basic organizational information obtained. Since the cost and effort of creating realistic simulation is so great, much time has been spent in attempting to find organizational units which might be most easily simulated. At the present time, detailed exploration is proceeding with an analysis of purchasing offices in large manufacturing firms. We currently hope to be able to run our first simulations of such units before the end of the year.

III. A THEORY OF ORGANIZATIONAL STRESS*

This paper first outlines the major conceptualizations of stress and related concepts, e.g., crisis, strain, etc. that have been used previously

*While the initial draft of this article was written by Drabek, the basic ideas contained in the latter sections of the article largely reflect a theoretical scheme initially formulated by Haas. Application of this scheme to organizational stress took place in several discussion settings and the comments and insights of the following team members contributed to its final development: R. R. Dynes, E. L. Quarantelli, D. Yutzy, E. S. Hobart, W. A. Anderson, J. R. Hundley, T. Cree, E. A. Schegloff, and J. R. Brouillette. This formulation is not offered as a final theory of organizational stress, but rather as one that will be continually modified and refined.

by social scientists. An initial formulation of a theory of organizational stress is then presented. Key organizational variables and hypotheses stating the relationships between these variables complete the paper. As future work is completed it is anticipated that the framework outlined here will be modified and refined.

A. The Concept of Stress:

Stress has been conceptualized in a variety of ways, but at the present time there is a lack of concensus as to a definition. Recognizing this current ambiguity, some individuals engaged in what they have labeled "stress research" have been content not to concern themselves with problems of theory. "After all, everyone knows what is meant by stress."

A great body of related research, for example, crisis research, has also been completed. Much of this research has been of value in our attempts to deal with this conceptual problem. It should be noted, however, that the intent here is not to present a review of stress literature,¹ but to present only the

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Readers interested in reviews of the psychological literature should see especially, William Harris, Robert Machie, and Clark L. Wilson, Performance Under Stress: A Review and Critique of Recent Studies (Technical Report VI), Los Angeles: Human Factors Research, Incorporated, 1956. E. Paul Torrance, "Behavior in Emergencies and Extreme Situations" (unpublished final report), Lackland Air Force Base, Texas: Air Force Personnel and Training Research Center, 1957. Richard S. Lazarus, James Deese, Sowin F. Osler, "The Effects of Psychological Stress on Performance, Psychological Bulletin, 1952, 49, pp. 293-317. Stephen B. Withey, "Reaction to Uncertain Threat," pp. 93-123 in George W. Baker and Dwight W. Chapman, Man and Society in Disaster, New York: Basic Books, Inc., 1962. H. Basowitz, H. Persky, S. J. Korchin, and R. R. Grinker, Anxiety and Stress, New York: McGraw Hill Book Company, Inc., 1955, pp. 10-22. W. D. Chiles, Psychological Stress as a Theoretical Concept. Dayton, Ohio: Wright-Patterson AFB, Wright Air Development Center, ARDC, USAF, July, 1957 (Technical Report 57-457).

major theoretical conceptualizations of stress. Most previous "stress" research can be grouped into one of the following categories:

1. Psychological research: Stress is " . . . defined simply by the operational or stimulus conditions which characterized each study."²

This definition used by Harris, Machie, and Wilson in their recent review of psychological stress literature was used as a basis to classify previous stress studies into two types: short-term stress and long-term stress. Short-term stress, i. e., stress stimuli preceeding, continuous or intermittent with the performance measure was subdivided into five categories: failure stress, distraction stress, fear stress, physical discomfort stress, and pacing or speed stress. Similarly, long-term stress was subdivided into four categories: combat stress, hazardous duty stress, confinement and isolation stress, and biological stress.³

Basowitz, Pershy, Korchin and Grinker introduced their study of soldiers in the U. S. Infantry who were undergoing paratroop training with a brief analysis of stress. They concluded: "Thus, any stimulus may in principle arouse an anxiety response because of the particular meaning of threat it may have acquired for the particular individual. However, we distinguish a class of stimuli which are more likely to produce disturbance in most individuals. The term stress has been applied to this class of conditions."⁴

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William Harris, Robert Machie, and Clark L. Wilson, op. cit., p. 6.

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Ibid. pp. 7-8.

4

H. Basowitz, H. Penshy, S. J. Korchin and R. R. Grinker, Anxiety and Stress, New York: McGraw Hill Book Company, Inc., 1955, p. 7.

Hence, "anxiety" was ". . . defined in terms of an affective response; stress is the stimulus condition likely to arouse such response."⁵

Similarly, Deese, after reviewing past research on stress, concluded that, "The problem faced in this paper will best be dealt with by abandoning attempts to specify stress as a condition of the individual-- as an intervening variable. Rather, the concept of stress is considered, as it undoubtedly arose, outside of the confines of the psychological laboratory, namely the conception of stress as a collection or class of stimulus events. Stimuli are defined by their common response-producing properties..."⁶

Recently Withey summarized the conceptualization of stress as formulated by psychologists. "Thus the term stress is of necessity a little looser than we would like it to be. The solution of most experimenters has been to produce situations which are thought to thwart the motives of most people."⁷ In short, a condition or situation was created which was thought to be distracting, fear producing, etc. to the subject, who in turn was said to be "under stress."

