RELATED LITERATURE

This section reviews some basic ideas from family sociology in order to elucidate family responses to disaster warnings and impacts. Also discussed are research on community responses to disaster warnings, as well as studies of evacuation behavior, hazard awareness/risk perception, and mass media in disaster.

Family Response to Disaster Warnings

The family is an important context within which people define and respond to hazards. While social definitions and the mass media affect a person's perception, the immediate family has a greater effect (Galvin and Brommel, 1982). Perceptions and "definitions of the situation" (Meltzer **et al.**, 1975) derive from communication processes within family contexts.

Stress on a family is frequently caused by a lack of financial resources, and it is exacerbated or alleviated by levels of marital stability, position in life cycle and social support networks, among others. The stress also depends on the definition of any situation arrived at by the family (Hill, 1949; Hill and Hansen, 1962; Hansen and Hill, 1964). Failure to arrive at a consensual definition of the situation can heat up marital conflict and disrupt family relationships (LaRossa, 1977; Olson **et al.**, 1979). Successful coping with previous crisis events appears to increase a family's ability to cope with a subsequent crisis (Hill, 1949).

Although a family's adaptation to the stress of disasters and to major changes in its life circumstances depends on communication capabilities, interactive processes, and available resources, it is also affected by its ties with extrafamilial organizations (Bain, 1978; LaRossa, 1977; Littlejohn, 1978; Mitchell, 1969; Parsons, 1943, 1949; Watzlawick **et al.**,

1967). While early sociological research tended to treat the family as an isolated system (Bakke, 1949; Burr, 1973; Hill, 1958), this view has been superceded by one giving greater attention to the external relationships that families establish to deal with stress (Hansen and Johnson, 1979; Lin **et al.**, 1979; McCubbin **et al.**, 1980). These support networks include kinship groups, neighborhoods, and mutual aid groups (Aschenbrenner, 1975; Cantor, 1979; Hill, 1970; Katz, 1970; Litwak and Szeleny, 1969; Martin and Martin, 1978).

The relationships a family has with its kin group are the subject of much sociological research (see Lee, 1980, for a relatively recent review). Most of this work points out the importance of kin relations for American families, whether in or out of crisis. The extensiveness of kin relations and the strength and energy of the ties typically vary by class and ethnicity, with blacks, Hispanics, and certain religious groups maintaining more active relationships than others (Lee, 1980; Staples and Mirande, 1980). Kinship ties can affect a family's definition of a given situation, response to hazards, resource availability in times of need, and stress-managing capacities (Bolin and Bolton, 1983).

Extended exposure to stress has been associated with persistent negative psychosocial impacts both on families and individuals (Bolin, 1982; Glesar **et al.**, 1981). In the case of disasters, extended exposure to stress may result from evacuation, emergency and temporary shelter of victims, residential and neighborhood disruption, disaster-induced unemployment, and related persistent disruptions in social activities (Bolin, 1976; Bolin and Bolton, 1983; Drabek and Key, 1984; Trainer and Bolin, 1976). An additional source of stress is the threat of recurrence or additional disaster.

When a group exhibits a general social and cultural adaptation to persistent or recurring disaster, it is said to have a disaster subculture. A disaster subculture provides families with definitions of the situation that may alert them to the hazardousness of a locale (e.g., Bolin, 1982). Such a subculture also constitutes an institutionalization of previous disaster experience and that, in turn, has been found to affect social responses to future disasters in a number of ways.

There is evidence that certain categories of individuals and families are less susceptible to stress-induced emotional disturbance than others. Those with higher incomes, higher levels of education, higher religiosity scores, and those of advanced age have been found to exhibit fewer disaster-related disturbances (Bolin, 1982; Bolin and Klenow, 1983; Drabek and Key, 1984; Huerta and Horton, 1978). Kinship ties have been found to be important in stress reduction for victims of disasters by some researchers (Wilson, 1962; see also Vosburg, 1971; Bolin, 1983; Cobb, 1976); but others (Houts **et al.**, 1980) find only weak support in their data for such an assertion. Large families appear more vulnerable to stress-related symptoms, perhaps because of the presence of young children.

Community Response to Disaster Warnings

The community and its component organizations, including the mass media, constitute an important frame of reference for individuals and families (Fried, 1966). Communities constitute symbolic objects of orientation (Hunter, 1974; 1975) and form the basis of persons' cognitive maps (Suttles, 1972). These mental maps render the local area familiar, safe, and accessible for residents. Cognitive identity with the locale increases with length of residency and with participation in local organizations (Bell and Newby, 1971; Hunter, 1975).

Communities that have had repeated experience with disaster are better able to maintain an organized response to future impacts, according to Fritz (1961). However, dysfunctional behavior may occur if the new disaster is different from earlier experiences (Parr, 1969). Prior experience may also add familiarity to an event, thus reducing sensitivity and adequacy of social response (McLuckie, 1970).

