The impact of Hurricane Andrew on 212 African American, Caucasian, and Hispanic elementary and middle school children was examined at 6 months postdisaster. Using self-report instruments, this case study examined the predictive utility of several hypothesized mediators of children's reactions to disaster. Results showed higher levels of intrusive symptomatology for girls and for elementary school children as compared with their middle school counterparts. No differences were found with reference to race. The lack of findings concerning race is addressed, as well as implications for future studies.

Recent disaster research has purported widely varying and divergent estimates of a causal link between disaster and psycho-pathological consequences. Previous studies targeting reactions of children in the post-hurricane environment have suggested that a relationship may exist between the hurricane and resultant disorders, including af-

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fective disorders, posttraumatic stress disorder (PTSD), behavioral difficulties, or general emotional distress. In addition, certain variables have been postulated as potential mediators of outcome, including the following: (a) the characteristics of the individual (e.g., age, gender, race, trait anxiety); (b) the emotional experience during the event (e.g., positive vs. negative); (c) the severity of physical damage (e.g., property damage, injury to or death of loved ones or friends); and (d) level of exposure of the individual to the event (Green et al., 1990; Lonigan, Shannon, Finch, Daugherty, & Taylor, 1991).

When studied independently of hurricane scenarios, tornadoes (Stewart, 1986; Sullivan, Romero, & Hutchison, 1993), flooding (Earls, Smith, Reich, & Jung, 1988; Stewart, 1986), and fire (Jones & Ribbe, 1991; Jones, Ribbe, & Cunningham, 1994) have been shown to elicit distressful reactions in their wake. Notwithstanding recent studies, further investigations are necessary to ensure reliable predictions of psychological distress in postdisaster environments.

A primary goal of this case study was to assess the predictive utility of a theory-based, conceptual working model. Green and her colleagues (1990), in an attempt to predict victims' reactions to a traumatic event, proposed four factors that predict a significant portion of victims' psychological distress. These four factors include the following: (a) the characteristics of the stressor (e.g., loss, threat to life, fatalities, and physical disruption); (b) cognitive processing of the traumatic event, including general coping strategies used in dealing with the event (e.g., magical thinking, appraisal, conceptual understanding of the cause of the event, and intrusive and avoidance symptomatology); (c) individual characteristic of the participant (e.g., demographics); and (d) characteristics of the environment, both pre- and postdisaster (e.g., reactions of the family members, interruption of the routine, peer and school support systems, and general life events; Green et al., 1991). Although each of these hypothesized predictors has garnered varying degrees of support within previous disaster studies (Green et al., 1990, 1991; Korol, 1990), this model has yet to be tested within the context of Hurricane Andrew specifically targeting African American children and adolescents. Hence, its application to the present event was examined. Only the first three factors were explored, each of which is discussed below.

Only recently have research efforts targeted race in the disaster area. While preliminary findings suggest that race leads to differential outcomes following disaster, such findings have been mixed. Regarding children, March, Amaya-Jackson, Terry, and Constanzo (1997) showed that race, as well as gender, represented risk factors for distress following disaster. African Americans (both male and female) and Caucasian females were more likely to exhibit posttraumatic stress and comorbid symptoms than Caucasians or males. Similarly, following Hurricane Hugo, African American youths reported greater numbers of PTSD symptoms than either Caucasian or other minority youths (Lonigan et al., 1991; Shannon, Lonigan, Finch, & Taylor, 1994). These findings suggest that differences do exist in the level of posttraumatic and comorbid symptomatology across African American and Caucasian youths following both natural and technological disasters. Furthermore, children from ethnic minority groups may have greater difficulty responding to and recovering from the impact of the disastrous events.

Although race has yet to be identified as a reliable marker to specific psychological outcomes, it has been associated with the medical illness of cardiovascular disease. Conceptual models seeking to account for factors that affect the physiological health of African Americans have been proposed (Anderson, 1991). Recently, chronic stress resulting from African American status has been conceptualized as contributing to maladaptive health outcomes. The effects of such stressors are moderated by factors thought to serve as protective mechanisms, such as support and coping strategies.
Similar logic was used in the present case study in hopes of determining the extent to which race and several mediating variables (namely, loss and coping) influence the occurrence and expression of PTSD symptoms. Although these factors by no means will be able to fully account for differential levels of PTSD symptoms, they may potentially play an important role in explaining the development of such symptoms following traumatic events.

Thus, one of the primary goals of this case study is to determine potential differences across African American, Asian, and Caucasian racial groups. Therefore, the major goal of this case study was to assess the impact of characteristics of the stressor (e.g., loss, threat to life, fatalities, and physical disruption); cognitive processing of the traumatic event, including general coping strategies used in dealing with the event (e.g., appraisal); and individual characteristic of the participant (e.g., age, race, and gender) during and after Hurricane Andrew. We hypothesized that children's appraisal of the stressor would contribute significantly to their level of self-reported distress 6 months following the event. Also, loss and life threat would also account for a relatively large percentage of the variance. Concerning age and gender, a relatively smaller amount of variance would be accounted for. Given the mixed findings concerning race, no specific hypotheses were put forth. In short, we hypothesized that this working model would be useful in predicting levels of distress, based on the specific sets of objective variables presented.

