# Children and Disasters

13

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**Contents**



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## 13.1 Introduction

Children's experiences with and exposure to disaster and other adverse events can plant the seeds for far-reaching physical, cognitive, and emotional changes that may not reveal themselves fully for decades (Laplante et al., 2004; Shonkoff et al., 2012). Socially, children are embedded in a number of caretaking relationships—within families, peer groups, schools, and many other organizations and institutions in their lives—that may either buffer or exacerbate the effects of disaster (Fothergill & Peek, 2015). Ecologically, children's capacity to grow and thrive is often contingent upon a supportive balance of these caregivers, networks, and institutions, all within the broader context of a child's built, natural, and cultural environment (Abramson, Park, Stehling-Ariza, & Redlener, 2010a; Noffsinger, Pfefferbaum, Pfefferbaum, Sherrieb, & Norris, 2012; Weems & Overstreet, 2008).

Children and disasters is an emerging subfield of disaster studies which has contributed to a number of disciplines—sociology, psychology, geography, anthropology, political science, and public health, to name a few—as well as to the field itself. In turn, these disciplines have shaped



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the study of children and disasters through methodological and theoretical advancements that have helped scholars better understand, develop, and expand this area of research. Indeed, these different disciplinary approaches to studying children and disasters reveal why some children may be more vulnerable, or resilient, than others to the deleterious effects of extreme events.

The study of children and disasters is particularly meaningful because the imbalance caused by disasters sheds light on many aspects of human development, as well as on the complex adaptive systems involved in protecting, educating, and empowering children. Work in this area, as with much of disaster research, represents a deeply practical undertaking: the insights gained can help families, communities, and entire nations better prepare for, mitigate, and respond to events that threaten the health and welfare of current and future generations. It also informs leaders and decision makers regarding how best to allocate resources and better engage children and their families before, during, and after disasters. The ultimate goal of much of this work is to bring together multiple actors to reduce the risks children face while preparing them to live in a rapidly changing and increasingly turbulent social, economic, and natural environment (Hayward, 2012).

## 13.2 Chapter Overview

Disaster studies have moved in new and exciting directions in the decade since the publication of the *Handbook of Disaster Research* (Rodríguez, Quarantelli, & Dynes, 2006). Most relevant to the topic at hand, the first edition did not offer a chapter on children and disasters, nor did it include index entries for "children" or "youth." The decision to dedicate an entire chapter to this population group in the second edition of the *Handbook* is in response, in part, to the rapidly growing number of social science studies focused on children in disaster.

In this chapter, we draw upon our review of literature on children and disasters, with an emphasis on the recent dramatic expansion in this area of study. Our overarching goal is to provide an overview of the substantive contributions of scholarship on children and disasters. Through this process, our specific objective is to identify major empirical, theoretical, and methodological trends and patterns. After reading the chapter, our hope is that others will understand the major contributions of this area of study—both for the field of disaster research and practice, and for the social sciences more generally—while also recognizing the need for new lines of inquiry and approaches.

We begin by defining key concepts that frame this chapter and by describing our approach to reviewing the literature. Next, we offer a summary of publication patterns associated with children and disasters; here we underscore the growth in this subfield and highlight how a relatively limited number of large-scale catastrophic events have served to spur research in this area. We then turn to six major waves of research that have been most prevalent over time. These include contributions to enhanced understanding of (1) the effects of disaster on children's mental health and behavioral reactions; (2) disaster exposure as it relates to physical health and well-being; (3) social vulnerability and sociodemographic characteristics; (4) the role of institutions and socio-ecological context in shaping children's pre- and post-disaster outcomes; (5) resiliency, strengths, and capacities; and (6) children's voices, perspectives, and actions across the disaster lifecycle. We also emphasize advancements in methods, theory, policy, and practice, and offer suggestions for future directions in research.

## 13.3 Definitions

Children and disasters are the central focus of this chapter, and accordingly, we begin by defining each in turn, with the acknowledgement that these are, and have long been, contested terms. The United Nations Convention on the Rights of the Child, which was first adopted and ratified on November 20, 1989, says that a *child* is anyone below the age of 18 (Office of the United Nations

High Commissioner for Human Rights, 1989). In the United States, the Census Bureau and various other government agencies also define children as people under the age of 18. The United Nations defines *youth* as those aged 15–24.[1]

Disaster researchers most often use the general terms "children" or "children and youth," while also differentiating between categories based on chronological age and stage of development. For example, emergency management plans may distinguish between infants, very young children, elementary school age children, and adolescents, teens, and/or youth and young adults (Peek, 2012a). In practice, as well as in social vulnerability scholarship, children are often defined as "at risk," "special needs," or a "vulnerable population" (see Thomas, Phillips, Lovekamp, & Fothergill, 2013). They are subsequently grouped together with women, racial and ethnic minorities, the elderly, persons with disabilities, the medically dependent, persons with special transportation needs, and/or persons with limited proficiency in the dominant language.

*Disaster* is likewise a contested term (Perry & Quarantelli, 2005). In this chapter, we follow Kreps (1984: 312) in defining disasters as "events, observable in time and space, in which societies or their larger subunits (e.g., communities, regions) incur physical damages and losses and/or disruption of their routine functioning. Both the causes and consequences of these events are related to the social structures and processes of societies or their subunits" (for further discussion, see Perry in this *Handbook*). The vast majority of studies reviewed for the present chapter focus on events that would fall into the following categories: *natural disasters* (i.e., geophysical, hydro-meteorological, and climatological events including earthquakes, landslides, floods, hurricanes, and tornadoes); *technological accidents* (i.e., hazardous, chemical, or nuclear releases, oil spills, train derailments, vehicle accidents, and power outages); *violent acts* (i.e., war, terrorist attacks, mass kidnappings); and *multiple events* or *all-hazards* (i.e., scholarship that addresses multiple hazards or that takes an all-hazards approach). It is worth noting that scholarship on school shootings—incidents that would be categorized as *violent acts*—remains largely disconnected from the children and disasters literature.

