Relationships among Neighborhood Evacuation, Volunteering and Place Attachment: Charleston and Hurricane Hugo*

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Abstract

The context of the neighborhood is found to explain both evacuation and volunteering behavior of residents of Charleston, SC in response to Hurricane Hugo. Residents' with strong feelings of place attachment were more likely to volunteer and to direct their volunteering towards the recovery of their neighborhood and their neighbors. Residents in neighborhoods characterized by high place attachment were more likely to either all evacuate or all remain; i.e., when place attachment is high, neighbors tend to follow the lead of neighbors. The family was used as the primary unit of analysis in this study and the resources available to a family were important determinants of evacuation and volunteering behaviors: families with more resources were more likely to evacuate and more likely to volunteer. Massive mobilization of informal volunteering was observed. About 19 of every 20 families interviewed voluntarily assisted in the recovery effort. The types of volunteering reflected the behavioral patterns and social structures that characterized neighboring prior to the Hurricane, hence illustrating the principle of "continuity."
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Prior to the September 22, 1989 landfall of Hurricane Hugo, many residents of Charleston, SC turned to their neighbors for advice about the evacuation that was being recommended by public officials. Many residents decided to evacuate, others remained. After the impact many volunteered their time and resources to assist in the recovery of neighbors and neighborhoods. This study attempts to describe and explain the evacuation and volunteering behavior of approximately 200 families located in ten Charleston neighborhoods.

In this paper we are interested in considering such questions as the following: What was the magnitude of evacuation among these family units? What social and contextual factors are associated with family evacuation? What was the magnitude of volunteer activity following Hugo's impact? What types of volunteer actions did households undertake. What factors differentiated those who volunteered from those who did not?

In seeking answers to these questions we will rely upon the existing literature on evacuation (c.f. Aguirre 1991; Drabek 1986; Fitzpatrick and Miletì 1991; Hultaker 1983; Ikeda 1982; Miletì et al. 1975; Perry et al. 1982; Perry 1985; Sorensen 1991) and volunteerism (c.f. Drabek et al. 1981; Dynes et al. 1990; Holland 1989; Lechat 1976; Miletì and O'Brien 1991; Nehnevajsa 1989; Perry et al. 1983; Wenger 1992; Wenger and James 1992). This literature
has examined both the magnitude and correlates of evacuation and volunteer behaviors. In attempting to differentiate those who evacuate and those who volunteer from those who don't, these previous studies have focused upon traditional social and demographic characteristics, such as sex, age, socioeconomic status, occupation, education and prior experience.

While we will build upon this research tradition, we also examine a class of independent variables that have not been studied previously by disaster researchers. A rich literature has emerged that focuses upon the concept of *place attachment*, or the sense of belonging, need, cohesion and love that individuals have for their neighborhoods and other places. No previous studies have examined the influence of place attachment upon evacuation and volunteer behaviors. We will. The addition of place attachment to the more traditional list of explanatory variables facilitates investigating volunteering and evacuation behaviors in the context in which it is likely to occur: near home, in the residential neighborhood.

Let us turn to a brief discussion of our two dependent variables. We will discuss some previous findings regarding evacuation and volunteering and operationally define the concepts as used in this research. This will be followed by a discussion of predictor variables and their hypothesized relationships with dependent variables.
The Dependent Variables

Evacuation

Drabek (1986), Fitzpatrick and Mileti (1992), Hultaker (1983), Mileti et al. (1975), Perry et al. (1982), and Quarantelli (1980) suggest that both the decision to evacuate and the act of evacuation are family based. For the most part, families evacuate as units and thus families should be treated, as they are here, as the units of analysis in studies of evacuation behavior.

With regard to the magnitude of evacuation, Drabek (1986, p. 101) suggests that given adequate warning approximately 50 percent of the threatened population should evacuate, however rates obviously vary across events. Aguirre (1991), Drabek (1986), Fitzpatrick and Mileti (1992), Ikeda (1982), Perry (1983), and others have reviewed the reasons evacuees have given for evacuating and the factors that differentiate between those who evacuate and those who did not. Among the identified reasons for evacuating are the perceived risk of harm and likelihood of impact, the perceived ease/possibility of evacuation, internal and external family resources, and the awareness that neighbors or others have evacuated. In addition, family composition and stage in the life cycle, socioeconomic status, age, education, ethnicity, and prior planning have been examined in relationship to evacuation. (Bartlett et al. 1983; Fitzpatrick and Mileti 1992; Flynn and Chalmers 1980; Perry et al. 1981; Perry et al. 1983). The results are inconsistent and inconclusive (Aguirre 1991, p. 44; Drabek 1986, ps.107-109; Quarantelli 1980, p. 43), however age, ethnic status, a lack of young
children, and a lack of family resources seem to be negatively related to evacuating.

Most importantly, previous research has emphasized the important role of group interaction and interpersonal discussions in influencing evacuation behavior. In particular, discussions with kin and neighbors appear to be important factors that facilitate evacuation (Fitzpatrick and Mileti 1992; Perry 1979; Quarantelli 1980).

