

DISASTER IMPACT AND RECOVERY:  
A COMPARISON OF BLACK AND WHITE VICTIMS\*

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*This paper presents an analysis of recovery from natural disaster of black and white disaster victims. The data were gathered in Paris, Texas following a tornado in that town in April, 1982 which destroyed or damaged over 1500 houses and apartments. A sample of 219 black victims and 212 white victims were interviewed seven months after the disaster, with information being gathered on some 178 items pertaining to their losses, aid received, psychosocial impacts and recovery. Discriminant function analysis is used to select sets of independent variables that predict recovery levels for black and white victims along two dimensions of recovery, emotional and economic recovery. Differences in determinants of recovery between the two groups of victims involved variations in losses, psychosocial impacts, aid utilization and social support, but not demographic or socioeconomic factors.*

In this paper I will examine the effects of, and response to, a major natural disaster in the United States by both black and white disaster victims. The focus shall be on comparing the two victims groups in terms of the differential effects of a disaster as well as on variations between the groups regarding the recovery process. Disaster research has, with only a few exceptions, paid little attention to ethnic/racial variations in social responses to disaster agents.

The research on which this paper is based marks a break with

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previous research in that one of the criteria for a research site was the presence of a proportionately significant black victim population. Other studies that note differential impacts and responses of blacks vis a vis whites tend to note differences only incidentally (e.g., Moore, 1958; Moore, 1963) and not as an elemental part of the research design.

Equally rare is research reporting variations in long-term recovery strategies and outcomes by race of the victims. While there are recent major works on family recovery from disaster (Bolin, 1982; Drabek and Key, 1984), race does not appear as a significant independent variable in those analyses.

After reviewing the pertinent literature on blacks in disaster, I describe the current study in terms of site characteristics, sampling, sample characteristics and data gathering instruments. In the analysis portion I focus on differential impacts/losses, aid received from both disaster agencies and social support groups, and racial differences in victim recovery from disaster.

### Previous Research

Much of the available research on minorities in disaster in the United States has concentrated on variations in responses to warnings and differences in evacuation behavior (e.g., Lindell et al., 1980; Perry et al., 1980). In addition, the role of the mass media in disaster response and recovery in a black community has been analyzed (Beady and Bolin, 1983). The studies on warning response were based on comparatively small samples of racial minorities, while the study on mass media involved only black victims.

Research on blacks in later stages of disaster has been equally sparse. Kutak (1938) suggested that black families adapted more easily to living conditions in emergency shelters than did white families. Moore (1958) found black victims to have suffered greater losses than others and thus concluded that they likewise had greater recovery needs. However, Moore's study did not examine the determinants of disaster recovery in detail for his black victims.

In a more recent study, Minnis and McWilliams (1971) examined patterns of residential integration/segregation following a tornado in Lubbock, Texas in 1970. Among their findings was the conclusion that blacks were more likely to accept post-disaster residential integration while whites preferred continued segregation (Minnis and McWilliams, 1971:169-170).

Pertinent literature not directly derived from disaster studies is available from American research on black families in general

and on families in stress or crises situations. Analogous to disaster contexts, the family stress literature has come to focus on social support networks as stress mitigating structures (e.g., Hill, 1972; Litwak and Szelenyi, 1969; McCubbin, 1979; McCubbin and Olson, 1980; McCubbin et al., 1983).

Some recent disaster research has focused on social support as a positive factor in victim response and recovery (Bolin, 1983; Drabek and Key 1984). Research on minority families has examined mutual aid networks, particularly among black Americans (e.g., Lin et al., 1979; Lopata, 1978; Martin and Martin, 1978) and the use of kinship support during stressful life events. Further, Staples (1976) reports that blacks in the U.S. have more extensive and cohesive kinship networks than do whites and are likely to rely on those networks under conditions of stress or deprivation (cf. Babchuck and Ballweg, 1971; Cantor, 1979; Jackson, 1971; McAdoo, 1978; Stack, 1974). Thus support networks can function as conduits of aid and support for families experiencing crises.

For the purposes of this analysis, the role of extrafamilial aid and support (whether from kin groups or community and federal sources) in responding to and recovering from disaster is a key concern. Differences between black and white disaster victims in responding to disaster related stresses have been neglected in the literature. In the remainder of this paper, I will present selected findings from my research to address this gap in the research literature.