Note the contrast, however, in this recent formulation presented by Korchin:

The use of the term "stress" in behavioral and biological sciences probably derives from the physical sciences, where usage has specified that stress is a force which is exerted on some system in such fashion as to deform, alter or damage

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Ibid.

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J. Deese, "Skilled Performance and Conditions of Stress," in R. Glazer (Ed.) Training, Research and Education. Pittsburgh: University of Pittsburgh Press, 1962, p. 204.

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Stephen B. Withey, op. cit., p. 96.

the structure of that system, while the resulting deformation is described as strain. The stress-strain concepts are thus related in stimulus-response fashion. In our fields, there is no ready agreement on formal definition, but a common sense emerges as to the phenomena under consideration. There are statements which define stress in terms of stimulus properties; others in terms of particular responses; and other definitions in interactional terms. Perhaps the simplest way out of a definitional conflict is to assert that stress-- a noun--describes an organismic state. Those events which provoke it are stress situations (or stimuli); the resulting behavioral alterations which occur are stress reactions.⁸

Hence, within psychology, there remains resistance to the notion that stress can only be conceived of as a set of conditions or a situation. Lazarus, Deese, and Osler in their classic article in 1952⁹ as well as others, have objected to defining stress as only a set of conditions on the basis that individuals do not act uniformly to all situations and that their behavior cannot be predicted by only describing the situation.

2. Medical and Physiological Research: "The defense mechanisms undergo certain changes in structure or function with increasing external loads, and such changes may be regarded as 'strain.'"¹⁰

Medical doctors and researchers concerned with stress from a physiological perspective have emphasized the adaptive nature of the man's

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Sheldon Korchin, "Some Psychological Determinants of Stress Behavior," prepared for a conference on "Self-Control Under Stressful Situations," under the auspices of the Bureau of Social Science Research, Inc., Washington, D. C. on September 9-10, 1962, under Contract AF 49(638)-992 OSR-USAF.

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R. S. Lazarus, J. Deese, and Sonin F. Osler, "The Effects of Psychological stress upon Performance," Psychological Bulletin, 49 (1952), pp. 293-318.

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Henry W. Brosin, M. D., "The Reciprocal Relations Between Incentives, Motivation, and Strain in Acute and Chronic Stressful Situations," Symposium on Stress, Washington, D. C.: Army Medical Service Graduate School, 1953, p. 212.

physiological system when it is under stress. The following statement is typical:

Stress may be regarded as the resistance of the organism to external loads. These external loads may influence the defense mechanisms of the body so they will undergo certain structural functional changes. These changes may be manifest, either through structural or chemical changes in certain specific tissues, or there may be a disintegration of the whole organism, with quick resulting death. Or, if there is a reorganization of the defense mechanisms of the body, there may be enough reorganization to make the organism compatible again with life, under certain special environmental conditions. In the latter case, medical care and treatment may restore this organism to something near normal again.¹¹

Perhaps the classic work on stress from a physiological perspective has been completed by Selye,¹² who has especially emphasized adaptation as a response to stress. He argued that the organism makes a "non-specific" response to all types of stress and has called this the "general adaptation syndrome" (G-A-S). Selye concluded that the syndrome evolves in three stages: the alarm reaction, the state of resistance and the stage of exhaustion. Hence the major point illustrated from this research is the emphasis on adaptation as a response to stress.

3. Research on "extreme situations": "Situations involving the threat of, or experience of, an interruption of normally effective procedures for reducing certain tensions, together with a drastic increase in tensions, to

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Paul H. S. Streit, "Address of Welcome," Symposium on Stress, Washington, D. C.; Army Medical Service Graduate School, 1953, p. iii.

¹²

H. Selye, The Physiology and Pathology of Stress, Montreal: Acta, 1950.
H. Selye, The Stresses of Life, New York: McGraw Hill, 1956.

the point of causing death or major personal and social readjustment, may be called 'extreme situations,' "13

Certain researchers have not used the term stress, but preferred rather to write of "extreme situations." Wallace, for example, conceived of disaster as part of the larger category of "extreme situations" the characteristics of which are implied in the above quotation.

In a classic article dealing with the reactions of prisoners in Nazi concentration camps, Bettelheim discussed certain characteristics of "extreme situations."14 Recently, he expanded many of these ideas and developed a framework of much wider interest, making the point that an "extreme situation" is much more than just deprivation of food, sanitary conditions, etc. since some prisoners were able to survive.