Therefore, in this study we will consider two aspects of evacuation behavior: 1) sharing information with neighbors about evacuation and 2) the actual act of evacuating one's place of residence. Respondents were questioned about both issues.

Volunteering

This study attempts to identify and explain the magnitude and variety of volunteer efforts undertaken by residents during the first few weeks following Hurricane Hugo. We focus our attention upon voluntary activities at the end of the search and rescue phase and during the phase of short term recovery/restoration.

Previous research has been directed at determining both the magnitude of volunteer behavior and the characteristics that differentiate those who volunteer from those who do not. With regard to the first issue, prior research indicates that volunteering is massive and that volunteers engage in a wide variety of tasks. (Barton 1970; Drabek et al. 1981; Dynes et al. 1990; Lechat 1976; Miletti and O'Brien 1991; Wenger and James 1992). For example, Lechat (1976) found that up to 75 percent of healthy survivors may
engage in helping behavior. Drabek et al. (1981) observed that about 60 percent of the injured victims in Wichita Falls, Texas engaged in helping behavior. Although only about ten percent of the population of Mexico City engaged in helping behavior after the 1985 earthquake, this percentage amounted to about 2,000,000 volunteers (Wenger and James 1992). About 70 percent of the residents in Santa Cruz and 60 percent in San Francisco counties participated in some sort of emergency response activity following the Loma Prieta earthquake (Miletti and O'Brien 1991). Also, these studies have found that volunteers engage in a wide variety of tasks, including search and rescue, debris clearance, the provision of food, shelter clothing, and transportation, and offering medical and psychological aid to victims.

With regard to the social and demographic factors that are associated with volunteering, studies present conflicting evidence. Some early studies noted that males and young people were more likely to volunteer than women and older persons (Miletti et al. 1975, p. 65). However, these findings were questioned by Perry et al. (1983). In Mexico City the highest rates of volunteering were found among the males, those 18 to 45, the most highly educated and the upper class (Dynes et al. 1990; Wenger and James 1992, p. 12). However, neither socioeconomic status nor gender influenced volunteering after the Loma Prieta earthquake (Miletti and O'Brien 1991). It must be noted that most of these prior studies focused upon the emergency period of the disaster and utilized the individual as the basic unit of analysis.
This study represents an extension of this previous work in two directions. First, we are not focusing primarily upon volunteer behavior during the emergency period. Instead, we are studying the period of short-term recovery and rehabilitation. Second, the family, not the individual, is the unit of analysis (Bolin 1982; Drabeck 1986; Hultaker 1983). The focus upon the family is needed because family resources are used to meet the demands of the disaster. Therefore, characteristics of the family are important determinants of the type and intensity of family volunteer efforts.

With regard to the types of volunteer activities that may be undertaken in the post-impact period, the "principle of continuity" suggests that pre-disaster behavior is a major determinant of trans- and post-disaster behavior (Quarantelli and Dynes 1977; Wenger 1978). In other words, the social structures and roles existing prior to the disaster are major factors in structuring post disaster behavior. This principle suggests that the types of neighborhood volunteering behaviors should correspond to the types of neighboring activity that occur in non-disaster conditions.

Warren (1981) identified types of neighboring activities found in United States. In this study we will examine whether the post-Hugo volunteer activities do in fact fall into the Warren's categories of "normal" neighboring activities. Allow us to briefly discuss these types by describing "normal" and "disaster" forms of volunteer activities.

Types of Neighboring and Volunteer Activities
Emotional Support. A major neighboring activity occurring during normal times is emotional support: neighbors greet, visit, and comfort one another. These activities range from the casual acknowledgement made when neighbors cross paths to the more intensive but still informal discussions about daily events. In times following a disaster these neighboring behaviors may take form as neighbors asking neighbors whether they need assistance and/or by neighbors sharing information about their neighborhood’s recovery.

Instrumental Support. Instrumental support represents the informal, short term, assistance neighbors deliver to one another in minor daily emergencies or special instances (e.g., borrow a cup of flower, watch children, barter skills). These exchanges are generally governed by rules of reciprocity: they are neither gifts nor charity. In times following a disaster these neighboring behaviors may take the form of sharing food and supplies, volunteering time to assist neighbors in clearing debris, running errands, and/or repairing buildings. What Warren calls material support is collapsed into this category.

Informational support. Informational support represents the exchange of information about the presence and location of resources and facilities within and outside of the neighborhood (i.e., good stores, child care opportunities, educational events, job opportunities). Because of special knowledge, ability, or concern, some people serve to access information and resources about the larger, resource rich communities and provide it to neighbors. In times of a disaster some residents may take it upon themselves to serve as a conduit to communities outside the neighborhood by
contacting authorities or attending public meetings to request aid and assistance for their neighborhood.

In addition to assessing volunteer behavior focused within the neighborhood, volunteering behavior directed elsewhere will also be assessed. Respondents were queried about their involvement in community-wise issues and non-neighborhood organizations. For each potential type of volunteering activity, analytic techniques were used to develop indices of volunteering activity.