### Family Recovery

In the analysis below the family is assumed to be an open system engaging in various levels of interchanges with social units around it (Drabek and Key, 1984). The impacts of a disaster often place demands on families that necessitate their utilization of extra familial aid sources to respond to and recover from their losses. Typically victim families will establish or activate linkages both with primary support groups as well as with the institutionalized structures of federal and state disaster agencies (Bolin and Bolton, 1983). These agencies specify eligibility criteria determining which families get aid, what kinds, and in what amounts. This overall aid resources structure is widely utilized by victims in major U.S. disasters.

The effects of aid on family recovery has received some attention in the disaster literature (Bolin, 1976; Bolin, 1982; Drabek and Key, 1984). Not unexpectedly, aid from federal and state agencies has been associated with economic recovery,

while aid from family and kin is usually associated more with the psychosocial dimension of recovery (Bolin, 1982). Family recovery is frequently conceptualized as having several aspects. Among suggested components are: housing recovery, financial recovery and emotional recovery (eg. Bolin and Bolton, 1983; Drabek and Key, 1984).

In the present analysis I will consider two broad dimensions of family recovery: emotional and economic recovery. Emotional recovery refers to the diffuse set of affective characteristics that are part of individuals and families and the reestablishment of those psychosocial qualities after they have been disturbed by a disaster. Economic recovery refers to the achieving of a financial status equivalent to victim's predisaster economic circumstance. Both dimensions are here measured by respondents' self-rating of their recovery progress.

### The Research

The data presented here were gathered in Paris, Texas (pop: 26,000) following a tornado that swept through that town in April 1982. The tornado moved west to east across older neighborhoods of the city hitting primarily working class and poor families including those in a federally subsidized housing project. More than 1000 homes were damaged or destroyed. Red Cross estimates indicated that 426 houses were destroyed, 291 received major damage and 519 received minor damage. An additional 28 mobile homes were damaged or destroyed as were some 356 apartment units.

Because the area received a federal disaster declaration, making available federal aid, and because a significant portion of the victims were black, the site was considered as ideal to examine the recovery of different racial groups. Data gathering was conducted approximately eight months post-impact, a time which would provide a reasonable cross section of families at various points in the recovery process (e.g., Bolin, 1982).

Using a list of all victims in the town, as provided by the Red Cross, a random sample was drawn and interviews obtained. The sample, upon which the following analysis is based, is divided equally between black and white. A total of 431 victims were interviewed with 49.2% (212) being white and 50.8% (219) being black.

Respondents were contacted and interviewed by trained personnel using detailed schedules consisting of 178 closed and open ended items. Interviews lasted approximately one hour. As with the sample, both black and white interviewers were

used. To facilitate a good interview completion rate, black interviewers completed interviews with both black and white victims. Completed interviews were obtained from 91% of those originally sampled. The sample frame was derived from Red Cross victim lists.

The interview schedule, based on previous ones used in long-term family recovery research (Bolin, 1982; Bolin and Klenow, 1983), obtained information in a number of pertinent areas, including: material impacts/losses, residential dislocations, utilization of federal, state, and local recovery aid programs, availability and use of social support networks, psychosocial impact items, and self-rated recovery indicators.

Victims of the Paris disaster had available to them a number of different federal, state and related aid programs and services. A Disaster Assistance Center (DAC) was established after the storm and provided victims with a central location at which to obtain information on available aid programs and to fill out applications for assistance. Among the major aid agencies and programs present were: the Federal Emergency Management Agency (FEMA) which provided temporary housing and related recovery services; The Red Cross which provided food, shelter, and additional assistance; Individual and Family Grants (IFG), jointly funded by state and federal governments, it made available grants of up to \$5,000 for families unable to obtain recovery aid elsewhere; the Small Business Administration (SBA) which had low interest loans available to qualified victims for home and business reconstruction purposes; Interfaith Disaster Services, an interdenominational church group that provided grants and services to needy victims. In addition, there were a number of local civil organizations that helped victims through various small scale programs of cash grants, and reconstruction assistance.

