Disasters, Victimization, and Children's Mental Health

Kathryn A. Becker-Blease
Oregon State University

Heather A. Turner and
David Finkelhor
University of New Hampshire

In a representative sample of 2,030 U.S. children aged 2–17, 13.9% report lifetime exposure to disaster, and 4.1% report experiencing a disaster in the past year. Disaster exposure was associated with some forms of victimization and adversity. Victimization was associated with depression among 2- to 9-year-old disaster survivors, and with depression and aggression among 10- to 17-year-old disaster survivors. Children exposed to either victimization only or both disaster and victimization had worse mental health compared to those who experienced neither. More research into the prevalence and effects of disasters and other stressful events among children is needed to better understand the interactive risks for and effects of multiple forms of trauma.

Disasters are relatively common events that disrupt children's basic needs including access to food, water, shelter, and primary caregivers. Much of what we know about disasters and children comes from samples of children exposed to a relatively few, large-scale disasters rather than from representative samples across the population (e.g., Centers for Disease Control, 2005; Landrigan et al., 2008; see Norris et al., 2002, for a review). In addition, we know little about how exposure to disasters is associated with exposure to other kinds of stressful events. In this study, we investigate the prevalence and effects of disasters and other stressful events in a representative sample of U.S. children.

Definitions

In this article, we use the term *disaster* to refer to one-time or ongoing events of human or natural cause that lead groups of people to experience stressors including the threat of death, bereavement, disrupted social support systems, and insecurity of basic human needs such as food, water, housing, and access to close family members. We use the term *victimization* to refer to "harms that occur to individuals because other *human actors* behaving in ways that *violate social norms*" (italics in original, Finkelhor & Kendall-Tackett, 1997, p. 2). Victimization includes maltreatment, sexual and physical abuse, neglect, exposure to domestic violence, and other crimes such as theft and peer and sibling physical assault. Finally, we use the term *adversity* to refer to other (nonvictimization, nondisaster) events that have been associated with poorer mental health, including having an incarcerated or substance-abusing parent. Disasters, victimization, and other adverse events are interrelated in complex ways. Exposure to any one type of event could put children at risk to experience other types of events, or affect how children respond if and when they experience another kind of event. Additional environmental and genetic factors could be implicated both in risk of exposure and for outcomes following exposure to any of these events.

Disasters

General population studies indicate that many people in the United States experience disasters each year. Adults self-report a lifetime prevalence rate of 11%–30% (Briere & Elliott, 2000; Goldberg &

Freyd, 2006; Green & Solomon, 1995; Norris et al., 2002) depending in part whether disaster is defined exclusively as natural disasters, or also includes human-caused incidents. To the best of our knowledge, this study is the first to obtain a national prevalence estimate for disaster exposure among children in the United States.

Numerous researchers have examined children's reactions to large-scale disasters worldwide. From these studies, we know that disasters are implicated in a range of physical effects, including traumatic brain injury, low birth weight, and respiratory, musculoskeletal, and other physical symptoms (Dirkzwager, Kerssens, & Yzermans, 2006; Keenan, Marshall, Nocera, & Runyan, 2004; Landrigan et al., 2008; Rath et al., 2007). Psychological sequalae include posttraumatic stress symptoms, depression, anxiety, behavior problems, sleep problems, and learning problems (Norris et al., 2002; Stein et al., 2004; Weems et al., 2007). Based on a review of many studies, Norris et al. (2002) concluded that school-age children are more likely than adults to experience severe impairment following disasters.

A few studies point to differential effects of disasters for adolescents compared to younger children. Increased aggression and enuresis among 2- to 9-year-olds have been reported 6 months after a flood (Durkin, Khan, Davidson, Zaman, & Stein, 1993) and preschoolers demonstrate increased fear of storms, concern for others, and other signs of disaster experience in their play up to 1 year following a hurricane (Saylor, Swenson, & Powell, 1992). Other studies of children who were under age 5 at the time of exposure to nuclear accidents show few long-term effects (Bromet et al., 2000; Cornely & Bromet, 1986). Dirkzwager et al. (2006) reported that children aged 4–12 reported increased sleep problems relative to controls, whereas adolescents aged 13–18 reported increased anxiety symptoms compared to controls. Green et al. (1991) studied children who experienced a dam collapse 2 years prior. They report that children aged 2–8 reported fewer posttraumatic stress disorder symptoms than children aged 9–15. Most symptoms had disappeared 17 years after the disaster, but some new symptoms (suicidal ideation and substance abuse) arose as participants aged (Green et al., 1994). Based on the available evidence, young children have been found to show less severe symptoms of shorter duration than older children and adolescents, but not enough data are available to speak definitively about age effects among children, particularly for those under 5.

Victimization

Studies investigating the effects of various forms of victimization (Finkelhor, Ormrod, & Turner, 2007) and adverse childhood experiences (Dong et al., 2004) have demonstrated that many people who experience one type of stressful event are likely to experience other types. When multiple stressful events are not considered simultaneously, consequences of multiple events may be attributed to the single event that is the focus of study. There is a particular risk of this effect with disaster research because most disaster research seeks samples after a particular event for the specific purpose of determining the effects of that one particular event. The data set used in this study allows us to estimate the effects of a wide range of stressful events, including disasters.

Disasters, Victimization, and Other Adversity

It is easy to imagine that risk for some stressful events puts children at risk for similar types of events. Poverty, parenting capacity, social support, and many other environmental factors may lead to the empirical evidence demonstrating associations among types of maltreatment and victimization. Why would we predict an association between exposure to victimization and disasters? At least two mechanisms could result in an association between disasters and other stressful events. First, the stress of the disaster may impair parents' ability to care for their children. As reviewed by Norris et al. (2002), adults exposed to disaster may experience sleep disturbance, a worsening of mental health symptoms, reduced social support, and increased use of alcohol following disasters. Further, several studies have pointed to increases in child abuse following natural disasters, although this finding is not universal (Curtis, Miller, & Berry, 2000; Keenan et al., 2004).

