

A Typology for the Classification of Disasters

Michael R. Berren, Ph.D.*

Allan Beigel, M.D.

Stuart Ghertner, Ph.D.

ABSTRACT: A model that can be used to classify various types of disasters is presented. The model allows for disasters to be classified along five criteria: (1) type of disaster (acts of God as opposed to man made), (2) duration of disaster, (3) degree of personal impact, (4) potential for occurrence, and (5) control over future impact. The point is made that the model can be utilized in identification of crucial elements of a disaster. The identification of such elements will, in turn, assist the human service provider in planning intervention activities that make sense in light of consequences (and potential future consequences) suffered by victims.

Over the past 25 years, a wide spectrum of social psychological literature has been published concerning disasters. Articles have appeared that provide descriptions of the extent of the destruction (Moore, 1958; Erikson, 1976; Glantz, 1976), assessments of the social and emotional consequences of disasters (Tyhurst, 1951; Hocking, 1970; Klein, 1974; Lifton & Olson, 1976; Edwards, 1976; Rangell, 1976; Janey, Masuda, & Holmes, 1977), and analyses of those intervention services provided to minimize the potentially devastating social and emotional consequences (Linderman, 1965; Richard, 1974; Zarle, Hartsough & Ottinger, 1974; Heffron, 1977; Duffy, 1978; Sank, 1979).

Types of disasters described include, among others, airline crashes (Duffy, 1978), fires (Linderman, 1965; Abe, 1976), mass kidnappings (Sank, 1979), tornadoes (Moore, 1958; Taylor, Zurcher, & Key, 1970; Zarle, Hartsough, & Ottinger, 1974), floods (Richard, 1974; Okura, 1975; Erikson, 1976; Lifton & Olson, 1976; Rangell, 1976; Heffron, 1977), earthquakes (Anderson, 1969; Janney, Masuda, & Holmes, 1977), and war-related events (Klein, Zeller-meyer, & Shanan, 1963; Prince, 1968; Klein, 1974).

Despite these many descriptive articles, very few investigators have focused on theoretical concepts that could provide cohesion to this important area of research. Although several authors have studied the psychological stages through which victims pass following a disaster (Tyhurst, 1951; Hocking, 1970; Edwards, 1976), their reports appear to make the erroneous assumption that all disasters are similar (disaster equivalency).

In this paper, we present the hypothesis, based on our own experiences in

**This work was completed at the Southern Arizona Mental Health Center where Dr. Berren is Director of Research and Evaluation, Dr. Beigel is Director, and Dr. Ghertner is Director of Treatment Support Services. Please address all reprint requests to Dr. Berren, 1930 E. 6th Street, Tucson, Arizona 85719.*

responding to disasters and a review of the existing literature, that to understand and predict psychological reactions to disasters one must first recognize the important characteristics that differentiate disasters from each other. It is our contention that these factors must be taken into account in planning strategies designed to reduce their emotional and social consequences.

A FIVE-DIMENSIONAL DISASTER TYPOLOGY

A study of the literature and a recent involvement with the aftermath of a disaster leads us to a formulation that describes five primary factors which can be used conceptually to distinguish one disaster from another. The five factors are

1. Type of disaster (a natural event as compared to a disaster perpetuated by man)
2. Duration of disaster
3. Degree of personal impact
4. Potential for occurrence (recurrence)
5. Control over future impact

These five factors are depicted graphically in Figure 1.

Even though the figure presents the five factors as dichotomous, they are better conceptualized as being on a continuum and are discussed from that perspective. In addition, although the typology allows for the classification of 32 types of disasters, it is quite likely that certain types do not occur.