". . . it was the senseless tasks, the lack of almost any time to oneself, the inability to plan ahead because of sudden changes in camp policies, that was so deeply destructive. By destroying man's ability to act on his own or to predict the outcome of his actions, they destroyed the feeling that his actions had any purpose, so many prisoners stopped acting. But when they stopped acting they soon stopped living."15

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Anthony F. C. Wallace, Human Behavior in Extreme Situations: A Survey of the Literature and Suggestions for Further Research, Washington, D. C.: National Academy of Sciences-- National Research Council, 1956, p. 1.

14

Bruno Bettelheim, "Individual and Mass Behavior in Extreme Situations," Journal of Abnormal and Social Psychology, 38 (1943), pp. 417-452.

15

Bruno Bettelheim, The Informed Heart, Glencoe, Illinois: The Free Press, 1960, p. 148.

Torrence, who for six years conducted research on a variety of problems dealing with "behavior in emergencies and extreme conditions" stated the reason for the selection of this terminology. "In spite of the obvious connection between 'stress research' and 'survival research', we have chosen to use the term 'behavior in emergencies and extreme conditions.' Frankly, this usage has been to avoid arguments which prevade the literature concerning the meaning of the term 'stress' and to prevent misunderstandings which might result therefrom."¹⁶

At the conclusion of his research, Torrence had developed the following model, "Behavior in emergencies and extreme conditions can most easily be discussed in terms of a process in which specific stresses produce a certain array of effects which are mediated by such variables as time, intensity, and capacity of the organism" (for adaptation).¹⁷ He then listed specific "stresses", for example, torture, extreme cold, extreme heat, food deprivation, etc. which require adaptation in order for men to survive. The three mediating variables of time, intensity, and capacity for adaptation were then followed by specific effects, for example, panic, fatigue, thoughts of suicide, fear of insanity, etc.¹⁸ Thus stress is again conceived of as a particular type of situation.

4. Crisis research: A crisis is ". . . a disruption of the social system resulting from any cause."¹⁹

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E. Paul Torrence, op. cit. , pp. 7-8.

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E. Paul Torrence, "How Men Behave in Emergencies and Extreme Conditions," op. cit., pp. 2-3.

¹⁸

Ibid.

¹⁹

Elizabeth W. Nall, "The Influence of Crisis in the Modification of Social Organization" (unpublished M.A. thesis), Michigan State University, 1956, pp. 10-11

Crisis, similar to stress, has been defined in a variety of ways. For example, Hermann suggested that an organizational crisis could be conceptualized along three dimensions, i. e., "an organizational crisis (1) threatens high priority values of the organization, (2) presents a restricted amount of time in which a response can be made, and (3) is unexpected or unanticipated by the organization."²⁰ It is important to note that Hermann utilized the concept of "crisis stimulus" and referred to the organization as responding to such a stimulus. However, "'crisis stimulus' and 'crisis response' or reaction will be used to separate aspects of the same concept."²¹

In a somewhat similar fashion, with special emphasis on the decision-making process Robinson suggested that "a situation of the greatest severity (the most crisis like) would be one in which the occasion for decision, arose from without the decisional unit, required a prompt decision, and involved very high stakes."²²

Straus has reported on recent experiments in which families were subjected to a simulated crisis which was created through modification of procedures

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Charles F. Hermann, "Some Consequences of Crisis Which Limit the Viability of Organizations", Administrative Science Quarterly, 8 (June 1963), p. 64. A similar discussion was presented by Charles F. Hermann, et. al., "Memorandum No. 1 for Project Michelson: Some Relations of Crisis to Selected Decision Process and Outcome Variables", unpublished research report for the "Studies in Crisis Decision-Making Project", 1964, pp. 3-6.

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Charles F. Hermann, "Some Consequences of Crisis Which Limit the Viability of Organizations", op. cit., p. 65.

22

James A. Robinson, "The Concept of Crisis in Decision-Making," Series Studies in Social and Economic Sciences, Symposia Studies Series No. 11, Washington, D. C.: The National Institute of Social and Behavioral Science, June, 1962, p. 8.

first developed by Swanson and later modified by Hamblin.²³ Each family was directed to figure out the rules of the game and their scores were compared to those of a hypothetical "average family." After four periods of play those families selected as "crisis" families ". . . receive penalty lights, and fail to keep up with the scores of the 'average family'. This is defined as a crisis because the previously successful mode of play suddenly becomes ineffective and the family fails to achieve its goals using these patterns."²⁴

In a recent article which briefly surveyed the concept of "crisis" as well as the resulting implications for mental health, Miller and Iscoe²⁵ concluded that the following criteria indicate when an emotional crisis is present: (1) the time factor (acute rather than chronic), (2) marked changes in behavior (less effective, attempts to discharge tensions), (3) subjective aspects (feelings of helplessness and ineffectiveness in the face of what appears to be insoluble problems), (4) relativistic aspects (what constitutes a crisis to one individual or group does not constitute it for another group), and (5) organismic tension (experienced in a variety of ways, may be temporary or long term).²⁶

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Murray A. Straus, "Communication, Creativity and Social Class Differences in Family Response to an Experimentally Simulated Crisis," 1964, unpublished research report on Project 2027, University of Minnesota, p. 2.

