

Natural Hazard Research

HUMAN BEHAVIOR BEFORE THE DISASTER
A SELECTED ANNOTATED BIBLIOGRAPHY

Stephen Golant
University of Toronto

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PREFACE

This paper is one in a series on research in progress in the field of human adjustments to natural hazards. It is intended that these papers will be used as working documents by the group of scholars directly involved in hazard research as well as inform a larger circle of interested persons. The series is now being supported from funds granted by the U.S. National Science Foundation to the University of Chicago and Clark University. Authorship of papers is not necessarily confined to those working at these institutions.

Further information about the research program is available from the following:

Gilbert F. White,
Department of Geography,
University of Chicago,
Chicago, Illinois 60637,
U. S. A.

Robert W. Kates,
Graduate School of Geography,
Clark University,
Worcester, Massachusetts 01610,
U. S. A.

Ian Burton,
Department of Geography,
University of Toronto,
Toronto 5, Ontario,
Canada.

Requests for copies of these papers and correspondence relating directly thereto should be addressed to Toronto.

HUMAN BEHAVIOR BEFORE THE DISASTER
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Baker, G.W. and Chapman, D.W., editors. Man and Society In Disaster. N.Y.: Basic Books, 1962.

This book is an excellent introductory reference source for virtually all aspects of disaster research. Theoretical and empirical subjects are both presented with documentation of the more important literature in the field. The volume consists of a collection of research papers by leading scholars in the disaster field. A number of these are relevant to this bibliography--of special importance are four papers by Withey, Janis, Friedsam and Chapman. The first three are listed separately by their authors in this bibliography. The volume contains the most comprehensive list of literature related to disaster.

Barton, Allen H. Social Organization Under Stress: A Sociological Review of Disaster Studies. Disaster Study Number 17. Washington: National Academy of Sciences--National Research Council, 1963.

This monograph supplies a good synthesis of the sociological perspective found in disaster literature written prior to 1963. While its emphasis is on the post-disaster period, it nevertheless contains several sections analyzing aspects of the pre-disaster period. Most useful is Chapter I where disaster studies, their approach, methodology, and findings are examined within a three dimensional disaster typology. The volume includes a 106 item bibliography as well as an introductory essay by Robert K. Merton.

Bates, F.L., Fogleman, C.W., Parenton, V.J., Pittman, R.H., and Tracy, G.S. "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, Disaster Study No. 18, 1963.

This empirical study is primarily directed at examining the effects of a natural disaster on a community; however, chapter 2 contains a short description of the period of warning and the reaction of the people who were in the area of impact. This account consists principally of random thoughts and disorganized interpretation and has only limited value.

Berkowitz, Leonard and Cottingham, Donald R. "The Interest Value and Relevance of Fear Arousing Communication," Journal of Abnormal and Social Psychology, Vol. 60, No. 1 (1960), 37-43.

The authors continue on the work of Janis and Feshbach (1953-54) which indicated that opinion change in the direction advocated by a communication flow is less likely to occur when the communication arouses strong fear than when it arouses less fear and that this could be explained by the fact that fear arousal caused the subjects defensively to avoid accepting the communicator's conclusions. In this empirical study the authors examine the factors of subject interest and relevance in predicting the effectiveness of a communication. The results indicate that relevant fear arousing communications produce greater tension in the audience than less relevant messages and that they are less effective if they are thought of as uninteresting by the subjects.

Bruner, Jerome S. "Personality Dynamics and the Process of Perceiving" in Perception, An Approach to Personality. Edited by R.R. Blake and G.V. Ramsey. New York: The Ronald Press Co., 1951, 121-149.

This paper as well as several others in this very useful volume discuss the relationship between personality and the perception process. In this particular article the author examines the importance of the personality factor as it relates to the construction of a theory of perception. The discussion is on a very general level and anyone looking for a systematic statement of relationships will be disappointed. Nevertheless, the author does present a useful summary of the personality approach to perception as well as outlining in some detail the analytic steps and influencing factors involved in the process of perceiving.