Method

Sample

All of the youngsters were residents of south Dade County, Florida, which was struck by Hurricane Andrew. The children and adolescents assessed were recruited through the aid of the Dade County Public School System. Participants were 213 children and adolescents examined from six elementary and two middle schools; 127 (59.4%) were female, 84 (39.4%) were male, and 2 (0.9%) did not indicate their gender. There were 82 (38.5%) Caucasians, 71 (33.3%) African Americans, 31 (14.6%) Hispanics, and 4 (1.9%) Asian Americans; 25 (11.7%) youngsters indicated "other" as their ethnicity.

There were 142 (66.7%) elementary school children studied who ranged from 8 to 11 years of age \((M = 9.4, SD = 0.76)\). The remaining 69 (32.4%) students were drawn from middle schools and had ages ranging from 12 to 15 years \((M = 13.3, SD = 0.74)\).

Procedure

A multimethod strategy was used to examine the level of distress and the ensuing adjustment phase. Children and adolescents were targeted and interviewed using a modified version of the Horowitz Impact of Events Scale (HIES; Horowitz, Wilner, & Alvarez, 1979; modified by Jones & Ribbe, 1993) and the Hurricane Questionnaire—Child/Adolescent Form (HQ-CA; Jones & Ribbe, 1993). We group administered these questionnaires in the youngsters' schools.

Results

A two-way factorial multivariate analysis of variance (MANOVA) was used with gender (male vs. female) and race (Black, White, and Hispanic) as the independent variables and the intrusion and avoidance subscales of the HIES as dependent variables. There was a significant gender effect, \(F(2, 161) = 5.56, p = .005\), and interaction, \(F(4, 324) = 2.54, p = .04\), but the race effect was not significant.
TABLE 1 Multiple Regression Results: Factors Predicting Intrusion Scores 6 Months After Hurricane Andrew (N = 213)

<table>
<thead>
<tr>
<th>Partial $R^2$</th>
<th>Coefficients</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>—</td>
<td>14.01</td>
</tr>
<tr>
<td>Appraisal</td>
<td>.127</td>
<td>4.53</td>
</tr>
<tr>
<td>Life threat</td>
<td>.059</td>
<td>2.81</td>
</tr>
<tr>
<td>Age/dislocation</td>
<td>.035</td>
<td>-3.00</td>
</tr>
<tr>
<td>Loss/injury</td>
<td>.025</td>
<td>3.64</td>
</tr>
</tbody>
</table>

Note. Total variance accounted for ($R^2$) equaled .25.

significant. A series of univariate analyses of variance were performed using the model described above. These analyses revealed a significant gender effect for intrusion on the HIES, $F(1, 167) = 8.25$, $p = .005$, qualified by a significant Sex x Race interaction, $F(2, 167) = 3.36$, $p = .04$. Inspection of cell means suggested that female Caucasian students exhibited much higher levels of intrusion than any other gender or race group. There were no significant effects for race, gender, or their interaction for the avoidance subscale ($p > .05$).

A two-way factorial MANOVA was performed with grade level (elementary vs. middle school children) and race (Black, White, Hispanic) as the independent variables and the two subscales of the HIES as the dependent variables. No significant differences were found for the effects of grade level, race, or their interaction ($p > .05$).

It is interesting to note the level of distress among these children. Although the HIES is not an actual diagnostic instrument, Horowitz et al. (1979) proposed cutoff scores over the summated scale, both intrusion and avoidance subscales inclusive. Low-distress youngsters are defined as having a total score of less than 9, moderate distress is denoted by scores between 9 and 18, and scores over 19 denote high distress in victims. For this population, 27 youngsters (13.0%) reported low distress, 34 (16.3%) youngsters reported moderate distress, and a distinct majority, 147 (70.7%) youngsters, received a score of 19 or higher, putting them in the high-distress category.

The HQ-CA yielded mainly dichotomous or ordinally scalable responses and was naturally of interest to determine the extent to which these were related to the HIES scales. It is clear that the avoidance subscale of the HIES has a much weaker, though similar relationship with the HQ-CA items than does the intrusion subscale.

To study these relationships further, we made the matrix of intercorrelations among all dichotomies and ordinally scalable HQ-CA items the basis for a factor analysis. This matrix was subjected to a principal-components extraction of roots. Inspection of the scree plot of the resulting eigenvalues suggested a six-factor solution, and the corresponding factor matrix was rotated using the varimax procedure.

