
Children and Disasters: Understanding Vulnerability, Developing Capacities, and Promoting Resilience — An Introduction

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Children and Disasters: Understanding Vulnerability, Developing Capacities, and Promoting Resilience – An Introduction

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Abstract

This comprehensive overview of the literature on children and disasters argues that scholars and practitioners should more carefully consider the experiences of children themselves. As the frequency and intensity of disaster events increase around the globe, children are among those most at risk for the negative effects of disaster. Children are psychologically vulnerable and may develop post-traumatic stress disorder or related symptoms; are physically vulnerable to death, injury, illness, and abuse; and often experience disruptions or delays in their educational progress as a result of disasters. Children have special needs and may require different forms of physical, social, mental, and emotional support than adults. However, children also have the capacity to contribute to disaster preparedness, response, and recovery activities. In order to promote children's resilience to disasters, we must improve their access to resources, empower them by encouraging their participation, offer support, and ensure equitable treatment.

Keywords: children, disasters, psychological vulnerability, physical vulnerability, education, preparedness, response, recovery, resilience

Introduction

Disasters can result from forces of nature, such as floods, fires, hurricanes, and earthquakes; technological accidents, such as plane crashes, oil spills, and chemical releases; or terrorism and other willful acts of violence. Disasters may be slow-moving in their onset or sudden and unexpected. What these events share in common is their potential to cause widespread community disruption, displacement, economic loss, property damage, death and injury, and profound emotional suffering.

Disaster risk is on the rise globally, largely as a result of the complex interplay between environmental, demographic, technological, and socioeconomic conditions. Climate change, environmental degradation, population growth, increased urbanization, unsustainable development in hazard-prone areas, risky technologies, and growing social and economic inequalities have all contributed to a dramatic increase in disaster events (Perrow 2006; Swiss Re 2007). Indeed, the number of natural disasters recorded globally has increased fourfold over the past three decades, growing from fewer than 100 in 1975 to more than 400 in 2005 (UN-HABITAT 2007). The resultant financial and human costs have been tremendous. Adjusting for inflation, economic losses associated with natural disasters are now estimated to be 15 times higher than they were in the 1950s, and from 1994-2003, disasters caused approximately US\$67 billion in losses each year (Guha-Sapir, Hargitt, and Hoyois 2004; World Bank 2006). During the same time period, more than 255 million people were affected annually by disasters, and these events claimed an average of 58,000 lives every year (Guha-Sapir et al. 2004; World Conference on Disaster Reduction 2005). Although disasters occur across the globe, the impacts are distributed unevenly, with as many as 98 percent of those persons most affected living in developing countries (UN-HABITAT 2007).

Children—here defined according to the United Nations Convention on the Rights of the Child as persons age 18 and younger—represent a significant portion of those who endure the devastating consequences of disasters. At the end of the twentieth century, disasters affected an estimated 66.5 million children each year (Penrose and Takaki 2006). This number is likely to triple over the second decade of the twenty-first century, with up to 175 million children affected every year by disasters triggered by climate change (Save the Children UK 2007). Despite these figures, researchers and practitioners have historically overlooked children's experiences and needs in disaster. The lack of focus on children may be due in part to the common—and erroneous—assumption that young people are not seriously affected by disasters and that their reactions are fleeting (La Greca et al. 2002; La Greca, Silverman, and Wasserstein 1998). Anderson (2005) contends that social science disaster research on children has lagged in part because of their status in society: (1) children do not set the research agenda; (2) children do not carry out research; and (3) children are not in policy making or relevant professional positions where they might see the need for such research and thereby become champions for it. Moreover, children's needs are often excluded from disaster preparedness planning and response activities. This is largely a function of children's lack of power to voice their concerns and the fact that most disaster professionals lack specific child health or child development expertise (Anderson 2005).

Considering Children's Experiences in Disasters

This special issue of *Children, Youth and Environments* emerged out of two primary concerns. The first was related to improving the health and well-being of children living at risk. Several recent large-scale disasters, including the 2004 Indian Ocean earthquake and tsunami, the 2005 Pakistan earthquake, and 2005's Hurricane Katrina, brought into sharp relief the pain that disasters may cause for the youngest victims. Therefore, a goal of assembling the papers in this special issue was to advance knowledge with the intent of providing guidance to policies and programs that will help alleviate suffering among children. A second concern that prompted this special issue was the lack of social science research on children and disasters. Although significant progress has been made in understanding children's mental health needs following disasters (see below and Weissbecker and colleagues in this issue for overviews), there is still much to be learned about children's experiences in disasters, their unique vulnerabilities, and their special capacities. With this in mind, we specifically encouraged the submission of work from developed and developing countries that offered new insights into the costs and consequences of disasters for children and youth. We also asked authors to consider children's strengths and their potential for contributing to preparedness, response, or post-disaster recovery activities.

This special issue, which includes 11 articles, two research notes, six field reports, one annotated resource list, five book reviews, and one film review, should be useful to scholars who study children and disasters, as well as to practitioners who work directly with children in emergency situations and post-disaster contexts. The authors offer quantitative and qualitative expertise, and come from various disciplinary backgrounds such as anthropology, education, environmental science, geography, landscape architecture, psychology, public health, sociology, urban planning, and urban and public affairs. Drawing on these diverse methodological and disciplinary perspectives, the papers explore children's responses to different disasters such as drought, earthquakes, hurricanes, tsunamis, volcanic eruptions, climate change, and the HIV/AIDS pandemic. Some of the contributions consider the experiences of children who live in a constant state of disaster as a result of chronic poverty, violence, or unsafe living conditions. Case studies focus on hazards risk in several geographic locations, including Botswana, El Salvador, Guatemala, Indonesia, Jamaica, India, New Zealand, the United States, and Zimbabwe. Taken as a whole, these papers underscore several reasons why we should more carefully consider children's experiences in disasters.