Drayer, Calvin S. "Psychological Factors and Problems, Emergency and Long-Term," The Annals, American Academy of Political and Social Science, Vol. 309 (January, 1957), 151-159.

Various factors are considered which influence psychological behaviour in a disaster situation and proposals are made which may eliminate some of the undesirable responses of the individual or group threatened with the catastrophe. The author suggests that the literature clearly emphasizes that "the meaning of a catastrophe to a group or an individual is more important than all other factors which influence the effectiveness of the responses to the crisis." Psychological preparation in the form of training for and education about the potential disaster is the most effective means to defend against unfavourable or inappropriate human reaction.

Friedsam, H.J. "Older Persons In Disaster" in Man and Society in Disaster. Edited by G.W. Baker and D.W. Chapman. N.Y.: Basic Books, 1962, 151-181.

This paper covers many stages of the disaster while focusing on older people. It includes a section on the reaction of this group to disaster warnings and cites other related references. It is one of few studies that deals specifically with the behaviour of one socio-economic group faced with disaster.

Fritz, Charles E. and Marks, Eli S. "The NORC Studies of Human Behavior in Disaster," Journal of Social Issues, Vol. X (1954), 26-41.

This paper reports on studies conducted by the National Opinion Research Centre (NORC) in the early 1950's. The emphasis of these studies appeared to be on amassing "overwhelming accumulation of evidence" rather than with achieving a comparable level of quality. This preoccupation with quantity over quality is reflected in open-ended, non-directive interviews averaging an hour and a half in length. Nevertheless, several of the findings of these studies were significant and have been validated in subsequent, more rigorous studies. These include an attack on the myth that panic is the predominant behaviour response in disaster situations and secondly, the finding that warning systems if inefficient can be more detrimental than beneficial.

Fritz, Charles E. and Williams, Harry B. "The Human Being in Disasters: A Research Perspective," The Annals, American Academy of Political and Social Science, Vol. 309 (January, 1957), 42-51.

The author provides a clear statement of the principal research "problems" characterizing disaster research. His purpose as he states is "to emphasize the more general, typical, and recurrent forms of behaviour found in disasters and to present findings pertinent to disaster preparedness, control, and amelioration." A good summary is provided of the state of the knowledge (at the time of writing) regarding the "threat" and "warning" periods.

Fritz, Charles E. "Disaster" in Contemporary Social Problems. Edited by R.K. Merton and R.A. Nisbet. Chicago: Harcourt, Brace and World, 1961, 651-694.

This is one of the earlier syntheses of human behaviour in disaster and provides an excellent introduction to the subject. A substantial part is devoted to a discussion of human attitudes and behaviour during the warning and "threat" period.

Goldstein, M.J. "The Relationship Between Coping and Avoiding Behavior and Response to Fear-Arousing Propaganda," Journal of Abnormal Social Psychology, Volume 58 (1959), 247-252.

Continuing the work of Janis and Feshbach the author reports on a laboratory experiment involving two classes of subjects, the copers and the avoiders who characteristically use different means of dealing with tension-producing material. Avoiders are unable to recognize tension-producing stimuli and relate them to themselves, while copers show the capacity to recognize such stimuli and relate them to themselves. His results show that while the superiority of minimal fear appeal with avoiders is clear, nevertheless, it is also apparent that the copers do not respond particularly well to either appeal. The conclusion drawn is that a minimal fear appeal is still the most effective means to illicit acceptance of propaganda.

Hamblin, Robert L. "Leadership and Crises," Sociometry, Vol. 21 (1958), 322-335.

This empirical study involves the use of two measures, the "influence ratio" and "acceptance rate" in order to determine leadership effectiveness and influence in a crisis situation. Two hypotheses were tested and supported by the experiment: (1) leaders have more influence during periods of crisis than during non-crisis periods; and, (2) groups tend to replace their old leader with a new leader if the old leader does not have an obvious solution to a crisis problem.

Hovland, Carl I., Janis, Irving L., and Kelley, Harold H. Communication and Persuasion. New Haven: Yale University Press, 1953.