Explanatory Variables: Theory and Operationalization

A major purpose of this study is to describe and explain the evacuation and volunteering behavior of families in a neighborhood context. The contextual effect of neighborhoods upon these behaviors has been inadequately addressed, but would appear to be important. For example, neighbors may feel pressured into helping neighbors in need simply because their close proximity makes them able to respond more quickly than other sources of aid such as friends, kin or public agencies (Form and Nosow 1958; Litwak and Szelenyi 1969). Similarly, because neighbors are familiar with their "turf," they are likely to know where to find resources (e.g., water, wood, access) and to know where the needy are located (e.g., elderly). Both of these factors may promote volunteering behavior and both should be somewhat constant across neighborhoods. However, a neighbor's response to these pressures may be tempered by their attachment to, investment in, and respect for their neighbors and the neighborhood.
Three factors that characterize families in neighborhoods were identified as being likely to explain rates of volunteering and evacuation observed in the different neighborhoods of this study: internal family resources, personal loss, and place attachment. In the following discussion each factor is defined, justified and operationalized. In operationalizing these factors respondents were asked a set of fixed questions focusing on the state of their neighborhood as it existed prior to Hugo and indices were constructed from responses to these items.

**Resources: Internal and External to the Family**

Family units serve as "role budget centers" (Dynes and Quarantelli 1973). They allocate their resources to meet external and internal demands according to the availability and magnitude of their assets. It was hypothesized that a family's internal resources should be positively related to both its volunteer and evacuation behaviors; i.e., the higher the level of internal resources, the more likely is a family to engage in both evacuation and volunteer activities. Internal resources include more than socioeconomic status, since the ability of a family to volunteer assistance is affected by the number of persons capable of offering assistance and by the number of persons inside the family that need the assistance and attention of others.

Internal family resources were operationalized by averaging the standard normal deviates (calculated across the sample) of the following measures: the number of persons in the household able to volunteer\(^1\), the total household income, the occupation of the head of
household, the education of the head of household, and the respondent's own assessment of their family's resources as compared to others in the neighborhood. The latter variable was included because Bolin (1982) suggests that people's perceptions of their ability to offer assistance relative to others influenced their helping behavior over and above their actual abilities.

Resources external the family were assessed by asking whether respondents could turn to someone outside their family for one or more of the following: information, emergency lodgings, loans of money, opinions. It was noted whether these resources were available inside or outside the neighborhood, but both sources are considered external to the family.

Family Loss
While bearing no logical relationship to evacuation behavior, the direct loss of family resources as a result of Hugo is another factor likely to influence family volunteering. Simply put, families with extensive property damage should be less likely to volunteer. The greater the damage to the family resource-base, the fewer resources are available to assisting others. Similarly, those families whose members lost a job or were injured should have fewer resources to devote to volunteer efforts. Respondents were asked to estimate a dollar figure for lost or damaged personal property.2

Place Attachment
Assuming that families have the resources to engage in volunteer activities, place attachment may partially explain the intensity and quality of the volunteer work families direct toward their neighbors and the neighborhood. It also may partially explain whether families choose to evacuate. A definition of place attachment is elusive. However, a literature has developed over the last 15 years that incorporates a wide range of perspectives, such as sense of community (McMillian and Chavis 1986), group cohesion (Buckner 1988), neighboring (Unger and Wandersman 1985), and the like (see Shumaker and Taylor 1983; Fischer 1977). Five dimensions of residents' subjective feelings of place attachment are discussed below. Each dimension is a potential explanatory variable in the prediction of evacuation and volunteering behavior. Each will be defined and operationalized in the discussion that follows.

Mutual Aid and Group Cohesion. Feelings of mutual aid and group cohesion are qualities that characterize the social fabric of most neighborhoods (Janowitz and Kasarda 1974; Weeing et al. 1990). Mutual aid describes residents' perceptions that neighbors will come to their aid in a time of need. This belief need not be based on evidence of past behavior and is often unstated (Unger and Wandersman 1986). Perceptions of mutual aid were assessed by summing respondents' affirmative responses to five questions about aid available from someone within the neighborhood (i.e., opinions, housing, money, chat, and information). Cohesion describes the extent to which group members share values, concerns, ambitions and aspirations. Members of a cohesive group are more likely to
work together towards common goals and to believe/respect the
opinions and advice of group members. Residents' perceptions of
cohesion among neighbors was assessed by having respondents rate
the extent to which: a) they felt that neighbors kept tabs on one
another, b) they felt that neighbors stuck together, and c) that
residents participated in neighborhood activities.

Place Love. Liking, attachment, love, and related terms
describe a broad class of feelings characterized by Shaver et al.
(1987) as affection. It is suggested here that the feelings and
consequences of love that characterize person-person relationships
also characterize feelings evoked by person-place relationships
(eg., Seamon 1979). Respondents rated whether they: a) liked the
neighborhood, b) felt at home there, and c) felt that the neighborhood
was more than just another place to live.