It is also possible that some of the same risk factors are associated with both disasters and victimization. In the geography and community development literature, vulnerability to disaster is conceptualized as the interaction between risk of disaster exposure and the ability to prepare for and respond to disasters (Cutter & Finch, 2008; Masozeraa, Bailey, & Kerchner, 2007). For the purposes of this article, we are mainly concerned with risk of exposure, but the overlap of concepts is relevant to our definition of *disaster*, as well as our survey respondents' definitions. People who

experience an ice storm for which both they and their community are prepared are less likely to self-report disaster exposure than another person who survived a storm that resulted in injuries and death. In another example, a homeowner living in a well-maintained home is at less risk for experiencing a major fire than is someone living in an apartment complex with inadequate fire alarms and escape routes. For these reasons and others, socioeconomic status (SES), urbanity, and race and ethnicity are persistent predictors of vulnerability to disaster (Cutter & Finch, 2008). These same factors are consistent predictors of exposure to victimization (Finkelhor et al., 2007; Stein, Jaycox, Kataoka, Rhodes, & Vestal, 2003). Likewise, some of the same factors that underlie risk of disaster exposure, also put children at risk for poorer mental health outcomes. Parents who have more resources are not only more able to locate safe shelter out of the way of a natural disaster but also in a better position to help children cope with the event and obtain professional mental health services if required.

Research Questions and Hypotheses

1. How many children are affected by disasters in the United States?
2. Is risk for disaster exposure associated with risk for exposure to other stressful events? We hypothesized that risk for disaster would be associated with risk of physical abuse, exposure to domestic and community violence, and other adversity. We made no hypotheses about the causality of this association.
3. To what extent is victimization history associated with mental health symptoms among disaster victims? We hypothesized that among disaster victims, victimization would be a significant predictor of mental health.
4. How do mental health symptoms compare for children who have experienced disasters, victimization, both disaster and victimization events, and neither disaster nor victimization events? We hypothesized that those who had experienced neither a disaster nor victimization would report the least mental health symptoms, those who had experienced both would report the most symptoms, and those who experienced either a disaster or victimization would have intermediate scores.

Method

Participants

This research is based on data from the Developmental Victimization Survey (DVS), designed to obtain 1-year incidence estimates of a comprehensive range of childhood victimizations across gender, race, and developmental stage. The survey, conducted between December 2002 and February 2003, assessed the experiences of a nationally representative sample of 2,030 children aged 2–17 living in the contiguous United States. The survey was conducted in English, and 1% of those contacted were unable to complete the survey due to a language barrier. The interviews with parents and youth were conducted over the phone by the employees of an experienced survey research firm specially trained to talk with children and parents. Telephone interviewing is a cost-effective methodology (Weeks, Kulka, Lessler, & Whitmore, 1983) that has been demonstrated to be comparable in reliability and validity with in-person interviews, even for sensitive topics (Bajos, Spira, Ducot, & Messiah, 1992; Bermack, 1989; Czaja, 1987; Marin & Marin, 1989). The methodology is also used to interview youth in the U.S. Department of Justice's National Crime Victimization Survey (Bureau of Justice Statistics, various years) and in a variety of other epidemiological studies of youth concerning violence exposure (Hausman, Spivak, Prothrow-Stith, & Roeber, 1992).

The sample selection procedures were based on a list-assisted random digit dial telephone survey design. This design increases the rate of contacting households with children aged 2–17 while decreasing the rate of dialing business and nonworking numbers. Experimental studies have found this design to decrease standard errors relative to the standard Mitofsky–Waksberg (Waksberg, 1978) method while producing samples with similar demographic profiles (Brick, Waksberg, Kulp, & Starer, 1995; Lund & Wright, 1994).

A short interview was conducted with an adult caregiver (usually a parent) to obtain family demographic information. Because the questions in the survey are of a sensitive nature, interviewers explained the study honestly and carefully up front. Care was taken to not refer to the study as a ''crime'' study, as many victims of crimes do not label their experiences as a *crime*. Instead, children's ''safety'' was emphasized.

Specifically, parents of 2- to 9-year-olds were told:

This study is being conducted by the [Name of University] to better understand problems facing children today. For this study, we will be interviewing 2000 families across the country to find out about stressful events that happen to some children, and how schools and various agencies may better protect kids from dangerous situations. Your family was selected at random to represent families with children aged 2–17. Your interview will take about 30 minutes. We will be asking you about things that may have happened in your child's school, neighborhood, or home, and about how your child's health has been lately. Some of the questions involve sensitive issues, such as whether your child has ever experienced violence and whether your child has ever experienced unwanted sexual advances.

Parents of 10- to 17-year-olds were told:

In learning about child safety for children, we would like to get the input of both children and their parents. It is particularly important for us to find out what kinds of situations *kids* consider dangerous, whether they have ever encountered these situations, and what they know about how to avoid or handle these situations . . . We will be asking him/her about things that may have happened in your child's school, neighborhood, or home, and about how your child's health has been lately. . .

Some of the questions involve sensitive issues, such as whether your child has ever experienced violence and whether your child has experienced unwanted sexual advances.

Before beginning the survey, 10- to 17-year-olds were told:

Your age group (x-year-olds) is part of national sample of 2,000 boys and girls selected completely at random. You will be representing all kids in the United States in your age group. This is an important study because you'll be able to tell us what kinds of dangerous situations kids face these days. What you and the other kids tell us will help us keep kids safe. Your interview will take about 20–30 minutes. We will be asking you about things that may have happened in your school, neighborhood, or home. We'll also ask about how your health has been lately. Some of the questions involve sensitive issues, such as whether you have experienced violence.

One child was randomly selected from all eligible children living in a household by selecting the child with the most recent birthday. If the selected child was 10–17 years old, the main telephone interview was conducted with the child. If the selected child was 2–9 years old, the interview was conducted with the caregiver who ''is most familiar with the child's daily routine and experiences.'' Caregivers were interviewed as proxies for this age group because the ability of children under the age of 10 to be recruited and participate in phone interviews of this nature has not been well established (Hausman et al., 1992; Waksberg, 1978), yet such children are still at an age when parents tend to be well informed about their experiences both at and away from home. In 68% of these caretaker interviews, the caretaker was the biological mother, in 24% the biological father, and in 8% some other relative or caretaker.

Data were collected using a computer-assisted telephone interview system (CATI). The use of CATI minimizes recording errors and provides substantial quality control benefits. For this survey, only interviewers who had extensive experience interviewing children and in addressing sensitive topics were chosen. Interviewers then went through extensive training on the questionnaire and interview protocol.

