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# Children and Natural Disasters

## *A Primer for School Psychologists*

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**ABSTRACT** Worldwide children are impacted by natural disasters, including hurricanes, floods, tornadoes, earthquakes, wildfires, landslides and sandstorms, winter and severe storms, heat waves, volcanoes and tsunamis. School psychologists should understand natural disaster effects, such as economic loss, relocation and health concerns and mental health issues. While most children are able to cope, a significant minority develops severe symptoms and Post Traumatic Stress Disorder (PTSD). School psychologists should gain trauma mental health training through the American Psychological Association, the National Association of School Psychologists, and the International School Psychology Association. They can also be involved in school and community prevention, mitigation and educational programming. This article presents an overview for school psychologists of the literature on children in natural disasters.

**KEY WORDS:** assessment; children; intervention; natural disasters; PTSD

On December 26, 2004 the world's attention was brought to natural disasters by media coverage of the tsunami that struck a total of 12 countries in Southeast Asia and left over 280,000 known dead (Centre for Research on the Epidemiology of Disasters [CRED], 2005). Natural disasters, however, impact every part of the world on a more frequent basis than most imagine, and school psychologists must be prepared to provide prevention and intervention services. The Centre for Research on the Epidemiology of Disasters (CRED, 2005) notes there are 307 natural disasters a year, impacting 104 countries, with over 50,000

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people killed, 250,000,000 people affected and 55 billion US dollars economic damages. Also in 2004, Florida was struck repeatedly by four hurricanes, making recovery difficult. The year 2005 was devastating, with Hurricane Katrina's storm surge, high winds and large mass causing massive devastation across the Gulf Coast. Katrina was followed by at least two more hurricanes and fires in the United States. In Pakistan, a deadly earthquake killed at least 79,000. Floods worldwide also attract media attention but cause fewer deaths than droughts and resulting famine, considered hidden epidemics due to their slow onset and thus less dramatic coverage (Food & Agriculture Organization of the UN, 2005). Other natural events that can qualify as disasters include tornadoes, landslides and sandstorms, winter and severe storms, heat waves and volcanoes (American Red Cross [ARC], 2005). Events are noted as disasters when the losses 'exceed the ability of the affected community to cope using its own resources' (Asian Disaster Preparedness Center, 2005). With Katrina, the United States was confronted perhaps with its first true disaster as resources for recovery have not been swift or complete for survivors.

For survivors, natural disasters leave economic loss, relocation and health concerns, and mental health issues. This is particularly true for the poor, the uninsured and for those in countries where monies must go toward relief and recovery efforts rather than further development (World Bank, 2005) and mental health services are scarce despite their great need (ARC, 2005). Among the most vulnerable are children who comprise a significant percentage of the victims of natural disasters world wide, both in deaths and in numbers impacted (Norris et al., 2002 a, b). In the tsunami alone, 37 percent of the deaths were children (over 90,000), surviving children lost siblings and friends and 7,722 were left with no parents (World Bank, 2005). In 1992, when Hurricane Andrew left over 175,000 residents homeless in Florida, thousands of children were traumatized as they lost homes, pets, toys and friends (Vernberg et al., 1996). In 1999, a severe tornado hit Oklahoma, killing 45 people and destroying 11,604 buildings, including two public schools attended by all the children in the community (National Oceanic and Atmospheric Administration [NOAA], 1999). Hurricane Katrina is responsible for the greatest population immigration within the United States in history, with children and families dispersed from the Gulf Coast to every state in the union. Thus, school psychologists throughout the country are likely to serve children impacted by this event. It is critical that they have knowledge and skills to provide appropriate services (Weinstein et al., 2000).

Despite the frequency of children's exposure to natural disasters, early trauma work focused on adult war victims (Kendall-Tackett et al., 1993; McNally, 1991). It was assumed that children's reactions to

trauma would be the same as adults (Anthony et al., 1999) until Terr (1979) demonstrated that children respond differently and did not 'bounce back' as had been assumed but exhibited long-term problems and generalized their fears. Psychologists then began to critically examine the effects of trauma on children. Pynoos et al. (1999) presented a model highlighting the interaction of trauma and stress with developmental levels and psychopathology. Meta-analytic reviews (Norris et al., 2002a, b; Vogel and Vernberg, 1993) demonstrated that children's range of responses to disaster are dependent upon many variables and demonstrate more severe trauma symptoms than adults, with rates for violence-related disasters higher than those for natural disasters. Due to their limited cognitive schema and behavioural repertoire, children are at great risk of 'freezing' during a disaster and not taking 'flight' or 'fight' action (Leach, 2004). Prevention and intervention programs for children are needed, and school psychologists are poised to assist in delivering such programs. Following is an overview for those interested in further information.