Place Identity. Important contributors to one's self-
identity include the places, objects, and buildings with which one
associates (Belk 1988). Csikszentmihalyi and Rochberg-Halton
(1981) suggest that the physical environment in general, and
household objects in particular, contribute to one’s interpretation
and understanding of self. Proshansky et al. (1983) and Korpela
(1989) refer to the contribution of place to self-identity as place-
identity. Place-identity influences how one evaluates past, current
and expected settings and serves as a basis for comparison and
evaluation of self. Place identity seems likely to result when the
values and beliefs symbolized by a place’s image complement or
enhance self image and hence promote place identity. Unfortunately
place identity is difficult to operationalize (Hull 1992). Instead we
assessed residents' feelings of pride and the degree to which their neighborhood made them feel special. It was assumed that strong place identity would make one proud of their neighborhood and feel special about being a part of it. Also assessed were residents' beliefs that what was good for the neighborhood was also good for them.

**Place Dependency.** Stokols and Shumaker (1981) and Shumaker and Taylor (1983) suggested that persons may become dependent upon a place because of specific functions/roles that are unavailable or cannot be satisfied elsewhere (i.e., job, special ethnic foods, religion, doctor). Residents' place dependencies were assessed by asking them how easy it would be for them to move away from the neighborhood, assuming money were not at issue.

**Place Influence.** MacMillan and Chavis (1986) suggest a critical aspect of sense of community is the perception of members that their community has some influence in obtaining resources, attention, and concern from the larger more powerful communities that surround it. A related factor is residents' perceptions that they have some influence on the local community (i.e., a member of a group needs to feel he can play a role in shaping group goals and behavior). The extent to which local officials were thought to pay special attention to a resident's neighborhood was rated by respondents.

**Hypothesized Relationships**
Family evacuation and volunteer behaviors are broken down into a total of seven "dependent variables:" talking with neighbors about evacuation, evacuation of residence, volunteering emotional support to neighbors, volunteering instrumental support to neighbors, volunteering informational support to neighbors, total volunteering effort of families focused within neighborhoods, and volunteering effort focused outside the neighborhood. Each dependent variable was subjected to regression and/or loglinear regression analyses. The following discussion explains why we anticipated certain relationships between each dependent variables and one or more of the independent, predictor variables.

The preexisting level of mutual aid and group cohesion within a neighborhood should be predictive of the extent to which neighbors talked with neighbors about evacuation. The stronger the neighborhood social fabric, the greater the consultation among members. Similarly, persons having strong feelings of place love and identity should be motivated to consult neighbors. Both place love and place identity promote behavior directed toward the source of the feelings and therefore may result in increased consultation. Also, place love and identity may result in residents placing more stock in the behavior and opinions of neighbors, hence promoting discussions about evacuation. The family’s internal resources should be another important predictor. Families with capable persons should be able to seek out and discuss evacuation issues with their contacts in the neighborhood. Also, families with higher education levels may consider more sources of information,
including neighbors, when reaching decisions about evacuation, including neighbors.

Equally important, residents' evacuation decisions may be influenced not only by their neighbors opinions, but also by their neighbors' behaviors. Therefore, we would expect residents in neighborhoods where sense of cohesion and other indicators of place attachment are strong to be more likely to either all evacuate or all remain when compared to residents in neighborhoods with low indicators of place attachment. Residents may endorse the official recommendation of evacuation as worthy and persuade neighbors about the need to evacuate directly through talk or indirectly by demonstrating their endorsement through their own evacuation activities. Or, they may chose to ignore the information as irrelevant or naccurate and deny that evacuation is necessary and communicate this belief to neighbors by talk or action.

Finally, family resources should influence evacuation. Internal resources make it easier to evacuate because there are more capable persons to assist in the evacuation effort, and better education and employment opportunities may result in greater awareness of evacuation plans and options. There also may be more financial resources that facilitate evacuation (personal automobile, credit cards to defer hotel expenses, etc.).

The intensity of each aspect of volunteer behavior inside and outside the neighborhood should be positively related to the family's internal resources. Families with strong internal resources should be able to spare time, food, money, and advice and therefore be more likely to volunteer. They simply have more volunteering capacity.
Finally, the five dimensions of place attachment (mutual aid and cohesion, place love, place identity, place dependency, and influence) should increase the likelihood of all forms of volunteer behavior directed toward the neighborhood. Mutual aid and cohesion existing prior to the disaster should result in mutual aid (volunteering) after the disaster. Residents' love of a place should have similar effects on their behavior as if it were love for another person, i.e., result in increased efforts to help neighbors and neighborhood recover. Place identity suggests that persons define themselves, in part, by their homes, neighborhoods, and other places. Thus one explanation for the apparently altruistic volunteering efforts of neighbors is that they are working for themselves as well as others (see Belk 1988); that is, to better the image of the neighborhood and hence better the image of self.

Volunteer behavior directed outside the neighborhood provides a means to confirm the other findings. The measures of place attachment should be negatively related to external volunteering since place attachment should direct volunteering toward the neighborhood. Both internal and external family resources should be positively related to volunteering activity outside the neighborhood.

