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THE NORC RESEARCH ON THE ARKANSAS TORNADO:
A FOUNTAINHEAD STUDY

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INTRODUCTION

The three volume, 960-page report, entitled *Human Reactions in Disaster Situations* issued in 1954 by the National Opinion Research Center (NORC) at the University of Chicago, is a classic. Not because it has been widely read, for very seldom do I encounter anyone who has ever even seen a copy of the publication, much less perused it. Not because its specific contents are very well known and used as a starting base in current disaster research scientific circles; for different reasons the various summaries and inventories of disaster findings have not presented any of the data or findings, except by Barton who gives some limited and selective material in his now two decade old book, *Communities in Disaster* (1970, pp. 130-138). And the NORC work, whether generally or specifically, is very seldom cited in the present day disaster research literature, and extremely few libraries have copies of the report.

Rather our argument is that the publication is a classic for two other reasons: 1) it primarily reports on what, by most criteria which could be used, is **still** the best survey study so far undertaken in the disaster area, and 2) because of the mostly unrecognized but highly significant influence the NORC work had on the historical development of disaster studies in the United States and on how much of the current research in the area is conducted.

In this review and analysis of the research effort in the disaster area by NORC we shall present: (1) the general background of the work; (2) the nature of the field research undertaken; (3) a selective summary of

the substantive focus and findings from the largest single field study within the NORC work, namely on the Arkansas tornado; (4) a brief overall assessment of the research done, and (5) some of the important consequences of what NORC did in the disaster area.

BACKGROUND OF THE RESEARCH

Near the end of World War II, the U.S.A. military commissioned social scientists to conduct survey studies on social and psychological consequences of the Allied bombing on German civilian morale. Contrary to expectations, the overall substantive finding was that the population had not broken down under the extreme stress of massive air raids (*U.S. Strategic Bombing Survey* 1947). However, equally as important for the future development of disaster studies was that the military became aware of social science research.

In the years immediately after World War II, U.S.A. military organizations started to raise questions of how the American civilian population might bear up in the future to the possible first direct air attacks on the American continent. There was also strong interest, given that any new conflict would probably involve the use of atomic bombs and perhaps even chemical weapons. In fact, initial concerns seemed to be strongest among the Medical Division of the Chemical Corps who "agreed that 'gas' owed much of its power as a weapon to the psychological aspects of its use...all this led to the conclusion that every advantage should be taken (for research purposes) of uncontrolled and unplanned situations in which toxic agents lead to large-scale death and injury" (Dill 1950, p. 1). Thus, while the overall conclusion of the Strategic Bombing Survey was ignored, it was accepted that worthwhile studies could be done to learn about social psychological factors associated with civilian as well as military reactions to new weapon systems (see, e.g., *Symposium on Psychological Research in the Chemical Corps* 1948).

In October 1948, a combination of hazardous chemical fumes and a temperature inversion generated a concentration of sulfur dioxide which over a period of several days killed 25 persons and sickened about 43 percent of the 13,600 residents in Donora, Pennsylvania (Townsend 1950). Personnel from the Chemical Corps Medical Laboratories of the Army Chemical Center (ACC) in Edgewater, Maryland noted that some

residents of Donora not directly exposed to the smog exhibited the same kind of physical symptoms as had victims who had been directly exposed. This was a puzzling observation and suggested that social psychological factors were operative.

Therefore, persons associated with the ACC approached NORC in 1949 and suggested doing an in-depth social science study of the Donora episode. But as we have written elsewhere (Quarantelli 1987), in initial meeting it was decided that the recruitment and training of a field force to do a retrospective study would take too long to produce the necessary data, and even if the work was done, the results might be questionable because of the time lag. Instead, it was agreed that what was necessary was the development of a preliminary field research design and the assembling of a trained staff ready to move into a disaster stricken community as soon as possible after impact.

Thus in January 1950, the ACC entered into a contract with NORC to draw up a master plan for the study of disasters. This plan was formulated and then thoroughly reviewed at a small conference held at the Medical Division, ACC, on January 30, 1950 (*Conference on Psychological Aspects of Disasters* 1950). In general it provided for the recruitment and training of a social science field research team which would be ready to move on a few hours' notice into a disaster-struck community in order to interview a systematic sample of victims. With the plan's acceptance a second contract was given to NORC.

By July 1950, a team of part-time interviewers had been recruited and trained. Partly for the field experience and also to gain substantive cues, the interviewers practiced gathering data on small scale, minor emergencies such as apartment and hotel fires, etc. During the first year, there occurred no community disaster of suitable magnitude to warrant the full scale field study specified in the master plan. Yet lessons learned from the smaller emergencies studied seemed useful, so the ACC during the second year provided funding for about six field trips on moderate size disasters, while the field team remained in readiness for a major disaster. The revised plan proposed by NORC partly reflected a reaction to criticisms of the survey questionnaire design that had been presented to the ACC; psychiatric consultants to the ACC had urged that there should be more on-the-scene field work and that the research techniques used be more open ended.

It was a very unusual research procedure for NORC to have a special standby field team. For its standard surveys, NORC used experienced part-time interviewers at sample points all over the United States. However, it was felt that a standby field team of interviewers specially trained to do a disaster study was necessary for the proposed research. It would be too difficult and too slow to bring a number of the regular survey interviewers to a disaster site. Perhaps more important, they would not have had the extensive training necessary to administer a very long questionnaire composed mostly of open ended questions ranging over a variety of topics, some of which called for intensive and subtle probing.