The next step of the analysis used two stepwise multiple regression analyses to predict the subscales of the HIES (see Table 1). The predictor variables were the four factor-related scores. All four factor-related scores entered the regression equation to predict the intrusion subscale, accounting for 25% of its variance. The factor-related appraisal score entered the equation first, accounting for 13% of intrusion variance. None of the four factor-related scores yielded a significant ($p < .05$) beta weight upon entering the equation to predict avoidance.

Discussion

As hypothesized, appraisal significantly predicted levels of distress. In addition, life threat also significantly predicted distress. A weaker finding was that the effects of loss/injury and age/dislocation contributed to virtually no variance, which is consistent with previous reports among children. Appraisal of the severity of the event did predict elevated levels of distress, supporting earlier efforts.

Threat to life, in which victims of the hurricane appeared to have viewed the event as uncontrollable and themselves as helpless, replicated findings in studies concerning the Buffalo Dam flood (Green et al.,
HURRICANE ANDREW

1990), dormitory fire (Jones & Ribbe, 1991), and automobile accidents (Keppel-Benson & Ollendick, 1993). Distress was better predicted by the perception of the life threat during the hurricane than the actual number of traumas experienced. This finding might underestimate the nature of the traumatic experience and its subsequent threat to life. A sufficiently horrific experience may predispose victims to negative sequelae rather than serve as a stress inoculation function.

That the loss/injury factor did not significantly predict distress may be explained by the fact that children and adolescents do not readily conceptualize or understand "loss," at least shortly after a traumatic event. They may see "positive outcomes" of such events, possibly as a protective defense mechanism (e.g., "getting a new house," "getting my house fixed," or "getting new toy/game computer").

Our findings concerning race demonstrate a possibility that this variable could play a mediating role in expressed symptomatology. Lonigan et al. (1991) found a prevalence among African American youngsters of expressed anxiety and PTSD symptomatology. Our findings counter this claim, with Caucasians being more susceptible to distress than African Americans. A pervasive problem within the disaster literature is the lack of standardized measurement instruments precluding precise comparisons between studies (for reviews, see Green, in press; McNally, 1991). This limitation has particular relevance for race. In light of the fact that several studies have reported that African Americans do exhibit greater levels of PTSD than do their Caucasian counterparts, a method problem may exist. That is, the term race has often been used as the sole indicator to differentiate African Americans from Caucasians. In using this term, investigators have often assumed that there were no differences within the African American population (i.e., values, beliefs, and lifestyles).

Recently, it has been pointed out that the term race does not discriminate adequately across varying subgroups of persons within the African American population. We argue that the term race, typically defined as a category of person related by common heredity or ancestry, should be replaced with more appropriate terms including ethnicity, acculturation, and socioeconomic status (SES). Each of these constructs can be objectively assessed with existing psychometrically sound instruments. Although a few studies have used the term ethnicity rather than race and SES (based on parents’ occupation; Shannon et al., 1994), investigators should be careful to more precisely assess and determine the relative roles of acculturation and SES to assure that the term ethnicity is not simply used as a proxy variable for other relevant factors. Indeed, little research has examined the important proximal factors affecting the hypothesized impact of ethnicity. Alvidrez, Azocar, and Miranda (1996) stated that ethnicity is better conceptualized as a distal variable that works through a variety of proximal variables including acculturation and SES. Although neither acculturation nor SES has been looked at within the context of coping, both have implications as to how individuals may deal with disaster.

With regards to acculturation, in that ways of handling threatening or challenging events may partly be a function of culture (i.e., personal or cultural values, beliefs, and goals), its impact on coping should be examined. For example, individuals who may attribute a devastating residential fire to "fate" may cope with its aftermath differently from an individual who conceptualizes this event as resulting from human error. Concerning SES, in that ethnic minority groups are more likely to be poor than majority groups, this factor may account for ethnic differences (Alvidrez et al., 1996). Hence, it is important that these often inappropriately used constructs be investigated in the future.

In summary, differences in gender, ethnicity, acculturation, and SES, as well as how they relate to children's coping and post-traumatic stress and comorbid symptomatology, need to be carefully considered in future investigations. These variables may be
essential to the understanding of the relationship between coping with disaster and consequential psychological distress and should be empirically tested to determine their individual and collective impact on components in the current theoretical model of postdisaster response with children and adolescents.

Notwithstanding several major shortcomings, including (a) the use of only one outcome measure; (b) self-report measurement introducing the possibility of over- and under-reporting of distress; (c) use of an open instrument with younger children; (d) lack of measurement of ethnicity, SES, and acculturation; (e) lack of premorbid assessment of the victims; (f) lack of assessment and interviewing of the parents and teachers; and (f) a sample-selection bias, some preliminary findings are suggestive. The stressor should be determined by the individual perception of the event, not by edict or accord. One must look at the context in which a potential stressor is embedded, never ignoring the interactive role of the environment, family, or friends. There must be special consideration for children given their differing levels of cognitive ability.

References


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