First, children represent a highly vulnerable group. Infants and young children, in particular, are physically vulnerable to both sudden-onset and chronic disaster events due to their partial or total dependence on adults. Older children and adolescents are also at risk for injury or death, and they may develop various behavioral, psychological, and emotional issues in the aftermath of disaster. We must recognize these different forms of physical and emotional vulnerability in order to better protect and help children. Also, as Anderson (2005) notes, knowledge of children's vulnerability is important from a social scientific perspective, as we attempt to build more robust theories and models that explain the full range of human experiences in disasters.

Second, without a sustained focus on children, their special needs may be neglected. Following a disaster, we cannot assume that children's needs are met if their parents' needs are met. Depending on their age and stage of development, children may require different forms of physical, social, mental, and emotional support than the adults in their lives. Yet research has shown that adults often underestimate children's problems and needs (McFarlane 1987). Moreover, when parents, teachers, and other adults are distracted or distraught, they may not be able to provide children with the care and support that would help reestablish a sense of safety and security. Children may be further disadvantaged by their inability to articulate their distress and subsequently seek help (Silverman and La Greca 2002), assuming help is even available.

Third, disasters can affect children's personal growth and development. Disasters not only disrupt children's daily routines, they may also result in missed school and delayed academic progress; missed social opportunities; and increased exposure to various life stressors, such as illness, divorce, family violence, and alcohol and drug abuse (Silverman and La Greca 2002). Moreover, disasters may separate children from their family members and friends, cause the death of loved ones, or displace children to unfamiliar and unwelcoming environments. These negative effects of disaster may have severe consequences for children's physical health and emotional and intellectual well-being in both the short and long term.

Although children are at special risk in disasters, they are *not* passive victims. Thus, a fourth point worthy of consideration is that children and youth can participate in disaster preparedness activities in their homes, schools, and communities that would likely minimize some of the risks that they face. Including disaster risk reduction information in school curricula is an excellent way to reach children. These children then may communicate risk information to their peers and family members (Ronan et al., this issue; Wisner 2006). In order to educate children about disasters and engage them in preparedness activities, age-appropriate materials must be developed and disseminated through various print and electronic media.

Fifth, children may have practical and creative ideas for helping their families and communities recover from disasters. Disasters harm the physical spaces where children live, learn, and play—their homes, neighborhoods, schools, parks, and playgrounds. Yet, adults rarely ask children about how they would like these spaces to be rebuilt. Systems can be established to include children's voices in decision-making processes, which would contribute to more holistic community-based disaster recovery planning. Although, as Bartlett (2005, 8) points out, there is a vast difference between "hearing" children speak and "listening" to what they say.

Understanding Vulnerability

In explaining variation in disaster impact, vulnerability scholars consider the intersections between key environmental and social indicators such as exposure to hazard risk, quality of human settlements and the built environment, socioeconomic status, gender, race, ethnicity, age, disability and health status, occupation,

education, access to resources, social networks, and social dependence (Cutter, Boruff, and Shirley 2003). Researchers working in this area often refer to “vulnerable groups,” which typically include the poor, women, ethnic minorities, persons with physical or mental disabilities, the elderly, and children. These groups are viewed as being more prone to damage, loss, suffering, injury, and death in disasters (Wisner et al. 2004).

All of the papers in this special issue explore, to some degree, children’s vulnerability to disasters (see Table 1). These papers help advance what we know about the potential risks that young people face in disasters, and the factors that influence those risks. They also acknowledge that all children are not equally vulnerable to disaster impacts. Weissbecker and colleagues (this issue) offer a comprehensive overview of the literature on psychological and physiological impacts of disasters on children, while also highlighting critical risk and protective factors that influence the ways that children are affected by extreme events.

Table 1. Types of vulnerability children experience in disaster

Psychological Vulnerability	Physical Vulnerability	Educational Vulnerability
<ul style="list-style-type: none"> • PTSD • Depression • Anxiety • Emotional distress • Sleep disorders • Somatic complaints • Behavioral problems 	<ul style="list-style-type: none"> • Death • Injury • Illness and disease • Malnutrition • Heat stress • Physical and sexual abuse 	<ul style="list-style-type: none"> • Missed school • Poor academic performance • Delayed progress • Failure to complete education

Psychological Vulnerability

Over the past 20 years, an increasing amount of scholarly attention has been devoted to children’s psychological responses to natural and technological disasters as well as to terrorism and other forms of violent conflict. Thus, much of the research that is available on children and disasters has examined children in a mental health context; in particular, the most widely studied reaction to disasters has been post-traumatic stress disorder (PTSD) or related symptoms (La Greca et al. 2002; Norris et al. 2002). This research has shown that a significant proportion of children show reactions following exposure to disasters that can interfere with or impair their daily living and can cause significant distress to them and their families (La Greca et al. 2002). In their review of the literature on the psychosocial consequences of disaster, Norris and colleagues (2002) found that young people were more likely to be affected by disasters than adults, with 48 percent of school-age samples suffering from moderate post-disaster impairment and 52 percent experiencing severe or very severe effects. Udwin (1993) notes that there is a growing body of evidence to show that most children react adversely after exposure to traumatic events, and 30 to 50 percent are likely to develop PTSD symptoms that may persist for long periods of time.

Common responses of children to disaster vary by age group and stage of physical and mental development. For toddlers and very young children (1-4 years), problems include clinginess, dependence, nightmares, refusing to sleep alone, irritability and temper tantrums, aggressive behavior, incontinence, hyperactivity, and separation anxiety (Norris et al. 2002). Older children (5-12 years) may exhibit marked reactions of fear and anxiety, increased hostility with siblings, somatic complaints, sleep disorders, problems with school performance, social withdrawal, apathy, reenactment through play, PTSD, and anxiety (Mandalakas, Torjesen, and Olness 1999). Teenagers (13-18 years) may experience decreased interest in social activities and school, rebellion and other behavioral problems, sleep and eating disorders, somatic complaints, increased or decreased physical activity, confusion, lack of concentration, a decline in responsible behaviors, engage in risk-taking behaviors, suffer from PTSD, and be at increased risk for alcohol or drug misuse after disaster (Mandalakas et al. 1999; Reijneveld et al. 2005; Shannon et al. 1994).

