A HALF CENTURY OF SOCIAL SCIENCE
DISASTER RESEARCH:SELECTED MAJOR
FINDINGS AND THEIR APPLICABILITY*

E. L. Quarantelli

2003

A HALF CENTURY OF SOCIAL SCIENCE DISASTER RESEARCH:

SELECTED MAJOR FINDINGS AND THEIR APPLICABILITY*

E. L. Quarantelli

Disaster Research Center
University of Delaware
Newark, Delaware 19716 USA
Email: elqdrc@udel.edu

Introduction

Since systematic studies started in the early 1950s, there has now been a half century of social science disaster research. After all this work, what can be said about what is known about the human and social behavior associated with natural and technological disasters? This paper highlights some of the more major findings from these studies. No attempt is made to present all that has been established by the research; that would require writing an encyclopedia. Our goal here is more limited and selective. Drawing from this base of 50+ years of social science research involving thousands of studies, we note some of the more established and important patterns of behavior at the individual, organizational, community and societal levels. However, we will not discuss the societal level directly because there is limited knowledge about that level. Instead we will discuss mass communication systems (in some respects seeing them as surrogates for society). At the end of all the substantive observations we will make some comments on what has been done with this established knowledge, or in other words, how the research findings have been applied. To avoid interminable and specific documentation, readers are presented a large bibliography at the end of this paper that lists the major research literature examined for the purpose of this paper.

To what extent are the research-based observations we discuss applicable everywhere? This is a very legitimate question. It is of particular relevance given that most of the studies so far undertaken have been done by social scientists in Western type societies, even though the great majority of disasters occur in developing countries. The observations from the ever growing number of studies in non-Western social systems appears to be consistent with what we have reported in this paper. But more will have to be done before we can be sure that the observations are universal ones. Even if that turns out to be the case, it is also to be expected that there will be societal- and cultural-specific human and group behaviors that might require some qualifications on the general observations made so far. There are some indications that the more universal behaviors are at the individual level, with increasingly fewer universal ones as the analysis goes from organizations to communities to societies.

We start with a discussion about community disasters. The great majority of disasters impact a community. However, there are non-community types of disasters, e.g., a plane crash in an isolated rural area. This affects behavioral responses (e.g., crash survivors do not receive the social support that emerges in a community when residents have undergone a common disaster experience). The 20 general observations below around which we organize our comments, are mostly about community disasters.

Community Disasters

1. Behaviors in community disasters and in everyday emergencies are both qualitatively and quantitatively different.

There are behavioral differences in degree and in kind. For instance, because of the typical massive convergence on the impact site of a disaster, the responding organizations have to deal with far more and usually previously unknown groups than in an everyday community emergency. As an example, in a massive fire near Nanticoke, a Canadian research team

identified 346 converging organizations, including 27 from the federal government and 10 from the regions, as well as 25 provincial government agencies, four new emergent groups, seven local government departments, 31 fire departments, eight voluntary groups, 41 churches, hospitals and schools, four utilities, and 52 different players from the private sector. Such convergence is drastically different from what occurs in everyday emergencies.

2. Disasters cannot be behaviorally differentiated in terms of the natural or technological agents involved, but they can be distinguished from conflict situations.

Disasters do differ in such dimensions as whether they give no forewarning (e.g., earthquakes and most explosions) or their duration of impact, but these are not single-agent specific features. However, community disasters can be seen as consensus type occasions that are distinguishable from conflict crises. In the latter, such as riots and terrorist attacks, there are deliberate efforts to make the situation worse or to continue the crisis. This distinguishes them from disaster occasions. Thus, with respect to hospitals, they may come under direct attack and usually has only the shift on duty available because of roadblocks or a curfew compared to disasters, where also patient inflow tends to build to a peak and then drop sharply compared to the erratic inflow during a riot.

3. Just as there are major differences between behaviors in everyday emergencies and community disasters, there are also differences between disasters and catastrophes.