Up to 13 callbacks were made to select and contact a respondent and up to 25 callbacks were made to complete the interview. Consent was obtained prior to the interview. In the case of a child interview, consent was obtained from both the parent and the child. Respondents were promised complete confidentiality and were paid $10 for their participation. Telephone interviewers screened 7,907 households. Of those, 5,011 households did not have an eligible child, 511 declined to participate, and 350 agreed to participate at another time but were unable to be reached by the end of the study. Of the 2,896 eligible households screened, interviews were completed with 2,035 participants, representing 70.3% of eligible households. The final sample consisted of 1,000 children aged 10–17 and 1,030 caregivers of children aged 2–9.

All procedures were authorized by the Institutional Review Board of the University of New Hampshire. Both universal and targeted interventions were used to assist children who were potentially at risk for abuse, or harm to self or other. All participants were given the phone number to the Girls and Boys Town National Hotline. The U.S. Department of Health and Human Services describes hotline this way:

The Girls and Boys Town National Hotline is a 24-hour crisis, resource and referral line. Accredited by the American Association of Suicidology, the Hotline has been in operation since 1989 and is staffed by trained counselors who can respond to questions every day of the week, 365 days a year. Approximately 250,000 callers contact the hotline annually to receive help relating to being suicidal, physically or sexually abused, on the run, addicted, threatened by gang violence, fighting with a parent, a parent frustrated by a child, scared of a spouse, or faced with an overwhelming challenge. (Healthfinder.gov, 2008)

Additionally, the CATI system was programmed to flag automatically cases in which a child could have been in danger. Interviewers also flagged cases that presented a concern and provided brief notes that could be used to better understand the situation. Children or parents who disclosed a situation of serious threat or ongoing victimization were recontacted by a clinical member of the research team, trained in telephone crisis counseling, whose responsibility was to stay in contact with the respondent until the situation was resolved or brought to the attention of appropriate authorities. The kinds of concerns varied widely and included depressed children who were seeking treatment, teenagers who were slapped once or twice by a parent, abused children who no longer had contact with the abuser, and adolescents who reported ''pressure'' to have sex from a romantic partner. In no case did it become necessary for the phone counselor to report suspected abuse of a child.

Measures

Demographic variables. All demographic information was obtained from the parent during the initial parent interview. Parents provided the child's age (in years), race and ethnicity (coded into four groups: White non-Hispanic, Black non-Hispanic, Hispanic any race, or Other Race non-Hispanic) and current family structure (coded into three groups: two biological or adoptive parents, one biological and a married or unmarried partner, or single-parent family). Participants also reported 2002 household income from wages, public assistance and child support (10 categories: $5000 or less through more than $100,000), and the highest education completed (for the parent with the most education, 11 categories: grade school through graduate degree).

Lifetime victimization. Victimization data were collected using the Juvenile Victimization Questionnaire (JVQ; Hamby, Finkelhor, Ormrod, & Turner, 2004). The JVQ was designed to assess a wide range of childhood victimization experiences, across childhood and adolescence. The same questions were used for self-report interviews with 10- to 17-year-olds and parent-report interviews for 2- to 10-year-olds, except for slight wording changes as needed (e.g., ''your child'' substituted for ''you'').

Concerns about the validity of self- and parent-reports take two forms. Some are concerned that respondents may underreport victimization events to avoid culpability, due to stigma, or due to forgetting. Others are concerned that respondents might overreport victimization events, to explain problems in their lives or to assist with child custody claims. It is possible that these motives were present for a small number of respondents, but we do not find systematic evidence of a greater bias toward under- or overreporting for parent-report versus self-report data (Finkelhor, Hamby, Ormrod, & Turner, 2005). Previous analyses have also demonstrated good respondent comprehension, construct validity, and test–retest reliability for JVQ items (Finkelhor et al., 2005). Researchers who have looked at this issue have found that while there is likely to be some underreporting in parent and self-reports, these reports are likely to be more valid than official reports that greatly underestimate victimization experiences (Hardt & Rutter, 2004; Kendall-Tackett & Becker-Blease, 2004; Straus, 1992).

The analyses presented in this article are based on 20 items covering four domains of victimization—sexual assault, maltreatment, witnessing family violence, other major violence—the screener questions for each module are available in Appendix A of Turner, Finkelhor, and Ormrod (2006). The complete text of the questions is available in Hamby et al. (2004). Participants were asked about each event in the past year. If no event was reported for the past year, participants were asked if the event had ever happened in their lifetime. From these data, we calculated the number of types of events reported across participants' lifetimes.

Nonvictimization adversity. The nonvictimization adversity module of the JVQ includes 15 stressful events and chronic stressors, including an item assessing exposure to a disaster. For the purposes

of these analyses, we include only the 14 nondisaster items in the adversity score.

Lifetime and past-year disaster exposure. Disaster exposure was measured using the following item, ''In your (your child's) whole life, were you (was she or he) ever in a VERY BAD fire, explosion, flood, tornado, hurricane, earthquake or other disaster?'' For those respondents who answered yes, follow-up questions assessed how many times, whether the most recent event happened in the past year, what type of disaster was experienced, the child's age at the time of the disaster, and if the child knew anyone who was injured in the disaster.

Current mental health symptoms. Mental health symptoms were measured using the anxiety, depression, and aggression subscales of the Trauma Symptom Checklist for Young Children (Briere et al., 2001; for children aged 2–9) and the Trauma Symptom Checklist for Children (Briere, 1996; for children aged 10–17). Both instruments assess reactions to a wide range of nonspecific stressful events across several domains. Participants report on how frequently they (or, for parents of 2- to 9-year-olds, their child) had experienced a list of behaviors, thoughts and feelings on a 4-point scale (0 = *not at all*, 4 = *very often*) over the past month. In this sample, approximately 5% of respondents scored in the subclinical or clinical range for anxiety, depression, or aggression. Because of the small number of extreme scores, we used continuous measures of mental health symptoms in our analyses.