Several factors influence children's psychological and emotional reactions to traumatic events (see Table 2) (for overviews, see Green et al. 1991; La Greca et al. 1998; Vernberg et al. 1996). One of the most critical predictors of children's post-disaster distress is the *extent and intensity of exposure* to the traumatic event. Children who experience life threat, become separated from family members, lose a loved one, suffer extensive damage to their homes and communities, or witness scenes of disaster destruction either directly or through media intake are at particular risk for developing PTSD, anxiety, or depression (Lengua et al. 2005; McFarlane 1987; Pfefferbaum et al. 1999; Saylor et al. 2003; Shannon et al. 1994). The *characteristics of the child*, including demographic characteristics and pre-disaster functioning, also influence children's reactions to disaster. Girls, racial and ethnic minorities, and children from lower socioeconomic backgrounds seem to be at increased risk for psychological impairment after disaster, although results are not always consistent (Lonigan et al. 1994; Shannon et al. 1994; Vogel and Vernberg 1993). Children with poorer behavioral and academic functioning prior to disaster are also likely to suffer higher rates of post-disaster impairment (La Greca et al. 1998). *Family factors* and *characteristics of the post-disaster environment*, including parental distress, lack of access to social support, and the occurrence of additional life stressors (e.g., abuse, poverty, divorce, death or illness of a family member) have been linked to children's adverse mental health outcomes and behavioral problems in the aftermath of disaster (Maida, Gordon, and Strauss 1993; Stuber et al. 2005; Swenson et al. 1996; Warheit et al. 1996; Wasserstein and La Greca 1998). Finally, the *coping skills of the child* and the *coping assistance received* influence children's ability to adapt and respond to traumatic events (Jeney-Gammon et al. 1993; Prinstein et al. 1996). It is important to note that most children, when faced with adversity, are capable of coping with one or two major risk factors in their lives without significant detrimental consequences. However, children are highly susceptible to developmental damage and troubling life outcomes when a number of risk factors accumulate (see Lauten and Lietz, this issue).

Until Hurricane Katrina made landfall on August 29, 2005, very few U.S. scholars had focused on the psychological and social consequences of post-disaster displacement. This all changed after Katrina, when more than 1.5 million residents, including as many as 370,000 children, were forced to relocate from their homes along the U.S. Gulf Coast (Casserly 2006). Several authors in this special issue (see Barrett, Ausbrooks, and Martinez-Cosio; Dolch, Meyer, and Huval-Burbank; Ensor; Lauten and Lietz; and Reich and Wadsworth) offer insights into the emotional challenges that displaced children faced following Katrina. Reich and Wadsworth (this issue) studied adolescents who relocated to the state of Colorado after Katrina. Their research calls attention to the enormous stress caused by risky evacuations, children's separation from family and friends, an unfamiliar geographic and cultural environment, and a profound sense of loss related to the destruction of homes, communities, and schools. Although the mothers of these displaced youth identified some benefits to the relocation, they also described negative changes in their children's worldview, behavior, coping strategies, and academic performance. Barrett and colleagues (this issue) surveyed displaced middle and high school students who evacuated to Dallas-Fort Worth after Katrina. They found that nine months after the storm, there were few differences between the relocated Katrina evacuees and their peers in their new schools in terms of emotional well-being. However, evacuee youth were more prone to participate in risky behaviors and fewer protective behaviors (such as school sports or other extracurricular activities) than their non-evacuee peers.

Physical Vulnerability

Children and youth are not only emotionally vulnerable to the effects of disaster. As catastrophic events have repeatedly and tragically demonstrated, children are also among those most at risk for illness, injury, and death. More than 18,000 children perished in the 2005 Pakistan earthquake (International Federation of Red Cross and Red Crescent Societies 2007), and the 2004 Indian Ocean tsunami claimed the lives of at least 60,000 children (Oxfam International 2005).

Compared to the number of studies that examine the mental health effects of disasters on children, much less research has explored children's risk for physical injury or loss of life in disasters of various types. The research that is available has examined the rates of injuries and fatalities among children in particular disaster events, such as earthquakes or droughts (Glass et al. 1977; Ikeda 1995; Parasuraman 1995; Ramirez et al. 2005). Most of this work has focused on developing countries because they are more prone to large-scale natural catastrophes that cause extensive loss of life.

Researchers have identified several social and environmental factors that contribute to children being at risk for death or injury in disaster (see Table 2). These include residing in hazard-prone regions in poorer countries and communities (Sapir and Lechat 1986), living in and going to school in substandard structures (Parasuraman 1995), losing a parent or becoming separated from family members (Sapir 1993; Sapir and Lechat 1986), and experiencing malnutrition and poor diet (Webster 1994; Young and Jaspars 1995) or artificial feeding (i.e., bottle feeding) (Kelly 1993). Female children are at higher risk of death (Ramirez et al. 2005; Rivers

1982; Sapir 1993), at least in developing nations. Research by Zahran, Peek, and Brody (this issue) shows that in natural disasters in the United States, the death rate for male children is higher than the death rate for female children across all age cohorts. There is no consensus in the literature on the age at which children are most at risk for death or injury in disasters, although younger and smaller children are generally considered more vulnerable because of their lesser size and strength to withstand disaster events. Different types of disaster seem to differentially impact children of various age groups. For example, Zahran and colleagues (this issue) found that in the United States, infants and very young children age 0-4 years are most likely to die of exposure to extreme heat, 5-14 year-olds are most likely to die in cataclysmic storms and flood events, and adolescents and young adults aged 15-24 years are most likely to die of excessive cold.

Bartlett (2008b, this issue) offers an overview of the potential physical health and safety implications of climate change for children in lower-income countries. She argues that children as a group are likely to be affected by climate change in particular ways, and generally in more extreme ways, than the population at large because of their greater vulnerability to a range of associated stresses. For example, due to their levels of physical development and immature immune systems, children are more susceptible to sanitation-related illnesses, malaria and other vector-borne diseases, malnutrition, heat stress, and respiratory disease.