In its initial recruitment of part-time (20 hours a month) interviewers--who numbered 17 over a year's time--NORC opted for graduate students from different disciplines in the social sciences. While some were drawn from psychology and political science, most were from sociology. Of the seven-person team who actually did the later data analysis, four were sociologists; the other three were from psychology, anthropology, and lay psychoanalysis. (I write this article from the perspective of being first hired at NORC as a part-time interviewer in 1951. Then I became a full-time research assistant as one of the multidisciplinary team assembled, and stayed through most of 1954 until the final report was written. In addition, during this time period I had some special responsibilities ranging from being a "troubleshooter" field interviewer, to monitoring the transcription operation of the Arkansas field tapes).

Eventually NORC undertook eight field studies including a very large scale study of a major disaster associated with the March 21, 1952 tornadoes in central Arkansas. In May 1952, the ACC extended the NORC contract. (See the report on the January 1952 *Conference on Field Studies of Reactions to Disasters*, 1953 where details of the extension are discussed). The new funding allowed a full processing of the field data gathered, an intensive data analysis, and the writing of an extensive final report which was completed in late spring of 1954.

The initial proposal and early stages of the work were developed mostly by Shirley Star, a sociologist who had supervised earlier large scale surveys in the U.S.A. on the mental health knowledge of the population. The overall supervision after all of the field data had been

gathered was given to psychologist, Eli Marks. However, Charles Fritz, an advanced graduate student in sociology, who had joined the project at its inception, directed the day-to-day operations of the field team, and had the most input into the data analysis procedures and the drafting of the final report.

The development of the master plan and questionnaire cost about \$1,000. The second year funding including the study of the Arkansas disaster was budgeted at around \$30,000. In totality, all the NORC work extending nearly five years (1950-1954) and involving eight field studies cost between \$50,000-\$60,000.

THE FIELD RESEARCH UNDERTAKEN

The eight different disaster occasions studied by NORC field teams included an air show plane crash in Flagler, Colorado; a series of house explosions in Brighton, New York; the West Frankfort, Illinois mine explosion; the Bakersfield, California earthquake; three consecutive plane crashes in three months in Elizabeth, New Jersey; a plant explosion in St. Paul, Minnesota; a carbon monoxide asphyxiation incident in Chicago, Illinois, as well as the Arkansas tornadoes. Although the three-volume report being discussed in this article reports on all these occasions, our discussion in this article will confine itself to the last disaster since its study was by far the major effort undertaken by NORC (for publications on other aspects not included in the NORC volumes, see for example, Bucher 1954, 1957; Endelman 1967; Fritz 1954, 1957; Fritz and Marks 1954; Krauss 1955; Quarantelli 1953; Schatzman 1960)

On March 21, 1952, a series of devastating tornadoes struck nine southern states, killing 231 persons and seriously injuring 1,829 others. The state of Arkansas was hardest hit and within it, White County, where a total of 46 persons were killed and 615 were injured, along with the destruction of over 650 buildings and the damage of another 830, with estimated loss of property being over \$3,500,000.

NORC conducted 342 interviews of a randomly area drawn and weighted sample of the pre-impact population in five communities in the center of the county. Out of the original preselected sample of 372 dwellings unit, there were only 30 uncompleted interviews--ten because the dwellings were vacant the day of the tornado, seven because of a

refusal to be interviewed, six because respondents had moved out of the area, one because the selected respondent had been killed in the tornado, etc. Of the 362 basic cases, interviews were completed for 342, that is, 94 percent (for a discussion of the more technical aspects of the area, cluster and probability sampling involved see pp. 9-12 and 204-211 of the NORC report).

The localities selected ranged from a town that had almost been totally destroyed and suffered 35 killed and over 400 injured, to a small nearby city which had suffered no serious damage or casualties, but had been heavily involved in the post-impact relief efforts in the county. In addition to the regular sample of the general population, special interviews were also conducted with 81 individuals who played key roles in rescue, medical control, relief and other organizational responses to the disaster. The field work took place over a 23-day period and was carried out by 26 mostly temporary but specially trained NORC staff members who averaged 12-15 hours of work per day.

The field interviewers used a slight variant of the unstructured interview guide that had been prepared earlier during the course of the training and exploratory work undertaken in Chicago. The guide for regular respondents had 44 general questions (but a majority had numerous sub-questions) plus 18 census type items; the guide for special respondents had 27 questions plus 20 organizational and census type items. The substantive thrust of the questions for regular respondents are discussed below.

All of the regular and special interviews were tape recorded and later transcribed into typewritten protocols. Since the average length of the unstructured interviews was a little over an hour and a half, the transcripts averaged 29 pages per interview. All typed transcripts were checked against the original tape by NORC staff members who had been part of the field team, a task that took more than 1,500 hours (for procedures and problems in transcribing tapes see Bucher, Fritz, and Quarantelli 1956a, 1956b).

Systematic codes for the general sample cases were constructed. In part because of the unstructured nature of the interviews, this proved to be very complicated, took a long time and involved a series of practical compromises (see pp. 17-22 of the NORC report for some of the problems involved). Each interview protocol was then subjected to

detailed examination and double coded, with the coded data being transferred to IBM cards for statistical analysis. Coding time, apart from the reconciliation required by the double coding, averaged 6-8 hours per case. In the final tabulation, 297 cases (139 from impact localities and 158 from nonimpact localities) were used; technical reasons having to do with weighing and contingency problems such as some respondents from impacted localities being away from the area the day the tornado hit, led NORC to drop the other cases from the final set used for coding and tabulation (see pp. 21-25 in the NORC report for a discussion of the rationale for the procedure used).