In the words of the authors this book attempts to identify and understand the major communication variables. While only chapter 3 actually deals with what could be termed a disaster situation, the total book provides a useful theoretical framework in which to evaluate and predict the effectiveness of a communication flow. Chapter 2 dealing with fear arousing appeals discusses the degree to which threat appeals are effective or ineffective in producing opinion change. In this chapter and throughout the book a number of variables are examined including, for example, the personality of the listener, the credibility of the communicator, the role of reference groups, and the technique of presentation.

Howard, Alan and Scott, R.A. "A Proposed Framework for the Analysis of Stress in the Human Organism," Behavioral Science, Vol. 10 (1965), 141-160.

After reviewing the various meanings assigned to the concept of stress, the author concludes that "stress" must be considered in a much broader context that transcends the levels of analysis signified by the terms biochemical, physiological, psychological, and sociocultural. Human behaviour therefore is conceived as problem-solving phenomena, where problem is regarded as any condition which is posed to the organism for solution. This article provides an excellent multidisciplinary approach to the concept of stress.

Hudson, B.B. "Anxiety in Response to the Unfamiliar," Journal of Social Issues, Vol. X (1954), 53-60.

This paper reports on studies undertaken on the response of individuals and groups as well as laboratory animals to events that are essentially outside the range of their experience. The author concludes that adult animals ranging from rats to humans are sensitive to events and objects in their environment that are not immediately perceived as familiar. The response may develop into marked emotional behaviour of flight, anger, excitement, or anxiety. It is likely to depend on the familiarity of the environment, where the unfamiliar stimulus is received, the length of time that is perceived before the threat is likely to materialize, and the amount of previous "threat" conditioning.

Hunt, J. McV. "Traditional Personality Theory In the Light of Recent Evidence," American Scientist, Vol. 53 (March, 1965), 80-96.

The author examines the traditional beliefs of psychologists and social psychologists comparing these to research findings of post World War Two researchers. His conclusions most pertinent to disaster behavioural research suggest that neither personality nor situational variables are by themselves sufficient to understand variations in behaviour; it is the interaction between them that is crucial. In the words of the author: "for either understanding variations of behaviour or making clinical predictions, we should be looking toward instruments that will classify people in terms of the kinds of responses they make in various categories of situations."

Instituut voor Sociaal Onderzoek van het Nederlandse Volk. Studies in Holland Flood Disaster, 1953. Washington: National Academy of Sciences--National Research Council, Committee on Disaster Studies, 1955. 4 volumes.

The southwestern part of the Netherlands was struck with one of its greatest flood disasters in January, 1953. Under the auspices of the NAS-NRC various aspects of the sociological and psychological processes were studied. This research resulted in probably one of the most comprehensive studies of a disaster ever undertaken. The four volumes comprise a lengthy and detailed analysis of human behaviour before and after the disaster occurred--each, however, being compiled by different authors, and portraying the situation in its various aspects. The first volume concerns itself with an investigation into the communication system during the period of emergency; the second volume surveys the evacuation problems and disaster experiences; volume three consists of case studies of three "disaster" communities; and, volume four summarizes the conclusions reached in the complete study.

Janis, Irving. "Problems of Theory in the Analysis of Stress Behavior," Journal of Social Issues, Vol. X (1954), 12-25.

Professor Janis presents one of the better evaluations of the state of disaster behaviour research as it was in the 1950's. He comments on what he feels are the "potential sins of intradisciplinarianism", the attempt to develop "grand" theories of behaviour that systematically cover the effects that disasters are known to have on individuals, organizations and communities. The author resigns himself to a rather piecemeal development of general hypotheses and theoretical assumptions. He proceeds to outline the psychological approach (his own discipline) to disaster studies, outlining directions for theory construction.

Janis, Irving L. "Psychological Effects of Warnings" in Man and Society In Disaster. Edited by G.W. Baker and D.W. Chapman. N.Y.: Basic Books, 1962, 55-92.