## 13.4 Approach and Limitations

This chapter draws upon a limited systematic review (Grant & Booth, 2009) of the social and behavioral science literature on children and disaster. The purpose of this review was twofold. First, we wanted to establish how and in what ways the subfield of children and disaster research has grown over time. Second, we set out to identify the major trends in research that have shaped the study of children and disasters as well as the broader field of disaster research.

To conduct our literature search, we used Web of Science and Social Sciences Abstracts via ProQuest. We used the keywords *children and disaster*[2] and searched across all time categories. We then narrowed the results within the databases by focusing on peer-reviewed journal articles, books, and reports published in the English language (conference papers and book reviews were excluded from the search).

The research team organized the search results by decade using the following categories: (1) publication title; (2) year of publication; (3) author(s); (4) journal/publisher; (5) volume/issue; (6) page numbers; (7) full

[1]See Fothergill and Peek (2015, Appendix A) for a discussion of the definitional complexity surrounding the terms *children* and *youth* in disaster studies.

[2]The following factors informed our final decision to focus on "children" rather than "children and youth" in our literature search and review. First, our initial searches using the terms *children and disaster* and *children and youth and disaster* returned many duplicate results. This is because many of the studies with *children and disaster* as keywords also included *youth* as a keyword. Second, the diverse use of the term *youth* limited its utility as a search term in this review (see www.un.org/esa/socdev/documents/youth/fact-sheets/youth-definition.pdf). Third, the sheer volume of results returned for *children and disaster* combined with the timeframe available to review the studies made it unfeasible to conduct a second systematic review of additional publications of youth and disaster.

citation; (8) abstract; (9) keywords; and (10) search engine. Once the publications were entered into the file, we completed a second review to eliminate duplicate publications and those studies that upon reading the abstract and full text did not actually focus on children and disasters. We also added additional columns for inventorying the studies,[3] including: (11) disaster type (i.e., natural, technological, violent acts, and multiple or all-hazards); (12) disaster event(s) studied; (13) sociodemographic variables considered (i.e., age of the child, race/ethnicity, gender, disability); (14) geographic location of the study; (15) theoretical approach; (16) methodological approach; (17) data source(s) and data type(s); (18) cross-sectional or longitudinal design; (19) disciplinary focus; and (20) comments from members of the research team.

Our approach to compiling and reviewing the literature on children and disasters offers particular benefits. First, the content indexed in Web of Science and Social Sciences Abstracts via Proquest represent a substantial portion of the peer-reviewed research published in disciplines that focus on the study of children and disasters. These databases are highly regarded in academic research and include the largest catalogue of English language disciplinary and interdisciplinary research over the past 100 years. Second, searching the terms *children and disaster* captured the most references across disciplines. This allowed our research team to better understand the breadth of research that has been published over the decades. Third, cataloguing the references on children and disaster in a data file allowed our multidisciplinary team to systematically identify changing trends and patterns in the field.

As with any review, there are limitations to our approach. For instance, our decision to search only two scholarly databases potentially excluded important articles published in other fields (e.g., medicine, education, and engineering) that may only be found in disciplinary specific databases such as PubMed, ERIC, and Engineering Source, respectively. In addition, by using two databases and setting our search parameters for peer-reviewed journal articles, books, and reports, we excluded many non-peer reviewed publications. Similarly, by focusing on English language publications we eliminated a growing and important body of work on children and disasters published in other languages. By using the search terms *children and disaster* we may have excluded important organizational studies, such as those focused on the role of pediatric healthcare facilities in emergency preparedness, response, and recovery. Even with these limitations in mind, the database we compiled suggested major trends within the children and disasters realm.

[3]Page limitations prohibit a full accounting of the literature inventory, although it informed every aspect of this chapter.

## 13.5 Foundational Studies and Publication Patterns on Children and Disasters

The first relevant entry from our search appeared in print in 1945 and was published by the U.S. Office of Education, Federal Security Agency. It was concerned with securing "authentic information" for schools and educators on behalf of children in the United States regarding the effects of World War II and the resultant enemy occupation of countries in Europe and Asia. While this study focuses on the "suffering" of "less fortunate fellows" and the "tragic casualties" of war, it also offers "renewed appreciation of the valiant manner in which youth of character meets disaster." As described below, these themes of vulnerability and capacity echo throughout the subsequent decades.

Other foundational works, all published in the 1950s, also established key scholarly themes that would inform research trajectories over time. For example, early studies elaborated on the role of schools (Perry & Perry, 1959) and the family (Chapman, 1957; Perry & Perry, 1959; Young, 1954) in shaping children's responses to disaster, with a specific focus on parent-child interactions in the disaster aftermath (Silber, Perry, & Bloch, 1958). Other research from this period examined

evacuation behavior of children and families (Anonymous, 1957) and emotional reactions of children to disaster (Bloch, Silber, & Perry, 1956). This formative research for the subfield was conducted by initial field research teams in response to two disasters, the 1953 Vicksburg Tornado and the 1953 North Sea Flood.

Our search for studies on children and disaster resulted in 1,657 unique publication entries, which appeared in print between 1945 and 2016. As shown in Fig. 13.1, fewer than 100 peer reviewed studies on children and disaster were published between 1945 and 1989. Publications in this area multiplied beginning in the 1990s, with the largest increase occurring in the most recent decade beginning in 2010. Quite notably, nearly half of all publications on children and disaster have appeared in print in just the last six years.[4]

Over the past eight decades, most research on children and disasters has taken an "all-hazards" approach or has focused on natural disasters. Furthermore, a large proportion of available publications have involved the study of a relatively limited number of large-scale events. The major events that have received the most frequent and sustained attention in the published literature on children and disaster include: the Chernobyl Nuclear Release (1986); Hurricane Hugo (1989); Hurricane Andrew (1992); the Oklahoma City Bombing (1995); the 9/11 Terrorist Attacks (2001); the Indian Ocean Earthquake and Tsunami (2004); Hurricane Katrina (2005); the Victoria, Australia Bushfires (2009); and the Haiti Earthquake (2010). While most research in this subfield is cross-sectional in design (Pfefferbaum & North, 2008), the aforementioned events are also the ones that have been most likely to generate longitudinal studies following child cohorts over time.