Analysis Plan

We used 2002 Census estimates (U.S. Census Bureau, 2000) to apply poststratification weights to adjust for the underrepresentation of Blacks and Hispanics in our sample relative to the national population. Weights also adjusted for the probability of selection due to the number of children in the household and the fact that only one child per household was selected to participate. Unless otherwise noted, analyses were conducted with weighted data. Due to the potential for method variance between the younger (parent report) and older (self-report) groups, data for the younger and older groups were analyzed separately. Within each group, age was positively associated with disaster and victimization exposure. Thus, where indicated, age is included as a covariate.

In tests of group differences, children who had experienced any incident within a victimization domain (sexual assault, maltreatment, witness domestic violence, other major violence) were included in that category of victimization and in the category of ''any victimization.''

For Hypothesis 1, we ran frequency counts for children reporting disaster and victimization experiences.

To test for associations between experiencing a disaster and victimization (Hypothesis 2), we conducted chi-square analyses to examine associations between lifetime disaster, victimization, adversity experience. We also used partial correlation to test for associations among disaster exposure, adversity, any victimization, sexual victimization, maltreatment, domestic violence, and other major violence, controlling for age.

For Hypothesis 3, we ran regression analyses with victimization and control variables predicting mental health symptoms among participants who reported experiencing a disaster.

For Hypothesis 4, we used analysis of covariance (ANCOVA) to compare mental health symptoms among four groups: no disaster or victimization, disaster only, victimization only, and both disaster and victimization, controlling for demographic factors. Bonferroni-corrected contrasts were used to identify significant differences among the four groups.

Regression analyses were used to identify predictors of mental health symptoms when group differences indicated greater symptoms among disaster victims relative to peers who did not experience disaster. In these analyses, victimization was calculating by summing the number of reported incidents across the four domains assessed. The theoretical range was 0–20 and participants reported between 0 and 12 incidents ($M = 0.82$, $SD = 1.52$). Adversity scores were obtained by giving a score of 1 for each type of adversity that the child had ever experienced and summing to form a continuous score. Race and ethnicity was coded into four groups: White and non-Hispanic, Black and non-Hispanic, Other Race and non-Hispanic, and Hispanic. Family structure was coded into three groups: single parent, stepparent household, and two biological or adoptive parents. To construct an index of SES, income and parental education scores were separately standardized, summed and then restandardized. When either income or education data were missing, the SES score is based on the variable available.

Results

Table 1 shows demographic variables for the sample.

How Many Children Are Affected by Disasters in the United States?

Based on analyses with weighted data, 281 or 13.9% of children and teens had been in a disaster during their lifetime, and 4.1% of the sample experienced a disaster in the past year. By comparison, 13.7% reported sexual victimization, 20.0% reported

maltreatment, 10.6% reported witnessing family violence, and 17.3% reported witnessing other major violence within their lifetimes. In total, 36.4% reported experiencing at least one victimization incident. Age at the time of disaster ranged from < 1 year old through 16 years old.

Of those who had experienced a disaster in their lifetime, 24.6% reported experiencing more than one. With respect to the most recent event, 12.8% had been in a fire, 26.7% in a tornado, 14.6% in a fire, 24.2% in a hurricane, and 17.8% in an earthquake. Eight participants indicated other disasters including bad ice and wind storms, the Oklahoma

Table 1
Demographics by Age (Unweighted Data)

	2- to 9-year-olds (M age = 5.4 years, SD = 2.4)		10- to 17-year-olds (M age = 13.8 years, SD = 2.2)	
	n (1,030)	%	n (1,000)	%
Female sex	518	50.3	491	49.1
Child race/ethnicity[a]				
White, non-Hispanic	760	73.8	776	77.6
Black, non-Hispanic	117	11.4	103	10.3
Other, non-Hispanic	40	3.9	31	3.1
Hispanic, any race	100	9.7	81	8.1
U.S. region[b]				
Northeast	224	21.7	217	21.7
Midwest	289	28.1	247	24.7
South	327	31.7	335	33.5
West	190	18.4	201	20.1
Metropolitan area[c]				
Rural	191	18.5	279	27.9
Town	230	22.3	219	21.9
Small city	216	21.0	162	16.2
Large city suburb	216	21.0	199	19.9
Large city	168	16.3	132	13.2
Parents in home				
Two parents (bio or adoptive)	778	75.5	641	64.1
One parent + partner	59	5.7	126	12.6
Single/other	193	18.7	233	23.3
Highest parent education[d]				
HS/Vo-tech, or less	250	24.3	273	27.3
Some college/college graduate	576	55.9	516	51.6
Graduate school	203	19.7	211	21.1
Household income (per year)[e]				
Under $20,000	98	9.5	100	10.0
$20,000–$50,000	376	36.5	317	31.7
More than $50,000	464	45.0	469	46.9

Note. Except for region of the United States, all demographic data were provided by the caregiver.
[a]Respondents indicated ''unknown'' race/ethnicity information for 13 children aged 2–9 and 9 children aged 10–17. [b]U.S. regions correspond to Census data and were derived from telephone area codes. [c]Metropolitan areas were defined as follows: rural = population < 20,000; town = 20,000–100,000; large city = population of 300,000 or more. Data were not available for 9 children aged 2–9 and 9 children aged 10–17. [d]Highest parent education is the highest level of education obtained by any parent in the home and was reported by the caregiver. Data were not available for the caregivers of 1 child aged 2–9. [e]Caregivers declined to provide household income information for 92 children aged 2–9 and 114 children aged 10–17.

City bombing, and World Trade Center attacks. Nine participants (.4%) reported being injured in the disaster.

Is Risk for Disaster Exposure Associated With Risk for Exposure to Other Stressful Events?

Table 2 presents the percentage of participants who experienced victimization and other adversity, by disaster exposure history and age group. These results do not control for age within each age group.

Partial correlation was used to examine relations between lifetime disaster exposure and history of victimization and adversity, controlling for age. Contrary to Hypothesis 2, for 2- to 9-year-olds, no correlation was found between lifetime disaster experience and lifetime sexual victimization ($r = .03$, $p = .31$), witnessing domestic violence ($r = .02$, $p = .45$), other major violence ($r = -.03$, $p = .30$), or any kind of victimization ($r = .02$, $p = .53$) when age was controlled. However, experiencing a lifetime disaster was positively associated with experiencing maltreatment ($r = .06$, $p = .04$) and adversity ($r = .08$, $p = .1$) with age controlled.