For example, in the typical disaster, the homeless seek shelter with local friends and relatives; in catastrophes since most everyone is homeless that cannot occur. Also, the facilities and operational bases of almost all emergency organizations are often directly hit in a catastrophe; this seldom occurs in a disaster. Different planning for the managing of a catastrophic occasion than a disaster is required. Of course, what would be catastrophic for a small town might be only disastrous for a metropolitan area.

4. Disaster-related behavior is very complex.

Part of the complexity is because it occurs at different social times in the life of a community. We can see this if we make an ideal type four fold distinction between the phases or times of disaster phenomena.   The four phases typically differentiated are:

Mitigation includes measures taken at a time distant, usually before, from an actual disaster impact and are intended to prevent or reduce the impact.
(e.g., building codes, land use regulations, zoning, educational programs, training, etc.)

Preparedness has to do with the actions planned and undertaken when the probability of a disaster in a particular locality is at hand.
(e.g., such behavior as warnings and evacuation.)

Response refers to crisis-relevant actions engaged in during and immediately after impact.
(e.g., search and rescue and the providing of emergency medical services.)

Recovery includes activities undertaken after the response in the crisis period is over.
(e.g., restoration of utilities and rebuilding of homes.)

The four phases should not be seen as linear but are best seen as linked in a semicircle. What is done at a previous stage affects later phases. For instance, if evacuees are relocated back to flood plains, this undermines a mitigation action that would involve relocation away from such risky areas.

In addition, there is also a need to differentiate the levels of social behavior involved. This is important. For instance, a disaster may totally destroy several families or even one organizational facility. But from the overall viewpoint of a large metropolitan area, such losses may be insignificant. For purposes of exposition in what follows we summarize research findings for four social levels (individual, organizational, community and societal) in the four time phases (mitigation, preparedness, response and recovery).

Individual Behavior

5. Individual/households are typically not much interested, much less concerned about disasters before they happen.

This is not totally unrealistic. Except in very disaster prone communities, the likelihood of being directly impacted by a disaster is somewhat low. One survey found that only 13.8% of Americans had ever been severely affected by natural disasters or fires. While in some societies the percentage would be higher, in many others it would be lower. Thus, it is not surprising that everyday concerns such as about work or family life, take much higher priority over very low probability occasions such as disasters that also have unclear implications for self. Exceptions occur in communities subject to recurrent crises (generated for instance by floods), and also where activist citizen groups exist such as around hazardous waste sites or chemical plants. These exceptions are known as disaster subcultures. However, it should be noted that even frequent disasters do not automatically generate such subcultures.

6. In those situations where there is forewarning, the reaction is usually quite rational and socially oriented.

For example, possible victims take seriously those warnings that clearly indicate the threat is fairly certain, will occur soon and will directly impact self and/or significant others. Meaningful actions are usually undertaken to cope with a perceived risk, especially if known others react similarly. However, it is very difficult to get evacuation if the location and probable safety of absent family/household members are unknown.

7. When disasters occur, individuals as a whole react very well, helping one another.

Although many rumors about them abound, actual instances of panic flight and looting are very rare, if nonexistent, at least in Western type societies. These in fact have become known in the research literature as the "myths" of disaster behavior. Instead, prosocial behaviors predominates with, for example, the great bulk, up to 90% plus of search and rescue, being undertaken by those civilian persons around impacted sites.

8. While the experience of a disaster is a memorable one, and there are differential short-run effects, there does not appear to be too many lasting behavioral consequences.