SUBSTANTIVE FOCUS AND FINDINGS OF THE ARKANSAS STUDY

The findings in the report cover eight different areas. The first two areas, presented primarily in descriptive terms based on frequency distributions (but profusely illustrated with long quotations from interviews) cover: (1) the immediate pre-impact and impact behavior of individuals and (2) the immediate post-impact (first 24 hours) behavior and the later post-impact (the next three weeks) of both victims and those not victimized but in nearby areas. Then there are four somewhat more analytical parts examining through mostly cross tabulations of the frequencies, certain factors which may have affected the behavior. Cross tabulations were made and reported with respect to **background** factors (primarily forewarning, disaster related skills, and previous disaster experience); variants in the **social situation context** (mostly presence or absence of other persons); **different role responsibilities** (almost exclusively with respect to household roles); and **degree of victimization** (this term is not used but exposure to danger and losses were examined). Another part looks at what are called restorative activities; this is primarily a description of certain medical, control, relief, media operations and community services as seen mostly from the perspective of the victims receiving the services. A final part pulls together the findings from the Arkansas study with the observation from the other NORC field studies and advances comparative generalizations.

The above general summary of content focus somewhat obscures the details presented in each section. For instance, chapter 2 provides infor-

mation on the social background and social setting of both impacted and nonimpacted respondents. In addition to demographic and background characteristics ranging from church attendance to prior disaster experience, there is a descriptive account, buttressed by 37 tables, of the spatial locations of the respondents at the time they were impacted, the ongoing and routine activities interrupted, the number and sex/age composition of households at the time of impact, which significant household members were absent at impact, the pre-tornado physical and/or emotional incapacitation of any member of the household, etc.

Chapter 3 gives a description of the behavior and reaction of the individual in the immediate pre-impact period (about 15 minutes) and the response of the person during the impact period (about 5 minutes). Included is the amount of forewarning of the tornado the respondent had (differentiated by each of the four major impacted localities), the pre-impact storm cues perceived, the definitive cues used to perceive it as an unusual event (differentiated by amount of forewarning had and also according to the four major impacted localities). There is a depiction differentiated by amount of forewarning respondent had the nature of the predominant pre-impact activities undertaken (e.g., investigatory behavior, precautionary activity, giving protection to others, protecting self--or self with others, protecting property, and receiving protection from others, etc.), the nature of the precautionary-protective actions taken, and the specific protective actions attempted (e.g., taking cover in a particular location inside a structure; placement of self and with relation to objects with protective goal--for instance, under table; going to storm cellar or comparable structure; going inside a structure from outside location; getting inside a vehicle; huddling together with others in mutual support; protecting self by particular body positions; other goal-directed protective flight such as going outside to get into a ditch, and the pre-impact precautionary-protective activity differentiated by amount of forewarning.

The Immediate Pre-impact Situation

From a substantive point of view, the following are illustrative of the findings reported. The tornado struck the sampled area between 5:30 and 5:45 p.m. when three quarters of the respondents were in their own

households with almost all members present. Less than 5 percent of the residents had heard forecasts of tornadoes earlier in the day, but most persons noted the cues of an approaching storm. The vast majority assimilated these cues to a "usual bad storm" definition (although the county was in "tornado alley", only about a third of the population had ever directly experienced a previous tornado). In general there was no realization of danger until demolition began, i.e., houses began coming apart or windows started breaking. About one third of the population had no warning at all, about a third had less than a minute that it was going to be more than bad storm, and the remaining one third had over one minute's warning.

The most common action in the immediate pre-impact period was investigatory action with persons attempting to assess the severity of the storm. There was frequently a considerable amount of social interaction centering around the meaning of weather cues, and in general, those who interacted with others tended to arrive at a definition of threat more quickly than those who did not. A substantial proportion of the population began also to take precautionary measures, e.g., closing windows and doors. Some parents began to round up their children or otherwise see that they would not be too greatly exposed to danger.

Self control was generally maintained. No one broke into panic flight, became markedly hysterical, or showed any great incapacity to act. Almost all activities were oriented towards persons (self or others); few took any action towards property. In general, the greater the length of the forewarning, the more precautionary-protective actions were taken. Just prior to the impact of the tornado, people began to sense that something unusual was happening and began looking around and even more intensively discussed the situation with others around them.

The Impact Situation

In the descriptive analysis in the NORC report, reactions and responses of respondents during the impact period are set forth by depicting the state of definition of the situation by respondents at the time of impact, the persons or material objects perceived as threatened during that time period, the specific nature of the threat (e.g., collapse of structure or fallen parts, flying debris, actually being blown away, danger of fire,

being struck by lightning, health state aggravation, etc.) and the perception of the tornado effects (upon structure, self and others).

Also included are the respondent's observation of the behavior of others differentiated as to whether they were male, female or children (e.g., engaging in precautionary-protective activity, giving protection to others, receiving protection from others, experiencing great affect and/or uncontrolled behavior, praying, experiencing affect but behavior controlled, calm and collected, stunned and dazed, investigating, immobilized, unconscious, acting towards property or respondent alone), as well as affective reactions during impact differentiated for males and females as well as by amount of forewarning had (e.g., highly agitated state but behavior controlled; highly agitated state involving uncontrolled behavior; highly agitated state with degree of control unstated; mildly agitated state but behavior controlled; mildly agitated state with degree of control unstated; confusion and bewilderment, shocked and dazed, shocked and dazed due to physical concussion, unconscious, calm and unexcited, anger and resignation, etc.). Detailed too are the initial types of actions taken by respondents during the impact period differentiated by amount of forewarning and if male or female respondent (e.g., protecting self or self with others, taking precautionary actions, giving protection to others, investigating behavior, receiving protection from others, immobilization, expressive behavior, inhibitory reaction, protecting property, etc.), the relationship of the initial activity taken and later predominant behavior, the full range of the specific precautionary-protective actions taken in impact, the cues used by impacted respondents to determine the end of impact, etc.