As an increasing number of children are orphaned in the developing world, largely as a result of chronic environmental hazards, water and food shortages, violence and conflict, and the HIV/AIDS pandemic, traditional mechanisms for caring for vulnerable children have been severely stressed. As Geiselhart, Gwebu, and Krüger (this issue) illustrate in their study of the families decimated by AIDS in Botswana, after parents die from the disease, children are sometimes left to fend for themselves or sent to live with aunts, uncles, or grandparents. These changes in family structures and living arrangements have exposed young people to various health risks emerging from inadequate financial support and insufficient food supplies. Moreover, children are at risk for contracting or transmitting HIV because family members often refuse to talk openly about the disease.

Increased rates of abuse may also contribute to children's physical and emotional vulnerability in the aftermath of disaster. In one of the first attempts to empirically examine whether or not child abuse escalates after natural disasters, Curtis, Miller, and Berry (2000) discovered statistically significant increases in child abuse reports in the first six months following Hurricane Hugo and the Loma Prieta earthquake, but found no statistically significant change in abuse rates following Hurricane Andrew. Keenan and colleagues (2004) examined whether there was an increase in traumatic brain injury (TBI—commonly referred to as shaken baby syndrome) among children two years old or younger after Hurricane Floyd. The results showed an increase in the rate of inflicted TBI in the most affected counties for six months following the disaster, possibly reflecting increased injury risk due to prolonged stress. Following the 2004 Indian Ocean tsunami, the media and advocacy organizations drew attention to the risks of sexual violence and human trafficking

that children, and especially girls, faced in displaced person camps. Drawing on interviews with women's advocacy organizations, Fisher (2005) documented incidents of rape, molestation, and physical abuse perpetrated against women and girls in the tsunami aftermath.

Educational Vulnerability

Disasters, which often destroy school buildings and displace students and teachers, may disrupt children's academic progress and diminish their long-term educational outcomes (see Table 2). More than 10,000 school buildings collapsed as a result of the 2005 Pakistan earthquake (Hewitt 2007), leaving surviving children with few alternatives for an adequate education. In the year following Hurricane Katrina, hundreds of students in New Orleans were turned away from the public schools. Local officials cited a lack of space and a severe teacher shortage as the reasons for denying entry to the students (United Teachers of New Orleans 2007). As many as 1,150 schools in Indonesia were damaged or destroyed in the 2004 tsunami (UNICEF 2005). However, the immediate attention to schools in the aftermath of the disaster and in the long-term reconstruction planning actually created a push to improve the overall quality of education in the affected region (Lauten and Lietz, this issue).

Following Hurricane Katrina, displaced students, many of whom were already performing well below grade-level in reading and math, suffered significant challenges (Casserly 2006). Vital records were lost in the storm, which resulted in delayed enrollment for some youth (Picou and Marshall 2007). Although getting children back into school was a top priority among parents (Fothergill and Peek 2006), many families did not immediately enroll their children in new schools because they were unsure how long they would be staying in their new community. Others simply did not want to let their children out of their sight (Casserly 2006). Some students were forced to enroll in several different schools as families moved across state lines in search of employment and affordable housing (Abramson and Garfield 2006; Picou and Marshall 2007). Lauten and Lietz (this issue) found that children experienced between one and 11 school changes over a three-month period following the storm, with an average of three moves per child. Barrett and colleagues (this issue) found that evacuee students who perceived their new schools to be welcoming and supportive fared better in the relocation than those who felt the school was unwelcoming.

Research on drought in southern Africa (Babugura, this issue) reveals that children often leave school to support their parents or siblings during times of chronic disaster. Girls, in particular, are at special risk for being taken out of school because of cultural expectations and their heavier workloads. Young girls are expected to fetch water, help with household chores, and look after their siblings, while boys are responsible for tending livestock and looking for food. While children understood the importance of helping out with family responsibilities, many young people were unhappy about leaving school as they clearly recognized the importance of attaining a good education for future life chances.

Table 2. Factors influencing children's vulnerability in disaster

Psychological Vulnerability	Physical Vulnerability	Educational Vulnerability
<ul style="list-style-type: none"> • Life threat • Family separation • Death of a loved one • Material loss • Home/school damage • Direct exposure or media exposure to disaster • Child characteristics (race, age, gender, SES) • Poor functioning pre-disaster • Parental distress • Low levels of social support • Additional life stressors • Negative coping skills • Lack of coping assistance • Displacement 	<ul style="list-style-type: none"> • Living in poor communities in hazard-prone regions • Living in/going to school in substandard structures • Loss of a parent • Family separation • Child characteristics (age, gender, SES) • Size, strength, stage of development • Poor diet • Parental distress • Unsafe/unsanitary shelter environments 	<ul style="list-style-type: none"> • Destruction of school buildings • Displacement of students and teachers • Loss of vital records • Delayed enrollment • Multiple school changes • Family instability • Unwelcoming/unsupportive school environments • Poor academic performance pre-disaster • Loss of a parent • Increased work demands

Gaps in Knowledge Regarding Children's Vulnerability

Substantial gains have been made in understanding the ways that young people are both emotionally and physically vulnerable during times of disaster. However, children still represent an understudied and underserved group (Anderson 2005; Jabry 2002). Thus, further research is needed to more thoroughly understand children's vulnerability and to help inform new policies and practices that could better meet children's unique needs in the aftermath of disaster.