While the social science literature on community response to natural disasters is lengthy, only a portion sheds light on media-related issues. It has been observed that receipt of a warning of impending disaster is followed by attempts to confirm it ((Mileti, 1974, 1975; Mileti, Drabek and Haas, 1975; Danzig **et al.**, 1958). If the warning is received via the mass media, attempts will be made to confirm it some other way (Drabek, 1969; Drabek and Stephenson, 1971). Warnings that are consistent across several sources are more likely to be believed (Clifford, 1956; Fritz, 1957; Wither, 1962), as are warnings communicated in person (Drabek and Boggs, 1968).

Disaster warning belief is determined by a complex set of factors, including warning sources, warning message content, the number of messages received, and interpretation of environmental evidence of impending impacts. Also important are observations of the actions of others, whether or not the community is cohesive at the time of the warning, previous disaster experience, and proximity to the projected impact area. Finally, demographic characteristics of the recipient, including socioeconomic status, race, age, sex and residence location, have an influence on warning belief (Anderson, 1969; Mileti, 1974; Mileti, Drabek and Haas, 1975).

Evacuation Behavior

Warning belief, in turn, brings about some type of social response, frequently evacuation (Drabek and Boggs, 1968; Perry, Lindell and Greene, 1980). Research on evacuation behavior is voluminous, but only a few of the most pertinent findings are reviewed here. Research generally has found that those nearest the predicted impact area are the most likely to evacuate (Danzig **et al.**, 1958; Perry, Lindell and Greene, 1980). Friedsam (1962), and Moore **et al.** (1963), have shown that the elderly are less likely to evacuate than others, mainly because they feel they have long-term investment in their places and do not want to leave, and also because they frequently are less mobile than others.

The family is the locus of decision making for evacuation (Clifford, 1956), as well as for choosing an evacuation location. Evacuees often exhibit anxieties over the home they left behind (Bates **et al.**, 1963), and these anxieties are compounded if the family did not evacuate as a complete "unit." Having the family intact prior to evacuating, and then evacuating as a unit, is of prime concern to those in disasters (Drabek, 1969). Evacuation and subsequent emergency shelter arrangements can be stressful on family members, particularly if the evacuation results in a lengthy stay in emergency shelters (Instituut Voor Sociaal Onderzoek, 1955). Evacuation may be to the homes of relatives, thus placing victims in a socially supportive context (Loizos, 1977). Other research has indicated that beyond a period of approximately one month, the relationship between a host family and evacuee family, even if they are kin, begins to deteriorate (Bolin, 1982, 1983).

Families typically seek to return to the impact area and to their homes as quickly as possible (Bates **et al.**, 1963; Dacy and Kunreuther,

1969), often before the situation is safe. Only in instances of severe and catastrophic impact do victims show little desire to resettle in their old locales (Erikson, 1976). Leaving a home either by force or choice can produce grief-like reactions in some families (Fried, 1966; Glesar **et al.**, 1981). Disaster research has also shown that those who evacuated unnecessarily in the past are less likely to evacuate in a similar future situation. Evacuation orders perceived as unnecessary, and false warnings, reduce the likelihood of adaptive reactions in future events (Bates **et al.**, 1963).

Hazard Awareness/Risk Perception

The earliest work in hazard and risk perception (and consequent social adjustments) came primarily from geographers (White, 1945; Burton and Kates, 1964; Hewitt and Burton, 1971) and psychologists (Wolfenstein, 1957; Lazarus, 1966). Sociologists (Wallace, 1956; Fritz and Mathewson, 1957; Mack and Baker, 1961) and anthropologists (Schneider, 1957; Anderson, 1968) also provided additional insights by focusing on social and cultural adjustments to hazards.

The concept of perception involves a social psychological dimension and, typically, a sociocultural one as well. As Allport notes, the use of the term

> . . . perception in social disciplines has . . . shifted from mere object awareness, physical world relations . . . to a cognitive and perhaps even phenomenological **modus operandi** for collective activities . . . and for concepts of self and society (1955, p. 368).

Given this broad conceptualization, it is appropriate to speak of risk perception for all social levels, from the individual to the community to the entire society. It is, of course, necessary to recognize the complex interdependency of individuals, groups, and societal perceptions, and the

interactions among those levels (Miller, 1964). It has been common to identify the characteristics of an environmental threat as affecting perceptions. Relevant dimensions include the perceiver's distance from the hazard (Manderthaner **et al.**, 1978), as well as notions held about the "speed of onset, scope, intensity, duration, frequency temporal spacing, causal mechanisms and predictability" (Mileti, Drabek and Haas, 1975, p. 23; see also Barton, 1969; Dynes, 1970a).