### **Assessment of trauma symptomology and PTSD for children in natural disasters**

Disaster mental health workers rely on comprehensive assessment information, including demographics, type and severity of trauma exposure, interviews and rating scales to identify children in greatest need of services. While general depression and anxiety measures or broad-band behaviour ratings can augment trauma scales, self-report instruments that capture reaction to the trauma itself are critical for screening, because children's understanding of (e.g. how scared they were) and reaction to (e.g. coping and anxiety, amount of support) the event significantly impact adjustment (see Evans, 2002). Self-report measures are typically based on the three clusters of Re-experiencing, Avoidance and Arousal as described in evolving versions of the DSM (see Cook-Cattone, 2004; National Center for PTSD, 2004; Ohan et al., 2002 for a summary of child instruments). Available self-report rating scales include The Children's PTSD Inventory (Saigh et al., 2000; Saigh et al., 2002); The Impact of Events Scale (IES; Horowitz et al., 1979; Yule et al., 1994); The Child Post-Traumatic Stress Disorder Reaction Index (CPTSD-RI; Frederick et al., 1992 in Nader, 1996); The Child PTSD Symptom Scale (CPSS; Foa et al., 2001); When Bad Things Happen (WBTH; Fletcher, 1996) and the Kauai Recovery Index (KRI), patterned on the CPTSD-RI (Hamada et al., 2003). Evans (2002) recently developed the OSU Child PTSD Inventory for use with children in tornadoes. For social support, researchers have used the Social Support for Children (SSSC; Harter, 1985) and for coping, the Kidcope

(Spirito et al., 1988) designed to assess coping strategies. Using this variety of measures, a body of literature has been developed; following are brief summaries. This review is comprehensive but not exhaustive.

For several natural disasters, such as volcanoes and landslides, there is no systematic body of literature on children. With the tsunami, relief efforts have focused on normalization and stabilization as mental health workers focus on services for those most affected by consequences that make all other disaster figures pale in comparison. For example, a graduate student of the authors from Malaysia stated, 'We didn't have as much damage. Only 60 people died'. A single disaster in the United States today that resulted in over 60 deaths, such as Katrina, would be considered significant; a total of 116 people died in the record-setting 2004 hurricane season (NOAA, 2005), and with all available resources, Florida is still in the recovery phase. While numbers of deaths are coming in slowly, Hurricane Katrina likely caused the largest number of deaths in the United States since early detection systems have been in place. Disaster workers on-site for tsunami victims are describing children who still are not speaking, and they are trying to reach them through non-verbal techniques such as art (Mennonite Central Committee, 2005) and puppet play therapy (International Medical Corps, 2005). Victims of Katrina are desperate to find missing family members and a home. A colleague whose rural Louisiana school received over 400 displaced children from New Orleans stated that a child whose home was destroyed said, 'I just want to know when I can go home' (Kim Welsh, personal communication, 23 September 2005). Another critical issue that has emerged is that many child victims and survivors do not know how to swim. In previous flood disasters, children who did not know how to swim and those who were left alone during the disaster constituted the greatest number of fatalities (Save the Children, 2005), perhaps due to the freeze phenomenon described by Leach (2004). Some disaster relief workers are concentrating on child survivors learning how to swim (Amritapuri, 2005), and this might be a consideration for children who were trapped in water during Katrina. For the tsunami and other disasters world wide, as well as Katrina, researchers and practitioners will have to rely on the existing bodies of literature for other natural disasters to best apply and evaluate empirically-supported psychological services for children.

### **Specific disasters and effects on children**

The most prolific and scientifically rigorous studies are on hurricanes, starting with Hurricane Hugo and with over 60 total articles (e.g. Belter et al., 1991; Garrison et al., 1995; Jeney-Gammon et al., 1993; Lonigan et al., 1991; Sullivan et al., 1991). Studies have examined