To begin, in order to fully understand the nature and scope of children's vulnerability in disasters, we need to learn more about children's experiences from children themselves. Much of the research that is currently available on children in disasters relies on the reports of parents and teachers and the use of pre-coded research instruments administered to both children and adults. There is obviously value in learning as much as possible about children's experiences from the adults in their lives, though research has shown that adults consistently underreport levels of distress and emotional problems in children (Babugura, this issue; McFarlane 1987). Also, when researchers rely solely on close-ended questionnaires, they may not learn of concepts and situations that children find important, whereas circumstances that researchers regard as deeply disturbing may in fact be of far less concern to children (Boyden 2003). Hence, we need to develop participatory, child-centered research methods and approaches that offer children and youth the opportunity to give voice to their own thoughts and interpretations of events. This will allow researchers to study topics that are salient in young people's lives (Eder and Fingerson 2002). Moreover, researchers and practitioners will be in a better position to comprehend the full scope of children's needs and vulnerabilities both

prior to and following a disaster.¹ A good case in point is Babugura's research with children living in a drought-affected region of Botswana (this issue). Using participatory data gathering techniques, such as picture drawing, storytelling, and interviewing, she was able to document children's fears of being separated from family, their loss of educational opportunities, the increased workload demands for boys and girls, and their diminished time for play and socialization. Moreover, through this research, Babugura learned that children were well aware of the devastating effects of poverty and HIV/AIDS, and that they saw these as much greater threats to their survival than drought.

Additional research should also explore how children's vulnerability varies across groups, cultures, and contexts. Prior research has examined how age, gender, and ethnicity affect children's experiences in disaster, but the findings have been inconsistent and are mostly based on studies of children in the United States and other developed countries. In addition, while these characteristics are often included as control variables, the research tends to lack a rich contextual discussion of the ways that these important characteristics (and others, such as social class, religion, family structure, power and status differences, access to resources, and physical ability) shape children's lives, opportunities, and post-disaster functioning. Even less is known about the different experiences of children in developed and developing countries. Children in developing countries (as well as some of the poorest children in developed countries) face daily risks related to persistent poverty, street crime and violence, poor health, no or low-quality housing, and inadequate and ineffective schools. These children and their families are living in crisis before disaster strikes. Future work should examine the ways that children's pre-disaster social context shapes their ability to respond to and recover from disaster.

The incidence of child abuse following disasters has not been studied thoroughly, even though it is widely recognized that disasters contribute to an increase in parental stress and depression (Curtis et al. 2000; Keenan et al. 2004). Children, especially girl children, may also be vulnerable to sexual abuse and exploitation in the aftermath of disaster (Babugura, this issue; Fisher 2005; Wiest, Mocellin, and Motsisi 1992). More empirical research is necessary to document the extent of post-disaster child abuse, the causes and gendered dimensions of physical, emotional, and sexual violence against children, and the short- and long-term effects of abuse.

¹ Admittedly, there are many barriers to investigating children's responses to disaster, including: challenges with obtaining Institutional Review Board (IRB) approval to study children; practical problems with accessing disaster-affected communities and families; a lack of time to develop research instruments and theory; and issues with getting trained researchers into the field. Yet, researchers have overcome these obstacles, as well as many others. Therefore, it would be useful if scholars who have successfully conducted research with children in disaster contexts published more detailed descriptions of their methods in order to assist those new to this area of research. For example, researchers might include discussions of how they gained access to research settings and participants, developed research instruments, utilized different methodological approaches (e.g., quantitative or qualitative), and gained approval to survey or interview children directly.

Much of the work that is currently available on children and disasters explores children's reactions to unexpected, sudden-onset events. We understand much less about children's vulnerability to slow-onset disasters and more chronic risks, such as drought and desertification, sea level rise, pollution, or the HIV/AIDS pandemic. These types of disaster not only endanger the lives and livelihoods of hundreds of millions of children worldwide, they also contribute to many other serious threats such as poverty, hunger, disease, war, and displacement. Several papers in this special issue, including work by Bartlett (climate change); Babugura (drought); Geiselhart and colleagues (HIV/AIDS pandemic); Manyena, Fordham, and Collins (food insecurity caused by drought and other factors); and Winterbottom (poverty and toxic environments) further our understanding of how children and youth are affected in particular ways by these different types of disaster, but more information is essential.

Most studies of disaster examine the effects of a particular event that occurred at a particular time in a particular place (Norris et al. 2002). Yet the effects of disaster can cause significant ongoing hardship for children and families. These stressors may generate prolonged psychological impairment and serious developmental issues for children. They also may result in delayed academic progress or end a child's access to schooling altogether. Thus, more longitudinal research on children's post-disaster experiences and long-term recovery is warranted.

Protecting and Supporting Children

As we increase our understanding of children's vulnerability to disasters, it is also important to consider the ways that organizations (e.g., governments, non-governmental organizations, humanitarian aid agencies, volunteer groups, schools) and individuals (e.g., mental health experts, public health officials, emergency responders, teachers, parents, friends) may work together or independently to protect and support children. Several of the contributions in this special issue focus on efforts to reduce children's vulnerability through disaster preparedness and response activities.

Using a child protection perspective, Lauten and Lietz (this issue) offer an overview and comparison of the response efforts in Aceh following the 2004 Indian Ocean tsunami and in Louisiana after Hurricane Katrina in 2005. By following international standards and best practices in humanitarian response, after the tsunami, aid agencies and the government of Indonesia were able to focus on family reunification and tracing efforts, facilitate the return of children to their home communities and schools, and address threats to children's personal security and safety. The U.S. response to Katrina, on the other hand, was not guided by a child protection framework or international humanitarian standards. As a result, children were subjected to traumatizing events in the aftermath of the hurricane. Children were forced to live in unsafe and overcrowded shelter environments, endured multiple relocations, and were subjected to separation from family members due to a lack of coordination among government agencies. This work underscores the critical importance of incorporating child protection as a country's first response to crisis.

Morris and Edwards (this issue) contend that one of the best ways to protect children during emergency situations is to build a "culture of risk reduction" before disaster strikes. In order to develop this culture in Jamaica, the Office of Disaster Preparedness and Emergency Management has implemented several programs to educate children in schools about their local hazards and ways that they can actively reduce the risks they face. Jamaica is also committed at a national level to integrating children's rights into all disaster response activities, and has subsequently developed a comprehensive set of guidelines to ensure that children's needs are addressed in post-disaster situations.