The reality of a hazard often has little to do with how it is perceived at various social levels (Van Arsdol, 1964) or how people respond to it (Mileti, 1980). The perception of hazard is further complicated when the objective nature of the threat is in dispute or uncertain (Grosser, 1964) or when the media carries inaccuracies (Scanlon **et al.**, 1980); however, awareness of a hazard may also be a function of the amount of media attention (Christensen and Ruch, 1978; McCombs and Shaw, 1972; Molotch, 1970; Needham and Nelson, 1977). Natural hazards literature indicates a tendency for individuals to underestimate the hazardousness of a situation (Burton **et al.**, 1965; Mileti, 1980; White **et al.**, 1958).

In situations where persons have previous experience with a hazard, their perceptions have been found to vary as to the nature of future threat. White (1945) suggests, in terms of flooding, that persons assume worst case events will not repeat themselves, although Kates (1962) has reported an opposite tendency. Burton **et al.** (1965) found that persons living in coastal areas subject to hurricanes tended to view the storms as repetitive. Bolin (1982) found continued psychological stress in tornado victims with the onset of tornado season the following year.

Kates has suggested (1962, p. 140) that people are "prisoners of experience" and tend to perceive hazards based on notions of the future as

past. Likewise, Janis (1951) indicates that near misses are important in affecting perceptions of risk. In situations where persons do not have direct experience with physical impacts of a hazard, such as an earthquake, there is a tendency to minimize the expected damage or to interpret the situation as nonhazardous (Jackson, 1981). This is suggested to be a psychological strategy to reduce the dissonance involved in placing oneself at risk.

The control a person feels he or she has over a situation may affect perception of risk (Wortman, 1976). According to Holdren (1982), individuals are more likely to tolerate a hazard if they feel they can control the situation. Sims and Bauman (1972) utilize the idea of locus of control in explaining coping with threatening situations. Some individuals are inclined to believe in the efficacy of personal action in dealing with risky situations (internal locus of control), while others, particularly those from fundamentalist religions, tend to feel that the situation is in God's hands and hence there is litle to do in response (external locus of control) (Sims and Bauman, 1972). The notion of control has implications for social adjustments made to hazardous situations, a subject to be considered below. When an individual's sense of control is threatened, negative psychological and emotional states can follow (Carver, 1966). Milburn (1977), based on experimental data, argues that **control** of a situation and not the **size of a threat** is the key in coping responses to threatening situations.

One of the central contextual factors affecting the process of risk assessment is family and kinship. Lucas (1966, 1969) examined variation in perception of ambiguous stimuli in a coal mining community subject to continuous threat (of accident in the mine). Lucas found that expert

knowledge of the hazard did not affect the perception of hazard (1966, p. 234), but rather primary role (family) relationships did. Persons tended to view the risk as real if they felt kin were at risk.

When the unit of analysis shifts to the level of community, much of the available literature is directed towards the adjustments that communities make regarding perceived hazards (Dynes, 1970b; Hutton and Mileti, 1979; Mileti, 1980). Response to hazard at the level of community is typically problematic due to the propensity to deny risk (White and Haas, 1975; Mileti, 1980; Mileti, Hutton and Sorensen, 1981). For some hazards, this is reinforced by the tendency of the mass media to underplay potential hazards (Turner, 1980), although the media can also create community-level anxiety by promoting rumors (Danzig **et al.**, 1958). In situations where the credibility of official information is questioned, rumor is a likely outcome.

According to Mileti (1980), the accuracy of risk perception improves with access to scientific information (see also Kunreuther, 1978). Slovic **et al.** (1974) argue that in adjusting to hazards, a model of bounded rationality pertains. Uncertainties, misperceptions of risk, crisis orientations, intuitions, and the inability to integrate multiple sources of information all conspire to limit the role of rationality in social adjustments to hazards (pp. 188-193; see also Hansson **et al.**, 1979).

Disasters and the Mass Media

Interest in the mass media and natural disasters was highlighted by the National Academy of Sciences/National Research Council study, Disasters and the Mass Media (NAS, 1980). Articles in that volume by Kreimer and Kreps summarize central issues and describe existing research. The mass media are part of a complex mix of communication in disasters. They are

often accused of reporting inaccuracies during periods of crisis (Stallings, 1971; Erickson **et al.**, 1976); the emphasis on speedy transmittal is a major cause of the errors, particularly in the broadcast media (Scanlon, **et al.**, 1980). However, Holton (1985) believes that the pervasive entry of television into the American home has fostered a total dependence on television as the ultimate source of reliable information and guidance during a disaster.

The media have a potential role in hazard awareness, warning transmission, and provision of evacuation and postimpact information for short- and long-term recovery. Needham and Nelson (1977) examined the role of local newspapers in covering erosion and flood hazard, and found coverage to be overly dramatic. However, when Rogers and Sood (1981) studied the role of media messages in the aftermath of the hurricane that devastated Dominica in 1979, they learned that a media organization's understanding of its audience plays a significant role in the quantity and quality of the disaster information it chooses to report. This finding has bearing on research by Wilkins (1985), who noted that the mass media tend to cover natural hazards in a fashion similar to coverage of any other news event.