Supporting Hypothesis 2, among 10- to 17-year-olds, correlation analyses controlling for age showed a positive relation between lifetime disaster exposure and lifetime sexual victimization ($r = .86$, $p < .001$), maltreatment ($r = .29$, $p < .001$), and adversity ($r = .13$, $p < .001$). There was no correlation with witnessing domestic violence ($r = -.002$, $p = .48$). Contrary to predictions, a negative relation emerged between lifetime disaster exposure and major violence ($r = -.15$, $p < .001$) and any kind of

victimization ($r = -.16$, $p < .001$) with age controlled.

Is Victimization Associated With Mental Health Among Lifetime Disaster Victims?

Controlling for sex, race and ethnicity, parent makeup, age, and SES, victimization but not adversity was associated with mental health symptoms (see Table 3). Specifically, among 2- to 9-year-olds, victimization predicted depression scores. Among 10- to 17-year-olds, victimization predicted depression and anger/aggression scores.

How Do Mental Health Symptoms Compare for Children Who Have Experienced Disasters, Victimization, Both Disaster and Victimization Events, and Neither Disaster Nor Victimization Events?

As shown in Table 4, among 2- to 9-year-olds, lifetime disaster and victimization exposure was significantly associated with anxiety, depression, and aggression in a model that included sex, age, race and ethnicity, parent makeup, and SES. Marginal means and Bonferroni-corrected contrasts comparing participants who experienced neither disaster nor victimization, disaster only, victimization only, or both disaster and victimization are presented in Table 5 and Figure 1. Those who experienced victimization only had higher scores than those who experienced neither disaster nor victimization or disaster only. Two- to 9-year-olds who experienced disaster only had unexpectedly low scores that did not differ significantly from those who had experienced neither a disaster nor victimization.

Table 2

Estimated Percent of Disaster Victims Who Also Experienced Victimization and Other Adversity

	Sex victim	Maltreatment	Witness family violence	Major violence	Any victim	Adversity
2- to 9-year-olds (*n*)						
Disaster victims (75)	2.7	8.0	6.7	13.3	24	18.7$_a$
No disaster reported (933)	4.2	15.1	9.4	8.9	25.6	64.3$_a$
10- to 17-year-olds (*n*)						
Disaster victims (207)	30.4$_b$	35.7$_c$	14.0	39.1$_d$	64.7$_e$	99.0
No disaster reported (809)	21.2$_b$	22.6$_c$	11.4	21.8$_d$	42.6$_e$	88.9

Note. Chi-square tests revealed statistically significant association between those cells marked with identical subscripts.
$_a\chi^2(1, N = 1,008) = 8.91$, $p = .002$. $_b\chi^2(1, N = 1,014) = 7.80$, $p = .01$. $_c\chi^2(1, N = 1,014) = 15.28$, $p < .001$. $_d\chi^2(1, N = 1,014) = 26.68$, $p < .001$. $_e\chi^2(1, N = 1,014) = 32.90$, $p < .001$.
Because data are weighted, observed cell counts are not whole integers. Rounding within cells resulted in $n = 282$ disaster victims for the sexual victimization and witnessing family violence. For maltreatment, major violence, and any victimization analyses, disaster victims $n = 281$. Four participants indicated they were ''not sure'' if the child/teen had been in a disaster and are not included in this analysis.

Table 3

Multivariate and Univariate Analysis of Variance for Mental Health Symptoms Among Disaster Victims

| | 2- to 9-year-olds | | | | | | 10- to 17-year-olds | | | | | |
| | Multivariate tests | | Univariate tests | | | | Multivariate tests | | Univariate tests | | | |
	df	F	df	Anx.	Dep.	Ang.	df	F	df	Anx.	Dep.	Ang.
Sex (female = 1)	(3, 54)	0.81	(1, 56)	0.20	0.88	0.48	(3, 168)	0.418	(1, 180)	0.76	0.07	0.02
Race/ethnicity	(9, 168)	1.52	(3, 56)	1.34	2.63	2.94*	(9, 510)	1.64	(3, 180)	2.83*	4.50**	3.31*
Parent makeup	(6, 110)	1.41	(2, 56)	0.16	1.28	2.07	(6, 338)	1.95	(2, 180)	3.87*	1.09	3.63*
SES	(3, 54)	3.01*	(1, 56)	8.34**	0.06	2.04	(3, 168)	0.057	(1, 180)	0.01	0.05	0.02
Age	(3, 54)	1.03	(1, 56)	0.10	0.53	2.78	(3, 168)	0.73	(1, 180)	1.17	0.86	2.21
Adversity	(3, 54)	1.58	(1, 56)	1.89	3.67	0.06	(3, 168)	1.44	(1, 180)	0.35	2.03	2.86
Victimization	(3, 54)	13.21***	(1, 56)	2.72	38.44***	1.31	(3, 168)	3.58*	(1, 180)	3.40	10.47**	4.37*

Note. Multivariate *F* ratios were generated from Pillai's statistic. SES = socioeconomic status.
*p < .05. **p < .01. ***p < .001.

Table 4

Multivariate and Univariate Analysis of Variance for Mental Health Symptoms: Comparisons by Disaster and Victimization History

| | 2- to 9-year-olds | | | | | | 10- to 17-year-olds | | | | | |
| | Multivariate tests | | Univariate tests | | | | Multivariate tests | | Univariate tests | | | |
	df	F	df	Anx.	Dep.	Ang.	df	F	df	Anx.	Dep.	Ang.
Sex (female = 1)	(3, 884)	0.81	(1, 886)	4.23*	0.34	4.79*	(3, 884)	3.73*	(1, 886)	.87	2.33	1.12
Race/ethnicity	(9, 2658)	1.52	(1, 886)	2.77*	6.26***	3.59*	(9, 2658)	2.32*	(1, 886)	2.91*	1.37	2.11
Parent makeup	(6, 1770)	1.41	(1, 886)	1.00	7.40**	3.95*	(6, 1770)	1.53	(1, 886)	0.01	1.68	1.50
SES	(3, 884)	3.07*	(1, 886)	0.10	0.30	0.04	(3, 884)	6.54***	(1, 886)	3.40	13.64***	15.30***
Age	(3, 884)	1.03	(1, 886)	0.36	9.30**	78.29***	(3, 884)	5.65**	(1, 886)	2.23	0.59	3.69
Victimization/disaster Group[a]	(9, 2658)	13.21***	(1, 886)	25.87***	32.39***	9.92***	(9, 2658)	14.64***	(1, 886)	37.62***	34.14***	37.53***

Note. Multivariate *F* ratios were generated from Pillai's statistic. SES = socioeconomic status.
[a]Victimization groups are: (a) no reported victimization or disaster, (b) victimization history without disaster exposure, (c) disaster exposure without victimization history, and (d) both victimization and disaster exposure.
*p < .05. **p < .01. ***p < .001.