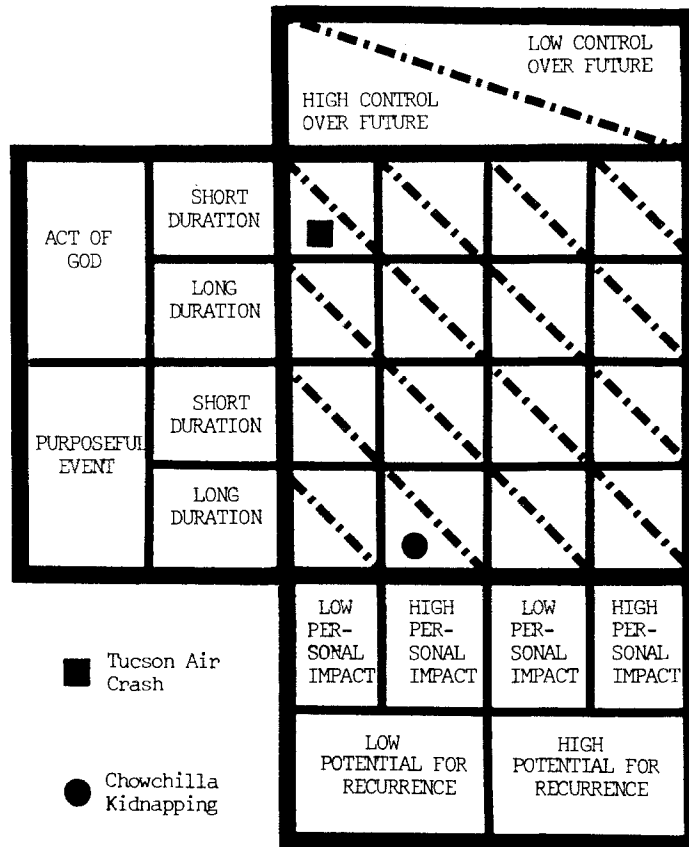
By using this typology to analyze different disasters more accurately, it is our hypothesis that it will be possible to predict (more definitively) the psychological impact of a specific disaster based on its classification. This should, in turn, lead to a better understanding of how to target interventions more specifically and effectively.

Type of Disaster

Much of the literature uses the terms "disaster" and "natural disaster" synonymously. Not all disasters, however, are natural disasters. As illustrated in Figure 1, catastrophic events can range from natural disasters or acts of God to disasters that are purposefully perpetuated by man. An earthquake occurring in a remote, primitive area is an act of God. Man has no hand in creating or intensifying the disaster. At the other end of the spectrum, the holocaust against the Jews during World War II (Klein, Zellermeier, & Shaman, 1963; Klein, 1974) or the mass kidnapping of children in Chowchilla, California (Terr, 1979), are clearly man-made disasters.

Most disasters are the result of events that fall somewhere between the extremes cited above. The disastrous flood that occurred at Buffalo Creek has been described as a combination of natural forces and man's compromising of nature (Erikson, 1976; Rangell, 1976). At Buffalo Creek, a dam collapsed and literally destroyed the town below. Reports following the dam's collapse con-

FIGURE 1
Five Dimensional Classification Typology with Two Disaster Examples.



firmed many suspicions that negligence on the part of the company controlling the dam was in part responsible, although not necessarily intentional.

Airline crashes are often the result of a combination of natural events such as bad weather and human error. The worst airline disaster in history, the collision of two jumbo jets in the Canary Islands, was a function of fog and apparent miscommunication between the control tower and one of the planes (Meisler, 1977).

Duration of Disaster

Many disasters might last for only a few seconds or a few minutes. Others are preceded by years of impending doom. The major destruction caused by a severe fire, such as at the Coconut Grove or Beverly Hills occurred within less than an hour (Linderman, 1965). Prior to the fires, the victims were not suffering from precatastrophic problems or concerns.

The Buffalo Creek flood serves as an example of a disaster at the other end of the duration continuum. The area residents, for some time, had lived with the possibility that the dam could eventually collapse. "The flood had been

part of the mental as well as the physical geography of Buffalo Creek, a feared event buried in the minds of people. The massive convulsion of the physical world that took place on February 26, 1972, was a mental imprint come true" (Rangell, 1976, p. 313). Another example of a disaster with a long precipitating history as well as duration is the famine in the Sahel region of Africa (Glantz, 1976). The preceding years of drought set the stage for the eventual and predictable disaster.

Degree of Personal Impact

Two earthquakes of equal magnitude will have a significantly different impact depending on where they occur. Similarly, a single earthquake, tornado, or flood will have a different impact upon the individuals who are classified as "victims." Some might suffer nothing more than the temporary inconvenience of living in a city piled with rubble, long supermarket lines, and poor telephone service. For others, the same disaster may result in the loss of family members or friends as well as loss of major material possessions such as a home.

This example points out that the term "victims" describes, in reality, a heterogeneous group who experience varying consequences as a result of the disaster. Furthermore, the personal impact of a disaster significantly affects both the victims' perceptions of the disaster as well as their lives after the disaster. This finding was demonstrated by Janney, Masuda, and Holmes, who in 1977 found that victims' short- and long-term attitudes related to perception of life were changed significantly following an earthquake that devastated a town in Peru. Citizens of a similar town, only 2 miles away, that was not damaged severely by the earthquake did not have these changes in attitude.