Methods

A telephone survey of residents in ten Charleston "neighborhoods" was conducted during the spring and summer of 1990. A neighborhood was arbitrarily defined as approximately 100 residential units located within a four to five contiguous street-
block area. An attempt was made to select neighborhoods that were approximately equal in the type (but not the cost) of damage caused by Hugo, were homogeneous within themselves but varied from others in socioeconomic status, age of buildings and density of houses (Table 1). Selection of neighborhoods was based upon advice from local officials.

Approximately one third of the residents from each neighborhood were randomly sampled and mailed a formal letter explaining that they would be contacted by phone. In total 346 potential residents were telephoned. A total of 14 partially completed and 185 fully completed interviews were obtained. The total response rate was 57 percent. The response rate of "residents" (i.e., not business) we were able to contact was 76 percent. Interviewers queried either the female or male head of household. One-third of the respondents were male. The interviewee was treated at times as a respondent (i.e., when asked questions about their attachment to place) and at times as an informant (i.e., whether the family evacuated and how much the family volunteered). This procedure was done because evacuation and volunteering are family activities, while a feeling of attachment is a subjective assessment of one person's state. It is assumed that if the respondent/head of household feels attached then the family as a whole will feel attached and their behaviors influenced accordingly.

Table 1 about here
Three trained interviewers conducted the twenty minute interview. Numerous pre-tests of the interview guide were conducted to train the interviewers and to assess the range of responses for each type of question so that closed ended, fixed option questions could be developed where appropriate.  

Ordinary Least Squares Regression and Maximum Likelihood Logistic Regression analyses were conducted to "test" the hypotheses by regressing various predictor/explanatory variables on each of the dependent variables. Significance of the beta weights is assumed to evidence support for the research hypotheses. Logistic regression was used for the dichotomous dependent variables (evacuation and discussions of evacuation). Ordinary Least Squares regressions were used for the other dependent variables even though the data is actually only of ordinal quality. Therefore it must be assumed that the different volunteering activities are of equal value and thus their aggregation of interval quality. Logistic Regression analyses were conducted for all dependent variables to confirm the results of OLS. Caution is in order in comparing the r-square and beta coefficients of the Logistic Regression with those of the Ordinary Least Squares regression analyses. MacFadden r-square is reported and the beta coefficients are reported at the means of the predictor variables.

The questions/items used to represent the place attachment, volunteering behavior, and external family resource indexes were subjected to Factor Analyses and Cronbach Alpha reliability analyses to confirm the a priori groupings of items for the different
indices and to assess the indice's internal consistencies (KR-20 for dichotomous data; Nunnally 1978). The analysis and statistics are not presented in detail but the major findings are summarized below.

The items assessing specific types of family volunteering behavior grouped, as expected, into categories descriptive of neighboring behavior occurring under "normal" times. All the items were submitted to one factor analysis and six factors emerged accounting for over 70% of the variance in volunteering behavior. The factors corresponded to the expected dimensions of neighboring behavior. The five items for instrumental support split between two factors (remove neighborhood debris, run errands, share supplies in one factor and prepare food and help repair neighbor's houses in another). Given these findings, the a priori specified groupings are retained rather than developing new indices that maximize the potentially unique variance found in this sample. KR-20 index reliability/consistency analysis of the a priori specified item groupings confirms these findings with measures ranging from 0.5 to 0.7; indicating moderate reliability/consistency in the indices.

Factor analysis of all items reflecting different aspects of place attachment identified three factors which accounted for 50% of the variance in respondents' ratings of twelve items. A Varimax rotation suggested the first factor represented feelings of place love, the second factor represented place identity, and the third represented mutual aid/cohesion. Cronbach's Alphas for these three indices were, respectively, 0.81, 0.81, and 0.61, indicating moderate to good reliability/consistency. An item asking respondents about
the influence of their neighborhood did not load highly on any of the first three factors. Since it was expected to be somewhat independent of these other factors it was retained as a single item index for place influence.

Items representing internal family resources loaded on two factors that accounted for 58% of the variance in these items. The major factor included income, number of people available in the household with capability to volunteer, occupation, and education. Rs' comparison of their own families' recovery capacity relative to other families in the neighborhood loaded almost exclusively on the second factor. Cronbach's alpha for items on the first factor is 0.64, in contrast to 0.49 when the latter item is included with the other four items. The subjective assessment of family resources seems to be capturing something quite different from the more objective estimates of income etc. and was retained and combined into one index.

Regression analyses were conducted to test the hypotheses. Because of the exploratory nature of this study, only the sign and significance of the explanatory variables are interpreted, not their magnitudes. Moreover, a liberal alpha level (.10) is used so that the results will err on the side of including predictors which may not be significant in subsequent applications.

Discussion of Findings

Findings Regarding Neighborhood Discussions of Evacuation
As was previously noted, the research literature has pointed to the importance of interpersonal interaction in facilitating evacuation. In our sample we observed rather high rates of interaction among neighbors. Most families talked with neighbors about evacuating (on average 63 percent; Table 2). Only one neighborhood was below 50 percent. This neighborhood had the lowest socioeconomic status (Table 1) and the least amount of evacuation (11 percent).