Christensen and Ruch (1978) compared the effectiveness of printed brochures, radio, and television for hurricane awareness, and found that both printed brochures and television are more effective than radio. Listeners held inaccurate views due to poor recall of radio public information announcements. This reflects Weaver's observation that printed media and television can exploit the visual component (1975; see also Turner, 1980). Regulska (1982) asserted that television, the print media, and other visual forms of information (as well as radio) can help improve public awareness of the adverse effects of natural disasters. However,

radio appears to play the major role in providing information **during** an actual disaster (Baldwin, 1980).

Others have examined the gatekeeping function of media coverage of disasters (Waxman, 1973) and the reporting policies of radio and television organizations (Kueneman and Wright, 1975). Larson (1980) found that newspapers gather more information than either television or radio. However, the broadcast media have speed and accessibility in their favor. As Larson suggested, radio can broadcast the most news, while both television and radio can alter programming more easily than print. In a 1985 study, Scanlon **et al.** proposed that, because their behavior during a disaster is predictable, information media could be integrated into a disaster plan in order to be used more efficiently during an actual disaster.

Much of the research on the media and natural disasters has concentrated on the warning phase (e.g., Adams, 1965; Anderson, 1969; Mileti, 1974). Janis and Mann (1977) have examined the role of information in emergency decision making. Another major study focused on public response to hurricane warnings delivered by the broadcast media (Carter **et al.**, 1979; Clark and Carter, 1979). Nigg (1982), and Turner, Nigg and Heller Paz (1986) investigated how the media's treatment of several earthquake-related issues (the Palmdale Bulge, for instance) influenced the response of government agencies, public interest organizations, and households in southern California.

Hartsough and Mileti (1985) determined that risk perceptions are strongly shaped by the varied dimensions of the actual disaster warnings. Furthermore, they hold that in reporting on a disaster, the media are not simply reporting what they know as unbiased observers; they are anticipating how disaster information will be received by the public.

Hartsough and Mileti further assert that any analysis of the influence of the media on the psychological effects of disaster must attempt to address these interdependent forces.

In terms of postimpact reporting, several studies should be noted. Hannegan (1976) studied postdisaster newspaper reporting, while Wenger **et al.** (1975) looked at how myths regarding natural disasters may be derived from media coverage. Paredes (1978) found that respondents thought that the media did a good job during hurricane disasters in Florida.

In two areas, there is little research: 1) the role of media in recovery (cf. Taylor, 1978), and 2) the effects of the media on human behavior in disaster contexts. In the case of the latter, there are difficult methodological problems in attempting to isolate media effects from other behavioral determinants of social action (e.g., previous experience, personal communication, environmental cues, and observation of others' behavior).

We will now examine the families stricken by Hurricane Frederic and their media use in all phases of the disaster, from early warnings through postimpact relief, rehabilitation, and recovery.

THE FAMILY SURVEY

One goal of the family survey was to gather data on the pre- and post-impact activities of a sample of black families affected by Hurricane Frederic in the greater Mobile area. These data provide a picture of the actions of families in a high-risk situation, and the ways in which they dealt with the threat, impact, and aftermath of the devastating hurricane. One of our primary concerns is to what extent the victims utilized the mass media and, in particular, the black media to gather information that informed their subsequent actions.

Methods

We restricted our survey to black families because a true random sample of victims of Hurricane Frederic was difficult, if not impossible, to obtain. The task of generating a random sampling frame (cf. Mileti, 1974) for such disaster victims was beyond the available time and resources of the research staff. Because a complete enumeration of all individuals affected by the storm was impossible, we restricted the sampling to stricken areas which, according to census tracts, were predominantly black (75% or more). We also used local informants in the city planning office to confirm areas in which there was significant damage as well as a predominantly black population. Given the patterns of racially segregated neighborhoods in Mobile and the distribution of impacts of the storm and subsequent flooding, this left us with five areas within Mobile and the adjacent community of Pritchard from which to draw the sample.

Each area was delineated on a large-scale map, and the number of housing units in each sampling zone were counted. After determining the approximate number of units in each area, ratios were calculated to decide

how many victims from each area would be selected for interviewing. Thus, the sample size for each area was proportional to the total number of housing units in the area (see Babbie, 1978). Once the desired sample size was determined, blocks in each area were enumerated and randomly selected. After a sample of blocks from each area was selected, all housing units on each block were listed and another sample drawn designating the houses/apartments from which interviews were to be obtained.