[4]The dramatic rise in the number of publications on children and disaster may reflect broader trends related to publishing, including the increase in the number of journals focusing on disasters as well as those dedicated to child and youth studies. The increase may also be due to the number of catastrophic events that have affected large numbers of children over the past several years, and the body of the research that has been generated in turn. Regardless of what is driving the increase, there has been a clear and sharp upward trend in the number of child-specific disaster publications.

## 13.6 Children and Disaster Research: Past, Present, and Future Directions

In reviewing the numerous studies that have been published over the past several decades on children and disaster, we identified six major waves of research (see Fig. 13.2). In the sections below, we briefly describe each wave and summarize key associated themes. Throughout, we reference publications that are illustrative of the particular wave as well as highlight the dominant approaches within a given wave.

It is important to note that these waves are not discretely sequential but instead are overlapping; the introduction of a new wave of research does not mean that a prior wave of work ended. Instead, new waves began in earnest as more longstanding waves continued unabated.

### 13.6.1 Wave 1: Assessing Children's Psychological and Behavioral Reactions to Disaster

The vast majority of published and cited literature on children and disasters focuses on children's emotional and behavioral responses to extreme events (La Greca, Silverman, Vernberg, & Prinstein, 1996; Norris, Friedman, & Watson, 2002a, Norris et al., 2002b; Wright, Masten, & Narayan, 2013). Researchers working in this domain tend to draw on mainstream psychological theory and contextual theories of exposure (Weems et al., 2010) and have long used standardized scales to measure traumatic reactions to disaster and associated symptoms such as intense fear, disorganized and agitated behavior, emotional numbness, and anxiety (Veenema & Schroeder-Bruce, 2002). Increasingly, researchers are also studying other dimensions of mental and emotional health including depression (Kanter, 2010; Lai, Auslander, Fitzpatrick, &

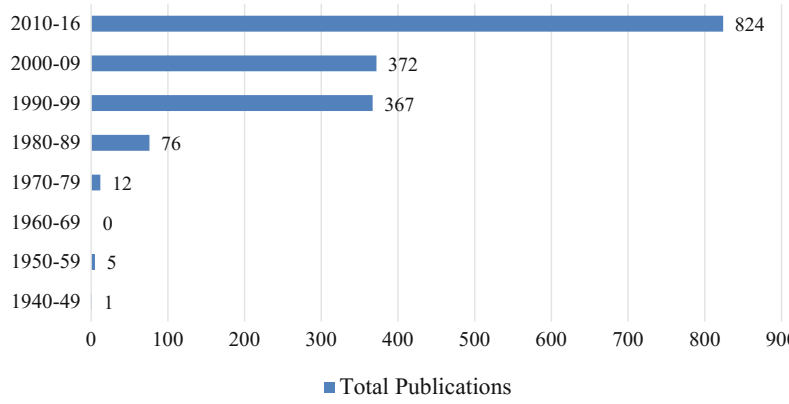


**Fig. 13.1** Number of publications on children and disasters

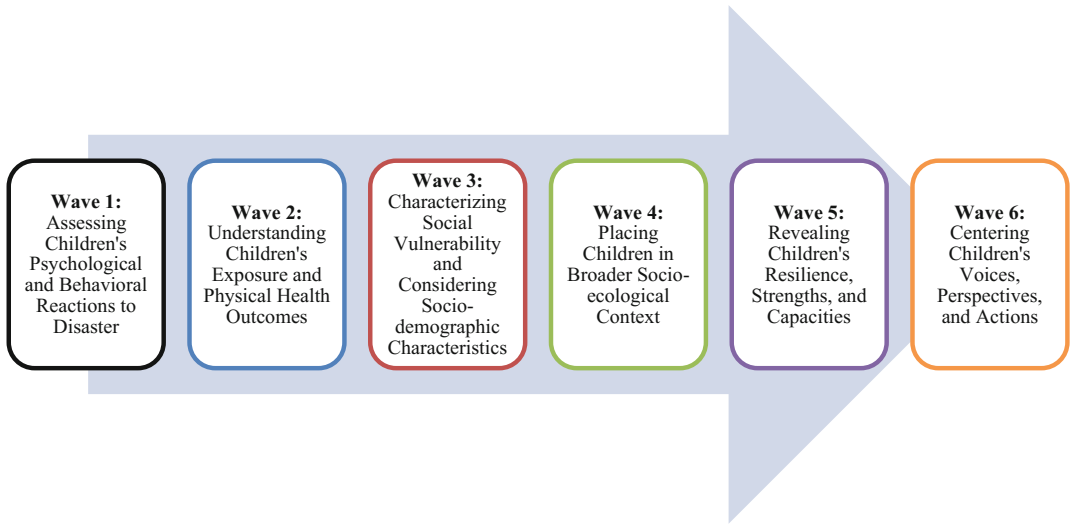


**Fig. 13.2** Major waves of research on children and disaster

Podkowirow, 2014a, Lai, La Greca, & Llabre, 2014b), serious emotional disturbance (Abramson et al., 2010a), and suicidal ideation (Tang et al., 2010).