Also shown in Table 5, as well as in Figure 2, are mental health scores by disaster and victimization group among 10- to 17-year-olds. In interpreting Figure 2, it is important to consider the variance in standard errors of the estimated marginal means. For each mental health subscale, disaster survivors' standard errors of the estimated marginal mean symptom score are greater than for the other three groups. This contributes to the fact that contrasts between scores for disaster survivors and the other three groups in many cases failed to reach traditional levels of significance. The mean mental health symptoms scores for lifetime disaster only survivors were in the predicted direction, that is,

higher than those who had experienced neither a victimization nor a disaster, and lower than those who had experienced either victimization only or victimization and disaster. Consistent with Hypothesis 4, 10- to 17-year-olds who experienced neither a disaster nor victimization had the lowest anxiety, depression, and aggression scores.

Discussion

To the best of our knowledge, this article provides the first prevalence and incidence estimate of disasters in a nationally representative sample of U.S.

Table 5
Estimated Marginal Means for Mental Health Scores by Age and Disaster and Victimization History

	Anxiety		Depression		Anger/aggression	
	Estimated marginal mean	Standard error	Estimated marginal mean	Standard error	Estimated marginal mean	Standard error
2- to 9-year-olds (*n*)						
Neither (614)	2.73_a	0.21	1.81_{cd}	0.13	2.80_h	0.22
Victimization only (217)	4.00_{ab}	0.25	2.97_{cef}	0.16	5.44_{hi}	0.27
Disaster only (54)	2.59_b	0.44	1.43_{eg}	0.28	2.63_i	0.48
Both (217)	4.64_b	0.85	4.42_{dfg}	0.54	3.91	0.92
10- to 17-year-olds (*n*)						
Neither (409)	1.92_{jkl}	0.24	1.70_{mno}	0.25	2.22_{pqr}	0.29
Victimization only (308)	4.66_j	0.24	4.40_m	0.25	5.44_p	0.29
Disaster only (59)	2.88_k	0.48	3.13_n	0.49	4.63_q	0.57
Both (122)	4.50_l	0.34	4.04_o	0.35	5.19_r	0.41

Note. Bonferroni-corrected contrasts indicated that means with identical subscripts were significantly different ($p < .05$) from each other.
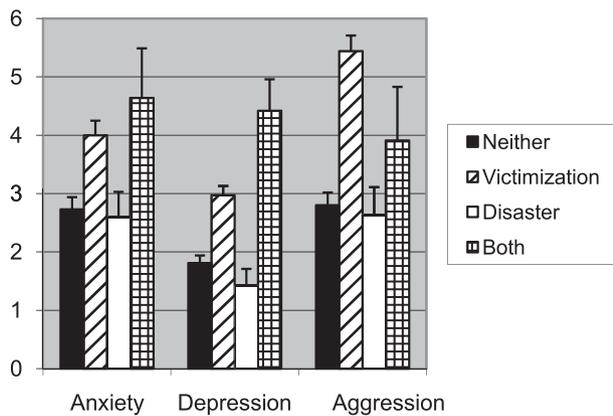

Figure 1. Marginal means for 2- to 9-year-olds' mental health symptoms by victimization and disaster exposure.
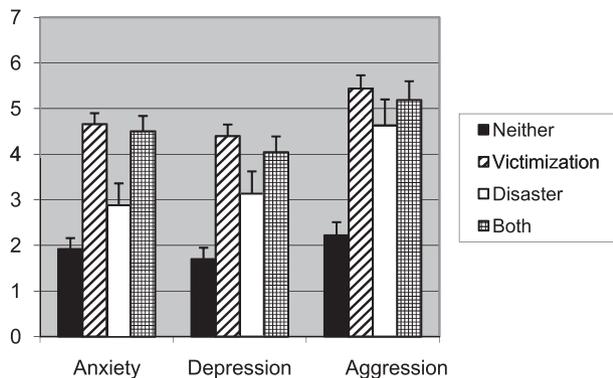

Figure 2. Marginal means for 10- to 17-year-olds' mental health symptoms by victimization and disaster exposure.

children. While the number of studies documenting the effects of disasters on children is increasing, it is important to know how many children experience disasters in order to understand the magnitude of the effects of disasters nationwide.

It was surprising that only 2 of 70 past-year disaster victims reported receiving counseling. We had expected more children to have received counseling because disasters tend to be relatively publicly known, nonstigmatized, and elicit community response. Some children may have received counseling following a disaster, but it was not reported because of the wording of our question that asked about counseling "for emotional or behavioral problems." It is quite possible that some participants did not consider disaster-related counseling to be "for emotional or behavioral problems."

We found an association between exposure to disasters, maltreatment, and adversity (controlling for age) among both age groups. Risk for disaster exposure shares some risk factors with risk for maltreatment and adversity. It is also possible that disaster exposure increases children's risk for subsequent maltreatment and adversity. Some of the adversities measured could have been directly related to a disaster (e.g., being homeless, knowing someone who died, seeing a dead body). Others are less likely to be related (e.g., being teased about one's appearance).

Regardless of the overlap in exposure to disasters and victimization, mental health professionals would benefit from knowing if previous or concurrent victimization is a significant predictor of mental health among those who have experienced a

disaster. We found that this is the case. Among lifetime disasters survivors, victimization history predicted 2- to 9-year-olds' depression scores, and 10- to 17-year-olds' depression and anxiety scores. We lacked the information to know if victimization is associated with children acutely exposed to disaster, but the association between lifetime exposure to disaster and victimization suggests the need for screening for victimization history among young disaster victims when treating mental health symptoms.