The actual unit of analysis in our study was the family and not the household per se. That is, one repondent per household was selected for interviewing and that respondent--an adult head-of-family or his/her spouse--served as the informant for the activities of the family before, during and after the impact of Hurricane Frederic. The interviewers determined if the home had indeed been damaged by Hurricane Frederic and if the occupants had been living there at the time the hurricane struck. If the home had not been damaged or the person contacted had not been living there at the time of the hurricane, interviewers were instructed to screen homes close by until one was found that met these two criteria.

A sample size of 200 families was dictated by budgetary constraints; however, this was adequate for basic statistical analysis and was large enough to be representative of black victims residing in Mobile. All discussion and analyses that follow are based on this sample of 200 black families.

Interviewing took place in May of 1982, as did related field work in Mobile described elsewhere in this report. For the family survey, a local consultant familiar with the black community in Mobile was retained. He aided the field director in the recruitment of interviewers familiar with interview techniques as well as with the local black community. Black

interviewers were used because it was felt that they would have greater success in gaining access to the black families in the sample.

Interviewers were trained in sessions directed by the consultant and the field director. The field director reviewed each returned interview for completeness before issuing new addresses for more interviewing. The survey was completed in approximately two weeks. Following completion of the family survey, a codebook was developed. Coding was done by the field director to insure consistency.

Due to the exploratory nature of the research, the interview schedules obtained information on a wide variety of subjects: demographics and general background information on victims; media use patterns; previous disaster experience; receipt of warning information for Hurricane Frederic; evacuation and other disaster response behavior; impact of the hurricane; aid-seeking activities; and related general attitudinal information.

The Demographic Profile

Most respondents were long-time residents of the Southeast. Victims had lived in Mobile an average of 21 years, and averaged 14 years in the same home prior to Hurricane Frederic. Only 4% of the respondents changed their residence after the hurricane, indicating a strong commitment to home and neighborhood. Of those interviewed, 66% owned their own home, while 22% rented a house. The remaining 12% lived in apartments. Table 1 presents data on household size for the respondents.

Of those interviewed, a total of 48% were married. Nineteen percent were divorced or separated, while 13% were single. Given the age of the sample, it is not surprising that 17% were widowed.

Most respondents had incomes falling below the national median. At the time of the interviews, 57% (n=114) (numbers appearing in parentheses

refer to the actual number of respondents in the particular category under discussion) were below the poverty line ($7,500), while only 13% (n=26) reported income in excess of $15,000 yearly. Table 3 presents a breakdown by occupation of the chief wage-earners.

TABLE 1

HOUSEHOLD SIZE

Number in Household	N	%
1	15	7
2	35	25
3	40	20
4	0	0
5 or more	72	29
	200	100%

The average age of respondents was considerably higher than the national average for heads of households.

TABLE 2

AGES OF RESPONDENTS

Age Range	N	%
18 - 25	16	8
26 - 39	53	26
40 - 59	79	40
60 and older	52	26
	200	100%

TABLE 3

OCCUPATION OF CHIEF WAGE-EARNER

Occupation	N	%
Retired	39	19
Unemployed	63	31
Unskilled service worker	12	6
Laborer	27	13
Operative	4	2
Craftsperson	13	6
Skilled service worker	22	11
Sales	4	2
Managers and professionals	16	7
	200	100%

The occupational distribution is reflected in the educational attainment of the respondents. Of those interviewed, 39% had not completed high school, while 34% had received a high school diploma. Another 13% had graduated from college with a B.A. or higher degree.

Victim Families and the Media

We have defined black media as media owned and operated by members of the black community and/or whose programming is focused toward the black community. The primary concern of the research reported here has been to determine if the black media played a special role in any phase of Hurricane Frederic. However, due to the limited size of the black media in Mobile, we have also concerned ourselves with all media operations in Mobile and the patterns of use of those media reported by our respondents.

With reference to the print media, 43% of the respondents did not have a newspaper subscription. Of those who did subscribe, 88% subscribed only to the daily Press Register (the "non-black" newspaper), while the remaining 12% subscribed to the weekly Mobile Beacon or The Inner City News (black-owned and focused) or to both a daily and a weekly. Because the Beacon and The News are not dailies, the low subscriber rates are not noteworthy.

In terms of access to the electronic media, only two respondents had no working television in their household. Forty percent of those interviewed had one television, while 54% had two or three sets available. In addition to the televisions, 40% also had one radio, while another 57% had two or more working radios in their households. Additionally, all 200 respondents had access to a radio in their automobile. Respondents indicated that they listened to radio an average of 4.9 hours per day. Average daily viewing time for television was 6.4 hours. Overall, 99% of the sample had televisions, while 97% had household radios. These figures compare with 97.9% television and 98.6% radio ownership rates for the United States as a whole (Larson, 1980).