Most of the available work on children's emotional health in disasters is, for obvious reasons, conducted during the response and recovery phases. However, major changes have occurred in this particular wave including a shift from a heavy reliance on parental and teacher assessments of children's post-disaster mental health, to a stronger emphasis on direct assessments administered to children themselves within home and classroom environments (La Greca, 2006; Lai, Esnard, Lowe, & Peek, 2016); more longitudinal research designs and associated measures that assess mental health outcomes at multiple points in time (Chen & Wu, 2006; McFarlane, 1987); movement from convenience sampling to representative probability-based sampling techniques; integration of geospatial and secondary data to compare stress reactions of exposed children to non-exposed children in different places (Taormina et al., 2008); and the

use of genetic markers (La Greca, Lai, Joormann, Auslander, & Short, 2013a) and a variety of other factors (Lai, La Greca, Auslander, & Short, 2013) in predicting risk and resilience among diverse child cohorts. In addition, studies are now more likely to include assessments of social support, adaptive coping strategies and styles, and other protective mechanisms and resources that may buffer against the most severe effects of disasters (Paardekooper, de Jong, & Hermanns, 1999; Pfefferbaum et al., 2012a, Pfefferbaum, Noffsinger, & Wind, 2012b; Wright et al., 2013).

Researchers have long been interested in assessing how disasters influence children's behaviors in the home, within peer groups, and in school (Stuber et al., 2005). Indeed, mental health experts recognize that one of the primary ways that psychological distress is expressed after a disaster is through behavioral reactions or the externalizing of mental health symptoms and responses (La Greca et al., 1996; Pynoos et al., 1993). Various negative behavioral reactions have been studied after disaster and, when disaggregated by age, have revealed substantial differences between infants, toddlers, young children, and adolescents (for summaries see Norris et al., 2002a, b; Peek, 2008). For instance, while very young children may experience regressive behaviors such as bed wetting, hitting, or otherwise acting out, adolescents and teens are more likely to engage in high-risk behaviors such as drinking, drug use, and unprotected sexual activity (Maclean, Popovici, & French, 2016).

Disasters may also influence children's ability to focus on schoolwork and may create or amplify behavioral issues within classrooms. Research has shown that school-aged children who are displaced for extended periods of time after a disaster tend to have higher dropout rates, to receive lower grades and lower testing scores, and to suffer from other educational and behavioral problems (Fothergill & Peek 2015; La Greca, 2006; Masten & Narayan, 2012). Much of the work on children's educational attainment in the aftermath of disaster has been conducted during the short- and longer-term recovery phases; a limited number of rigorous studies have drawn on pre-existing educational data to assess how disasters have affected a number of behavioral and educational outcomes.

### 13.6.2 Wave 2: Understanding Children's Exposure and Physical Health Outcomes

The spaces where children live, go to school, play, and work may expose them to elevated levels of risk before, during, and after a disaster. Mounting evidence now even suggests that children exposed in utero to moderately severe to severe levels of stress caused by disaster may experience serious developmental consequences (Charil, Laplante, Vaillancourt, & King, 2010; Laplante et al., 2004; Laplante, Brunet, Schmitz, Ciampi, & King, 2008).

Environmental health assessments and epidemiological studies suggest that children who are exposed to lead (Pb) and other environmental contaminants may suffer a number of neurobehavioral impairments throughout the life course (Healey, 2009). Exposure to polluted air, water, and soil is especially dangerous for young children, and may result in acute as well as chronic health problems (Xu et al., 2012). In fact, according to the World Health Organization (WHO), more than one in four deaths of children under 5 years of age are attributable to unhealthy environments. Further, approximately 1.7 million children under age 5 die each year due to environmental risks, and climate change will exacerbate the challenges that young children face (WHO, 2017).

When disasters strike, children may be killed or injured due to a variety of causes (see Roberts, Huang, Crusto, & Kaufman, 2014; Thabet, Ibraheem, Shivram, Winter, & Vostanis, 2009). In one of the only studies available on child mortality in U.S. disasters, Zahran, Peek, and Brody (2008) found that extreme cold and extreme heat were the mostly deadly hazards for children and that boys across all age cohorts were more likely to perish than girls. Still, estimating child mortality in disaster events is challenging, both because there is no standardized global disaster mortality data (Borden & Cutter, 2008)

and because available data are rarely disaggregated for child populations age 0–18 years. Additionally, the deadliest hazards for given populations change across time and space. For example, pandemics claimed the most lives globally in the early 20th century whereas droughts and heat waves have resulted in the highest disaster mortality rates since the mid-1900's (Roser, 2016). In places like the United States, Japan, and New Zealand, child mortality in earthquakes, for example, has fallen dramatically during the 20th century, largely due to state-of-the-art seismic design, enhanced building codes, and stringent code enforcement. In other places, like China, Pakistan, and Haiti, tens of thousands of children lost their lives when their schools and homes collapsed in seismic events (Hu, Wang, Li, Ren, & Zhu, 2011).

In addition to direct physical exposure to disaster, a growing number of studies have focused on secondary shocks that follow disaster events and further endanger children. For instance, Biswas, Rahman, Mashreky, Rahman, and Dalal (2010) examined children who sustained injuries due to abuse at the hands of adult caregivers after disaster. Lai et al. (2014a, b) documented a rise in sedentary activity among children after disaster. Researchers have also examined longer-term physical health concerns among children and parents living in communities contaminated as a consequence of technological disaster, such as the 2010 Deepwater Horizon oil spill (Abramson et al., 2013) and the 1986 Chernobyl Nuclear Release (Yablokov, 2009). Thomas et al. (2008) studied respiratory problems and post-event asthma diagnoses among children exposed to the dust cloud following the collapse of the World Trade Center Towers on September 11, 2001.