What factors differentiated between those families who discussed evacuation with their neighbors and those who did not? The results of the regression analysis explained a modest and significant amount of the variance in this measure (approximate r-square = 0.18; p < .001; Table 3). In general, families with higher internal family resources were more likely to hold discussions with neighbors about their evacuation plans. This finding was expected. Also as hypothesized, families with feelings of place identity and place love were more likely to talk to neighbors about evacuation. Residents with these feelings should respect the values and opinions of fellow residents, be concerned about their neighborhood, and want to discuss its fate with similarly concerned neighbors. Our findings support this argument. Contrary to what was hypothesized feelings of mutual aid and group cohesion were not predictive of the intensity of neighborly discussions regarding evacuation.

Table 2 about here
Findings Regarding Actual Evacuation Behavior

The rates of evacuation for the ten neighborhoods varied significantly, ranging from a low of 11 percent to a high of 90 percent (Table 2), with an average of approximately 58 percent. Though this rate is rather high, it is certainly consistent with the previous findings from the research literature.

What factors differentiated high rate neighborhoods from those that were less likely to evacuate? Regression analysis was able to explain a small, but significant, amount of the evacuation behaviors of families (approximate r-square = 0.09; Table 3). As predicted, internal family resources seem to be important predictors of evacuation. Simply put, the analysis suggests that families with more resources are more likely to evacuate. Internal resources, such as credit cards and the presence of capable family members who can help with the evacuation may enable coping with the expenses and hassles resulting from an unplanned evacuation trip.

However the most significant factor contributing to evacuation was whether families talked with neighboring families about their evacuation plans prior to evacuating. Those families who discussed evacuation with others were more likely to evacuate. When respondents were asked what topics they discussed, the most frequently mentioned items were places to evacuate, how to prepare for hurricanes, and the magnitude of the threat (e.g., the size of the hurricane, low elevation of property, etc.). These topics suggest that residents felt significant concern. Neighbors appear to have
shared their concerns with others, confirmed the reality of the threat and hence motivated themselves and the others to evacuate.

While no characteristic of place attachment was significantly related to evacuation behavior using the family as a unit of analysis (Table 3), there is evidence that place attachment has a relationship with evacuation behavior when examined using the neighborhood as the unit of analysis. As we have just observed, the behaviors and opinions of neighbors were an important source of confirmatory information. To test this hypothesis, the five neighborhoods where residents behaved most similarly (i.e., neighborhoods where 11, 21, 83, 85, and 90 percent of residents evacuated; Table 2) were compared, using an unpaired t-test, to the five neighborhoods where residents behaved least similarly (i.e., neighborhoods where 77, 63, 59, 50, and 42 percent of residents evacuated). The hypothesis is confirmed. The five neighborhoods where residents were most similar in their evacuation behaviors had significantly more place love (p < 0.01; df=8), place identity (p < 0.01; df=8), and mutual aid/cohesion (p< 0.03; df = 8). Figure 1 graphically portrays the observed relationships.

Table 3 and Figure 1 about here

Therefore, a developmental model is implicit in these findings. High levels of place attachment and place love appear to be positively associated with neighborhood discussions regarding evacuation. Although generally the relationship between

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neighborhood evacuation discussions and actual evacuation is positive, when the discussions occur in high place attachment neighborhoods the families tend to act homogeneously and somewhat uniformly; i.e., they either all evacuate or they all remain in their homes.

**Findings Regarding Volunteer Behavior**

The extent of volunteer behavior was massive and represents one of the largest rates of volunteerism reported in the literature. Approximately 95 percent of those interviewed engaged in some sort of volunteering activity. About 50 percent engaged in five or more activities. Offering emotional support to neighbors was the most frequently reported activity (70 percent of respondents claimed to have offered such support; Table 2). The least popular activity was soliciting information from authorities (17 percent). Most families (52 percent) offered instrumental support by helping clear debris (70 percent), run errands (48 percent), cook food (53 percent) and/or share supplies (62 percent). A few (26 percent) assisted neighbors in the repair of their property. Even though a substantial percentage of families directed their volunteering behavior outside the neighborhood (approximately 32 percent), most volunteering was focused inside the neighborhood. Approximately 44 percent of families engaged in some type of volunteering other than those represented by the 11 categories listed in Table 2. The most popular of these activities was donating money to some recovery related cause.
What factors differentiated those families who volunteered from those who did not? Regression analyses testing the hypotheses about volunteer behavior are discussed below and results are displayed in Table 3. First it should be noted that none of the factors significantly predicted residents' voluntary efforts to solicit information and resources from authorities. In general this activity was among the least frequently undertaken. Similarly, residents' feelings that their neighborhood had influence did not significantly predict any of the volunteering behaviors. A final finding that cuts across all hypotheses is that the dollar amount of damage to personal property apparently was not a factor in influencing volunteering behavior. However, as hypothesized, families with more internal resources volunteered in more ways, both inside and outside the neighborhood. The family's capacity to offer assistance was a significant predictor for all types of volunteering behavior, especially offering instrumental support to neighbors (i.e., materials and labor).