24

Ibid. pp. 3-4.

25

Kent Miller and Ira Iscoe, "The Concept of Crisis: Current Status and Mental Health Implications," Human Organization, 22 (Fall, 1963), pp. 195-201.

26

Ibid. p. 196.

Form and Nosow used the concept of crisis to conceptualize individual, group, and organizational behavior following community disaster. Note how the concepts of disaster and crisis are related, i. e., "the disaster creates crisis."

The concept "disaster" is generally applied to the condition of a community at a particular point in time. From the point of view of its residents, the disaster creates crisis. Crisis may be considered as a breakdown of the social relations and social systems in a community that are of greatest significances to the individual or particular organization involved. In another sense, crisis may be thought of as a destruction of the stable relationships that are necessary for the person. Crisis emerges when these relationships are perceived as being destroyed or in process of destruction.²⁷

5. Disaster Research: "Disasters are defined . . . as events where the sum of individual tragedy, the loss of resources, the continued existence of great danger, the disruption of the social system, and the combination of these effects are so critical that for a time the very ability of the community to function successfully as a community is endangered."²⁸

Among the more significant relevant findings from disaster research is the model suggested by Barton in his recent review of several disaster studies. He conceptualized disaster as part of a larger category-- collective stress, which was defined ". . . as a large unfavorable change in the inputs of some social system."²⁹ "The inputs of a social system include its physical

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W. H. Form and S. Nosow, Community in Disaster, New York: Harper and Brothers, 1958, p. 12.

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Harry B. Williams, Jr., "Communication in Community Disasters," (unpublished Ph. D. thesis), Chapel Hill: University of North Carolina, 1956, p. 30.

²⁹ Allen H. Barton, Social Organization Under Stress: A Sociological Review of Disaster Studies, Washington, D. C.: National Academy of Sciences, National Research Council, 1963.

environment, its external economic relationships, its external power relationships, and its sources of personnel."³⁰

Barton was able to weave previous disaster studies into this input-output model where social systems are viewed not as existing in a vacuum, but rather in a dynamic, ever changing environment. A disaster may result in changes in the input variables which in turn may cause change in the social system. Utilizing a "levels" approach, he was able to place into this framework research on family stress situations, community stress, families in community stress, communities in national stress, etc.

Bates and others analyzed portions of the data from Hurricane Audrey in terms of various types of "role stresses." The hurricane was conceived as an external "cause" which created various types of stress, e. g., loss of a family member, neighbor, or friends, loss of property, disruption of businesses and occupations and the general disruption of the community social organization.³¹ The impact of these variables on the individual were analyzed in terms of "role stresses" of which four types were formulated: (1) Role Conflict-- conflict between the roles an individual plays; (2) Role Frustration-- playing of normal roles may not be possible for some time after the disaster; (3) Role Inadequacy-- inability of individual to play role he is expected to play because of personal inadequacy; and (4) Role Saturation-- consists of overloading individual with role expectations or of not expecting enough of him.³² Hence, disaster is

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Ibid. p. 3.

³¹ F. L. Bates, et. al. The Social and Psychological Consequences of a Natural Disaster: A Longitudinal Study of Hurricane Audrey, Washington, D. C. : National Academy of Sciences, National Research Council, 1963, pp. 77-79.

³² Ibid., pp. 53-60.

seen as an event which creates a variety of changes which in turn may result in stress for an individual, group, organization, or community.

6. Organizational Theory: stress is ". . . a force exerted between contiguous portions of a structural whole."³³

A brief review of organizational theory indicates that theorists have frequently utilized the concept of stress in relation to the "natural system" model.³⁴ Utilizing this model, organizations are conceived as complex systems which strive for survival through continuous adaptation. Merton, for example, conceived of strain as the key concept to avoid static functional analysis.

The key concept bridging the gap between statics and dynamics in functional theory is that of strain, tension, contradiction, or discrepancy between the component elements of social and cultural structure. Such strains may be dysfunctional for the social system in its then existing form; they may also be instrumental in leading to changes in that system. In any case, they exert pressure for change. When social mechanisms for controlling them are operating effectively, these strains are kept within such bounds as to limit change of the social structure.³⁵

Although Merton offered no clear definitions of "strain" or "stress", it is clear he conceived of them as fitting into an analytic framework for the analysis of dynamic social systems. For example, in his discussion of "the strain toward anomie" he stated, "When, however, the cultural emphasis shifts

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Alvin L. Bertrand, "The Stress-Strain Element of Social Systems: A Micro Theory of Conflict and Change," Social Forces, 42 (October, 1963), p. 4.

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The term is from Gouldner in which he makes a distinction between the natural system and rational models for the analysis of complex organizations. See Alvin W. Gouldner, "Organizational Analysis," pp. 400-428, in Robert K. Merton, et. al. Sociology Today, New York: Basic Books, Inc., 1959.