A theoretical framework is presented within which the human reaction to warnings and informative communications about unfavourable events can be both analyzed and understood. The notion of disaster is used in a very broad sense and empirical examples include everything from poisoning to flood disasters. Behaviour response is examined both in terms of direction and intensity and includes discussion of adaptive and maladaptive behaviour and overreaction and underreaction responses to disaster threats of varying degrees of severity. The author proposes a number of situational (e.g. availability of escape route) and nonsituational (e.g. experience) factors accounting for the variety of response to disaster warning.

Janis, Irving and Feshbach, Seymour. "Personality Differences Associated With Responsiveness to Fear Arousing Communications," Journal of Personality, Vol. 23 (1954), 154-166.

This paper is an extension of a previous paper of the authors, the results which supported the general hypothesis that--"communications which arouse a high degree of fear or anxiety in the recipient tend to stimulate defensive reactions which interfere with acceptance of the communicator's message." In this empirical study the authors derive indices of anxiety for a group of subjects and expose them to fear arousing communications. They conclude that--"when a strong fear appeal is presented the drive level of the high anxiety individual would presumably mount to the point where it interferes with acceptance of the communicator's message; but when the same individual is exposed to a mild appeal, the low level of anxiety drive that is aroused might facilitate acceptance."

Killian, Lewis M. "The Significance of Multiple-Group Membership in Disaster," The American Journal of Sociology, Vol. LVII, No. 4 (January, 1952), 309-314.

While the study is concerned principally with post-disaster behaviour, many of the research results are pertinent to the investigation of pre-disaster behaviour. The author reports on reactions of people in four Southwestern communities to disasters--explosions and tornadoes finding that conflicting group loyalties and contradictory roles resulting from multiple-group membership were significant factors affecting individual behaviour in critical situations. Conflicts were found to arise between the family and secondary groups; "heroic" roles and prosaic occupational roles; "the company" and fellow-workers; and, the community and extra-community groups.

Kilpatrick, F.P. "Problems of Perception in Extreme Situations," Human Organization (Special Issue-Human Adaptation to Disaster) Vol. 16, No. 2 (Summer, 1957), 20-22.

The author suggests that the perceptual process be given greater attention in disaster research in order that human behaviour be better understood. Seven general hypotheses are proposed that may be applicable to disaster studies.

Lachman, Roy, Tatsuoka, Maurice and Bon, William J. "Human Behaviour During the Tsunami of May 1960," Science, Vol. 133 (May 5, 1961), 1405-1409.

This empirical study examines the Hawaiian (Tsunami) disaster of May, 1960 in the city of Hilo where in spite of a 10 hour warning 61 persons were killed and many hundreds injured. The authors evaluate the efficiency of the warning system and attempt to account for the behaviour of the affected families, in particular why some families evacuated and others did not. They found that the warning system was very ambiguous with no distinction being made between alerting the public versus providing instructions for subsequent action (e.g. evacuation). They conclude also that education and previous disaster experience play a minor role as a determinant of adaptive behaviour in response to an ambiguous emergency warning but that personality factors such as chronic anxiety provide a better explanation.

Lang, Kurt and Lang, Gladys, G.E. "Collective Responses to the Threat of Disaster" in The Threat of Impending Disaster, Contributions to the Psychology of Stress. Edited by G. Grosser, H. Wechsler, and M. Greenblatt. Cambridge: M.I.T. Press, 1964, 58-75.

The reaction of a group to a disaster threat is examined in terms of the interpersonal, individual and sociological components of the group and its social environment. In the face of disaster threat, various combinations of characteristics of these components can result in varying degrees of group demoralization. In a group suffering extreme demoralization, for example, the members are either incapacitated or psychologically isolated from each other. The effects of various kinds and characteristics of threats are discussed in terms of their influence on group morale.

Lazarus, Richard S. Psychological Stress and the Coping Process. Toronto: McGraw-Hill Book Co., 1966.

If there is any one book that can be said to be indispensable in studying the behavioural process prior to a disaster, it is this one. The literature on stress and associative topics of cognitive processes, threat, coping processes, etc. is immense. The author has skillfully brought together in one volume a synthesis of this literature including both empirical and theoretical works reporting on experiments and theory based on both animal and human organisms. Some of the topics covered include: the various meanings given to stress, and parallels and differences among psychological, physiological and sociological stress; the concept of threat and the factors determining its appraisal; the role and importance of personality variables psychological makeup of the human organism; and, the nature of the coping process.