Substantively, the following are illustrations of what was reported. At impact almost all individuals changed their definition of the occasion from an unusually bad storm to something of disastrous proportions. Not all immediately labeled it a tornado, but all nevertheless thought of it as something threatening death or injury and felt themselves and those with them to be in considerable danger. A chief concern seemed to be that the house in which they were located would collapse on them; less frequently that the structure itself would fly away. Almost everyone in the localities hit by the tornado had a "near miss" experience in the sense that they perceived that the structure in which they were located was disintegrating or shaking very badly. Around 30 percent of impacted

respondents were knocked down; another 18 percent got hit by the flying debris. In a few instances individuals were completely blown out of their houses, but only 3 percent reported being completely trapped in debris.

People were frightened, in most cases quite badly, but almost everyone maintained self control. Very few individuals were so dazed or stunned as not to be able to act. Most persons in the same situation were seen as acting in a controlled manner--frequently acting to protect themselves and others. Men were seen as being more active than women. Most of the few reported instances of loss of self control were on the part of children.

The first action taken during impact was generally of a protective nature, of self and/or others. Usually it was not a complex action, but rather elementary such as dropping to the floor or huddling over children. In many instances such behavior was taken in common with other persons present in the same situation. The initial action taken in impact tended to be continued as the predominant action during the rest of the period. There was no hysterical breakdown, no panic flight, and no affective immobility. Nearly all persons tried to do something to protect themselves and individuals with small children or elderly persons around them, attempted to protect them. After taking elementary behavioral precautionary-protective actions, about one third began to pray. Except in instances where sections of the house started to cave in or began to blow away, there was little moving around. Overall, most actions taken were adaptive to the particular impact situation for the involved individual.

The Immediate Post-Impact Situation

Immediately after impact there was an initial tendency to localize the disaster as having occurred only in one's own neighborhood; slightly later, only in one's town or area. However, as outsiders came in, especially those looking for relatives, residents of impacted localities learned other areas had been hit. This underestimation of the severity and extensiveness of the tornado was even more true of persons outside of the stricken localities where over three quarters first learned of the disaster elsewhere, when told by others.

Most persons who had experienced the tornado impact reported that they were quite psychologically shaken after it was immediately over.

However, they maintained overt self control and attempted to do what they thought was called for by the situation. Almost no individuals were so disturbed that they needed someone to take care of them.

Literally just minutes after the tornado had passed, individuals started to extricate themselves from the debris, looked around at what damage had been done, and talked over the situation with their neighbors. As it was observed or learned how extensive the tornado was, those persons with relatives nearby began to hunt for them. Others, after they had assured themselves of the safety of their families, turned to help the community in general. Rescue work was rather rapidly (although somewhat confusedly) initiated wherever it was needed by those people who happened to be in the vicinity. When seriously injured were found, they were sent off for medical attention by whatever means of transportation were available. For about six hours, persons in the impact areas primarily worked at searching and rescuing and giving emergency help to one another, with men being considerably more active than women in such activity.

Family oriented activity took precedence over other behavior. As long as individuals were searching for or had to take care of their own families, they gave little attention to other activities. Almost no one reported interest in property at this time period.

After midnight, most tornado oriented activities were discontinued. Respondents who had undergone impact had by that time found temporary living quarters and went to bed or attempted to rest. Most of the persons from outside the impacted localities who had come into the stricken zones returned home. Even formal organizations (who by this time were operating throughout the county) sharply curtailed their activities except for those groups that had taken over rescue work.

Searching for relatives was an individual or family household activity undertaken by 45 percent of impacted respondents. Very few people were located by organizations, partly because it took some time to set up operations. Eighty-four percent of searchers had located by midnight all persons sought. Most respondents initially confined their searching to their own immediate block or neighborhood, but as the extent of the tornado was realized, the area of search was extended.

Early rescue activities were undertaken by about a quarter of locally impacted people, almost all males, in small informal groups (only 3

percent acted alone and half worked with strangers). These activities were quite unsystematic because they were initiated with the idea of digging out, as quickly as possible, victims who were known to be trapped at particular locations. More systematic and extensive work was only undertaken by formal organizations such as the National Guard which moved in around midnight and took over more subsequent rescue work. The sight of the dead and injured was reported as traumatic and disturbing by many of the earlier rescue workers, although it did not seem to have limited their efforts.

The Later Post-Impact Situation

The later post-impact behavior of respondents is described in detail in chapter 4 where 52 tables are presented. This is divided into the reaction of individuals the night of the tornado until the next morning (about a 12-hour period), and the later post-impact period (about a three-week period). In almost all cases, a differentiation was also made between those who lived in impacted localities and those who lived outside with questions and answers adjusted for that matter (e.g., ways in which non-impacted respondents learned about the tornado, their assessment and timing of tornado definition, and the degree of their accurate assessment about the extensiveness and/or severity of the tornado which is then contrasted with the assessment and time of tornado definition made by those within impacted localities, and the ways in which impacted respondents learned of tornado impacts elsewhere, etc.).

Considerable detail is provided in the report as to the orientation of major activities by respondents according to different time periods. For example, Table 4-6 depicts the percentage of impacted and impacted respondents who acted toward persons (e.g., self and self with others, household-kin present, household-kin absent, non-household kin, intimates, community generally) and towards property (own, non-household kin, intimates, generally), differentiated as to whether actions took place in first half hour, in the next six hours--from 6 p.m. to midnight, and from midnight to dawn the next day. Also reported are types of major tornado oriented activities differentiated by the same time periods (e.g., respondent performed emergency relief, searched for missing, conversed with others, assessed property damage, undertook rescue

actions, provided medical help; or respondent was recipient of emergency relief, rescue or medical help; etc.).