Warnings

As described in the literature review in the previous section, one factor pertinent to warnings and warning response is previous disaster experience. A relatively large number of respondents had had direct experience with another natural disaster prior to Hurricane Frederic (42.5%). The nature of these previous experiences included: floods (30.6% of those with prior disaster experience); hurricanes (42.4%); or a combination of several disaster agents (21.2%). Ninety-one percent of those with prior disaster experience had received warnings before that disaster. Those

warnings had been via television, radio, or face-to-face communication. Sirens were also mentioned by 60%. Eighteen percent had received warnings about potential disasters that never happened. Most indicated that these false warnings had been for hurricanes that had veered away from the predicted landfall. Of those receiving false warnings, 37% said such incorrect warnings made them less likely to believe future warning messages.

Concerning warnings about Hurricane Frederic, all 200 respondents indicated that they had received at least one warning prior to the storm's impact. Respondents reported receiving an average total of 15 warnings from all sources. Fifty-six percent received their first warning via television, while 31.5% first heard about the oncoming storm via radio. Fewer than 20% of those interviewed received their first warning from personal sources (neighbors, relatives, friends). As might be expected, none reported having received their first warning from a newspaper.

Respondents were asked how many hours before the actual impact of Hurricane Frederic they received their first warning message. Virtually all respondents had from 12 to 24 hours of lead time between their first warning and the storm's onset. About half of those interviewed relied on a combination of media sources to keep them informed of the storm's progress. Another 24% used only television and 10% used only radio. However, 65% indicated that the warning source they tended to believe most was television. Most of the remainder reported that they most believed radio messages. Only 38.5% of the respondents attempted to confirm the warnings by obtaining additional information from other sources. This is not surprising given the number of warning messages received, even if all warnings were from a single source.

An additional factor in the failure to seek specific confirmation of warning messages has to do with perceived risk. A majority of respondents were "fairly certain" to "very certain" that Hurricane Frederic would hit Mobile after receiving their first warning (61.5%). Additionally, when asked how certain they were that Frederic would hit **their neighborhood**, 67% said they believed it would. Of these, 40% were "very certain" that their neighborhood would be damaged by the storm. Moreover, prior to impact, a majority of respondents (73%) felt personally at risk. Most indicated they felt "moderate" to "extreme" personal danger.

To better understand influences on warning receipt, belief, confirmation, and risk perception in more depth, cross tabulations among key variables were performed. Findings are offered as hypotheses and only those supported at a .05 probability level using a Chi-square test of association have been included.

The number of warning messages received via the mass media was positively correlated to several factors. The more radios available to a respondent, the more warnings received. Those respondents at the highest education levels (four or more years of college) received more warnings than those with lower education levels. Those respondents who subscribed to a newspaper received more warning messages than did those who did not; however, those messages were not received from newspapers. The last relationship disappears when we control for education. This would seem to indicate that those with higher levels of education actively sought out warnings and disaster-related information, or listened to news broadcasts more often.

Both income and education were positively correlated to warning confirmation attempts: respondents of higher socioeconomic status were more

likely to attempt to confirm warnings. Previous disaster experience was also strongly correlated to warning confirmation behavior.

It is interesting to note a negative relationship between family size and warning confirmation. Those with larger families were less likely to seek confirmatory evidence. It has been noted in previous studies that, because large families feel vulnerable, they are more likely to believe a warning without trying to confirm it through another medium (Bolin, 1982). Those with large families (five or more members) were also more likely to rely on radio than on television as the primary source of warning information.

Respondents with previous disaster experience tended to feel more sense of personal risk at the onset of Hurricane Frederic than did those without such experience. Similarly, they were more likely to be certain that Hurricane Frederic would strike their neighborhood, an indicator of the sensitizing effect of prior disaster experience. A sense of personal risk was also found to be positively associated with the number of warning messages received. Respondents who received 15 or more warnings almost uniformly reported having felt "extreme danger" prior to the storm's impact. Also, those who had the longest lead time (warning 20 or more hours prior to impact) were the most likely to report feeling at personal risk from the impending storm. The longer warning period provided time to gather additional information and, perhaps, to reflect on the storm's potential impact.

Age had no effect on the number of warnings received, although the elderly were more likely to have received early warnings than were younger respondents: 36.5% received a warning at least 24 hours in advance of impact, compared to 18.9% of the younger respondents. Elderly respondents

were somewhat more likely to have received their first warning via radio (37.9%, compared to 26.7% of younger respondents). Only 9.8% of the elderly heard about Hurricane Frederic from a source other than the mass media (for instance, telephone or face-to-face contact). In comparison, 23.7% of the younger respondents received their first warning from nonmedia sources. We surmise that this difference is due to the greater social isolation of the elderly. Television ranked as the most believable source of warnings for all age groups. Only 27.5% of the elderly and 21.2% of all others ranked radio as most believable. The differences across age groups are not statistically significant. The data suggest a possible relationship between age and warning confirmation. Some 41% of the younger respondents attempted to confirm the warnings, while 31% of the elderly sought confirmation (not significant at the .05 level). Thus, while in no case did a majority attempt to confirm a warning, it would appear that the elderly were even less likely to do so. There appears to be no difference between age groups regarding certainty that Hurricane Frederic would actually strike the respondent's area of the city. After receiving initial warning, a majority of respondents were "fairly" to "very certain" that their area would be hit by the hurricane.