diagnostic efficacy of PTSD symptoms and PTSD rates, severity, developmental and/or age effects of PTSD, gender and ethnicity, pre-morbid functioning, child versus parent report and social support and coping. In the acute phase, up to 30 percent of the children experience severe symptoms, around half moderate symptoms and up to 95 percent exhibit some symptoms. General prevalence rates for a full PTSD diagnosis range from 5–18 percent (Bahrack et al., 1998; LaGreca et al., 1996; Lonigan et al., 1998). Lonigan et al. (1998) found that many victims exhibited some symptoms, including behavioural and emotional avoidance, bad dreams and repetitive thoughts. They found three symptom clusters: Intrusion/Active Avoidance, Numbing/Passive Avoidance and Arousal. Garrison et al. (1995) found that difficulty concentrating, diminished interest in significant activities, irritability or outbursts and avoidance of thoughts were experienced by about a third of the children and recurrent and intrusive recollections by a fifth. Physiological reactivity to cues and a sense of a foreshortened future were experienced by fewer than 10 percent, but may predict seriousness of symptomology. Bahrack et al. (1998) also found memory and concentration effects; trauma recall can vary, with severe trauma imbedded without details, while those with moderate exposure may recall significant details of the event (Howe, 1997). Omens, guilt, anger and anxiety all appeared to be markers of exposure to trauma separate from classic PTSD symptoms. Guilt, while not predictive of PTSD, was common in children surviving a hurricane (Lonigan et al., 1998) and likely contributes to adjustment difficulties. Long-term, up to a third of the children exhibited symptoms impacting daily functioning (e.g. Carrion et al., 2002; Cook-Cottone, 2004; Lonigan et al., 1998; Russoniello et al., 2002). Studies such as LaGreca et al. (1996), conducted 32 weeks post-disaster, found continuing high rates of PTSD as families coped with secondary trauma (Shaw et al., 1995). Jeney-Gammon et al. (1993) found coping patterns to be related to adjustment.

Degree or severity of exposure to a natural disaster is known to impact trauma symptoms (Garrison et al., 1995; LaGreca et al., 1996); increased PTSD is related to increased exposure to the hurricane or other traumatic events, with life threat being the greatest predictor of children who continued to exhibit PTSD symptoms over time. General behavioural and emotional symptoms post-disaster may not be readily apparent by knowledge of degree of exposure in hurricanes where there is a long warning time for a large number of people. Shaw et al. (1995) found that children less impacted by the hurricane had the same prevalence rate of mild and moderate PTSD symptoms as did children in the immediate path of the storm, perhaps due to vicarious traumatization via the media, uncertainty regarding the path of the storm and peripheral impact of living in a storm ravaged area. LaGreca et al. (1996)

found a reduction in emotional and behavioural problems in the school system following a hurricane, perhaps due to a numbing effect (Shaw et al., 1995). Rates returned to normal the following year. In schools less heavily affected by the storm, there was a reported initial increase in disruptive behaviours. These studies underline the need for systematic screening to identify and treat children with mental health needs.

Researchers have also found that children were more accurate reporters of their distress than parents and teachers (Vernberg et al., 1996; Vogel and Vernberg, 1993). LaGreca et al. (1998) found that children's pre-existing levels of anxiety were predictive of significant PTSD reactions and later adjustment. The availability of social support and the type of coping strategies used to cope with disaster-related distress are predictive of children's PTSD symptoms at three, seven and ten months post-disaster (LaGreca et al., 1996). The most frequent coping strategy reported by the children was wishful thinking, followed by positive coping, social withdrawal and blame/anger. Teacher support was also highly and uniquely predictive of the ability to resolve PTSD symptoms as time elapsed. Children reported the greatest level of support from parents and friends and the least from classmates.

Young children showed more severe symptoms than did older children and adolescents, but PTSD symptoms had consistent dimensionality across age groups (Lonigan et al., 1998). Most symptoms were reported more frequently in females than in males with the exception of a sense of foreshortened future and diminished interest in a significant activity (Garrison et al., 1995; Lonigan et al., 1998). Symptom patterns were not consistent across ethnic categories and some have failed to replicate previous findings of gender, grade and ethnic differences in children with PTSD following a disaster. Prevalence rates have been found by some to be lower among black males than among white males and black or white females, while others found Hispanic and African American children reported higher levels of PTSD than did White children (Garrison et al., 1995; Lonigan et al., 1998). Given the ambiguous state of the literature, assumptions should not be made based on demographic variables.

In general, being in a hurricane created a significant risk for children for the development of PTSD. Researchers (Lonigan et al., 1998; Shannon et al., 1994) stress the need for continuing longitudinal study of these children in order to determine if PTSD contributes to the formation of adult psychopathology.