Lee, Douglas H.K. "The Role of Attitude in Response to Environmental Stress," Journal of Social Issues, Vol. XXII, No. 4 (October, 1966), 83-91.

This paper presents a short general theoretical statement relating attitude of the human organism both in a physiological and psychological sense to environmental stress. The interaction between physiological and psychological adaptations to stress is pointed out. One of the author's important conclusions is that attitude to environmental stress is definable only over a small time interval, and should be considered in terms of all the circumstances prevailing over that interval.

Leventhal, H. and Watts, J.C. "Sources of Resistance to Fear Arousing Communications On Smoking and Lung Cancer," Journal of Personality, Vol. XXXIV (1966), 155-176.

This paper examines the relationship between nature of response and fear arousing communications of different "fear" intensities. Empirical results are reported on the communication of threat of danger to health from cigarette smoking. The results suggest that the intensity of the fear arousal communication cannot by itself account for the reaction to that fear. Of special importance is the participant's perception of his "vulnerability" to the threat. The article emphasizes the complexities involved in predicting reactions to fear arousing communications and points out the inconsistencies and contradictions of results reported by a number of related studies.

Loomis, Charles P. "Towards Systematic Analysis of Disaster Disruption, Stress Recovery--Suggested Areas of Investigation" in Behavioral Science and Civil Defense. Edited by G.W. Baker and L.S. Cottrell, Jr. Disaster Study Number 16. Washington: National Academy of Sciences --National Research Council, 1962, 121-141.

The author proposes a theoretical framework within which disaster and its associative disruption can be studied. His conceptual scheme called the Processually Articulated Structural Model provides a "means for codification, analysis, and (hopefully) eventual explanation of both the structural and processual features of organization.

Mack, R.W. and Baker, G.W. The Occasion Instant: The Structure of Social Responses to Unanticipated Air Raid Warnings. Disaster Study Number 15. Washington: National Academy of Sciences--National Research Council, 1961.

This probably is one of the best empirical research monographs produced by NAS-NRC. It reports on empirical studies that examined human attitudes and behaviour of recipients to three different surprise (but false) civil defense warning signals in three United States cities (Chicago, Oakland, and Washington). Warning is viewed as a process and is examined under three categories: (1) the receipt of the signal; (2) interpretation of it; and, (3) action based upon it. Attempts are made to generalize the empirical results for all three locations and to place them in the context of disaster and social science behaviour theory. The study concludes with a rather detailed list of propositions and hypotheses summarizing existing knowledge and research directions.

Menninger, Karl. "Regulatory Devices of the Ego Under Major Stress," The International Journal of Psycho-Analysis, Vol. XXXV, Part 4 (1954), 412-420.

The author defines and describes the regulatory devices used by the ego under stress. Initially, a dichotomy is made between minor and major stresses, the former handled by relatively minor, 'normal', 'healthy' devices, the latter, prolonged stress, exciting the ego to increasingly energetic and expensive activity in the interests of homeostatic maintenance. The functions of the ego are viewed as a homeostatic effector attempting to achieve a tenable level of homeostatic maintenance. The author identifies five major orders of devices used by the ego to cope with the organism's stress, ranging from simple exaggerations of normal functioning, e.g. hyper-alertness to insanity and violent mania.

Miller, James C. "Living Systems: Basic Concepts," 193-237; "Structure and Process," 337-370. Behavioral Science, Vol. 10 (1965).

Fundamental to an understanding of human behaviour before the disaster is the concept of stress. Increasingly, stress as well as other characteristics of the warning or pre-disaster period is being examined within a systems framework. These two papers provide a thorough introduction to living systems theory and are indispensable to an understanding of the notions of stress, structure, and adjustment process in a systems framework.