### 13.6.3 Wave 3: Characterizing Social Vulnerability and Considering Sociodemographic Characteristics

Social science research on children and disasters has increased markedly over the past decade, and much of this work has been framed using a social vulnerability approach.[5] Social vulnerability scholarship has a rich intellectual history that links historical and economic root causes of disaster to current unsafe conditions to help explain the progression of vulnerability among particular people in specific geographic places (Wisner, Blaikie, Cannon, & Davis, 2004). Because children have increasingly been recognized as a potentially vulnerable population, they now regularly appear on lists that emergency managers and public health responders use when attempting to conduct rapid needs assessments after disaster or to prepare populations before an event occurs. Social vulnerability scholars use quantitative, qualitative, and geospatial methods to understand the social, political, environmental, and economic factors that place children in harm's way and the ways that loss and suffering may unfold in their lives in the short and longer-term aftermath of disaster (for an overview, see Peek, 2008).

Although scholars have increasingly called for more fine-grained analyses of children's vulnerability and experiences in disaster (Masten & Osofsky, 2010), much of the work that fits within this wave does not disaggregate children's experiences by age, stage of development, race, or gender. Instead, much of this scholarship refers to "children" or "children and youth" as a uniform category. This represents a challenge to the progression of the subfield, as children of different ages are obviously quite different developmentally and thus have different needs and vulnerabilities. This is equally true for children with different national, racial, ethnic,

[5]We think this increase is due, at least in part, to Anderson's (2005) appeal for more sociological disaster research on children as well as to the publication of the 2008 special issue on children and disasters, which appeared in the journal *Children, Youth and Environments*. Both Anderson's seminal article where he asked "Where are all the children and youths in social science disaster research?" (p. 161) and the special issue used a social vulnerability framework and encouraged researchers to look beyond the mental and physical health effects of disaster to expand the subfield in more sociological directions.

gender, religious identities, sexual orientations, socioeconomic backgrounds, and so forth.

Children and disaster scholarship written from a social vulnerability perspective, at present, is rarely explicitly intersectional in nature, meaning that the work often does not account for the dynamic interaction between important individual and social characteristics. This is not meant to imply, however, that scholars ignore the importance of socio-demographic and socio-contextual characteristics in shaping children's pre- and post-disaster experiences. Yet, when these characteristics are considered, they are often treated as control variables at the individual and household level. The work that is available has revealed important interactions between a child's age at the time of disaster and other characteristics such as racial minority status, disability, gender, household composition, and recovery conditions in the home and neighborhood (Green et al., 1991; Peek & Stough, 2010; Weems et al., 2010). These efforts have also helped to identify certain characteristics of children most vulnerable to negative outcomes following disaster exposure (Lonigan, Shannon, Taylor, Finch, & Sallee, 1994; Masten & Narayan, 2012). This wave of research underscores the importance of identifying and understanding the role of development and developmental timing, gender, and a range of other characteristics (e.g., cognitive skills, personality, previous exposure, attachment relationships) when assessing vulnerability for children in disaster.

### 13.6.4 Wave 4: Placing Children in Broader Socio-ecological Context

Although children are at the center of the studies we have reviewed for this chapter, they obviously do not exist in isolation. They are embedded in families, peer networks, schools, neighborhoods, communities, media and technology cultures, and political and economic structures (Bronfenbrenner, 1986). While earlier studies acknowledged this fact, research over the past two decades has more explicitly drawn on socio-ecological theory to place children and youth in broader context.

Work associated with this wave has revealed the roles that institutions play in children's lives before, during, and after a disaster. The family and schools—as two of the most prominent institutions in most children's lives—have received the most attention in the disaster literature historically and to date.

Parents, especially mothers, have been identified as key to helping children prepare for, evacuate, and recover from disaster (Peek & Fothergill, 2008). Research has also demonstrated that parental mental health, particularly the mother's mental health status, is a significant predictor of children's physical and emotional well-being after disaster (Lowe, Godoy, Rhodes, & Carter, 2013; Tees et al., 2010). This research emphasizes how children's fates are closely tied to the fates of their adult caregivers before, during, and after disaster.

A growing body of work is now available on the roles of schools and teachers in helping children and families to prepare for and recover from a variety of hazards events (U.S. Department of Education, 2013; Johnston et al., 2016; Tipler, Tarrant, Johnston, & Tuffin, 2016). Schools have also been identified as important sites for emotional and behavioral health interventions (Lai et al., 2016; Pfefferbaum et al., 2012a, b). Childcare centers and after school programs have been the focus of a more limited number of studies, but these institutions have received increased attention over the past decade (Singh, Tuttle, & Bhaduri, 2015). This is due, in part, to initiatives such as the U.S. Disaster Report Card, published annually by the advocacy group Save the Children, and by regulatory reforms instituted more recently by the U.S. Administration for Children and Families.

Research is beginning to emerge that examines the role of place attachment and place disruption in shaping the wellbeing, emotional regulation, identity development, and self-esteem of children in the home, school, and other post-disaster contexts (Cox, Scannell, Heykoop, Tobin-Gurley, & Peek, 2017; Scannell, Cox, Fletcher, & Heykoop, 2016). Case studies of

Hurricane Katrina and other disasters have revealed that children can experience disorientation and diminished wellbeing as a result of displacement from culturally familiar surroundings (Fothergill & Peek, 2012; Peek, 2012b; Robinson & Brown, 2007). This includes studies documenting increases in stress and stress-related disorders (Wickrama & Kaspar, 2007); behavioral problems (Reich & Wadsworth, 2008), and other issues related to academic achievement, cultural practices, and social relationships (Peek & Richardson, 2010).

### 13.6.5 Wave 5: Understanding Children's Resilience, Strengths, and Capacities

Much of the available scholarship on children and disasters has focused on assessing negative responses and outcomes or their overall vulnerability before, during, and after disasters. At the same time, there is ample evidence of children's resilience in times of disaster as well as some limited, but growing, work on children's capacities and strengths.