This might seem a surprising conclusion given widespread comments at times about possible longer run consequences on impacted survivors. However, there is considerable controversy

about the negative or mental health effects on victims of community disasters. Such occasions can generate many surface psychological reactions such as sleeplessness, loss of appetite, anxiety and irritability. Many researchers argue, and we agree with them, that such effects are primarily subclinical, short lived and self remitting. In some postimpact situations most of the victims can exhibit some such characteristics, but research indicates that if no disaster had occurred many individuals would still manifest these and similar symptoms because of everyday stresses. Equally as important, even those persons showing reactions are rarely functionally incapacitated in terms of their normal everyday home, school and work behaviors. On the other hand, others concerned with the topic argue that disasters typically create post traumatic stress disorders (PTSD) which may last for a long time and that requires the use of crisis intervention techniques. There is some agreement that PTSD may occur among first responders to a disaster. Anyone interested in the issue should recognize there is a controversy and a voluminous literature that provide only ambiguous research support for each position.

Organizational Behavior

9. Disaster mitigation activities are seldom on the agenda of any organization.

The major recent exceptions in North America and increasingly in Europe are in the private sector in such businesses as banking, and in those that have always placed a high priority on safety such as the chemical and nuclear power industries. However, even when mitigation measures are undertaken, for cost reasons, they usually have to have an excluding grandfather clause.

10. To the extent that non-emergency organizations undertake preparedness planning--and until recently few did--they often plan incorrectly.

For example, there tends to be a focus on written disaster plans. But good planning instead focuses on such processes as: undertaking public educational activities; establishing informal links between key groups; assessing, monitoring and communicating information about local risks; holding disaster drills, rehearsals and simulations; developing techniques for training, knowledge transfer and assessments; convening meetings to share information; obtaining the involvement of citizens, businesses, and non-emergency public agencies and relevant non-local groups in the planning process; and updating strategies, resources and laws as necessary. The production of a document or a written plan, while sometimes legally necessary, is never as important as the planning process.

11. Organizations typically have many problems in coping with the crisis time period of disasters, but they are often not the expected difficulties.

For example, the often asked question about "who is in charge?" is a meaningless one since research shows that any attempt to impose a command and control model on any disaster occasion is both impossible and useless. However, there typically are at least three sets of crisis management problems: (1) Information flow problems in the communication process within and between organizations, and to and from organizations and citizens; (2) Organizational decision making problems resulting from losses of higher echelon personnel because of overwork, conflict regarding authority over new disaster tasks and confusion over jurisdictional responsibilities; and (3) Problems in interorganizational coordination that results from a lack of consensus about what constitutes "coordination," strained relationships created

by new disaster tasks and the magnitude of the disaster impact. All this is compounded by the vast convergence of many organizations to the impacted area. In a plane crash in the United States studied by the Disaster Research Center, at least 439 groups appeared on the scene including 31 fire departments, 26 police groups, and 14 military units.

12. There is only selective organizational change at best from undergoing a disaster.

After a disaster there usually is much talk within organizations on improving the planning for crises. However, such talk seldom is actually implemented by way of any real structural or functional changes. Nevertheless, changes that were underway before a disaster occurred might be accelerated if organizational leadership is present.

Community Behavior

13. Except in a few disaster prone or at risk localities, local areas generally give very low priority to community wide mitigation activities.

However, more has been undertaken in recent years partly because of the attention given to disasters everywhere by the mass media or more correctly, the mass communication system. Sometimes, advantage can be taken of the window of opportunity offered by a disaster elsewhere by indicating that the same could occur in one's own community. In addition, sometime leadership is taken by government organizations such as the US Federal Emergency Management Agency which has initiated *Project Impact* at the local community level, for the putting into place mitigation measures that will reduce the ever escalating cost of disasters.

14. Preparedness planning at the community level is very uneven and often problematical.

In part this is because to the extent attempts are made, existing or preimpact community cleavages, disputes and conflicts often make the effort very difficult, if not impossible. For example, there are often everyday stresses and strains between local police and fire departments, between them and the local emergency management agencies, among hospitals and emergency medical service entities, and between public and private sector groups. Such differences act as major barriers to disaster planning,

15. The greater the disaster, the more there will be the emergence of new behavioral structures and functions at the crisis time period.