Moore, Harry Estill. . . . And The Winds Blew. Austin, Texas: Hogg Foundation For Mental Health, University of Texas, 1964.

The author presents a detailed chronological description of the warning information generated and adaptive action that occurred before the onslaught of Hurricane Carla in September, 1961. The format of the book is essentially comparable to that of a Captain's Logbook. In its present form it represents one type of data source that could be utilized in the study of human behaviour. It should be read prior to its companion volume Before the Wind by the same author also cited in this bibliography.

Moore, Harry E. et al. Before the Wind, A Study of the Response to Hurricane Carla. Disaster Study Number 19. Washington: National Academy of Sciences--National Research Council, 1963.

This empirical study focuses on events preceding and following the mass evacuation that took place along the Texas and Louisiana coast on a scale unprecedented in United States experience which occurred in response to the threat of Hurricane Carla--September, 1961. While various aspects of the evacuation process is examined, emphasis is placed on the nature of the warning process, the perception of the warning, and the decision making processes that occurred both on an individual and family level.

Moore, Harry Estill. Tornadoes Over Texas: A Study of Waco and San Angelo In Disaster. Austin: University of Texas Press, 1958.

Despite its imposing size and the fact it is written by a sociologist, this book is somewhat disappointing in its structure, analysis and conclusions. It best can be described as a very readable narrative which emphasizes the post-disaster impact.

Pervin, Lawrence A. "The Need to Predict and Control Under Conditions of Threat," Journal of Personality, Vol. 31 (1963), 570-587.

The author reports on an empirical study investigating the effects of varying degrees of certainty and subject control under conditions of threat in a laboratory experiment. The subjects were exposed to current shocks which part of the time were under their control. The results of the experiment supported the hypothesis that predictability of a threatening stimulus is preferable to and less anxiety-arousing than unpredictability. Other results indicated, however, that both predictability and unpredictability have desirable, anxiety-reducing properties and undesirable anxiety-arousing properties. The findings suggested that complete predictability is more desirable in new and highly threatening situations, whereas some degree of unpredictability is desirable in repetitive, less threatening situations.

Rayner, Jeannette. "Studies of Disasters and Other Extreme Situations--An Annotated Selected Bibliography," Human Organization (Special Issue-Human Adaptation to Disaster) Vol. 16, No.2 (Summer, 1957), 30-40.

Eighty-eight items published prior to 1958 are briefly described. The list includes empirical and theoretical studies from NAS-NRC as well as from other academic researchers in the disciplines of sociology, political science, anthropology, and psychology.

Roder, Wolf. "Attitudes and Knowledge On the Topeka Flood Plain" in Papers On Flood Problems. Edited by G.F. White. Dept. of Geography, University of Chicago, Research Paper Number 70, Chicago, 1961, 62-83.

In this empirical study a sample of 103 residents and business people in the Topeka flood plain (Kansas) were interviewed as "potential victims of a future flood". The area has had a history of serious flooding and despite the fact that an entire flood-protection program is underway, during the time it is not completely finished and even when completed, there is no insurance that the area could not be susceptible to serious flooding. From what little is discussed in this paper about human behaviour it can be concluded that previous experience with a flood disaster may play little or no part in the decision making process of a residence to continue or seek new residence in a flood plain area.

Schneider, David M. "Typhoons on Yap," Human Organization (Special Issue-Human Adaptation to Disaster) Vol. 16, No.2 (Summer, 1957), 10-15.

The author, an anthropologist, presents an empirical analysis of the behaviour of a nonWestern culture in the face of a "disaster". The typhoon is a recurrent "disaster" which is a common event on the island Yap, part of the Western Caroline Group. It is responsible for much physical damage to buildings, but causes little personal injury or loss of life. The behaviour of the Yap people is indicative of their understanding or interpretation of a "disaster". Their coping with the oncoming crisis combines a mixture of magic, religion and common sense. There is a minimum of rational preparation. Interesting comparisons are made with the behaviour of United States disaster participants in parallel situations.

Schroder, H.M., Driver, M.J., and Streufert, S. Human Information Processing. Toronto: Holt, Rinehart and Winston, 1967.