Substantively, the NORC report notes that although relatively few deaths occurred, most individuals in impacted localities knew at least by sight or by name someone who was killed, this knowledge being acquired rather early. A substantial proportion of the individuals who had undergone impact, had sustained injuries (over 40 percent). However, most of these injuries were of a relatively minor nature, not requiring hospitalization or otherwise seriously incapacitating the victims. Only 9 percent of rescuers reported giving and/or receiving first aid. Property losses were very extensive. About four fifths of the respondents in impacted localities reported destruction of or major damages to their homes. For the most part, these residents owned their own homes and had little insurance to cover the losses. In addition, of course, many lost much of their household furnishings. Other losses, although frequently substantial, were not seen as serious deprivation. Disruptions of work routines (40 percent of impacted respondents), cooking-eating routines, household routines, etc. while frequently noted, were considered minor in view of the loss of lives and/or destruction of homes in the community.

Specific emergency time activities of respondents are also spelled out in detail. Particularly examined were search activity, rescue activity (which is separated from search), giving and receiving first aid and the obtaining of immediate temporary shelter. Under the topic of searching there is a depiction of the relationship of the persons who were the object of searching activity, the results and types of search undertaken, conditions which were perceived as impeding searching, and the elapsed time between impact and the knowledge of status of objects of search. Also discussed are the respondent's role in rescue activity, the social relationships of members or rescue groups, and the social relationship to persons that respondent tried to rescue, traumatic and disturbing aspects of finding dead and injured in searching and rescuing activity, and explicit blame and praise about rescue activity. Information about temporary sheltering covers the type of respondent's first temporary shelter (e.g., staying with relatives, intimates, particular known others, strangers, etc.), location of initial shelter differentiated by degree of damage to respondent's house, differences between first and second temporary sheltering, duration of time spent in shelters, etc.

Illustrative of the data obtained was that two-thirds of those in impacted localities obtained temporary shelter from kin in nearby areas. About a third of the homeless moved to a second temporary shelter with other relatives and some of them managed to get quarters of their own (e.g., trailers or tents). About half of impacted respondents were still living in such shelters at the time of the NORC field work; half defined it as a bothersome situation. The shelter problem on the night of the tornado was one that was met by other individuals. Almost no one who needed living quarters, either impact night or later, sought or obtained shelter through any formal group.

Relatives helped disaster victims in other ways--e.g., in debris clearance and salvaging of property. However, most relief and rehabilitation aid after the first night was given by formal organizations such as the Red Cross or the Salvation Army. Major exceptions to this were shelter, debris clearance and salvaging of property which were attended to by the victims with the help of friends and relatives.

The information obtained about the later post-impact period focused on four general topics: socio-physical tornado consequences, relief aid, physical and mental health effects, and perceived changes in behaviors as a result of the experience. Data are provided on the total number of non-household kin killed, the nature of injuries to respondents and their spouses, the social relationships of respondents to persons who suffered major and minor injuries, major property losses sustained, what domestic routine and work disruptions occurred as well as what expenses were incurred and what income was lost as a result of the tornado. Also reported are the selected relief and rehabilitation activities performed for self and household members, the nature of relief and recovery aid received from other individuals, and the nature of aid provided by impacted respondents to other victims.

Detailed also are physical and mental health consequences of the disaster such as the pre-tornado ailments aggravated by the event, acute physiological-psychosomatic reactions reported as well as protracted physiological-psychosomatic reactions, affective psychological disturbances, and cognitive psychological disturbances; also what was seen as worst or most upsetting generally as well as the most specific aspect of the experience, and the respondent's overall sense of deprivation differentiated by impacted localities. In addition, information is provided

on what respondents learned from the experience and how this would affect their plans for future threats, the causal explanation offered for the tornado happening, what changes in values and social relationships had occurred in the month after impact, perceived changes in victims generally and children specifically, and respondents plans about rebuilding as well as what they say as the community opinions on the matter.

Examples of substantive findings were that severe mental health problems did not appear although a great number of individuals--both those who had directly undergone impact and those who had not--reported psychological or psychosomatic reactions. Among those directly impacted, while 81 percent said they had no acute reactions, 68 percent indicated protracted reactions such as 49 percent who reported nervousness, 46 percent sleep disturbance, 19 percent loss of appetite, and 19 percent headaches. Some reactions only occurred post-impact night but many effects were still present three weeks after impact. However, it was widely reported that few of the reactions were particularly debilitating or incapacitating.

Some individuals felt that they had changed their values (21 percent said their religious convictions were strengthened), learned something new (32 percent of impacted respondents said they were most sensitive to storm/tornado cues), or acquired different social relationships as a result of their tornado experience (16 percent said they were closer to kin and friends); others reported a slight increase in community solidarity. While relatively few changes were noted, of those that were, almost all were of a positive rather than negative nature.

More than two-thirds of victims who had property losses intended to rebuild. There was also a general feeling that the various stricken localities were going to likewise build back. Almost no one felt that rebuilding was useless or impossible, although about 19 percent questioned their ability to do so without financial assistance.

No one event or happening was singled out with great frequency as the worst or most disturbing aspect of the experience. Even searching for relatives, a matter of very great concern right after impact, was infrequently reported as the worst part of the experience. The mass funeral ceremony which was held, was mentioned by almost no one.

Despite large property losses and considerable injuries, only 3 percent of impacted respondents felt they had suffered very great overall

deprivation. Comparisons were made as to what could have happened otherwise (like being killed) or to what had happened to others. In general, the disaster was seen as due to natural forces for which no one could be blamed. Similarly, victims accepted the disruption of community services as an inevitable consequence of the disaster and not major deprivations.