A fourfold typology captures the phenomena well. Type I organizations are established ones that do not markedly change their general structure and functions at times of crises (E.g., many police and fire departments maintain their traditional forms and spheres of activity). Type II organizations are expanding ones that have new structures but old functions (E.g., Red Cross chapters who by preplanning incorporate many volunteers into a new social structure but carry out traditional agency tasks). Type III organizations are extending ones that have old structures but new functions (E.g., a construction company using its traditional group structure to undertake building or street debris clearance). Finally, Type IV groups are new entities that had no preimpact existence but which carry out new disaster functions (E.g., informal search and rescue teams, or damage assessment groups). These last kinds of groups play crucial roles in the crisis period of a disaster.

However, even the best of preplanning is limited in preparing for all emergent behaviors. In fact, it appears that the greater the disaster, the more an increasing involvement of the organized entities going from Type I through Type IV. An ordinary, everyday emergency could be handled only by Type I organizations, but a catastrophic disaster will require the multiple presence of all four types of organized behavior. It goes without saying that the presence of many such groups of differing structures and functions creates major problems of coordination at the community level.

16. The recovery period is typically difficult with both old and new problems emerging.

The muting of preimpact community differences that exist at the crisis time period, disappears in this later time phase, so all the old problems reappear. In addition, there are new problems that stem from the disaster impact, for example, differences on whether and how a devastated business or residential neighborhood area should be rebuilt.

Mass Communication Systems (as surrogate for the society)

17. The mass communication system (MCS) pay little attention to mitigation activity.

This is not only true of the MCS but also of societies generally, at least until recent time. In part this correctly reflects the fact that disasters/catastrophes may be of very high impact but are very low probability occasions for any given locality. The lack of attention is also partly reinforced in cultures such as North American ones inclined to take relatively rather short time views of the future.

18. The MCS normally have a dual and not well integrated roles: to "observe and report" what is happening and to "warn" of the impending threats.

In the first instance, the MCS acts as an outsider to the community, in the latter it is an integral part of the emergency preparedness system. Seldom are the two roles well integrated, leading to a weaving back and forth from one role to the other, confusing audiences of MCS. In part because of the first orientation it is often very difficult to get the MCS to become an integral part of community disaster planning and crisis managing.

19. News stories provide the operative "reality" about the crisis period for almost everyone, but are necessarily incomplete.

In many ways, MCS are the surrogates for societal attention to any disaster (while this is true for all time periods, it is especially so for the response or crisis time phase). In addition, the new communication revolution involving computers, satellite dishes, etc. will allow much interactive and decentralized information seeking, thus probably creating further problems for community level responses. Apart from that, even at the present time much of what is reported is not so much false as incomplete. The norms and values that guide news gathering leads to an incomplete and somewhat unbalanced picture of what goes on during the height of the crisis. For example, while usually 90% plus of search and rescue is informally undertaken by citizens on site, the focus of MCS reports will be on formal and organized search and rescue groups.

20. In the recovery period there is a tendency for the MCS to focus on conflictive aspects and atypical problems.

In a sense, this time phase marks a going back to normal time news gathering norms. These stress not the reporting of agreements or routines, but emphasize conflict situations and what is out of the ordinary, i.e., man bites dog rather than the converse. In societies where the MCS is strongly linked to political parties, reporting will reflect such a bias.

Applicability of Findings

What has happened to these large bodies of knowledge about disaster related behaviors?

In other words, how much of this has been applied to improve disaster planning and crisis management? The answer is complex, but we think there are at least four major points to be made about the use of social science knowledge in addressing problems of disaster policies, programs and organizations.

First, this knowledge has been and is increasingly used or applied.

There are several different factors that have influenced the much better disaster planning and managing that characterizes the contemporary world. By almost any criteria that could be used, in practically every place in the world, the planning for disasters and disaster management are much better than they were certainly 50 years ago and in many places even 20 years ago. It is easy to miss that point unless one takes the appropriate historical view on what once existed and what now exists. Part of this better stance toward disasters stems from the increasing professionalization of emergency managers and planners, some from disasters that at least in the symbolic sense, have world wide impact. But some of what currently exists stems from the fact that the social science knowledge about disasters has been incorporated into disaster policies, planning and organizations around the world. The research has been used and is increasingly being used.