Finally, we compared mental health symptoms among children who have experienced disaster only, victimization only, neither disaster nor victimization, or both disaster and victimization. A surprising finding affected the interpretation of the hypothesized effect: Two- to 9-year-olds who experienced both disasters and victimization and 10- to 17-year-olds who experienced disasters only had more variable mental health scores than peers in the other three groups. This effect should be tested in future research. If this result stands, it suggests a need for careful screening to differentiate those children who are at risk for negative mental health outcomes.

The possibility of method bias is introduced by having parents report on behalf of young children while older youth provided self-reports. The decision to use different reporters for younger versus older youth was made to reduce bias that is known to exist when parents are asked to report on their older children's experiences and mental health. Based on the available evidence, this procedure offered the most accurate data available given the subject matter. Nevertheless, we do not have retrospective reports from participants later in life, nor do we have corroborative reports from other sources. Additional clinical measures (e.g., structured clinical interviews) would have yielded additional information about the diagnosis of mental disorders in this sample.

Despite many strengths of this study, there are some limitations to discuss. Because we sampled households with telephones, the sample probably underrepresented low-income and homeless families. We asked about victimization, disaster, and adversity prior to asking about mental health symptoms. It is possible that the sequence of questions led to higher reports of mental health symptoms. On the other hand, youth experiencing depression and anxiety symptoms may have been more likely to recall and report bad events, inflating the association between negative past events and mental health. The retrospective nature of reports could lead to underreporting, especially of sensitive questions about abuse. Because many abuse events are not reported to authorities, we believe self-reports are an important method for collecting these data, but underreporting could have led to underestimating associations between some victimization experiences and mental health. We do not, in these data, have the ability to know the sequence of disaster exposure, victimization, other adversity and onset of mental health symptoms. Longitudinal, prospective data would better address the important question of whether being in a disaster leads to other adversities or even puts children at risk for victimization.

In addition to addressing these limitations, future research may also assess several factors that may well mediate or moderate the association between disaster exposure, victimization, and mental health symptoms, such as level of fear, loss of property, homelessness, lack of food and water, and separation from caregivers. In fact, some of these factors may be more related to certain types of posttraumatic stress disorder or other mental health symptoms than others (Briere & Elliott, 2000). Outcomes other than mental health symptoms should be considered in a representative sample as well, including changes (positive and negative) in relationships, school performance, and parenting. Overall, the results point to important interactions among various kinds of stressful events and a need to continue to study various forms of stressful events simultaneously.

References

Bajos, N., Spira, A., Ducot, B., & Messiah, A. (1992). Analysis of sexual behavior in France (ACSF): A comparison between two modes of investigation: Telephone survey and face-to-face survey. *AIDS*, *6*, 315–323.

Bermack, E. (1989). Effects of telephone & face-to-face communication on rated extent of self-disclosure by female college students. *Psychological Reports*, *65*, 259–267.

Brick, J., Waksberg, J., Kulp, D., & Starer, A. (1995). Bias in list-assisted telephone samples. *Public Opinion Quarterly*, *59*, 218–235.

Briere, J. (1996). *Trauma Symptom Checklist for Children: Professional manual*. Odessa, FL: Psychological Assessment Resources.

Briere, J., & Elliott, D. (2000). Prevalence, characteristics and long-term sequelae of natural disaster exposure in the general population. *Journal of Traumatic Stress*, *13*, 661–679.

Briere, J., Johnson, K., Bissada, A., Damon, L., Crouch, J., Gil, E., et al. (2001). The Trauma Symptom Checklist for Young Children (TSCYC): Reliability and association with abuse exposure in a multi-site study. *Child Abuse & Neglect, 25*, 1001–1014.

Bromet, E. J., Goldgaber, D., Carlson, G., Panina, N., Golovakha, E., Gluzman, S. F., et al. (2000). Children's well-being 11 years after the Chornobyl catastrophe. *Archives of General Psychiatry, 57*, 563–571.

Bureau of Justice Statistics. (various years). *National crime victimization survey*. Washington, DC: Bureau of Justice Statistics.

Centers for Disease Control (2005). Effects of Hurricane Katrina on children's blood lead levels. Retrieved June 10, 2008, from http://emergency.cdc.gov/disasters/hurricanes/katrina/leadkatrina.asp

Cornely, P., & Bromet, E. J. (1986). Prevalence of behavior problems in three-year-old children living near Three Mile Island: A comparative analysis. *Journal of Child Psychology and Psychiatry, 27*, 489–498.

Curtis, T., Miller, B. C., & Berry, E. H. (2000). Changes in reports and incidence of child abuse following natural disasters. *Child Abuse & Neglect, 24*, 1151–1162.

Cutter, S. L., & Finch, C. (2008). Temporal and spatial changes in social vulnerability to natural hazards. *Proceedings of the National Academy of Sciences of the United States of America, 105*, 2301–2306.

Czaja, R. (1987). Asking sensitive behavioral questions in telephone interviews. *International Quarterly of Community Health Education, 8*, 23–32.

Dirkzwager, A. J. E., Kerssens, J. J., & Yzermans, C. J. (2006). Health problems in children and adolescents before and after a man-made disaster. *Journal of the American Academy of Child & Adolescent Psychiatry, 45*, 94–103.

Dong, M., Anda, R. F., Felitti, V. J., Dube, S. R., Williamson, D. F., Thompson, T. J., et al. (2004). The interrelatedness of multiple forms of childhood abuse, neglect, and household dysfunction. *Child Abuse & Neglect, 28*, 771–784.

Durkin, M. S., Khan, N., Davidson, L. L., Zaman, S. S., & Stein, Z. (1993). The effects of a natural disaster on child behavior: Evidence for posttraumatic stress. *American Journal of Public Health, 83*, 1549–1553.

Finkelhor, D., Hamby, S. L., Ormrod, R., & Turner, H. (2005). The Juvenile Victimization Questionnaire: Reliability, validity, and national norms. *Child Abuse & Neglect, 29*, 383–412.

Finkelhor, D., & Kendall-Tackett, K. (1997). A developmental perspective in the childhood impact of crime, abuse and violent victimization. In D. Cicchetti & S. L. Toth (Eds.), *Developmental perspectives on trauma: Theory, research and intervention* (Vol. 8, pp. 1–32). Rochester, NY: University of Rochester Press.