While some descriptive narration is provided in the NORC report about the relief and restorative activities of organizations, most of the data given on assistance and help is on the perceptions and actions of individual respondents in both impacted and nonimpacted localities. With respect to the medical area, information is provided on such matters as the respondent's role in medical activity, the social relationship to hospitalized victims, the perceived role of outside communities in providing hospital and medical help, and favorable and unfavorable comments about the medical aid available after the tornado. Data are given of the views of respondents about social control aspects and agencies; reported are perceptions of the attitudes about outsiders who came into the impacted localities, looting losses sustained, evaluation of looting stories circulating in the area, the social characteristics attributed to looters, attitudes towards the National Guard and the state patrol, etc. Information is also provided about what aid was received from which relief agencies, what volunteer activities were undertaken with various organizations, evaluations of the actions of relief groups, attitudes and reactions about the specific operations of the Red Cross and the Salvation Army, the evaluation respondents comparatively made of the different responding relief groups, etc. Data are provided too on the major sources of general information that respondents used, and the means they used to communicate with one another in the post-impact period.

As substantive examples, the NORC report notes that evaluation of the medical care by both impacted and nonimpacted respondents was overwhelmingly favorable in nature. The amount of negative comment was extremely low; only 4 percent of impacted and 3 percent of nonimpacted respondents. There was widespread agreement, including by hospital personnel, that patients from the tornado areas were very calm, quiet and undemanding.

The tremendous convergence from outside into the disaster area was widely noted, as well as that it created major traffic problems and

hindered relief efforts. Tornado victims generally distinguished between those who they saw had legitimate reasons for being in the area (e.g., kin and friends or volunteers in rescue and relief efforts) and those who were seen as mostly sightseers. Persons in the latter category were more frequently singled out for condemnation.

Only 9 percent of the sample population reported that they had lost property (business and/or non business) which they felt **might** have been looted, and the value of the items was quite small. However, 58 percent of respondents in impacted localities and 52 percent of the nonimpacted sample had heard stories of looting; about half in each case thought the stories were true although very few reported they had directly seen instances of looting or actions of social control agencies which they thought indicated the presence of looters.

Over a quarter of the nonimpacted respondents reported some household member did volunteer work with relief organizations. Evaluations of relief were generally favorable in nature although a distinct majority of victims received **no** organizational aid. There was higher assessment of the Salvation Army than of the Red Cross with praise of the former almost universal among the impacted respondents. While the Red Cross received a higher percentage of favorable comments than unfavorable ones, it received more unfavorable criticisms than any group providing relief help, mostly centered around its slowness in providing rehabilitation aid and its bureaucratic procedures.

Word of mouth communication was the major source of information for most persons. This was true immediately after impact and also in the later period; the mass media, newspapers and radio, were relatively unimportant except in providing a general overall picture of the disaster impact as over against specific details. Informal communication and direct perception were the principal means of discovering the falsity of reports circulating in the area.

While the above are primarily descriptive findings of frequency distributions reported in 136 tables in four chapters of the report, there are more analytical findings from cross-tabulations reported in another 126 tables in four later chapters. As illustrative of the results reported are the following.

Background Factors

With a longer period of forewarning, there was the greater likelihood of persons taking actions oriented to the threat before the storm actually hit, and also a greater frequency of actions taken to protect oneself and others during impact. Respondents with disaster-related skills or training perceived the threat of an impending disaster earlier, behaved with greater self control, and displayed more adaptiveness and active orientation to others than did individuals without such skills, even though they had as intense emotional reactions of all kinds as had other victims. Persons with this background tended more than others to take the role of informal leaders in both the immediate emergency and the later time period; they were also less likely to exhibit later post-impact negative psychological effects. There was little relationship between previous disaster experiences and responses to this tornado.

Social Situation Context

Persons who were with others during the tornado tended to have more forewarning and to take more precautionary and protective actions before impact. Those in interacting groups showed a higher frequency of adaptive behavior before and during the tornado. Lack of threat interaction before the tornado was associated with more frequent precautionary actions during impact itself (usually a maladaptive and dangerous response), and with state of confusion and bewilderment during impact, but was not particularly associated with other intense psychological reactions during the disaster. Males more often took directing or initiating actions when they were the only male present; females more often took such leadership when there were children present.

Absence of a household family member showed only a slight relationship to intensity of emotional reactions during the immediate post-impact period, largely because most families were together or quickly reunited after impact. However, concern for the welfare of 'extended family members' as evidenced by searching activities was associated with heightened anxiety in the immediate post-impact period.

Role Responsibilities

Male household heads with dependents differed from those without dependents and from persons in all other household roles, in displaying more controlled adaptive behavior, and greater protectiveness towards others, before and during the impact of the tornado. They also showed more community-oriented activity after impact both in activities in the emergency phase such as rescue and in later post-impact help to disaster victims, and in addition had higher morale in having more positive attitudes about post-impact problems and a greater tendency to understate their deprivations.

During impact females with dependents were as other-protective as the males with dependents, but also had the most intense affective reactions and a higher frequency of expressive behavior, praying, and dependency on others. On indices of post-impact morale, they showed the lowest frequency of positive attitudes about problems of post-impact aid and recovery (especially about disruption of community services), felt most affected by the disaster in a long run sense, and gave the most supernaturalistic explanation of the tornado.

Degree of Victimization

Greater exposure to danger during impact was associated with slightly more intense emotional reactions during the storm, and to a somewhat greater degree, with shocked-stunned reactions during the post-impact period. Those who experienced more extreme danger were also more community oriented--particularly in rescue work and aid to the injured. They were also more active in informal aid to disaster victims and in disaster related community orientation throughout the whole post-impact period as well as being more positive towards control and relief agencies.