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Robert K. Merton, Social Theory and Social Structure (revised and enlarged edition), Glencoe: The Free Press, 1957, p. 122.

from the satisfactions deriving from competition itself to almost exclusive concern with the outcome, the resultant stress makes for the breakdown of the regulatory structure."³⁶

Similarly Parsons, following other "natural system" theorists utilized the concept of strain to inject a dynamic quality into the social system. He defined strain as follows, ". . . a condition in the relation between two or more structured units (i. e., subsystems of the system) that constitutes a tendency or pressure toward changing that relation to one incompatible with the equilibrium of the relevant part of the system."³⁷

In one of the few theoretical papers devoted solely to an analysis of stress from a sociological point of view, Bertrand recently suggested the following distinctions, ". . . strain may be distinguished as a functional (or dysfunctional) process, whereas stress is a structural element."³⁸ He illustrated the distinction with the following example. ". in a given factory system, stress will be inherent in the fact that the inept boss' son is selected to fill an important executive position. Strain associated with this stress will be manifest in the behavior of those persons who must put up with this 'actor', even though his ineptness is a source of frustration for them."³⁹

36

Ibid. p. 157.

37

Talcott Parsons, et. al., Theories of Society, Glencoe: The Free Press, 1962, p. 71.

38

Alvin L. Bertrand, Loc cit.

39

Ibid.

7. Organizational Research: "These empirical results seem to indicate that an organization will look for new patterns of behavior when it needs them--when it is under stress."⁴⁰

In his analysis of "Plant Y" which was "acutely ill" and became "extremely healthy over a three year period (1953-1956),⁴¹ Guest concluded that the organization became better "integrated", i. e., that consensus increased on role expectations held by various position incumbents. Lack of such consensus ". . . determines the degree of tension and stress likely to be found in the organization."⁴² Similarly Stogdill defined "group integration" ". . . as the extent to which structure and operations are capable of being maintained under stress."⁴³

Chapman and Kennedy after simulations of organizational stress on a complete system (the "air-defense direction center") emphasized change as a result of organizational stress.

In experiments with organizations, the laboratory model changes under stress. It learns. Learning is an invaluable characteristic. It is also a complicating one. Because organizations learn, a formula for predicting their performance, unlike a formula for predicting the behavior of aircraft, has to take into account the way the organization changes under stress.⁴⁴

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Robert L. Chapman and John L. Kennedy, "The Background and Implications of the Rand Corporation Systems Research Laboratory Studies," in Some Theories of Organization, edited by Albert H. Rubenstein and Chadwick J. Haberstroh, Homewood, Illinois: The Dorsey Press, Inc., 1960, p. 144.

⁴¹Robert H. Guest, Organizational Change: The Effect of Successful Leadership, Homewood, Illinois: The Dorsey Press, Inc., 1962, p. 144.

⁴²Ibid.

⁴³Ralph M. Stogdill, Individual Behavior and Group Achievement, New York: Oxford University Press, 1959, p. 198.

⁴⁴Robert L. Chapman and John L. Kennedy, op cit., p. 141.

It is important to note that both the concept of adaptation as a response to stress as well as the degree of integration of the system as an indication of how it will "stand up" under stress have been used in organizational research.

B. Organizational Stress: The Theoretical Formulation

Utilizing cues from a variety of discussions, many of which were just cited, the following definitions and conceptual distinctions appear fruitful.

1. An organization: A relatively permanent and relatively complex discernible interaction system.⁴⁵

This definition formulated by Haas emphasizes three major elements. First and most important, the organization is conceived of as a discernible interaction system, and hence has those characteristics commonly associated with a social system, e. g., interdependence of parts. This interaction system is relatively complex, both horizontally and vertically. Likewise, the system is relatively permanent, i. e., it exists over a period of time.

2. Performance structure: "The discernible patterning in the behavior of the participants....."⁴⁶

If one were to observe organizational incumbents over a prolonged period of time, certain patterns or similarities in interaction sequences would be seen. This pattern, which could be directly observed, is referred to as the performance structure of the organization.

⁴⁵ Much of the following discussion is presented in more detail in J. Eugene Haas, Role Conception and Group Consensus, Columbus, Ohio: The Ohio State University Bureau of Business Research, 1964, pp. 25-31. See also Elaine S. Hobart, "The Comparative Utility of the Rational and Natural System Models in Organizational Analysis", unpublished Master's Thesis, The Ohio State University, June, 1964, pp. 5-11

⁴⁶ Haas, op. cit., p. 31.

3. Normative structure: "The norms which make up the roles and positions⁴⁷ of the organization.

The normative structure is one of the conceptual tools that is utilized to answer the question, "Why do the certain interaction patterns recur over time?" These patterns (performance structure) occur, in part, because of the operation of the normative structure which simply consists of the various social norms which, ". . . operating through the participants, tend to produce the patterning which has been observed."⁴⁸ The normative structure can be conceptually divided into two parts: (a) the official structure, i. e., policies (norms) coming from official sources within the organization, and (b) the unofficial structure, i. e., norms coming from unofficial sources. It should be noted that both the unofficial and official structures refer to patterns of norms related to specific positions within the organization regardless of the particular individuals who might occupy those positions. Individuals may leave the organizations and new ones replace them, but the normative structure would remain relatively unchanged.