Other scholars have completed impressive reviews of the child resilience literature, which we will not duplicate in detail here.[6] Recently, Wright et al. (2013) published an updated extensive review of the study of resilience, with a focus on the key concepts and findings resulting from four distinct waves of research over the past four decades. Masten and Narayan (2012) and Meyerson, Grant, Carter, and Kilmer (2011) have also summarized the literature on posttraumatic growth among children and adolescents.

In addition to this body of theoretically informed and empirically rich research on children's resilience, scholars have begun to more systematically document children's strengths and capacities. Anderson (2005: 162) called for work in this area, saying that it was "crucial to understand… what children do for themselves and others to reduce disaster impacts." There is now more published evidence of the ways that children help their peers, their family members, their schools, organizations to which they belong, and their communities before, during, and after a disaster. For example, in their research after Hurricane Katrina, Fothergill and Peek (2015) offer a typology of ways that children helped adults; children helped other children; and children helped themselves after the storm. A few examples among many of their efforts included assisting relatives during evacuation, caring for younger children in shelters, and drawing, singing, and keeping journals to help themselves cope. Tobin-Gurley et al. (2016) explored gendered dynamics of helping behaviors among youth in communities affected by wildfire, flooding, and a tornado, respectively.

Children and youth are now active in preparedness activities around the globe, and research has demonstrated that these efforts may be especially effective if they link individual preparedness with preparedness in schools and communities (Ronan, Alisic, Towers, Johnson, & Johnston, 2015; Ronan, Crellin, & Johnston, 2012). In the U.S., teens have the opportunity to take part in various preparedness efforts sponsored by the Federal Emergency Management Agency (FEMA, 2016) as well as to receive disaster education through the American Red Cross and other organizations. Internationally, children are increasingly engaged in participatory action projects aimed to enhance their strengths and to build their personal and collective resilience (Zeng & Silverstein, 2011).

### 13.6.6 Wave 6: Centering Children's Voices, Perspectives, Actions, and Rights

Most recently, a wave of child-centered research and child-led action-oriented initiatives has emerged, which has further centered children's voices, perspectives, and activities (Towers,

[6]Some of the most widely cited reviews and empirical studies of children, resilience, and disasters include: Caffo and Belaise (2003), Cryder, Kilmer, Tedeschi, and Calhoun (2006), Masten (2015), Masten and Narayan (2012), Masten and Obradovic (2008), Masten and Osofsky (2010), and Zolkoski and Bullock (2012).

Haynes, Sewell, Bailie, & Cross, 2014). Some of the research has focused on the roles that children can and do play in disaster risk reduction and climate change adaptation across the globe (Martin, 2010; Tanner, 2010). In addition, with the introduction of the United Nation's Convention on the Rights of the Child, there has been more explicit discussion of children's human and political rights in post-disaster contexts (see Hayward, 2012).

This wave, perhaps more than any that came before it, is distinguished by the diverse methods and approaches that researchers and advocates have used to work for and with children living at risk and child disaster survivors. New creative methods and participatory approaches have allowed researchers and practitioners to understand and highlight children's stories and perspectives, while often developing community-based engagement strategies with an explicit goal for social justice (Fletcher et al., 2016; Haynes & Tanner, 2015). This wave has also been distinguished by its unabashed and unapologetic concentration on child-led and adult-led youth advocacy efforts (Cox et al, 2017; Peek et al., 2016). This work, in particular, has blurred the line between research and action with social change as an ultimate goal.

## 13.7 Advancements

The research in the six waves illuminate substantive advancements in the area of children and disaster. This section discusses how scholarship on children and disasters often intersects with and contributes to disaster studies and the social sciences more generally while also highlighting the theoretical, methodological, and policy implications of this work.

### 13.7.1 Theoretical Contributions

Theoretical contributions to the subfield of children and disasters sit at the nexus of many disciplines and areas of inquiry. As discussed in Wave 1, psychologists were central to establishing the subfield of children and disaster studies and their work continues to have a strong theoretical influence. Children and disaster scholarship has also drawn from and contributed to other theoretical and empirical lines of inquiry, as further described below.

Research on children has expanded and enriched the social vulnerability paradigm in disaster studies. In line with other social vulnerability scholarship, research on children has linked vulnerability to economic, historical, structural, and political root causes. This research has highlighted the importance of examining social forces, social structures, and access to resources in the context of disasters. A growing body of evidence has illustrated that children may be more vulnerable to the deleterious health effects of disaster and may suffer lifelong consequences from major exposure to disaster, further underscoring the importance of examining this population group across time.

This subfield has also used and expanded social-ecological models that consider the influence of micro-, meso-, and macro-level social, cultural, political, and economic forces in shaping children's lives. Work that employs this theoretical lens reminds us that children are embedded in various social and civic institutions, which clearly have a powerful influence on how they prepare for and recover from disasters.

Children have demonstrated resilience and adaptive capacities to disaster, especially when given the opportunity to contribute in meaningful ways. Although the power of volunteerism and the benefits of being actively included in community efforts has long been documented in the disaster literature, the examination of children's roles and contributions allows for broader theorizing about new skill sets and contributions from different generations. Children, often identified as vulnerable, passive, and even helpless, have demonstrated that participation from all members of a community is invaluable to disaster risk reduction and individual and collective resilience.

Just as we are seeing the field of disaster studies align more closely with environmental justice efforts and climate change research, there

has been an expansion of literature focusing on child- and youth-based adaptive strategies and a growing body of knowledge focusing on the impacts of environmental- and war-based migration patterns for refugee children (Sirin & Rogers-Sirin, 2015). Continuing research in this area is critical to solidify and learn from the intersections between disasters, environmental justice, and climate change.