Second, this use of the relevant knowledge is however uneven in several ways.

There are considerable differences between different societies in their use of the knowledge. Western type societies have been among the leaders in trying to apply knowledge and understanding about disasters. There is also a strong tendency to primarily apply the research findings that have to do with disaster preparedness and disaster response. There are understandable, for a variety of reasons, for less acceptance and use of what studies have found about the possible mitigation of disasters as well as the recovery from disasters. In other words, the research that has examined the crisis time periods of disasters is more easily accepted than what has been found about better recovery from disasters or mitigating disasters in the first place.

Third, the uneven use of knowledge about disasters partly reflects political realities.

What do we mean by Apolitical realities?@ The political arena is where the basic decisions and fundamental policies of all societies (as well as communities) are discussed and implemented. Many different social factors feed into such decision making and policy implementation. The results of research are at best only one such factor, and even if attended to, are not necessarily among the more important factors. Political decision makers and policy developers have to take into account everything from practical realities, competing demands,

perceived longer run consequences, and resource limitations. In that framework, research results may be of little importance. Contrary to what is sometime implied in the criticisms that are sometime made of political decision making, the process by most criteria is very rational and understandable. The arrogance sometimes expressed in the views of scientists is actually much less rational and not easily understood.

Fourth, for a variety of reasons there will be increasing use of the current as well as the knowledge that will be developed in coming decades.

There is one development in particular that will accelerate this process. The information revolution being generated by the development of computers and related technology will undoubtedly affect in major ways what can and should be done by way of disaster planning and crisis managing in the future. It is not that all the consequences of the information revolution are always positive for those aspects. But on balance, the world including the area of disasters will be better off as the knowledge that will be accelerated by the information revolution.

<div align="center">A Concluding Observation</div>

We have indicated a number of problems at different times of and social levels in disasters. Some of them could be reduced or even eliminated by better planning and managing. However, it should be recognized that there are limits to what can be done to change what happens at times of disasters. This is not a counsel of despair but to suggest that it is important to remain rooted in reality, especially as established by systematic research. Even simple knowledge of what is likely to occur can be very helpful. We have tried to present some of that research-based knowledge.
.

BIBLIOGRAPHY

Albala-Bertrand, J. M. The Political Economy of Large Natural Disasters. Oxford: Clarendon Press. 1993.

Alexander, David. Confronting Catastrophe: New Perspective on Natural Disaster. New York: Oxford. 2000.

Barton, Allen. Communities in Disasters: A Sociological Analysis of Collective Stress Situations. New York: Doubleday, 1969.

Blaide, P., T. Cannon, I. Davis and B. Wisner. At Risk: Natural Hazards, People=s Vulnerability, and Disasters. New York: Routledge. 1994.

Benthal, Jonathan. Disaster Relief and the Media. London: I.B. Tauris, 1993.

Bolin, Robert. Long-Term Recovery From Disaster. Boulder, CO.: Institute of Behavioral Science, University of Colorado, 1982.

Cutter, Susan. Environmental Risks and Hazards. Englewood Cliffs, New Jersey: Prentice Hall, 1994.

Cutter, Susan. American Hazardscapes; The Regionalization of Hazards and Disasters. Washington, D.C. Joseph Henry Press.

Drabek, Thomas E. Responses to Disaster: An Inventory of Sociological Findings. New York: Springer-Verlag, 1986.

Drabek, Thomas E. and Gerard J. Hoetmer (eds.) Emergency Management: Principles and Practice for Local Government. Washington, D.C.: International City Management Association, 1991.

Dynes, R. "Community emergency planning: False assumptions and inappropriate analogies." International Journal of Mass Emergencies and Disasters 12 (1994): 141-158.