Warning Response

After receiving warnings, respondents pursued several courses of action. Some evacuated, others prepared to weather the storm at home, and a few changed their behavior very little, if at all.

Of the 200 victims of Hurricane Frederic we surveyed, only 63 (31.5%) evacuated their homes. Time away from home lasted anywhere from 24 hours to three weeks. The majority of evacuees (77.8%) were able to return to their homes after a one-day absence. Of those who did evacuate, 39.7% went

to the homes of relatives. Virtually all other evacuees went to Red Cross shelters.

A total of 69% of the respondents received messages about evacuation via the mass media. Most who received such messages recalled that they included information as to where emergency shelters were located. However, as noted above, a clear majority did not leave their homes. When respondents were asked why they did not choose to leave their homes, the most common response was that they "felt safer in their own home" (74%, n=102). Other justifications for not evacuating included:

1) Belief that "God will protect me" (7%, n=10)

2) Did not believe the storm warnings (6%, n=8)

3) Unable to evacuate because could not locate all family members (5%, n=7)

4) Fear of looting (3%, n=4)

5) Inadequate time to evacuate prior to impact (3%, n=4)

6) No place to evacuate to (2%, n=2)

Respondents were also asked about the evacuation behavior of neighbors and kin. Thirty-five percent claimed their neighbors had evacuated prior to impact, while 39% believed they had not. The remainder were not sure. Regarding relatives, 39.5% claimed they had relatives who did evacuate, while most of the remainder said their relatives did not leave their homes. Sixty-seven percent of the respondents discussed the impending storm with neighbors and relatives, either by telephone, face-to-face, or both. However, most of those persons (73%) said the discussions did not influence their response to evacuation messages. Of those saying the discussions **did** influence their behavior, 51% said the discussion made them decide to stay in their homes.

For those receiving evacuation messages, the information was received almost exclusively via the broadcast media. Of those evacuating, 83% relied on both television and radio for evacuation information. Nine respondents indicated that they received evacuation information directly (face-to-face) from the police.

Fifty-eight percent of the total sample said they followed advice given out over the broadcast media on how to prepare for the storm. More than three-fourths of those who evacuated secured their homes before leaving for other shelter. Most of those who did not evacuate also prepared their residence for the storm (72.3%, n=99). The primary modes of preparation included taping and/or boarding windows, stockpiling food and water, and provisioning the home with candles, batteries, and radios.

When asked to consider all the warning and evacuation messages received, the majority of respondents (60%) claimed that television provided the most believable information. Twenty-nine percent felt that radio was most believable, and only one respondent felt that the newspaper was most believable.

The sample was evenly split as to what factor made a message believable. General content of the message was mentioned by 23.5%, 26.5% said it was the actual delivery (tone, sense of urgency), 20% found the specificity of the message to be most important, and 25% said that the visual aspects of television made those warning and evacuation messages most believable. When asked to consider the storm's actual impact and damage in retrospect, 60% of respondents again cited television as the most accurate provider of information. The remainder felt that radio had been the most accurate.

Respondents were asked if there were any personal characteristics of television reporters that might incline them to believe the reporters'

warnings. Only 1% cited race, while 4.5% cited age. One-fourth said personal characteristics of the reporter were not important. Most respondents (68.5%) cited the content of the message as the characteristic contributing most to believability.

Respondents agreed on what made warning/evacuation messages most believable--the visual component (weather maps, pictures of destruction). One-half of the respondents said they had seen television films of Hurricane Frederic prior to its impact on Mobile. Of those respondents, 69% claimed that the films influenced their subsequent actions. Additionally, 72.5% said they had watched weather programs regarding Hurricane Frederic (as opposed to films of the actual storm) and that those programs had influenced their decisions about the storm.

In order to see if demographic characteristics helped to explain differences in evacuation behavior, a number of comparisons were run. Evacuees and nonevacuations showed no significant differences in terms of family size, age, occupation, education, income, marital status, or religious affiliation. Gender is the only variable where any meaningful differences appear: women were slightly more likely to evacuate their homes than were men.

Previous disaster experience was strongly related to evacuation behavior. Those with previous experience were not only more likely to evacuate, but were also more likely to follow directions given out via radio and television. Respondents with higher socioeconomic status (as measured by education, occupation and income) were also more likely to follow the advice broadcast by the media. The greater the personal danger perceived by the respondent, the more likely he or she was to evacuate. However,

since most respondents did not evacuate, in spite of feelings of personal danger, they apparently felt more secure in their own homes.