### 13.7.2 Methodological Contributions

Scholars studying disasters have long utilized traditional social scientific methods such as surveys, qualitative interviews, focus groups, and participant observation. Work in the subfield of children and disasters adheres to this pattern, but has also led to methodological advances in numerous areas including psychological evaluations and interventions in school-based settings (La Greca, 2006; Lai et al., 2016), mobile, child-led methods (Gibbs, Mutch, O'Connor, & MacDougall, 2013), arts-based and creative methods (Peek et al., 2016; Scannell et al., 2016), participatory action research (Tanner, 2010), and participatory mapping and video (Gaillard & Pangilinan, 2010; Haynes & Tanner, 2015).

In their review of children and disaster mental health research, Steinberg, Brymer, Steinberg, and Pfefferbaum (2006) concluded that in order to continue to advance the subfield, researchers would need to increase the use of representative samples, control groups, and longitudinal designs. Pfefferbaum et al. (2013) conducted a systematic review of methods used while studying children in three major disasters. They found that researchers are now using a more diverse set of approaches including experimental designs with control and randomization, hypothesis testing, and intervention evaluations. Yet, they also noted gaps in terms of the lack of longitudinal research designs, the need for more focus on biological stress reactions, and more careful investigation of the role of family and community in shaping children's disaster recovery.

Researchers working in the subfield have increasingly employed advanced statistical techniques such as structural equation modeling (Abramson, Stehling-Ariza, Park, Walsh, & Culp, 2010b; McLaughlin et al., 2013) and latent growth curve analyses (La Greca et al., 2013b). All the while, scholars continue to draw on more traditional ethnographic and mixed-methods studies (Towers, 2015) to test and extend Bronfenbrenner's foundational work on child development.

### 13.7.3 Policy Implications

The 1989 United Nations Convention on the Rights of the Child focused attention on the responsibility of adults to protect the human rights and welfare of children, while the 2011 Children's Charter for Disaster Risk Reduction, developed in consultation with more than 600 children in 21 countries, identified children's priorities for a child-centered approach to disaster risk reduction. The growth of children and disaster research has helped solidify the need to better understand how children, adults, and entire communities can and should better prepare for and respond to disasters that threaten the health and well-being of children. Moreover, the majority of research outlined in the six waves has an explicit goal to inform and influence policy and practice to reduce the risks as well as the harm and suffering experienced by children in disasters.

Advancements in the subfield of children and disasters have already led to many positive changes in disaster policy and practice, such as improved building codes and safety and preparedness standards for child occupied buildings and ongoing efforts to improve disaster education, preparedness, response, and recovery efforts. For example, the Federal Emergency Management Agency (FEMA), the American Red Cross, and the U.S. Department of Education recently partnered to create a national strategy that provides a clear vision for youth preparedness. FEMA also has a webpage dedicated to "children and disasters" that offers a variety of preparedness, emergency management, response, and recovery resources as well as

information to help children cope with the negative effects of disaster.

In 2017, a bipartisan bill, the Homeland Security for Children Act (H.R. 1372), was introduced in the House of Representatives to ensure that the needs of children are included in the thinking and planning for a disaster throughout the U.S. Department of Homeland Security. Among other things, this bill directs FEMA to include children in disaster response planning and integrates House and Senate Homeland Security committees into the process of meeting children's needs (Schlegelmilch & Serino, 2017).

Globally, the United Nations International Children's Emergency Relief Fund (UNICEF) responds to the needs of children in regions that are most vulnerable to and hardest hit by emergencies and disasters. These efforts are supplemented by the important work being done in some of the most vulnerable communities and countries by advocacy organizations such as Save the Children, Plan International, and the International Red Cross and Red Crescent Societies.

## 13.8 Future Directions and Enduring Questions

As scholarship on children and disasters has continued to grow and expand, enduring challenges have remained and new questions have emerged. We bring this chapter to a close with some reflections on new directions for research on children and disasters.

First, there remains a need for more explicitly intersectional research, which helps to elucidate how nationality, race, class/caste, gender, disability status, sexual orientation, immigrant status, indigenous status, and many other diverse characteristics shape children's lives and experiences in pre- and post-disaster contexts globally. Although researchers are increasingly using more sophisticated statistical models to control for these characteristics, the dynamic ways in which they interact and play out in young people's lives deserves more attention, as does the shifting climatic, cultural, and economic contexts in which children are coming of age (White, 2011).

Second, with the increased number of studies focused on children's strengths, capacities, and actions, we see a need for more nuanced analyses of how cultural, social, political, and technological practices and values within communities and broader societies influence children's participation in disaster risk reduction and climate change adaptation strategies. How do these different structures encourage or constrain their voices, actions, and involvement at the local and national levels? Anderson (2005) previously observed that children are often excluded from these very conversations about hazards and disasters (and other issues of social importance) because they cannot vote and are rarely included in decision-making processes. Yet, there has been movement for a more inclusive child-centered disaster risk reduction agenda in recent years, such as the efforts witnessed at the Child and Youth Forum of the Third United Nations World Conference on Disaster Risk Reduction in Sendai, Japan (Cumiskey, Hoang, Suzuki, Pettigrew, & Herrgård, 2015). At that conference, young people from around the world made their desire to become critical players in disaster risk reduction apparent. How much systemic change will result from that action is still an open question.

Third, we see a need for sustained support and funding for life course research and other longitudinal studies to capture the enduring impacts of trauma on child-to-adult post-disaster trajectories over time. The biological and psychological sciences have long focused on how children age and develop. Disaster research is equally interested in how the stress of calamitous events disrupts conventional timelines and life course development, for children, adults, and more broadly for communities. Disaster events often compel individuals, communities, and institutions to rapidly rebuild their lives and routines in what Olshansky, Hopkins, and Johnson (2012) refer to as "time compression." Altogether, such a focus on time-varying effects of disasters is perhaps most productively studied in children, particularly with longitudinal study designs. Children are acutely sensitive to time because

their own physical, emotional, and cognitive development continues inexorably regardless of a disaster's stressors, and they may be particularly sensitive to perturbations in their environment. A disaster's effect is likely to be revealed sooner among children than adults; a 30-year time frame can capture effects from prenatal exposure through young adult life course transitions and any number of critical developmental time points in between. Furthermore, even in more abbreviated time spans, disaster research on children can illuminate the effects of rapid changes on social and civic institutional stability, as well as on successful individual and collective adaptation and coping strategies. These are emerging areas of considerable interest in the broader field of disaster studies, and represent especially fruitful areas of scholarship in the subfield of children and disaster studies.