Dynes, R. and K. Tierney (eds.) Disasters, Collective Behavior and Social Organization. Newark, DE. : University of Delaware Press, 1994.

Dynes, R., B. De Marchi and C. Pelanda (eds.) Sociology of Disasters: Contributions of Sociology to Disaster Research. Milan, Italy: Franco Angeli, 1987.

Godschalk, D., T. Beatley, P. Berke, D. Brower and E. Kaiser. Natural Hazard Mitigation: Recasting Disaster Policy and Planning. Washington, D.C.: Island Press, 1999.

Auf der Heide, E. Disaster Response: Principles of Preparation and Coordination. St. Louis: Mosby, 1989.

Hewitt, Kenneth. Interpretations of Calamity From the Viewpoint of Human Ecology. London: Allen and Unwin, 1983.

Hughes, M. An Annotated Bibliography and Listing of the Social Science Literature on Planning for and Responding to Hazardous Materials Disasters. Newark, DE. : Disaster Research Center, University of Delaware, 1992.

Kreps, Gary. "Sociological inquiry and disaster research." Annual Review of Sociology 10 (1984): 309-330.Kreps, Gary. Social Structure and Disaster. Newark, DE. : University of Delaware Press, 1989.

Kreps, Gary (ed.). "Special issue on the boundaries of disaster research: taxonomy and comparative research." International Journal of Mass Emergencies and Disasters 7 (1989): 213-431.

Lagadec, Patrick. Major Technological Risks. Oxford: Pergamon, 1982.

Lagadec, Patrick. States of Emergency: Technological Failures and Social Destabilization. London: Butterworth-Heinemann, 1990.

Lystad, M. (ed.) Mental Health Response to Mass Emergencies. New York: Brunner/Mazel, 1988.

Mileti, Dennis. Disasters by Design: A Reassessment of Natural Hazards in the United States. Washington, D.C.: Joseph Henry Press, 1999.

Mitchell, J. K. "A contextual model of natural hazard." Geographical Review 89 (1989): 391-401.

Mitchell, J.K. The Long Road to Recovery: Community Responses to Industrial Disaster. New York: UN University Press, 1996.

Nimmo, D. and J. Combs. Nightly Horrors; Crisis Coverage in Television Network News. Knoxville, TN.: University of Tennessee Press, 1985.

Oliver-Smith, Anthony. "Anthropological research on hazards and disasters." Annual Review of Anthropology 25 (1996): 303-328.

Perrow, C. Normal Accidents: Living with High-Risk Technologies. New York: Basic Books, 1984.

Perry, Ronald. Minority Citizens in Disaster. Athens, GA.: University of Georgia Press, 1986.

Petak, W. (ed.) Special issue on emergency management. Public Administration Review 45 (January, 1985).

Petak, W. and A. Atkisson. Natural Hazard Risk Assessment and Public Policy Anticipating the Unexpected. New York Springer-Verlag, 1982.

Perrow, C. Normal Accidents: Living With High-Risk Technologies. New York: Basic Books. 1984.

Porfiriev, Boris. Disaster Policy and Emergency Management in Russia. Commack, N.Y.: Nova Science Publishers, 1998.

Porfiriev, Boris and E. L. Quarantelli (eds.) Social Science Research on Mitigation of and Recovery from Disasters and Large Scale Hazards in Russia. Newark, DE. : Disaster Research Center, University of Delaware, 1996.

Porfiriev, Boris and Lina Svedin (eds.) Crisis Management in Russia: Overcoming Institutional Rigidity and Resource Constraints. Stockholm, Sweden: CRISMART. 2002

Quarantelli, E. L. "The case for a generic rather than agent specific agent approach in disasters." <u>Disaster Management</u> 2: 191-196.

Quarantelli, E. "Converting disaster scholarship into effective disaster planning and managing: Possibilities and limitations." <u>International Journal of Mass Emergencies and Disasters</u> 11 (March 1993): 15-39.