Potential for Occurrence (Recurrence)

Some disasters have a greater probability for occurrence than do others. Regardless of how fearful of flying one might feel, the probability of being in an airplane crash is extremely low. Likewise, fires similar to that which occurred at the Coconut Grove Supper Club (Linderman, 1965) are rare. Conversely, the possibility of having a major springtime flood in one of the states bordering the Mississippi River is fairly high. Although not a certainty, its occurrence is not totally unexpected. Also spring tornadoes in Texas and Oklahoma, summer hurricanes coming off the Caribbean or Gulf of Mexico, and brush fires during the hot, dry summer in the Los Angeles area occur with some regularity. All have a relatively high potential for occurrence. Although a single community cannot be singled out ahead of time as a specific target for a disaster, the chances are good that certain types of disasters will regularly occur within specific geographic regions. Thus although no one could have predicted ahead of time that Wichita Falls would be devastated by a tornado in the spring of 1979, the fact that a major tornado touched down in north Texas in the spring of 1979 was not surprising.

Control over Future Impact

There are some disasters that man has the opportunity to prevent from occurring again or at least to reduce their potential devastating consequences. A recent example took place in Tucson, Arizona following the crash of an Air Force jet 100 feet from a junior high school (Berren, Beigel, & Ghertner, 1979). Soon after the crash occurred, citizens' groups began to exert pressure on the local Air Force base to put an end to flights over populated sections of the city. The community acted in an attempt to reduce the (potential) future impact of another air disaster and was successful. Most landings over populated areas of the city were eliminated. Thus even if another Air Force jet crashes while landing, the probability of disastrous consequences to those on the ground has been greatly reduced.

In contrast, the long, dry Southern California summer creates a high risk for fires breaking out in exclusive foothill housing areas. These fires occur on a regular basis and lead to extensive damage. Although certain precautions are taken, the community is unable to reduce significantly the probability of extensive damage. Nature is too powerful a foe and man's occasional carelessness makes fires almost inevitable.

APPLICATION OF THE TYPOLOGICAL CLASSIFICATION

Jet Air Force Crash in Tucson, Arizona

On the afternoon of Friday, October 27, 1978, an Air Force 7-D Corsair II jet fighter crashed in the street approximately 100 feet from the fence surrounding Mansfield Junior High School. Upon impact, the aircraft ignited into a wall of flame several stories high. Two individuals were burned to death in their car and six others received mild to severe injuries. The crash and subsequent deaths and injuries were witnessed by over 100 students who were eating lunch on the school grounds. The noise and vibration created by the crash resulted in students and teachers running hysterically through the schoolyard and the school building. Within 2 hours, most major signs of the crash, such as ambulances, fire, smoke, and crowds had been eliminated. The Tucson crash can be classified as follows (see Figure 1)

Type of disaster The crash was more an act of God than a disaster purposefully perpetrated by man. Apparently, part of the plane's carburetor system failed and a crash landing was inevitable. The pilot was perceived by some as a hero for staying with the plane long enough to steer it clear of the junior high school. Others felt that the location of the crash was a function of pilot error since he should have ditched the plane over the desert surrounding the city.

Duration of the disaster. Within 2 hours after the crash, most evidence that a disaster had taken place was gone. Only a charred airplane and two burned parked cars remained in the street. A meeting previously scheduled for that evening in the school auditorium was held. By the next morning, the jet and two cars had been removed and the street was being repaved.

Although the crash and resultant fire lasted for only approximately 35 minutes, the panic of students wanting to call their parents and the behavior of terrified parents attempting to get

through police lines to find their children continued for several hours. Compared to natural disasters that have destroyed entire communities and left hundreds homeless for long periods of time, the major consequences of this disaster were relatively short in duration.

Degree of personal impact. For the students, the personal impact of the crash was minimal. Although it is true that immediately after the crash, many students were traumatized and hysterical, only one student was injured. Even though the crash could have resulted in numerous fatalities and massive property loss, the students never faced any real danger nor did anyone have any major material losses since the plane landed on a side street and missed the school. In comparison to other airline crashes, the Tucson crash would have to be classified as being of moderately low personal impact.

Potential for occurrence (recurrence). The probability of any air disaster is extremely low and the probability of a crash occurring at a particular spot (i.e., next to Mansfield Junior High School in Tucson, Arizona) is infinitesimal. The occurrence was highly unlikely and the probability of these individuals being victims a second time is extremely remote.

Control over future impact. Parents of students at the school and citizens in the community had the opportunity to reduce the even minimal chance of an air force jet crashing again in the vicinity of the school or a populated area. Through the political process, numerous hearings, and a major investigation community pressure was placed on the local Air Force base to change their landing approach patterns over the city. Prior to the crash, the approach pattern ensured that virtually every plane landing at the Air Force base (approximately 175 a day) flew over the junior high school, the University of Arizona, and other densely populated areas of the city. Use of an alternate pattern resulted in a 75% reduction in the number of low-flying Air Force jets over the junior high school and other populated areas. Thus with this particular disaster considerable opportunity existed for exerting control and preventing similar disasters.