Papers by Peek, Sutton, and Gump (this issue) and Dolch, Meyer, and Huval-Burbank (this issue) highlight programs designed to meet the immediate needs of disaster affected children and their families. Specifically, Peek and colleagues (this issue) provide an overview of the Church of the Brethren Children's Disaster Services (CDS) program, which is the primary organization in the United States responsible for caring for young children in the aftermath of natural and human-made disasters. In the event of a disaster and when a need for child care has been identified, CDS certified volunteers offer free care to young children in designated centers. Dolch and colleagues (this issue) describe the activities of a school-based health center (SBHC) in Louisiana in the aftermath of Hurricane Katrina. Because this SBHC existed before the storm, medical professionals and social workers affiliated with the center were able to quickly mobilize to provide the evacuee children and their families with prescription medications, eyeglasses, clothing, and school supplies. They also offered medical exams and mental health assessments.

Winterbottom (this issue) details the Children's Garden of Hope project, which aims to improve the lives of children living in shanties around a massive garbage dump in Guatemala City. These children's families were displaced to the region as a result of civil war, and today the children endure poverty, lack of education, gang predation, physical and sexual abuse, toxic living conditions, and poor physical and mental health. Many of the lessons learned from more acute disasters, such as earthquakes or tornadoes, are not applicable to these young people's lives, as there is seemingly no end to the daily disasters that they suffer. With this in mind, the Children's Garden of Hope was conceptualized and designed with the intent of offering a clean and safe space for these children to play, relax, socialize, and go to school. Input was sought from children, their mothers, and teachers to ensure that their various needs would be met.

In order to protect and support children in disasters, families, teachers, and others who care for children must be adequately prepared and have access to the necessary resources to respond appropriately. Similarly, it is vital that daycare centers and schools in hazard-prone regions actively engage in preparedness activities. Two of the papers in this special issue explicitly address these concerns. Barrett and colleagues (this issue) acknowledge that families often play the most critical role in supporting child disaster survivors. However, their research with Katrina-evacuated children demonstrates that teachers played an important role in helping young people cope with the tremendous loss caused by the disaster. Also, evacuated children and youth who felt supported in their new school environment

showed fewer negative emotional symptoms and more positive protective factors than their peers. In their survey of daycare centers in hurricane-prone regions of Florida, Wilson and Kershaw (this issue) found that a relatively high proportion of the centers were not adequately prepared to respond to children's needs in the event of a hurricane. Despite the fact that almost all of the 67 childcare centers included in the sample had experienced a hurricane, only 40 percent had sought an agreement with another center to provide care in the event that the facility was uninhabitable following a disaster, barely two-thirds of the respondents indicated that their center had a written hurricane response plan, approximately 70 percent had a "hurricane kit" for the agency, and roughly half of the respondents indicated that they felt ill-prepared to address children's emotional needs after a disaster. This work by Wilson and Kershaw represents only the second published study on the preparedness of daycare centers in the United States (also see Junn and Guerin 1996). Given that millions of very young children are in daycare on any given weekday, it is important that more attention be devoted to understanding the ways that these organizations are, and are not, prepared to protect children in the event of a disaster.

Developing Capacities

Children are vulnerable in disasters, and they do rely on adults for various forms of protection and support. Yet, children also have considerable strengths that could serve as a significant resource for families, communities, and organizations attempting to prepare for, respond to, and recover from disasters. Children's knowledge, creativity, energy, enthusiasm, and social networks could be utilized during all phases of the disaster life cycle, and there is increasing evidence from the field that documents the important actions young people have taken before, during, and after disasters to help themselves and others (see Table 3).

Preparing for Disaster

Many children and youth in primary and secondary schools around the globe benefit from formal and informal curricula that address disaster preparedness and prevention (Wisner 2006). These lessons seem to be most effective when children engage in hands-on, experiential learning. For example, school children in Andhra Pradesh, India, which is periodically affected by severe cyclones, learn how to treat injuries by bandaging fake wounds and rescue their classmates from the beach in mock disaster drills (Nikku et al. 2006). Some children in Sri Lanka participate in a mapping exercise that requires that they draw a school map on chart paper, identify areas where a disaster or accident could happen, and then identify safe evacuation routes. Once the mapping is complete, children visit the physical sites identified as risky areas and safe zones and then participate in an evacuation drill (Nikku et al. 2006). After several hurricanes and earthquakes struck El Salvador, Plan International encouraged the establishment of children's clubs in local schools. In these clubs, children have the opportunity to learn about the risks they face and how to protect themselves and their peers when disasters threaten (Mitchell et al., this issue). In Jamaica, schools participate in an innovative disaster-themed culinary competition where students prepare recipes and meals using only foods that would be available after a disaster—those with a long shelf life and that do not require refrigeration (Morris and Edwards, this issue).

Ronan and colleagues (this issue) contend that programs within schools that specifically target young people have the potential to have the greatest impact within communities. The idea is that when children are educated about hazards risk, they will share the knowledge with their families and the larger community, ultimately prompting positive change. Ronan and colleagues review several studies that confirm that children who participate in school-based hazards education programs tend to have increased accurate knowledge of hazards, increased reports of home adjustments for hazards preparedness, reduced levels of fear, and more realistic risk perceptions than their peers.

In addition to education through schools, some communities that have experienced disasters have taken active steps to prepare children and youth for future events. Following the 2001 El Salvador earthquake, programs were funded to encourage children's participation in disaster mitigation and education (Raftree et al. 2002). In the aftermath of the 2001 Gujarat earthquake, Save the Children UK partnered with the Gujarat State Disaster Management Authority to initiate an emergency preparedness program. Children from many different villages and 84 children's groups were trained regarding search and rescue activities, early warnings, risk communication, and psychological care and trauma. After the sessions were completed, the trained children met with other children to share what they learned and to help develop an emergency evacuation and response plan (Nikku et al. 2006). Following major flooding in the central provinces of Vietnam in 1999, Plan International began working with communities in the region to establish the "Safe Village" disaster preparedness model. As part of this initiative, children were involved in consultation meetings where they had the opportunity to voice their concerns, ideas, and knowledge. Through their active participation, children in these hazard-prone areas were made aware of what might happen, how to react appropriately, how to seek help, and how to safeguard themselves, their families, and their property in the event of a disaster (Laufer 2002). In their research on food insecurity in Zimbabwe, Manyena and colleagues (this issue) discovered that children had a strong desire to participate in disaster risk reduction activities. However, they were often excluded due to dominant norms and cultural values.