Quarantelli, E. L. "The environmental disasters of the future will be more and worse but the prospect is not hopeless." <u>Disaster Prevention and Management: An International Journal</u> 2 (1993): 11-25.

Quarantelli, E.L. "The future is not the past repeated: Projecting disasters in the 21st Century from present trends." <u>Journal of Contingencies and Crisis Management</u> 4 (1996): 228-240.

Quarantelli, E.L. "Ten criteria for evaluating the management of community disasters." <u>Disasters</u> 21 (1997); 47-69.

Quarantelli, E.L. "Problematical aspects of the information/communication revolution for disaster planning and research: Ten non-technical issues and questions." <u>Disaster Prevention and Management</u> 6(1997) 94-106.

Quarantelli, E.L. (ed.) <u>What is a Disaster? Perspectives on the Question</u>. London: Routledge, 1998.

Quarantelli, E. L. and Alla Mozgovaya (eds.) <u>An Annotated Inventory of the Social Science Research Literature on Disasters in the Former Soviet Union and Contemporary Russia</u>. Newark, DE. : Disaster Research Center, University of Delaware, 1994.

Rosenthal, U., M Charles and P. 't Hart (eds.) <u>Coping with Crises: The Management of Disasters, Riots and Terrorism</u>. Springfield, Illinois: Charles C. Thomas, 1989.

Rosenthal, U., A. Boin and L. K. Comfort (eds.) <u>From Crises to Contingencies: A Global Perspective</u>. Springfield: Charles C. Thomas. 2002.

Scanlon, Joseph. <u>Convergence Revisited: A New Perspective on a Little Studied Topic</u>. Boulder, Colorado: Institute of Behavioral Science, University of Colorado, 1992.

Scanlon, J., S. Alldred, A. Farrell and A. Prawizick. "Coping with the media in disasters: Some predictable problems." <u>Public Administration Review</u> 45 (1985): 123-133.

Smith, C. Media and Apocalypse: News Coverage of the Yellowstone Forest Fires, Exxon Valdez Oil Spill and Loma Prieta Earthquake. Westport, CT.: Greenwood Press, 1992.

Stallings, Robert. "Conflict in natural disaster." Social Science Quarterly 69 (1988): 569-586.

Stallings, Robert. Promoting Risk: Constructing the Earthquake Threat. New York: Aldine. 1995.

Stallings, Robert (eds.) Methods of Disaster Research Xlibris. 2002.

Sylves, R. and W. Waugh (eds.) Cities and Disaster. North American Studies in Emergency Management. Springfield, Illinois: Charles C. Thomas, 1990.

Tedeschi, R., C. Park and L. Calhoun. Posttraumatic Growth: Positive Changes in the Aftermath of Crises. Erlbaum. 1998.

Tierney, Kathleen. "Improving theory and research on hazard mitigation: Political economy and organizational perspectives." International Journal of Mass Emergencies and Disasters 7 (1989); 367-396.

Tierney, Kathleen, M. Lindell and R. Perry. Facing the Unexpected: Disaster Preparedness and Response in the United States. Washington, D.C.: Joseph Henry Press, 2000.

Toft, Brian and Simon Reynolds. Learning From Disasters: A Management Approach. N. Y.: Butterworth-Heinemann, 1997.

Turner, Barry. "The social etiology of disasters." Disasters 3 (1979): 53-59.

Turner, Barry and Nick Pidgeon. Man-Made Disasters. London: Wykeham, 1997.

Walters, L., L. Wilkins and T. Walters (eds.) Bad Tidings: Communication and Catastrophe. Hillsdale, New Jersey: Lawrence Erlbaum Associates, 1989.

Wenger, Dennis and E. L. Quarantelli. Local Mass Media Operations, Problems and Products in Disasters. Newark, DE. : Disaster Research Center, University of Delaware, 1989.