4. Interpersonal structure: ". . . the particular kinds of relationships that have developed among members of the group being analyzed."⁴⁹

In most organizations a certain amount of the performance structure can be explained only by the interpersonal structure, i. e., persons interacting with other persons as persons. It must be clearly noted that the relationships which constitute the interpersonal structure are idiosyncratic to

⁴⁷

Ibid.

⁴⁸

Ibid. p. 26.

⁴⁹

Ibid. p. 27

the position incumbents and are not determined by the position they occupy. Hence, if another person were placed in one of the positions the same relationship would no longer exist.

5. Organizational strain: Discrepancies between the internal structural elements of the organization.

Many types of such strain have been analyzed by previous researchers.

At one level inconsistencies may exist between the official and the unofficial structures. What is frequently labeled role conflict is perhaps the clearest example of organizational strain.⁵⁰ When the role relationships between positions are of such a nature that individuals in any one of the positions find conflicting expectations are held for them, role conflict is said to exist. Between any two position incumbents there may also exist a lack of consensus as to the definition of the role relationship between them. Organizational strain could also result from role inadequacies (i. e., the personal inadequacy of a position incumbent to play the particular role) or from role saturation (i. e., overloading a position incumbent with expectations or of not expecting enough from him). Such structural inconsistencies are probably found in varying degrees in all organizations and simply exist as part of the ongoing structure of the organization.

6. Organizational stress: The organizational state or condition when there is a sudden change in the demands and/or capabilities of the organization.

Organizational stress is seen not as a set of conditions, but rather

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See Neal Gross, et.al., Explorations in Role Analysis, New York: John Wiley and Sons, 1958, for the classic treatment of this phenomenon.

is a term used to refer to the state of an organization when certain (i. e., stress producing) conditions are present. Organizational stress is not viewed as a discrete variable, but rather constitutes a continuum. The degree of stress is determined by the relationships between two major variables: (a) a change in the demands made on the organization, and (b) a change in the capability of the organization. Upon analysis, the complexity of the relationship becomes apparent. To simplify as much as possible the extreme case is first examined. Hence, a maximum stress situation would be characterized by:

- a. change in demands made on the organization
 - 1) sharp increase in demands
 - 2) increase in demands is unanticipated
 - 3) demands are given high priority
 - 4) nature of demands are such that immediate organizational action (mobilization, decisions, etc.) is required
 - 5) emergence of demands not previously made on organization (but which are temporarily accepted by the organization and are characterized by 2, 3, and 4 above).
- b. change in capability of organization
 - 1) absence of key personnel⁵¹
 - 2) absence of important equipment or material
 - 3) absence of crucial information

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The term "absence" is used in a broad sense here, e. g., a key official may have been killed or injured in the disaster or have been out of town at the time he was needed; similarly equipment, material, and information may have been damaged, never existed, or have been taken elsewhere before the disaster. At any rate, they were unavailable when needed.

It should be obvious that change in either demand or capability may result in some degree of stress. At the present time it appears most fruitful to test a variety of hypotheses which would test the framework rather than initially attempting to deal with such questions as exactly who are "key" personnel or what constitutes "crucial" information. While such questions are essential for future clarification of the theory, it would appear more expeditious at present to utilize extreme situations such as large scale community disasters as the source of changes in demand or capability so that hypotheses might be tested and more precise instruments developed. Only after this has been done can the additional precision of the theoretical scheme take place through which such questions can be more fruitfully investigated.

C. Organizational Stress: The Hypotheses

Now that these six conceptual tools have been defined and clarified a more detailed analysis of organizational stress can follow. By utilizing a community disaster, which is only one of a multitude of sources for a sudden change in organizational demands or capabilities, each of the parts of the theoretical framework will be illustrated and a series of hypotheses presented.

The general hypothesis could be stated in this manner: the greater the degree of organizational stress, the greater the change in the performance structure of the organization.

A community disaster occurs and immediately the demands placed on the community emergency organizations are increased. Certain of these demands will be seen by the organizational incumbents who have developed a particular set of interaction patterns (i. e., performance structure), as legitimate responsibilities of the organization. Certain organizational

equipment or personnel may have been rendered inoperable by the disaster. Thus, as the organization attempts to cope with the sudden changes in demands and organizational capabilities brought about by the disaster, certain changes in the performance structure of the organization may be anticipated. By comparing the performance structure of an organization before a disaster (time one) to the performance structure during the emergency response period (time two), the degree of change could be obtained.