Respondents who had high personal losses (e.g., deaths in family, injuries to self or household members, etc.) had the most intense emotional reactions in the immediate post-impact period, and had more severe and protracted psychosomatic and psychological reactions in the later post-impact period. They also had higher frequencies of negative attitudes toward rescue, medical and mortuary activities but were quite

positive about all other aspects of post-impact relief and rehabilitation. In addition, they reported much less willingness or intention to rebuild, and gave more supernaturalistic interpretations of the disaster than those with lesser losses. Of the victims who were in the impact of the tornado, the most actively community-oriented in alleviating the disaster impact were those with moderate personal losses or with high property losses and low personal losses. These persons also had higher morale as indicated by generally positive attitudes toward the various post-impact aid problems and by a greater tendency to understate their own deprivations. Respondents outside of impacted localities compared themselves primarily with those among their neighbors who had suffered less disruption from the tornado than they had, whereas those in impacted localities who suffered medium personal loss or high property loss only, generally tended to compare their situation with that of those victims who had high personal losses.

Finally, through a comparative analysis of the data from all eight NORC field studies, a number of general propositions or themes are advanced. Human beings assimilate threat cues to a normal context. Victims tend to assess the nature and extent of a disaster in terms of their immediate surroundings and consequently grossly underestimate the scope and destructiveness of the event. Irrational, hysterical, uncontrolled and nonadaptive actions, such as panic flight, are extremely rare in disasters. The impact of a disaster results in an increase in social solidarity, much cooperative action, and a considerable amount of pro-social behavior among the stricken population in the immediate aftermath period. There is a hierarchy in the response patterns of disasters victims with decreasing emphasis going from self and immediate family, other primary ties, other human beings, personal property, possessions of kin, and property of others.

Separation of family members and kin is a very important factor in affecting disaster responses of individuals. Initial search, rescue, first-aid assistance and immediate relief activities are quickly and overwhelmingly undertaken by persons at disaster sites long before any organizational or agency responses take place. Disaster relevant skills are important in affecting who will take immediate and organized post-impact actions. Persons who have pre-impact social responsibilities for others will react better in disaster situations. Those who have

prerehearsed planning on how to act in disasters will take quicker and more appropriate actions right after impact. Undergoing a disaster *per se* does not necessarily lead to much individual learning from the experience. The most immediate and most crucial need in disasters is the need for accurate information, both by individuals and groups. Controlling victims or anti-social behavior is not a problem in disasters, but outside convergence always presents difficulties. The appearance of blame, resentment and hostilities are rather unusual phenomena rather than inevitable consequences of disasters. Evaluations of organizational relief and recover help are influenced by the rapidity and directness of the aid given. Psychological and psychosomatic reactions, while widespread in disasters, are neither severe nor debilitating.

OVERALL ASSESSMENT OF NORC RESEARCH

What was presented above of the sampling, the interview guide, the field work procedures, the code used in data analyses, the research findings, etc., in the NORC Arkansas study is an effort to indicate the complexity and detailness of work that was done over 37 years ago. Taking all into account, it is our argument that the work is superior in many respects to almost all survey studies and much other disaster research undertaken since that time.

It certainly can be argued that the sampling done was far better in a number of ways than almost all population samples typically used in other past and current studies, survey or otherwise, of the reactions of impacted and nonimpacted people in different communities to the same major disaster. The elaborateness of the interview guide far transcended both in quantity and range of topics what is usually covered in past and current research on the responses of victims and non-victims to a community wide disaster. The field work, could also be said, to be better in many respects than almost all other studies in the area; this ranged from having a non-completion rate of only six percent, to having a special field team specifically trained only for studies on disasters, to the obtaining of very lengthy tape recorded interviews. The gathered data was not only double coded (an almost unheard of process these days), but a very elaborate and finely differentiated coding scheme was used.

The research findings per se may strike many contemporary readers as having a somewhat familiar tone. But of course many of the generalizations that are taken for granted in the social science research community today were set forth for the very first time in the NORC volume. Threatened individuals assimilate threat cues to the normal. Self control is maintained in extreme stress situations. Panic or wild flight, hysterical breakdown, affective immobility are almost non-existent behavioral responses at time of disaster impact. Those in danger try to help one another. Because persons are very frightened or afraid does not mean that they will fail to try and take protective actions, many of which are adaptive in a danger context. Passivity is not characteristic of the immediate post-impact period. The initial and by far the greatest amount of search and rescue is undertaken on the spot by survivors. While concern about family members loom large and take precedence, efforts are made to assist any other persons perceived as requiring help, even strangers. Search and rescue is typically a small, informal group effort. Rescuers are psychologically very bothered by the sight of dead and badly injured people.

Other family members elsewhere quickly provide the great majority of temporary sheltering for homeless victims. Severe mental health problems are not occasioned on any scale by disasters. A majority of victims exhibit negative psychological effects as a result of the experience, but with few incapacitating or behaviorally dysfunctional consequences. Those whose homes are destroyed by a disaster intend to rebuild. Deprivations from a disaster are evaluated by victims in relative rather than absolute terms. The injured are undemanding in a major disaster context. Convergence on a disaster site is a major problem and makes other problems worst. There may be widespread stories of looting, but actual cases of looting are very rare in post-impact situations. A fair percentage of the population near an impacted area will volunteer their services.

Having warning about a disaster makes for better precautionary and protective responses at time of impact. The presence of others in the social situation during and immediately after a disaster impact, is a major factor in the individual actions that will then occur. Having responsibility for others makes for adaptive responses. It is the perception of the rela-

tive degree of victimization that makes for differentiated responses in the post-impact period.