A number of innovative disaster preparedness materials have been developed to reach children in more informal settings, such as when children are engaged in play and leisure (for an annotated resource list, see Gill, Gulsvig, and Peek, this issue). Games, comics, and music are integral parts of the lives of many young people, and these media have become important vehicles for transmitting disaster risk knowledge (Wisner 2006). Computer games, web sites, movies, and television videos also represent increasingly popular ways to actively engage children and youth in disaster preparedness activities (for example, see Morris and Edwards, this issue). Wachtendorf, Brown, and Nickle (this issue) evaluate three U.S. educational initiatives that focus on children and disasters to better understand how children's vulnerabilities and capacities are characterized. These initiatives, which target children of different age groups, emphasize the important roles that children can play in terms of engaging in disaster preparedness activities, vulnerability reduction strategies, positive emotional coping, and active problem-solving. Children are

shown as responsible, active agents with the potential for promoting positive change.

Responding to Disaster

During the emergency phase of disaster, children have warned others of impending threats. For instance, Tilly Smith, a 10-year-old British girl who had recently learned about tsunamis in her geography class, convinced her family and other tourists to evacuate to higher ground just before the deadly tsunami waves struck the coast of Thailand in 2004 (Owen 2005). Her actions likely saved dozens of lives.

Research by Mitchell and colleagues (this issue) highlights the important role that children may play as potential informants within informal and formal risk communication networks. Drawing on research with children, parents, and policy makers in El Salvador, the authors found that children understand and can respond constructively to and communicate effectively about the risks they experience. In fact, children acknowledged their own value as risk communicators and were aware that they had the power to influence their family members, friends, and teachers. In one instance, children actually engaged in direct action to stop unregulated quarrying of sand and stone from the river, which had resulted in increased erosion and vulnerability to flooding of houses near the river. Of course, as Mitchell and colleagues acknowledge, these capabilities are age-dependent and largely shaped by the willingness of communities and policy-makers to involve children in more active roles.

In addition to communicating risk and warning others of impending threats, children have also taken actions to help evacuate and protect others in disaster situations. For example, members of Child Brigade, which is a child-led organization of working street children in Dhaka, helped save children who were fleeing from a massive fire in the slums of Bangladesh. Child Brigade members subsequently informed adults and families of the location to which children were being evacuated following the disaster. When family members did not arrive to claim some of the rescued children, members of Child Brigade stayed with them and engaged the children in games, singing, storytelling, and other activities (Nikku et al. 2006). In Hurricane Katrina, young people assisted with the evacuation of elderly and disabled family members by placing them on mattresses and helping them to float through the floodwaters (Kirschke and van Vliet-- 2005). Research conducted by Mitchell and colleagues (this issue) on the Vietnamese community in New Orleans East found that children assisted in the evacuation and relief efforts as they were able to translate information from formal English sources (e.g., FEMA and the American Red Cross) to their non-English speaking family members. They communicated important messages such as the location of evacuation safe places, how to access relief supplies and food distribution centers, and assisted with aid registration applications.

Recovering from Disaster

Following disasters, children have participated in and led various initiatives aimed at promoting their own recovery and the recovery of those around them. Some studies have documented various effective coping strategies among child disaster

survivors, including writing and drawing about the events, taking photographs, communicating with friends and supportive adults, and creating disaster jokes and games (Fothergill and Peek 2006; Raftree et al. 2002). In the aftermath of the 2004 South Asia earthquake and tsunami, children in India conducted their own participatory healing sessions using prepared modules of laughter therapy, game therapy, fun therapy, and peer counseling (Nikku et al. 2006). Psychological recuperation programs were implemented after the 2001 El Salvador earthquake, where young people were trained to work with other children to reduce traumatic effects (Raftree et al. 2002). In the month following the 2004 slum fire in Bangladesh, Child Brigade members provided medical care, distributed food, located rescued children's families, and conducted needs assessments for the children and other residents affected by the fire. They also served as liaisons between fire victims and those with resources, such as non-governmental organizations, politicians, and other community members. The Child Brigade continued to run their protection center until all of the children were taken into homes (Nikku et al. 2006). Junior Red Cross Circle members helped identify families affected by the 2004 floods and landslides in Nepal. These young people also distributed and administered surveys to disaster victims (Nikku et al. 2006). Fothergill and Peek (2006) found that children often engaged in helping activities after Hurricane Katrina, including taking care of younger children in shelters and assisting parents with household chores. Nikku and colleagues (2006) note that children often take the initiative to raise funds and gather supplies to help disaster victims in affected communities.

Children are aware of their capacity to contribute to various community rebuilding and recovery initiatives. They are knowledgeable and resourceful when it comes to their surroundings, and quick to come up with interesting and practical ideas (see Bartlett 2008a, this issue). For example, children affected by the 2001 El Salvador earthquake identified ways that they could help in the reconstruction process, including: organizing clean-up campaigns, removing loose stones and walls, and helping to clean up refuse; planting trees and plants; helping to rebuild houses and schools; bringing water and food to those who were rebuilding; holding educational meetings and learning to draw, color, read, and write; and caring for siblings while parents go to work. El Salvadoran children also participated in reconstruction planning, including helping with the design of houses (Raftree et al. 2002). Bartlett (2008a, this issue) details the rebuilding of a child-friendly settlement in Cooks Nagar, India, after the 2004 Indian Ocean tsunami. Through a series of small group meetings, children and adults in the community offered a number of design solutions that would ensure efficiency, utility, privacy, and safety in their new homes. Bartlett makes a compelling case for the inclusion of both children and adults in post-disaster rebuilding processes.