### Methods

This analysis relies on discriminant function analysis. Discriminant function analysis is a type of multivariate statistical technique that computes mathematical dimensions (discriminant functions) that maximize differences between previously designated criterion groups for the dependent variables (Cooley and Lohnes, 1971). The discriminant functions are linear combinations of independent variables that measure the discreteness' of the groups specified for the dependent variables (Snedecor and Cochran, 1967).

This analysis considers two dependent variables for each

of the racial groups. Black and white victims were asked to rate their degree of recovery from the tornado in regards to two dimensions: economic recovery and recovery in terms of "emotional well-being" of their families. Both questions used a 5 point (0-4) self rating scale, where 0 represented no recovery and 4 represented complete recovery. These variables have been collapsed into three categories in the current analysis: complete recovery (4), intermediate recovery (3), and low recovery (0-2). These three categories or levels constitute the criterion groups for each of the two dependent variables, economic and emotional recovery.

In the following, separate discriminant functions are derived for the black victim subsample and the white victim subsample for each of the two recovery dimensions. A number of independent variables were selected based on the literature (e.g., Bolin, 1982). A stepwise statistical procedure in the discriminant program selected from these predictor or independent variables a smaller set of variables determined to be important discriminators. For each of the recovery dimensions, a comparison is made between the black and white samples. This allows an assessment of differences in factors explaining recovery between the two victim groups for both of the recovery dimensions. The analysis also allows a comparison to be made of differences between the determinants of emotional and economic recovery within each of the two racial subsamples.

### Analysis

In this analysis the goal has been to determine a set of independent variables which best discriminate among the three recovery levels for blacks and whites for the two dependent variables (emotional and economic recovery).

Table 1 presents the standardized discriminant function coefficients for black victims regarding stages of economic recovery. The size of the coefficients indicates variables relative contribution to each of the two discriminant functions, similar to the interpretation of beta weights in regression analysis. Correspondingly each discriminant function may be described or named by the pattern of variables that load most heavily on it as in factor analysis.

Only coefficient of .500 or larger have been selected to describe the functions discussed as coefficients of that magnitude are statistically and conceptually the most important ones. Function 1 may be characterized as a combination of recovery aid and housing factors. Aid from the IFG, Red Cross and

Interfaith Disaster Services all load strongly with the first two being clearly the most important. Housing factors that contribute to the function include the number of post-disaster residential changes (negative score), poor temporary housing conditions (negative score) and receiving temporary shelter from friends or relatives (positive score).

Function 2 has several variables that are significantly associated, two of those variables involving a psychosocial dimension: whether the primary group aided in emotional recovery and anxieties over bad weather. In addition, having lived in a FEMA mobile home as temporary housing loads positively on Function 2 while the number of young children contributes negatively. This latter is the only demographic variable selected by the stepwise procedure for blacks on economic recovery and suggests that a larger number of dependents is likely to impede economic recovery from disaster.

Looking at the proportion of variance in economic recovery accounted for by the two functions, the aid and housing function

**Table 1:** Standardized Discriminant Function Coefficients for Economic Recovery of Black Victims.

Variable Label	Function 1	Function 2
Interfaith aid	.723	.153
Current housing is poor	-.994	.343
Lived in FEMA trailer	.266	.643
Red Cross aid	3.021	-.221
Total number of housing changes	-.843	-.073
IFG aid	4.875	.781
Percent losses that were insured	.734	.174
Primary group aided economic recovery	-.962	-.123
Primary group helped emotional problems	.461	.944
Temporary shelter with family, friend	.549	.083
Weather related anxieties	.134	-.516
Number of Minor childre	.217	-.537
Percent of variance explained for black economic recovery	81.78	18.22

(No1) accounts for the greatest amount (81.78%), although function 2 also explains a statistically significant amount of variance.