Commonplace as these generalizations and propositions about disaster behavior are at the present time (and only major ones have been mentioned), they were almost all first set forth, and statistically and illustratively detailed in the NORC Arkansas report. This is all the more striking in that the NORC researchers initiated their work expecting often to find rather different behaviors than they ended up observing. Put another way, they had originally in mind what later came to be called the "mythologies" of disaster behavior (see Quarantelli 1987 and forthcoming). So the research findings that were produced were considerably at variance with what the researchers initially thought they were going to find.

It should also be noted that there are a few assertions in the report that are either unreported or contradicted in the social science disaster literature. For example, praying, a fairly common reaction in the Arkansas tornado, is very rarely mentioned as a response to a disaster threat. Disruption of work routines was perceived as a relatively minor matter. A distinct majority of impacted households received no organizational aid. The mass media were generally unimportant in providing information for victims. There was little relationship between prior disaster experience and response in the tornado disaster, etc. It is unclear if these observations have been generally unreported in other studies because the phenomena has not been studied (who studies praying?) or because they reflected some disaster specific aspects about the Arkansas occasion.

The NORC research was hardly perfect. For instance, the survey data from individuals could have been statistically analyzed in a far more sophisticated fashion than it was, even for a study done more than three decades ago. The intellectual leanings and professional training of the bulk of the coders and analysts probably accounts for what happened in this respect. The variables used in the cross tabulations usually reflected standard survey analytical dimensions (e.g., distinguishing between male and female respondents) rather than more sociologically advanced conceptions that could have been used (e.g., family or household social composition). Finer distinctions were drawn in the coding of psychological and psychosomatic reactions than were warranted by the quality of the

interview data (this probably reflected the theoretical interests of the original designer of the research plan). While conceptualizing the social situation as a possible determinant of disaster reactions was an advanced idea, still infrequently used in present day studies, its operationalization in coding and analysis was poorly developed. The gathering of the organizational data was never given the systematic attention that was accorded the survey of individuals, its analysis was rather simple minded being almost totally at a common sense descriptive level, and observations requiring questions and examination were not followed through. Finally, while the field and the data analysis teams were multi-disciplinary in composition, the work done ended up being almost exclusively sociological in orientation, for reasons we have discussed elsewhere (Quarantelli 1987 and forthcoming).

IMPORTANT CONSEQUENCES OF THE NORC WORK

Since I have already discussed some of the specific consequences of the pioneer social science disaster work for later research in the area (see Quarantelli 1981, 1987, and forthcoming), our very brief comments here will be organized around four general themes, namely that there have been contributions to: 1) disaster methodology; 2) the substantive knowledge in the disaster area; 3) the infrastructure of disaster research; and 4) the support of disaster research. Even today, the three volume-NORC report can be used as a model for these four matters.

Disaster Methodology

The NORC research showed that disasters could be relatively easily studied in the field by social scientists. Nearly four decades ago this was not a widely held belief; in fact, even the researchers involved wondered if it would be possible to do what they had initially planned. More important than just being able to do a study, what was done also indicated that extensive and good research could be done. The work at NORC in addition showed that quick response studies could be undertaken. To a considerable extent, the field team operation became the prototype of how to conduct studies of the immediate pre-impact and the response time periods in disasters. Most of the Disaster Research Center

field studies, for instance, now numbering over 500, have followed this model since 1963. For how to go about studying individual behavior in disasters, the NORC work still is useful for pointing the way.

Substantive Disaster Knowledge

As indicated in detail earlier, much of what is now believed about the behavior of individuals in disasters, was first set forth in the NORC study. Not only did the research lay down the initial groundwork to challenge the mythologies that existed three decades ago about disaster behavior, but a very wide range of generalizations, propositions and hypotheses concerning individual behavior were set forth that have come to be the core of knowledge in the area (of course most of these have been built upon and confirmed in later studies by many others). Even though the NORC work is seldom referenced in current or even much of the literature in the last two decade, it is possible to see where many later research findings have their roots in studies that were done at the University of Chicago in the early 1950s. Actually for what we should know about the behavior of individuals in disasters, the NORC work is still worthwhile reading.

Infrastructure of Disaster Research

Several young sociologists in particular were trained at NORC who later went on to work in organizations that were to be key groups in the development of American social science research in disasters. For example, Charles Fritz became a central figure at the National Academy of Sciences, first in its Committee on Disaster Studies (1951-1957) and Disaster Research Group (1957-1962), and later as the long time Executive Secretary of the Academy's various committees on disaster topics; especially in his later capacity he had tremendous influence on the development in the United States of the social science study of disasters. I went on to co-found in 1963 the Disaster Research Center at Ohio State University, moving it to the University of Delaware in 1985. The activities in both organizations strongly affected, as discussed elsewhere, what came to be defined as a disaster, why the emergency time period became a focus of study, how planning for instead of managing disasters

was emphasized (see Quarantelli 1987), as well as how it was thought disasters needed to be studied through field research of a particular kind. The fountain head of the thinking of both Fritz and Quarantelli on methodological and theoretical issues in disaster research clearly rests in their involvement in the NORC pioneer work. To understand a great deal of present day disaster research requires understanding what was done in the NORC study.

Support of Disaster Research

After the NORC work was finished, it was possible for both researchers and potential research funders in the disaster area to point to the study done as an example of the value of such an undertaking. It was not only possible, but as I can personally attest, the work was so used. This was important especially for an area of study that was in its very initial stages; both researchers and funders had to believe they were doing something worthwhile and the three-volume NORC work were a testimony to that fact.

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