Also as hypothesized, residents' perceptions that before the hurricane their neighbors were cohesive and would offer aid in a time of need was positively related to each aspect of volunteering behavior. This finding is consistent with the principle of continuity: behavioral norms existing prior to the disaster influence behavior after the disaster. In contrast to expectations, this measure was also positively related to families volunteering activities outside the neighborhood.

Feelings of place identity and place love were expected to significantly influence the intensity of family neighborhood
volunteering efforts. There was modest support for this hypothesis. Place identity was positively and significantly related to instrumental volunteering activities, but not to the offering of emotional support. A stronger case for this proposition could be made if place identity significantly contributed in a negative way to families volunteering efforts devoted outside the neighborhood. This was not the case; the beta coefficient was negative but only significant at the 0.2 level. Feelings of place love were not significantly related to any specific category of volunteering efforts directed toward the neighborhood. However, feelings of place love were negatively related to volunteering behavior directed outside the neighborhood at a very modest level of significance (p = .11), providing weak support for the hypothesis. On balance, the statistical support for the effects of place love and place identity is marginal, at best. However, the direction of the relationships is as expected as is the contrast between activities directed inside and outside the neighborhood.

Conclusion

The findings indicate the importance of considering the neighborhood context in attempting to understand family patterns of evacuation and volunteer behavior. Furthermore, they indicate that place attachment, a previously ignored variable in the disaster research literature, has significant effects upon neighborhood action. Before
discussing the implications of these general observations, allow us to briefly consider some of the more specific findings.

Concerning neighborhood discussions of evacuation, the percentage of neighbors that held discussions about evacuation prior to Hugo ranged from 31 to 85 percent. Seven of the ten neighborhoods had percentages in excess of 60 percent. Because the likelihood of evacuation increased when neighbors talked to neighbors, the factors promoting these discussions are relevant. Two significant predictors were found. First, families with more internal resources were more likely to consult their neighbors. Second, feelings of place attachment further increased the likelihood of these discussions, suggesting that place attachment may indirectly affect residents decisions to evacuate.

One of the more surprising findings was that the measure of neighborhood mutual aid and group cohesion was not a significant predictor of the intensity of discussion among neighbors. Perhaps the operationalization of this variable was flawed. It was based upon residents' perceptions of mutual aid available within the neighborhood and the perceived cohesion among neighbors. Perhaps this measure does not correlate with the intensity of social interaction occurring within a neighborhood. A direct measure of a neighborhood's social network assessed via network analysis may be a more useful predictor.

Nearly 60 percent of the survey residents evacuated. However, there were considerable differences in the rates of evacuation among neighborhoods. These differences can be explained, in part, by factors studied here: the magnitude of resources available to the
family, both from internal and external sources, and whether residents held discussions with neighbors about evacuation. Residents with more resources and those who talked with neighbors were more likely to evacuate. Together these factors explained approximately 9 percent of the variance in evacuation behavior.

The findings on evacuation indicate the importance of the neighborhood context. The regression analysis suggests that place attachment had an insignificant effect on evacuation behavior when tested using the family as a unit of analysis. However, the t-tests using the neighborhood as the unit of analysis found that the dimensions of place attachment significantly explained differences in the evacuation rates of neighborhoods. The results suggest that neighborhoods high in place attachment are likely to either all evacuate or all remain because, perhaps, neighbors reinforced one another's evacuation decisions.

This finding has potential implications for evacuation warning strategies. It reconfirms the old adage that "a warning issued is not a warning received or acted upon." The efficacy of media warnings in these neighborhoods may be reduced if a few key residents discount the warning or the need to evacuate. If, however, the warning strategy focuses on a few key residents and they become advocates of evacuation, then neighbors may be more likely to follow suit regardless of media warnings (see Weeing et al. 1990 for a relevant discussion of these issues in community information programs).

There was massive mobilization of informal volunteering efforts on the part of Charleston residents. About 19 of every 20
families voluntarily assisted in the recovery effort. In fact, the rates of volunteering are higher than almost all of the reported cases in the literature.

Why were we able to observe these high rates? A number of conceptual and empirical factors may have been involved. First, we have used the family, and not the individual, as the unit of analysis. This focus is appropriate given that families tend to control and allocate resources toward volunteer efforts. The inclusion of a number of individuals within families may result in a higher rate of volunteer participation than would be found for studies that have used the individual as the unit of analysis. Second, we have examined volunteering in the short-term recovery period, not in the emergency period as most previous studies have done. The extended time period and greater number of relevant tasks may facilitate higher levels of volunteering. Third, we have included a wider variety of volunteer tasks in our examination than have many previous studies. Therefore, volunteer behavior that might have been ignored in prior research was observed in this study. Fourth, there were some empirical conditions at the site that may have facilitated massive volunteering. The extensive nature of roofing and tree damage in Charleston required immediate attention. In addition, since much of the damage occurred close to home (i.e., roofs and trees) volunteering was convenient, or at least the opportunity was proximate. Furthermore, it is possible that the high rates of volunteering we observed resulted because "volunteer" behavior directed toward the neighborhood was actually self
serving; i.e., it serviced feelings of place attachment and speeded up resumption of "normal" behavior patterns.