The differences in the way information is used for adaptive purposes is the focus of interest in this book. In particular it is concerned with how people use conceptual structures such as attitudes, needs, strategies, concepts and norms for adaptive purposes. The emphasis is on the analysis and measurement of information processing in fairly complex, social, problem-solving situations. The book maintains that adaptive preference or orientation acts first like a set of filters--selecting certain kinds of information from the environment--and, second, like a program or set of rules which combines these items of information in specific ways. The first aspect is the component or content variable, and the second aspect is the structural or information processing variable. It is the latter variable on which the book is based. It is not easy reading and assumes substantive knowledge of psychological concepts.

Wallace, Anthony, F.C. "Tornado In Worcester, An Exploratory Study of Individual and Community Behavior in An Extreme Situation," Washington, D.C.: National Academy of Sciences --National Research Council, Disaster Study No. 3, 1956.

This is one of a series of NAS-NRC empirical "research" reports on disasters, in this case the Worcester, Mass. tornado disaster of 1953. Despite an encouraging introductory time-space theoretical framework within which to study a disaster, this report like several others in this series is of inferior research quality. The report covers all aspects of the disaster including a section on the warning period containing a random picture of the behaviour of those who were in the impact area. It presents interesting reading, some useful ideas, but little in terms of systematic analysis or conclusions.

Williams, Harry B. "Some Functions of Communication In Crisis Behavior," Human Organization (Special Issue-Human Adaptation to Disaster), Vol. 16, No. 2 (Summer, 1957), 15-19.

The disaster is viewed as one form of crisis occurring within a social system. Human behaviour of the organism during the "threat" of disaster is examined and interpreted as it functions when receiving the communication of the crisis situation. The manner in which the organism receives, interprets and acts in response to the communication is a function of his past experience, his present value system, the duration of time he perceives he has to act, and the nature and degree of interaction he has between his social and physical environment. The author proposes eight hypotheses concerning the role of information in crisis behaviour.

Williams, Harry B. "Human Factors In Warning-And-Response Systems" in The Threat of Impending Disaster, Contributions to the Psychology of Stress. Edited by G. Grosser, H. Wechsler, and M. Greenblatt. Cambridge: M.I.T. Press, 1964, 79-104.

The warning of an impending disaster is examined within a systems framework which seeks to examine the principal components of such a system, their characteristics, their interrelationships, and their relative importance in the functioning of the system. One of the principal processes in such a system is the information flow from the official body to the unaware public and the warning system is analyzed in reference to the efficiency of this process.

Withey, Stephen B. "Reaction to Uncertain Threat" in Man and Society In Disaster. Edited by G.W. Baker and D.W. Chapman. N.Y.: Basic Books, 1962, 93-123.

Threat is regarded as a form of stress and a very detailed analysis is given which focuses directly on the "anatomy" of the threat. A discussion of some of the pertinent literature related to psychological and physiological stress is presented reviewing the relationship between threat, stress, and behaviour. The notion of threat is analyzed in terms of three distinct categories: (a) its characteristics; (b) its kinds; and, (c) its stages.

Wolfenstein, Martha. Disaster, A Psychological Essay. London: Routledge & Kegan Paul, Ltd., 1957.

Writing in 1957 Dr. Wolfenstein was way ahead of her colleagues in the study of disaster. In this book, undoubtedly a classic in the field, the author systematically views the disaster from a psychological perspective examining the varying role of denial attitudes in relation to different temporal phases of a disastrous event; in relation to a remote threat, to an imminent threat, to the impact of extreme danger, and to the phase of retrospect. The volume also contains a chapter with a rare analysis of the attitudes of the "resource manager" to the disaster as opposed to the "man on the street".

Zajonc, Robert B. and Burnstein, Eugene. "The Resolution of Cognitive Conflict Under Uncertainty," Human Relations, Vol. 14, No. 2 (May, 1961), 113-117.

Two experiments are presented which examine the relationships between information conflict, uncertainty, and the cognitive processes. The experiments illustrate a laboratory approach to an understanding of human behaviour.