Hence by utilizing the characteristics of the maximum stress condition a series of hypotheses can be readily developed, all of which partially deal with the question, "When will change in the performance structure occur?" Each of the hypotheses should, of course, be prefaced with the statement, "All other things being equal." For example, the demands must be made known to organizational incumbents who must perceive such demands as legitimate responsibilities of the organization.

Utilizing the variables previously outlined, the hypotheses are as follows:

1. The greater the increase in demands, the greater the degree of change in the performance structure.
2. The more that the increase in demands is unanticipated, the greater the degree of change in the performance structure.
3. The higher the priority of the demands, the greater the degree of change in the performance structure.
4. The sooner organizational action is required to respond to the demands, the greater the degree of change in the performance structure.
5. The greater the number of demands not previously made on the organization, the greater the degree of change in the performance structure.

6. The greater the absence of key personnel, the greater the degree of change in the performance structure.
7. The greater the absence of important equipment or material, the greater the degree of change in the performance structure.
8. The greater the absence of crucial information, the greater the degree of change in the performance structure.

To briefly recapitulate to this point, the reasoning has been as follows:

(a) a community disaster occurs which (b) causes organizational stress, i. e., the state of the organization when there is a sudden change in demands for organizational capabilities which in turn (c) is reflected by changes in the performance structure of the affected organization. A series of hypotheses all of which were related to the question, "When will changes in the performance structure occur?" were presented. In this way, those variables which indicate the presence and the degree of stress were related to changes in the performance structure of the organization which could be directly observed.

In this framework the concept of stress is relegated to a position similar to the physician's use of the concept of illness. Illness refers to the state or condition of the organism and is said to exist when certain indicators are present, i. e., symptoms. Hence, when changes in the normal functioning of the organism occur, for example, the presence of a rash, marked change in rate of breathing, etc., illness is said to be present or the organism is said to be ill. The word "ill" is used as a descriptive adjective, i. e., describing the state of the organism. When used, however, as a noun, for example, "illness is present", confusion results as this implies that "a thing" is present. The connotation of the presence of a "thing" is unfortunate, as

the concept clearly implies only a description of the state of the organism which is known only by certain observable indicators which reflect changes in the normal functioning of the organism.

Similarly, organizational stress can be identified by certain observable indicators, i. e., changes in the performance structure, which occur as the organization attempts to cope with changes in demands or organizational capabilities. More precise measurement of the variables previously outlined will stipulate not only when the performance structure will change (i. e., when organizational stress is present), but also the rate and degree of such change.

Assuming that changes in the performance structure do occur, the next logical question is "When an organization is in a stress state, what in the performance structure of the organization will change?" In order to answer this question fully, elaborate descriptions of the types of changes that do in fact occur as a result of organizational stress would need to be completed. Areas in which hypotheses appear to be most fruitful are among the following:

1. As the degree of organizational stress increases, the rate of task performance will increase.
2. As the degree of organizational stress increases, organizational incumbents will increasingly limit their activities to those tasks of highest priority.
3. As the degree of organizational stress increases, the criteria of priority of task will increasingly emphasize the time dimension, i. e., those tasks which require immediate action.
4. As the degree of organizational stress increases, the rate of official decision making will increase.
5. As the degree of organizational stress increases, organizational incumbents will increasingly make only decisions of highest priority.

6. As the degree of organizational stress increases, the rate of non-official decision making will increase.
7. As the degree of organizational stress increases, the number of individuals conferred with before a decision is made will decrease.
8. As the degree of organizational stress increases, the amount of deviation from the official lines of authority will increase.
9. As the degree of organizational stress increases, the number of organizational incumbents through which directives are transmitted will be decreased.
10. As the degree of organizational stress increases, the total amount of information to be communicated will increase.
11. As the degree of organizational stress increases, the amount of deviation from the official communication channels will increase.
12. As the degree of organizational stress increases, the modes of communication will shift so as to increasingly maximize speed.

One major area of analysis yet remains unmentioned. Thus far, hypotheses related to two major questions have been presented: (a) when will change in the performance structure of an organization occur? and (b) what will change in the performance structure?

The next logical question would appear to be, "Why does the performance structure change the way it does?" Two major variables, both related to the internal structure of the organization, may explain much of the variation in changes in organizational performance structures. Plans made prior to the emergency and the degree and nature of organizational strain that also existed within the organization before the emergency, appear to be the most fruitful areas of investigation. The first of these areas might be stated as a general question as follows:

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What influence do official emergency plans (part of the official normative structure at time one) formulated prior to the disaster have on the performance structure as it exists at time two (i. e., following the disaster)?

It was originally suggested that two basic conceptual tools could be used to explain why the performance structure of an organization has a particular pattern: the normative structure (composed of the official and unofficial structures) and the interpersonal structure. The degree of influence that each of these structures has on the performance structure varies from time to time. The basic problem here is to explain why the performance structure at time two is different than the performance structure at time one.