Table 2 presents the discriminant function coefficients for emotional recovery among blacks. Function 1 may be described by four key psychosocial variables: primary group support for victims's emotional problems, the experience of storm related emotional strains (negative score), storm related sleep disturbances (negative score) and anxieties over weather phenomem. Function 2 may be described as a combination of psychosocial disruption variables and aid and social support variables. Two psychosocial variables stand out: the loss of mementos in the disaster and a fatalistic belief in the lack of personal control over life events. The aid variable that most strongly loads is aid received from Interfaith Disaster Services. The social support variables most strongly associated include visitation frequencies and the number of close relatives in town. Of the two derived functions, Function 1 accounts for the majority of explained variance (73.16%), although as before,

**Table 2: Standardized Discriminant Function Coefficients for Emotional Recovery of Black Victims.**

Variable Label	Function 1	Function 2
Loss of mementos	.026	.560
Interfaith aid	.453	4.245
Visitation frequency with relatives	.281	3.998
Percent of losses insured	.284	.095
Number of close relatives	-.172	.703
Primary group aid for emotional problems	.546	.120
"I have little influence over events" <sup>a</sup>	.264	-.802
Experienced emotional strains	-.623	.078
Family life is still disrupted	-.357	.008
Sleep disturbances	-.510	-.072
Storm anxieties	-.822	.432
Percent of variance explained	73.16	26.84

<sup>a</sup> Likert scale item asking respondents to agree with the statement "I have little influence over the events in my life."

discriminant function scores (respectively) for white victims. In Table 3 (economic recovery), Function 1 is characterized by several disaster loss variables including total losses (in terms of percent of home and possessions destroyed), losses relative to those around victims (an indicator of relative deprivation), the loss of mementos and personal possessions, and increased costs of living. All variables are negatively associated with Function 1. Function 2 may be described as being determined by of aid variables. IFG, SBA and Red Cross aid all contribute positively to the function as does the variable measuring the percent of losses that the victim was able to cover by aid and insurance. Additionally, aid from friends and a victim's evaluation of the role of primary group aid in economic recovery both have statistically significant discriminant function scores (Table 3). Function 1 accounts for approximately twice the explained variance as Function 2 (67.41% vs. 32.59%).

For discriminators of white victim emotional recovery (Table 4), Function 1 is best described by four impact and social support items: the number of close friends in town, the number of household members injured (negative score), unsatisfactory temporary housing at the interview (negative score) and continuing storm related family disruptions. Function 1 explains 73.23% of the variance in emotional recovery. Function 2 consists of three psychosocial impact variables: presence experiencing emotional strains from the disaster, storm related sleep disturbances, and anxieties during threatening weather. No demographic factors load at the .5 inclusion level for either function although respondent's age does load relatively strongly on Function 1. Past research has shown the positive effect of age in the emotional recovery of disaster victims (e.g., Bolin and Klenow, 1983).

The ability of the derived functions to separate the recovery group centroids (average scores for each recovery level) was investigated next. Table 5 presents the group centroids or means for the discriminant scores on economic recovery (black and white) and Table 6 does likewise for emotional recovery. For each table the relative size of the difference between reported values of the centroids is an indicator of how well the functions separate the recovery group or levels.

To test for the statistical significance of the differences between recovery group means (centroids) a series of two group comparisons using an F statistic were run for both subsamples on each of the two recovery measures. In all instances statistically significant differences between group means exist for both black and white victims ( $P < .05$ ). This indicates that the derived discriminant functions distinguish well among

**Table 3:** Standardized Discriminant Function Coefficients for Economic Recovery of White Victims

Variable Label	Function 1	Function 2
Total losses	-.775	-.154
Losses relative to other victims	-.599	.357
Loss of mementos	-.506	.222
Temporary shelter with kin	-.280	-.453
Red Cross aid	-.613	8.730
SBA loan	1.523	5.075
IFG aid	.671	3.588
Percent of losses covered by aid/insurance	.155	.611
Number of close relatives	-.373	-.176
Received aid from friends	-.070	.501
Primary group aid in economic recovery	-.161	.722
Increases in cost of living	-.591	.099
Percent of variance explained	78.41	32.59

**Table 4:** Standardized Discriminant Function Coefficients for Emotional Recovery of White Victims

Variable label	Function 1	Function 2
Number of close friends	.508	.186
Household member injured	-.759	.287
Knew others killed or injured	-.254	.017
Percent losses insured	.224	.480
Received aid from relatives	.218	.372
Experienced emotional strains	-.026	-.542
Poor current housing situation	-.576	.395
Family is still disrupted	-.683	.060
Sleep disturbances	-.193	-.652
Storm anxieties	-.299	-.580
Respondent's age	.458	.288
Percent of variance explained	73.23	26.77

**Table 5:** Group Centroids for Discriminant Scores on Economic Recovery

Group	Centroids for Function 1	Centroids for Function 2
1 Low recovery	1.582(-1.482)	.415 (-.723)
2 Intermediate recovery	-.142 (-.527)	-.447 (1.252)
3 Complete recovery	-1.40 (.965)	.625 (-.226)

a White scores in parentheses.