Three of the papers in this special issue offer examples of ways that children have participated in waged labor either to contribute to post-disaster rebuilding efforts or to play a part in their own and their families' survival. Ensor's (this issue) research in New Orleans documents the experiences of Honduran children, all boys, who migrated to the city in search of work following Hurricane Katrina. These children did not directly experience the storm, but contributed to the city's reconstruction,

especially by working as day laborers for construction companies. Babugura (this issue) found that during times of drought in Botswana, boys and girls would travel to the capital city to look for jobs. The money they earned was used to buy food, clothing, and shoes. Three of the girls in Babugura's study revealed that they had engaged in sexual acts in exchange for money during times of extreme hardship. Manyena and colleagues (this issue) found that children in Zimbabwe were willing to contribute money earned through fishing, hunting, and basket making to ensure their families did not go hungry.

Table 3. Children's contributions throughout the disaster lifecycle

Preparedness	Response	Recovery
<ul style="list-style-type: none"> • Disaster drills • Risk mapping • Evacuation planning • Home hazards adjustments • Search and rescue training • Risk communication • Formal and informal hazards education 	<ul style="list-style-type: none"> • Warning others • Risk communication • Translation of disaster materials • Evacuation assistance • Physical protection • Search and rescue 	<ul style="list-style-type: none"> • Effective coping strategies: writing, drawing, taking pictures • Peer counseling • Aid collection/distribution • Planning and rebuilding efforts • Caring for other children • Assisting with household chores • Participating in paid labor

Gaps in Knowledge Regarding Children's Capacities

Compared to the literature on children's vulnerability in disaster, much less has been published regarding children's capacities and contributions. Yet, as illustrated above, more researchers and practitioners are beginning to recognize the potential of young people as active agents during all phases of disaster. Still, we need to increase our knowledge of children's capacities in order to better understand the roles children can play in reducing personal and community vulnerability and to implement more effective programs that encourage their involvement.

Children of different ages obviously vary in their levels of mental and emotional maturity and physical development. In addition, children's knowledge of risk and hazards likely differs across cultures, physical and social environments, and family structures. Because of these and many other differences, not all children have the same strengths or abilities. There is a need to identify age- and culturally-appropriate activities in which children can participate. This means that activities must be evaluated beforehand to ensure that they are suitable for the ages and capacities of the children involved and so that risky or potentially hazardous activities are avoided (Raftree et al. 2002).

Although post-disaster convergence and volunteer behavior have long been an interest of disaster researchers (Barton 1969; Dynes and Quarantelli 1980; Fritz and Mathewson 1957), child volunteerism in response to disasters represents a largely unexplored topic. Thus, even though children and youth can and do

volunteer in disaster, we know very little about what motivates their behavior or of the contributions they have made. As Wisner (2006) argues, children often have the time to offer their skills and labor, and their volunteer efforts can benefit the community by adding energy and new insight to projects. As more is learned about child volunteerism, it would be useful for community leaders and school administrators to carefully consider how young people could be directly involved in volunteer efforts both before and after disaster.

Research should also explore the relationships between children's pre-disaster knowledge and preparedness levels, their post-disaster involvement in response and recovery activities, and overall levels of vulnerability. Specifically, future studies might examine whether children who participated in school- or community-based preparedness activities or educational programs suffered lower rates of injury, death, and mental distress in the aftermath of disaster. Similarly, research could investigate whether children who volunteer, provide disaster relief, or contribute to rebuilding and reconstruction efforts experience fewer traumatic symptoms and less emotional distress after a disaster. Empirical research is necessary to discover whether children's involvement in pre- and post-disaster activities promotes healing and personal recovery.

Children do have valuable insights to share with one another and with adults regarding disaster preparedness and response activities. However, many local and national governments, NGOs, and disaster relief agencies have no experience with including children in participatory processes. This means that children are neither consulted nor represented in most organizations involved with disaster management and relief. Nikku and colleagues (2006) contend that we must create formal spaces for children's participation in decision-making structures, but little is known about how to make this change happen. Also, as several of the authors in this special issue have noted, there may be numerous logistical and cultural barriers to including children in participatory decision making processes (see Babugura, this issue; Bartlett 2008a, this issue; Manyena, this issue; Mitchell et al., this issue). Future research should focus on factors that promote or discourage the inclusion of children in disaster-related activities. Research should also document the ways that adults have successfully worked with and for children to ensure their involvement.

Finally, a system should be established to document lessons that have been learned in the field and through scientific study regarding children's capacities. Young people in communities around the world are actively participating in disaster preparedness, response, and recovery activities. This information, however, is not readily available in a centralized location (e.g., a website or an online sourcebook). If this information was more easily accessible, practitioners, policy makers, local leaders, and other decision makers could replicate or enhance the most effective programs in their own communities. Applying this knowledge in practice would allow for wider involvement of children and would ultimately reduce risk.

Promoting Resilience

There are many definitions of disaster resilience, but most generally, the term refers to the ability of people and communities to survive, adapt to, and recover from loss and disruption (Manyena 2006; Paton 2006). Vulnerability and resilience are related concepts. Buckle (2006), however, argues that it is important to remember that resilience is not the opposite of vulnerability. Just because children are vulnerable in disasters does not mean that they are inherently not resilient. We can promote children's resilience—and by extension, reduce their vulnerability—by improving their access to resources and information, empowering them through encouraging their participation in disaster preparedness and response activities, offering personal and community support, and ensuring equitable treatment.

When children are vulnerable, communities are also more vulnerable to the effects of disaster. Children who are uninformed regarding hazards, warnings, evacuation and other protective behaviors are likely at greater risk for death and injury when disaster strikes (Wisner 2006). After disasters, when children lack a sense of routine and normalcy and are suffering physically and emotionally, it is difficult, if not impossible, for family members and communities to begin the process of recovery (Fothergill and Peek 2006). Thus, by focusing on developing children's resilience, we are also increasing the resilience of families and entire communities. As disaster events increase in frequency and intensity around the world, it is all the more important that disaster researchers and practitioners develop new ways to learn from and work with children to make their lives safer and their communities more resilient to disasters.

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