Certain organizations have "disaster plans" which specify in varying degrees of completeness the nature of an "emergency performance structure", i. e., an official policy (therefore part of the official structure of the organization at time one) as to what the performance structure of the organization is supposed to be at time two. Such plans may play an important part in determining the nature of the performance structure at time two under certain conditions. It should be clear, however, that organizations may have plans originally designed for other types of possible anticipated stress producing situations which may be adapted to fit the conditions of a disaster situation, e. g., department store procedures for hiring temporary personnel for the Christmas rush season could be utilized in the event of food poisoning in the employee cafeteria. Such plans may also exist as part of the unofficial structure; however, only those coming from official sources will be considered at this point.

1. The greater the extent to which organizational plans which specify the nature of the "emergency performance structure" are written, the greater the influence of such plans on the performance structure at time two.
2. The more detailed and specific the organizational plans which specify the nature of the "emergency performance structure" are, the greater the influence of such plans on changes in the performance structure at time two.
3. The more frequently organizational plans which specify the nature of the "emergency performance structure" are rehearsed, the greater the influence of such plans on the performance structure at time two.
4. The greater the proportion of organizational incumbents who participate in rehearsals of organizational plans which specify the nature of the "emergency performance structure," the greater the influence of such plans on the performance structure at time two.
5. The more "realistic" that rehearsals of organizational plans which specify the nature of the "emergency performance structure" are, the greater the influence of such plans on the performance structure at time two.
6. The more nearly rehearsals of organizational plans which specify the nature of the "emergency performance structure" coincide with the characteristics of the disaster, the greater the influence of such plans on the performance structure at time two.
7. The more widely organizational plans which specify the nature of the "emergency performance structure" are disseminated within the organization, the greater the influence of such plans on the performance structure at time two.
8. The more frequently organizational plans which specify the nature of the "emergency performance structure" are re-evaluated, the greater the influence of such plans on the performance structure at time two.
9. The more accurately organizational plans which specify the nature of the "emergency performance structure" coincide with the characteristics of the disaster, the greater the influence of such plans on the performance structure at time two.

10. The more easily organizational plans which specify the nature of the "emergency performance structure" can be adapted to fit the conditions of the disaster, the greater the influence of such plans on the performance structure at time two.

The second area of investigation which attempts to answer "why does the performance structure of an organization change the way it does" can be stated as follows:

The greater the degree of organizational strain between elements of an organization at time one, the greater the amount of change in the performance structure at time two.

Organizational strain was previously defined simply as "discrepancies between the internal structural elements of the organization." Such inconsistencies may exist at various levels. The hypotheses below are stated so as to indicate variations in the tendency towards changes in the performance structure. It should be noted that the location of such change within the structure of the organization is thus clearly implied, i. e., the hypotheses are related to the question, "Why does change occur at this point in the organizational structure rather than at some other point?"

1. The greater the degree of role conflict experienced by a particular position incumbent at time one, the greater the degree of change in the performance structure at time two.
2. The greater the degree of role dissensus between any two position incumbents at time one, the greater the degree of change in the performance structure at time two.
3. The greater the degree of role saturation experienced by a particular position incumbent at time one, the greater the degree of change in the performance structure at time two.
4. The greater the degree of role inadequacy of a particular position incumbent at time one, the greater the degree of change in the performance structure at time two.

5. The greater the number of roles performed by a position incumbent at time one, the greater the degree of change in the performance structure at time two.

The totality of the scheme outlined in this paper has been limited to intra-organizational stress, and has been illustrated, for the sake of simplicity, utilizing only one possible source of stress, a community disaster. To prevent any confusion, it should be quickly pointed out that it is quite possible to have a community disaster and yet have many organizations in the community experience only a slight degree of stress. It was assumed that it was not the disaster per se that served as the source of organizational stress, but rather the sudden change in demands and organizational capabilities (brought about by the disaster) that were the source of stress.

While it may appear at first glance rather "academic" to mention this "chicken and the egg" type of qualification, it is a very important point, as it is assumed that this framework can be applied to a variety of social systems in which the source of stress need only be relevant to the particular social system. Hence, the source of stress may have nothing to do with community disasters, but the processes of coping with the stress situation would remain the same. For example, relevant aspects of this theoretical framework have been applied to a group of college students who meet once a week to analyze a five page article in one hour as part of the work assigned in a course. One third of their grade in a course was based on the group analysis, and the demands were suddenly sharply increased, by assigning an entire book to be analyzed. Changes in the performance structure occurred and analysis of these changes using the conceptual tools outlined in this paper is currently in process.

A general theoretical framework for the analysis of organizational stress has been outlined. Hypotheses related to three central questions were presented: (a) When will change in the performance structure of an organization occur? (b) What in the performance structure will change? and (c) Why does the performance structure change the way it does? While the hypotheses remain crudely stated, it will only be through clarification of the variables and the construction of precise instruments by which they can be measured, that the entire framework can be modified and strengthened, thus enabling research efforts to be of greater value, yielding increasingly more significant and precise results.