The principle of "continuity" suggests that behavioral patterns and social structures existing prior to a disaster are key determinants of behavioral patterns and social structures occurring after the disaster. The results of this factor analysis support this principle; i.e., volunteer activities grouped into indices similar to the types of neighboring activities found during "normal" times. In addition, residents' perceptions of mutual aid and group cohesion existing prior to the disaster were predictive of their volunteering behavior after the disaster. The perception of mutual aid is an unstated belief that neighbors will support neighbors in a time of need (Unger and Wandersman 1985). These findings suggest that this belief was substantiated by actual behavior.

The other dimensions of place attachment, save residents' feelings that their neighborhood had influence, were significantly related to various aspects of volunteering behavior, to neighbors' discussions of evacuation, and perhaps indirectly to the actual evacuation decisions. These results suggest that place attachment provides a valuable contextual variable in studies of volunteer behavior (and perhaps evacuation behavior) in residential areas hit by disaster. This perspective is further supported by the few existing studies that examine the relationship attachment to place and residents' responses to actual or perceived hazardous events (e.g., Bachrach and Zautra 1985; Edelstein and Wandersman 1987).

In sum, we have found that not only are family evacuation and volunteer behaviors strongly influence by the magnitude of
resources held by a family, but they are also influenced by the strength of neighborhood place attachment that exists within the family. The concept of place attachment has not been previously studied by disaster researchers. It seems to significantly impact the magnitude of neighborhood discussions about evacuation and thereby facilitate evacuation. It also fosters family volunteering within the neighborhood. These findings remind both students of disaster and hazard and emergency managers of the importance of examining these issues with the family as the unit of analysis within the context of the neighborhood. Finally, given the significant effect of place attachment in these findings, inclusion of this dimension in future research would appear to be warranted.

Endnotes

1. The number of persons in the household able to volunteer was calculated using the following formula: the number of adults minus the number of children less than 8 years old, plus 1/2 the number of children between the ages of 8 and 15, plus the number of children greater than 15 still living at home, minus the number of persons at home over 65. Occupation was assessed so that larger numbers

2. We also queried respondents as to whether someone in the family was injured, died, or lost employment, but so few answered yes (x% injured, x% died, x% lost jobs) that this variable was not used in the analysis as part of the personal loss factor.
3. From 2 to 8 items represented each dimension of place attachment. Unless otherwise noted, responses were on a 5 point scale from strongly agree to strongly disagree with a specific statement (i.e., "you feel proud of your neighborhood"). All question were preaced with a phrase that reminded respondents we were interested in the state of affairs prior to Hugo.

4. The interview guide is extensive and a complete discussion of it is beyond the scope of a journal method's section; copies are available from the authors. All major constructs used in the analysis are discussed in sufficient detail to convey their operationalizations.

5. In an alternative analysis the ratio between the amount of damage and annual income was used as a independent variable instead of property damage because we thought this ratio might more accurately reflect the impact on the family. However, this variable also was not a significant predictor of volunteering activities.

References


Colorado, Institute of Behavioral Science, The University of Colorado.


Figure 1. Curvilinear Relationships between Dimensions of Place Attachment and Percentage of Residents Evacuating per Neighborhood
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<th>Occup</th>
<th>Damage</th>
<th>Age</th>
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Income is measured in thousands of dollars; education in years of schooling; occupation is coded 1 for unemployed, 2 for home duties or retired, 3 for clerical or laborer, 4 for professional, white collar, etc; damage is estimated by respondent in terms of dollars; age is in years; # people represents the members of family capable of volunteering; N is the number of people interviewed from each neighborhood.
Table 2. Percentage of Residents Volunteering and Evacuating by Neighborhood

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<tr>
<th>Emotional Support</th>
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<th>Informational Support</th>
<th>Outside Neighborhood</th>
<th>Evacuation</th>
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Mean | 77 | 64 | 70 | 70 | 48 | 26 | 53 | 62 | 52 | 23 | 11 | 17 | 22 | 35 | 32 | 58 | 63 |

Note: M denotes the average percentage for each type of volunteering.
R-square estimates for the logistic regressions are calculated as suggested by Knorr and Burke (1980).

"suggest the relationship was not hypothesized and hence not tested."

---"suggest the relationship was not hypothesized and hence not tested.

Ordinary least squares regression analyses. The numbers in parentheses are the significance levels. These estimates vary depending upon the level of the independent variables and are calculated after all other variables have been controlled for. Cell entries for the dependent variables are the standardized beta weights from their means. Cell entries for the other dependent variables are the standardized beta weights from their means. Cell entries for the dependent variables are the standardized beta weights from their means. Cell entries for the dependent variables are the standardized beta weights from their means.

Volunteer 19

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Table 3: Regression analysis results.