Fourth, as underscored throughout this chapter, mental health studies continue to predominate, and psychologists and psychiatrists are the most often-cited scholars working in the children and disaster space. We applaud this important work and want to see it continue. At the same time, we see a need for more disciplines and more inter- and multidisciplinary teams to conduct research to push the boundaries of this field. Engineers and social scientists, for instance, have successfully partnered to assess where the most unsafe school structures are located, and how this varies by the sociodemographic characteristics of the school children enrolled in the buildings. Continuing to bring together experts from different disciplinary backgrounds will further encourage new and exciting research questions. Environmental justice scholars could help those in disaster studies think more carefully about the unequal distribution of risk and how this increases children's vulnerability. Gender scholars could partner with disaster researchers to offer more nuanced analyses of how boys and girls experiences differ in pre- and post-disaster environments. Educational researchers could design longitudinal studies to assess how disasters influence a variety of educational outcomes for school-age children affected by disaster. Climate change scholars might engage with disaster researchers to explore how and where children are experiencing the combined impacts of climate change and disasters and elucidate the growing role of children and youth in climate adaptation initiatives. The young median age of many indigenous populations combined with a growing acknowledgement of the value of local knowledge and particularly of indigenous knowledge practices, can and should prompt the greater inclusion of and collaboration with indigenous scholars. With the rising number of children and youth under correctional supervision in the U.S., criminologists could partner with vulnerability scholars to understand how juvenile justice facilities prepare for disaster to ensure that juvenile populations are not left behind during a crisis.

Fifth, children are now considered "digital natives" (Prensky, 2001), given that they are born into a world marked by the rapid and widespread dissemination of electronic information through the web and various social media platforms. For eight decades, children have been the object and subject of many research studies. However, casting them as digital natives also recognizes their power and capacity as drivers and creators of new knowledge and information, especially in digital form. How, if at all, these realities will shape their engagement with and involvement in the hazards and disaster field more generally is yet to be determined.

Sixth, there is a pressing need for more scholarship that focuses on how key organizations and institutions produce (or reduce) risk in children's lives and promote (or hinder) resilience. As Tierney (2014) observes, powerful organizations and institutions socially produce much of the risk that populations face. Yet, most children and disaster scholarship focuses on the individual child as the primary unit of analysis. The family, childcare centers, schools, healthcare, religion, political structures, the juvenile justice system, and other core organizations and institutions that shape children's lives and affect risk levels warrant further study.

Seventh, as more interventions and policies are established to protect, engage, and empower children, there is a need for more

evidence-informed evaluation research as well as more policy-focused research to analyze how current policy does, or does not, help reduce children's risk and speed their recovery in the aftermath of disaster. Annual reports from Save the Children, for instance, have repeatedly shown that many childcare centers and schools across the U.S. fail to meet basic preparedness standards. A study of a national sample of licensed prehospital emergency medical service agencies revealed that while most agencies (72.9%) reported having a written plan for response to a mass-casualty event, only 13.3% had such a plan available for pediatric-specific mass-casualty events (Shirm, Liggin, Dick, & Graham, 2007). Evaluation research would help policy makers, emergency managers, and other practitioners to understand which programs are successful and why (Catalano, Berglund, Ryan, Lonczak, & Hawkins, 2004) and to assess whether educational interventions are actually working (Johnson, Johnston, Ronan, & Peace, 2014). The National Commission on Children and Disasters (2010) offered a series of policy recommendations to enhance the nation's preparedness, response, and recovery capacity for children and families; there is a need for a systematic assessment of the policy implementation that has, and has not, followed from that seminal report.

## 13.9 Conclusion

This chapter summarized eight decades of research by presenting six enduring and emerging waves of study on children, disaster, and mental health and behavioral reactions; exposure as it relates to physical health and well-being; social vulnerability and sociodemographic characteristics; socio-ecological context; resiliency, strengths, and capacities; voices, perspectives, and actions. Each new wave of research has opened up novel lines of inquiry by individual researchers as well as disciplinary and multidisciplinary teams and has involved a wider range of diverse child participants both nationally and internationally.

Although researchers have studied children's reactions to disaster since the 1940s, the field has expanded tremendously over the past decade. Indeed, as our review demonstrated, nearly half of all studies on children and disaster have been published since 2010. This work has focused on natural disasters, technological accidents, and violent incidents, although a relatively small number of large-scale events has driven much of the research in this subfield. While mental health research continues to predominate, research from the social sciences has increasingly focused on children's vulnerability, voices, and human rights before, during, and after disaster. This has led to the introduction of new methodological approaches including more participatory, ethnographic, longitudinal, and mixed methods designs as well as more diverse theoretical frames.

Given the tremendous growth of research on children and disasters, especially over the past decade, we assume and hope this momentum will continue. Children make up somewhere between 20 percent to over 50 percent of the population in countries around the world. Although often cast as invisible, they are an important segment of any given population worthy of sustained research attention and specific policy- and practice-oriented actions. Moreover, children, who have inherited a changing climate and a world marked by more weather extremes, are increasingly involved in initiatives to reduce their own risk as well as the myriad risks that they will confront over the life course. Children often have the time, energy, creativity, and capacity to contribute to disaster risk reduction, and their involvement in these efforts should be encouraged and recognized by researchers and practitioners alike.

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