**Table 6:** Group Centroids for Discriminant Scores on Emotional Recovery

Group	Centroids for Function 1	Centroids for Function 2
1 Low recovery	-1.354 (1.413)	.453 (.017)
2 Intermediate recovery	-.049 (-.531)	-.607 (-.741)
3 Complete recovery	.858 (-.575)	.387 (.532)

a White scores in parentheses

recovery levels for both subsamples on each of the dependent variable (economic and emotional recovery).

### Discussion

For blacks, the variables that proved to be the best predictors of economic recovery were, as might be expected, monetary and housing aid received (Table 1). It is interesting to note that primary group aid in economic recovery appeared as a negative factor in economic recovery, suggesting that kin and friends in this instance were not a functional source of economic recovery aid. While the variables selected as good discriminators of white economic recovery levels were similar to those selected for blacks, some important differences may be identified (cf. Tables 1 and 3). SBA loans figured prominently among the white subsample but not among blacks. This reflects the fact that many blacks could not qualify for SBA disaster loans. Other research (e.g., Bolin, 1982) has shown low interest SBA loans to be an important factor in allowing families to rebuild homes and to get resettled into permanent housing promptly. Both the elderly and the poor (including in this study, blacks) are typically not able to qualify for such loans, hence their typically lower scores on economic recovery.

Another important difference between the two subsamples is that for whites primary group aid loaded positively on one of the economic recovery functions while for blacks a negative coefficient was derived. This suggests that differences exist in the ability of the respective social support groups of blacks and whites to provide aid that contributes to the economic recovery of victims. Again, this undoubtedly reflects underlying socioeconomic structures, with blacks having few economic resources at their disposal. It is interesting to note that for neither black or white victims, did the stepwise selection procedure pick socioeconomic status variables as important primary discriminators of levels of economic recovery.

For black victims, emotional recovery was found to be determined by a combination of social support and psychosocial impact variables, the latter having negative discriminant function scores. The role of social support in buffering the effects of stress, such as disaster, is consistent with much of the social support literature as discussed earlier (Kahn and Antonucci, 1980). Thus, the support of family and kin were found important in black emotional recovery. Psychosocial impact variables were also related to the emotional recovery of white victims. However, whites differed from blacks to the extent that fewer

social support items were selected as discriminators for white emotional recovery. Also the negative effects of having family injured in the disaster and knowing others killed or injured was found among white but not black victims.

An examination of Tables 5 and 6 also offer evidence of differences between black and white recovery. The centroids for discriminant scores for both economic and emotional recovery show clear differences between blacks and whites. The tests of significance for recovery group mean differences show that for each racial group, the derived functions are successful in obtaining significantly different recovery group means. Comparing within each racial category the functions also discriminate well between the three recovery levels for both economic and emotional recovery. This indicates that the selected variables and the functions derived from them constitute a reasonable set of factors to explain differences in recovery for each racial group.

What this analysis illustrates then is that differences exist between the two social groups in terms of factors that predict recovery outcomes. Those differences were not found to directly involve socioeconomic variables, but rather differences in losses, psychosocial impacts, aid received, and social support. Black economic recovery would appear more sensitive to such factors as the number of minor children in the household than white's (see Tables 1 and 3). Children in such instances imply greater demands being placed on parents in terms of housing clothing and feeding of the departments. Likewise black emotional recovery was affected by social support factors more so than white recovery. While socioeconomic factors are of major importance in recovery from disaster (Bolin, 1982), it is worth noting here that sociocultural factors may also play a role in differential recovery outcomes.

### References

- Babchuck, N. and J. Ballweg  
1971 "Primary Extended Kin Relations of Negro Couples." *Sociological Quarterly*, 12:69-77.
- Beady, C. and R. Bolin  
1983 *The Role of the Black Media in Disaster Reporting to the Black Community*. Institute of Urban Research: Morgan State University.