Finkelhor, D., Ormrod, R. K., & Turner, H. A. (2007). Polyvictimization and trauma in a national longitudinal cohort. *Development and Psychopathology, 19*, 149–166.

Goldberg, L. R., & Freyd, J. J. (2006). Self-reports of potentially traumatic experiences in an adult community sample: Gender differences and test-retest stabilities of the items in a brief betrayal-trauma survey. *Journal of Trauma & Dissociation, 7*, 39–63.

Green, B. L., Grace, M. C., Vary, M. G., Kramer, T. L., Gleser, G. C., & Leonard, A. C. (1994). Children of disaster in the second decade: A 17-year follow-up of buffalo creek survivors. *Journal of the American Academy of Child & Adolescent Psychiatry, 33*, 71–79.

Green, B. L., Korol, M., Grace, M. C., Vary, M. G., Leonard, A. C., Gleser, G. C., et al. (1991). Children and disaster: Age, gender, and parental effects on PTSD symptoms. *Journal of the American Academy of Child & Adolescent Psychiatry, 30*, 945–951.

Green, B. L., & Solomon, S. D. (1995). The mental health impact of natural and technological disasters. In J. R. Freedy & S. E. Hobfoll (Eds.), *Traumatic stress: From theory to practice*. (pp. 163–180). New York: Plenum

Hamby, S. L., Finkelhor, D., Ormrod, R., & Turner, H. (2004). *The Juvenile Victimization Questionnaire (JVQ): Administration and scoring manual*. Durham, NH: Crimes Against Children Research Center.

Hardt, J., & Rutter, M. (2004). Validity of adult retrospective reports of adverse childhood experiences: Review of the evidence. *Journal of Child Psychology and Psychiatry, 45*, 260–273.

Hausman, A. J., Spivak, H., Prothrow-Stith, D., & Roeber, J. (1992). Pattern of teen exposure to a community-based violence prevention project. *Journal of Adolescent Health, 13*, 668–675.

Healthfinder.gov. (2008). Boys Town National Hotline. Retrieved January 10, 2009, from http://www.healthfinder.gov/orgs/HR3689.htm

Keenan, H. T., Marshall, S. W., Nocera, M. A., & Runyan, D. K. (2004). Increased incidence of inflicted traumatic brain injury in children after a natural disaster. *American Journal of Preventive Medicine, 26*, 189–193.

Kendall-Tackett, K., & Becker-Blease, K. (2004). The importance of retrospective findings in child maltreatment research. *Child Abuse & Neglect, 28*, 723–727.

Landrigan, P. J., Forman, J., Galvez, M., Newman, B., Engel, S. M., & Chemtob, C. (2008). Impact of September 11 World Trade Center disaster on children and pregnant women. *Mount Sinai Journal of Medicine, 75*, 129–134.

Lund, L., & Wright, W. E. (1994, March). *Mitofsky-Waksberg vs. screened random digit dial: Report on a comparison of the sample characteristics of two RDD survey designs*. Paper presented at the Centers for Disease Control and Prevention Behavioral Risk Factor Surveillance System conference, Atlanta, GA.

Marin, G., & Marin, B. (1989). A comparison of three interviewing approaches for studying sensitive topics with Hispanics. *Hispanic Journal of Behavioral Sciences, 11*, 330–340.

Masozeraa, M., Bailey, M., & Kerchner, C. (2007). Distribution of impacts of natural disasters across income groups: A case study of New Orleans. *Ecological Economics, 63*, 299–306.

Norris, F. H., Friedman, M. J., Watson, P. J., Byrne, C. M., Diaz, E., & Kaniasty, K. (2002). 60,000 disaster victims speak: Part I. An empirical review of the empirical literature, 1981–2001. *Psychiatry: Interpersonal and Biological Processes*, 65, 207–239.

Rath, B., Donato, J., Duggan, A., Perrin, K., Bronfin, D. R., Ratard, R., et al. (2007). Adverse health outcomes after Hurricane Katrina among children and adolescents with chronic conditions. *Journal of Health Care for the Poor and Underserved*, 18, 405–417.

Saylor, C. F., Swenson, C. C., & Powell, P. (1992). Hurricane Hugo blows down the broccoli: Preschoolers' post-disaster play and adjustment. *Child Psychiatry & Human Development*, 22, 139–149.

Stein, B. D., Jaycox, L. H., Elliott, M. N., Collins, R., Berry, S., Marshall, G. N., et al. (2004). The emotional and behavioral impact of terrorism on children: Results from a national survey. *Applied Developmental Science*, 8, 184–194.

Stein, B. D., Jaycox, L. H., Kataoka, S., Rhodes, H. J., & Vestal, K. D. (2003). Prevalence of child and adolescent exposure to community violence. *Clinical Child & Family Psychology Review*, 6, 247–264.

Straus, M. A. (1992). The conflict tactic scales and its critics: An evaluation and new data on validity and reliability. In M. A. Straus & R. J. Gelles (Eds.), *Physical violence in American families: Risk factors and adaptations to violence in 8145 families* (pp. 49–73). New Brunswick, NJ: Transaction.

Turner, H. A., Finkelhor, D., & Ormrod, R. (2006). The effect of lifetime victimization on the mental health of children and adolescents. *Social Science & Medicine*, 62, 13–27.

U.S. Census Bureau. (2000). *(NP-D1-A) projections of the resident population by age, sex, race, and Hispanic origin: 1999–2100*. Washington, DC: Population Projections Program—Population Division.

Waksberg, J. (1978). Sampling methods for random digit dialing. *Journal of the American Statistical Association*, 361, 40–46.

Weeks, M. F., Kulka, R. A., Lessler, J. T., & Whitmore, R. W. (1983). Personal versus telephone surveys from collecting household health data at the local level. *American Journal of Public Health*, 73, 1389–1394.

Weems, C. F., Pina, A. A., Costa, N. M., Watts, S. E., Taylor, L. K., & Cannon, M. F. (2007). Predisaster trait anxiety and negative affect predict posttraumatic stress in youths after Hurricane Katrina. *Journal of Consulting and Clinical Psychology*, 75, 154–159.