The elderly were no more likely to evacuate than were other age groups. Elderly people seemed less likely to recall having received evacuation messages than younger respondents (38.5% of the elderly, compared to 28.4% of others did not recall receiving any evacuation messages). The elderly who did evacuate were less likely to use public shelters than were younger evacuees. Only 43% (n=6) of them went to public shelters, while 63% of the younger evacuees (n=31) used public facilities. Elderly people were more inclined to go to the homes of relatives rather than to public shelters.

No significant age differences were found regarding sources of evacuation information, which media were considered best for evacuation information, or what made the evacuation messages most believable.

Impact and Aftermath

Given the scope and severity of Hurricane Frederic and the fact that it was accompanied by tornadoes, it is not surprising that all respondents reported some damage to their homes. Tornadoes embedded in the hurricane caused damage to the homes of 17.5% (n=35) of the respondents. Overall, 40% reported slight damage, 29% had moderate damage, and the remaining 31% said their homes were either severely damaged or destroyed.

Of these victims, 67% did not use governmental aid programs to help pay the costs of repair. Many (61.5%) had their homes insured against storms. However, only 60% of those with insurance said that their insurance settlement was adequate to cover their losses. Those whose insurance settlement was inadequate made up the difference with their own savings (58%, n=34), or by borrowing (14%, n=8). Ten percent reported that they

had not been able to make up the difference. In fact, one-fourth of the victims said that three years after impact, they were not yet over their financial losses.

Virtually none of the respondents indicated that they or any of their family members were physically injured during the storm. However, 21% said that either they or some member of their family were emotionally upset by the storm experience. Of these cases, 19% considered the disturbance serious enough to seek counseling. Within this group, information about the availability of storm-related psychological counseling was derived primarily from a church or from radio spots. Over the entire sample, only 11.5% of the respondents were aware of programs designed to aid victims with emotional problems. Of these, most (56%) found out about the programs from radio public service announcements, 24% from television, and the remainder through informal, nonmedia sources.

Looking more specifically at the material aid received by victims, we found that 14.5% (n=24) made use of the Red Cross (food, clothing, household goods) and church groups (food, clothing, ice). Another 59% received aid from the federal government, most of it in the form of food stamps, with a few small housing (2) and cash grants (n=6).

Respondents received information about these programs from a number of sources. Information on Red Cross programs came primarily from the radio, word-of-mouth, or newspapers. Those who received aid from federal programs said that radio had been their primary source of information, with a few relying on newspapers. At the time of the survey there were no disaster assistance centers, per se, and hence no single source of information on all available aid programs.

The shift from television during the preimpact phase to radio and newspapers during the postimpact phase reflects the storm's effect on Mobile. Power outages, downed antennas, and evacuation to public shelters all conspired to make portable radios and emergency edition newspapers more available sources of information in the immediate aftermath of the storm.

Not surprisingly, victims with the greatest levels of damage to their property were most likely to receive federal aid (57.4% of those with severe losses, compared to 21.1% of those with slight damage). However, the greater the level of damage, the more likely it was that the victim had not recovered from financial loss three years postimpact. The incidence of emotional disturbance among victims also correlated directly with impact severity and property damage.

Those with the highest levels of property damage were also the most likely to say they would react differently in future disasters. Of these, almost all said they would more carefully follow media advice for securing their homes, and 20% said they would obtain or increase home insurance coverage.

The elderly were somewhat more likely to report severe damage to their homes than were younger respondents. The elderly were also less likely to use federal programs than were younger victims (42.3% vs. 64.9%). This should be viewed in light of the finding that the elderly were more likely to have insurance coverage. Age was also related to whether respondents thought they would react differently in future disasters, with younger victims being the most likely to say they would react differently.

Victims and the Black Media

Since there are no black-owned or black-focused television stations in Mobile, no general conclusions may be drawn regarding its role. However,

it is evident that it would have had no special role in the warning phase since all media serve the same function during that phase: the dissemination of clear, concise, accurate information regarding the impending disaster and what steps should be taken to mitigate its impact. Virtually none of our respondents said that the race of television or radio reporters had any bearing on the believability of the warnings they received.

Shifting to the postimpact phase, we documented the increasing use of radio and newspapers as sources of information. In the relief and recovery phases, black-focused media have the potential of serving the specific needs of the black community by focusing on the particular needs of the community. Among the survey respondents, the two black-owned radio stations in Mobile had higher listenership than did non-black stations (28% of the total sample relied on a black-owned station). The black media, at least the radio, do reach the black community in Mobile; however, whatever special services black media might provide to black disaster victims will vary with each disaster site and the extent to which the postimpact needs of black victims differ from the needs of the victim population in general.