Mass Kidnapping of School Children in Chowchilla, California

On July 17, 1976, 26 students and a school bus driver were kidnapped by armed bandits wearing ski masks. The ordeal lasted over 27 hours during which time the children and bus driver were taken on an 11-hour bus ride and then buried alive in a large truck. After hours underground, the children and bus driver were able to dig a tunnel to the surface and escape. While they were captive, the children had no access to restrooms or food. Many of the children believed that death was imminent (Terr, 1979).

Type of disaster. The kidnapping was obviously a disaster perpetrated by man. The kidnapping was well planned and the ultimate goal of the kidnappers was apparently extortion.

Duration of disaster. The kidnapping lasted just over 27 hours from the time of initial contact with the masked bandits to eventual escape. During their captivity, the victims could not escape from the reality of what was happening and that death was a distinct possibility. The intensity of the situation did not lessen during the 27 hours and, as time passed, the situation became more frightening.

After they escaped, the major part of the disaster was over. Although there was no long-term clean-up phase, as in a tornado or earthquake, the 27-hour ordeal should still be considered a fairly long-term event.

Degree of personal impact. The children experienced an extraordinary amount of emotional trauma during the kidnapping. Many thought they would either be shot or suffocate underground. Most expressed the concern that they would never see their families again. Physical suffering was less severe and most physical problems (cuts, scrapes, bladder infections, cramps, etc.) were readily treated.

A second set of victims, the parents, also suffered mental anguish during the time of their child's captivity. They had no idea whether they would ever see their child alive again. Most parents reported dwelling on images of the last moment they had seen their child on the morning of the kidnapping. Even though there was no loss of life or loss of major possessions, the kidnapping was a disaster that had high personal impact for the victims.

Potential for occurrence (recurrence). Kidnappings, especially mass kidnappings, are rare events. The probability of these students or even this community being faced with a second kidnapping would have to be considered remote. The victims were not kidnapped because of their political views, their race, or religion. The children were not even from wealthy families. They had no characteristics that would have predicted their mass plight and they had little in common except for living in the same town and being in the same school bus at the same time.

Control over future impact. Even though the chances of a second kidnapping are extremely low, many families modified their lives to reduce the probability even further. Some parents began driving their children to school. Others talked about moving from Chowchilla (which in reality would do nothing other than reduce the slight risk of being kidnapped in Chowchilla and increase the slight risk of being kidnapped somewhere else). Despite these actions if someone wanted to kidnap any of the children again, they could probably do so. Consequently, there is relatively low control over future kidnappings.

DISCUSSION

Recognition of the importance of providing crisis intervention and follow-up support after disasters is increasing. Newspaper and professional accounts testify to the community need for the intervention steps taken by local mental health associations, mental health centers, the Red Cross, and other human service providers.

This classification model can be utilized to identify crucial elements of a disaster and to assist human service providers in the planning of their intervention activities. A paper in preparation will describe specific courses of action that might be taken based on particular disaster classifications.

A limited example of how the typology can lend itself to identifying specific appropriate courses of action, however, can be seen by comparing the classification of the Tucson air crash with that of the Chowchilla kidnapping. Based on the analysis that the classification typology yields, the two groups of children required different initial intervention activities.

The Tucson children, due to the low personal impact of the disaster, were accepting of group discussions (coordinated by the local mental health center) the day following the crash (Berren, Beigel, & Ghertner, 1979). The classroom discussions, both didactic and experiential, were designed to clarify facts and feelings related to the crash.

It is unlikely that a similar course of action would have been wise in the case of the Chowchilla children. The intensity of the individual trauma suffered suggests that one-to-one intervention would be a more logical first step and that ongoing therapy would be required for some of the victims.

For some disasters, where prevention or reduction of future impact is feasible, mental health intervention services might be oriented toward consultation and education services that can assist others to take steps necessary to

reduce the potential impact. For example, following the Air Force jet crash, the emphasis was on community effort to eliminate planes from flying at low altitudes over the city. The low need for mental health services to reduce the degree of personal impact allowed resources to be used for this purpose.

In other instances, priority for intervention services should not be oriented toward this type of activity. Fire survivors and their relatives will be less benefited by or interested in this kind of intervention and are more likely to require direct services to help them deal with their grief and other emotions arising from the disaster.

Using this typology as a framework, the authors are in the process of completing a second paper for publication that will clearly delineate what kinds of mental health intervention strategies are most appropriate for each major type of disaster. This second paper will, in addition to discussing service implications of disasters, elaborate on the process of classification by analyzing a great number of major disasters that have occurred over the past two decades.

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