- Bolin, R.  
1976 "Family Recovery from Natural Disaster: A Preliminary Model, *Mass Emergencies*, 1:167-177.
- 1982 Long-Term Family Recovery from Disaster. Institute of Behavioral Science: University of Colorado.
- 1983 Social Support and Psychosocial Stress in Disaster. Paper presented at the Western Social Science Association Meetings (April). Albuquerque, NM.
- Bolin, R. and P. Bolton  
1983 "Recovery in Nicaragua and the USA," *Mass Emergencies and Disasters*, 1(March):125-144.
- Bolin, R. and D. Klenow  
1983 "Response of the Elderly to Disaster: An Age-Stratified Analysis," *International Journal of Aging and Human Development*, 16G(4):283-296.
- Cantor, M  
1979 "Neighbors and Friends," *Research on Aging*, 1:434-463.
- Cooley, W.W. and P.R. Lohnes  
1971 *Multivariate Data Analysis*. New York: Wiley.
- Drabek, T. and W. Key  
1983 *Conquering Disaster: Family Recovery and Long-Term Consequences*. New York: Irvington.
- Hill, R.  
1972 *The Strengths of Black Families*. New York: Emerson-Hill.
- Jackson, J.  
1971 "Negro Aged: Toward Needed Research in Social Gerontology," *The Gerontologist*, 22:52-57.
- Kahn, R. and T. Antonucci  
1980 *Convoys over the Life Course: Attachment Roles and Social Support*. Pp 253-286 in Bates and Brim (eds.) *Life Span Development and Behavior*, Vol. 3. New York: Academic Press.

- Kutak, R.  
1938 "The Sociology of Crises: The Louisville Flood of 1937," *Social Forces*, 17:66-72.
- Lin, N.; R. Simeone; W. Ensel; and W. Kuo  
1979 "Social Support, Stressful Life Events and Illness: A Model and an Empirical Test," *Journal of Health and Social Behavior*, 20:108-119.
- Lindell, M.; R. Perry and M. Greene  
1980 *Race and Disaster Warning Response*. Seattle: Battelle HARC.
- Litwak, E. and I. Szeleny  
1969 "Primary Group Structure and Their Functions: Kin, Neighborhoods and Friends," *American Sociological Review*, 34:475-481.
- Lopata, H.  
1978 "Contributions of Extended Families to the Support Systems of Metropolitan Area Widows: Limitations of Modified Kin Network," *Journal of Marriage and the Family*, 40:355-366.
- Martin, E. and J. Martin  
1978 *The Black Extended Family*. Chicago: University of Chicago Press.
- McAdoo, H.  
1978 "Factors Related to Stability in Upwardly Mobile Families," *Journal of Marriage and the Family*, 41:237-244.
- McCubbin, H.  
1979 "Integrating Coping Behavior in Family Stress Theory," *Journal of Marriage and the Family*, 41:237-244.
- McCubbin, H. and D. Olson  
1980 "Beyond Family Crisis: Family Adaptation. Paper presented at the XIIIth International Seminar of The Committee on Family Research. Rosersberg Castle, Sweden.
- McCubbin, H.; D. Olson; and J. Patterson  
1983 "Beyond Family Crisis: Family Adaptation," *Mass Emergencies and Disasters*, 1(1):7394.

Minnis, M. and McWilliams

- 1971 The Voice of the People in Disaster and After: A Study in Residential Integration. Lubbock: Texas Tech University.

Moore, H.

- 1958 Tornadoes Over Texas. Austin: University of Texas Press.
- 1963 Before the Wind. A Study of Response to Hurricane Carla. Washington, D.C.: National Academy of Sciences.

Perry, R.; M. Lindell; and M. Green

- 1980 Evacuation Decision Making and Emergency Planning. Seattle: Battelle HARC.

Snedecor, G.W. and W.G. Cochran

- 1976 Statistical Methods. Sixth Edition. Ames, Iowa: Iowa State University Press.

Stack, C.

- 1974 All Our Kin: Strategies for Survival in the Black Community. New York: Harper.

Staples, R.

- 1976 Introduction to Black Sociology. New York: McGraw Hill.