There are many commonalities exhibited by the children from hurricanes with those in earthquakes and floods. Several articles have examined the effects of earthquakes upon children (Durkin, 1993; Galante and Foa, 1986; Goenjian et al, 1995; Guerin et al., 1991; Kolaitis et al., 2003; Nolen-Hoeksema and Morrow, 1991; Pynoos et

al., 1993; Roussas et al., 2005). Developing countries report rates of psychiatric morbidity in children far in excess of that found in the United States (Goenjian et al., 1995; Lima et al., 1989; Pynoos et al., 1993). Durkin (1993) found higher rates of PTSD after the 1985 earthquake in Chile compared with rates following the Coalinga earthquake, but similar depression rates. Rates of PTSD for most children in Armenia were greater than for those reported in Hurricane Hugo (Belter et al., 1991; Shannon et al., 1994), the Missouri flood (Earls et al., 1988), the Buffalo Creek dam collapse (Green et al., 1991) and the sinking of the Jupiter (Yule, 1992). Goenjian et al. (1995) found for children in Armenia, the degree of post-traumatic stress, and the children's reporting that they wanted to die, closely followed the degree of exposure, i.e. the number of family members lost in the earthquake, the extent of damage of their home and prolonged community disruption. The frequency of PTSD, depressive disorder and mixed PTSD/depressive disorder was associated with proximity to the epicentre. They also found that guilt is associated with severity of PTSD, and more significantly for children. Kolaitis et al. (2003) found that children who were alone at the time of the earthquake in Athens had more severe symptoms. Kiser (1993) found anticipatory anxiety in a group of children who were told an earthquake was imminent which did not materialize, which is consistent with the hurricane studies showing vicarious trauma. Roussos et al. (2005) more recently found rates of 4.5 percent and 13.9 percent of PTSD in children at the epicentre and 10 kilometers from the epicenter of the 1999 Greek earthquake.

The earliest flood studies in the psychological literature of the collapse of the Buffalo Creek dam found significant psychological distress in the survivors (Gleser et al., 1976). Green et al. (1991), in a 17-year follow-up of the Buffalo Creek children, found 37 percent of the children examined reported post-traumatic stress symptoms that were related to the child's individual disaster experience, age, gender, parental functioning and general atmosphere in the home. Earls et al. (1988) found parents under-reported their children's distress and children in families with pre-existing psychiatric problems had more severe flood reactions. Kreuger and Stretch (2003) found that flood impact and the recovery mechanisms of the family were related to PTSD and recovery in the children. Bokszczanin (2002) found that, again, degree of exposure, loss and perception of danger were predictive of children's PTSD and depression symptomology in a flood in Poland.

Very few studies have addressed wildfires, despite increased exposure to them, particularly in the western part of the United States as people build in high risk areas. Langley (2003) found for a group of adolescents exposed to wildfire that degree of exposure and loss, as well

as coping efficacy, were related to PTSD symptomology. McDermott and Palmer (1999) and McFarlane (1987) studied children after Australian bushfires. PTSD rates were about 12 percent and varied with the degree of exposure, fear of parental death and parental anxiety after the fire. As with many other disaster studies, general depression and anxiety were not different than non-exposed children.

The effect of surviving a tornado has not been well studied despite this being one of the most frequent types of natural disaster in the United States. Early case studies included Weinreb (1954) and Block et al. (1956). Penick et al. (1976) found that tornado victims experienced a significant number of long-term mental health problems. Madakasira and O'Brien (1987) interviewed tornado survivors and found intrusive thoughts were the most frequent symptoms reported (82 percent), followed by increased tension on exposure to disaster scenes or mentions (68 percent), concentration difficulty (66 percent), memory impairment (61 percent), estrangement (57 percent) and insomnia (55 percent). Steinglass and Gerrity (1990) conducted one of the few studies that compared responses of victims in two different kinds of disasters, flood and tornadoes and found very high short-term PTSD symptoms rates in both communities. At 16 months symptoms decreased; however, the tornado damaged community had a significantly higher incidence of post-traumatic stress (21 percent) than the flood ravaged community (14.5 percent) despite better relief and recovery services. Greening and Dollinger (1992) examined adolescents' perceptions of tornadoes and/or lightning risk in groups that had experienced tornadoes, lightning, floods or no disasters. Students in all groups perceived tornadoes to have a higher fatality risk than lightning (although this is not accurate; NOAA, 2005). Stoppelbein and Greening (2000) compared children who had been in a tornado, had lost a parent and those who had social or academic stressors, finding children who had lost a parent had more severe PTSD symptoms than those experiencing other trauma, including tornadoes. They did not examine children who had lost a loved one in the tornado, who might have had symptoms similar to the bereavement group.

In 2000, the present authors studied children in two tornado damaged rural school districts in Oklahoma one year after the largest and most destructive tornado ever in the United States, for the first author's dissertation (Evans, 2002). One school, the centre of community cohesiveness for the 230 K-12 children, was totally destroyed and children had to attend school in the neighbouring community while the Federal Emergency Management Agency (FEMA) rebuilt. Following data collection, the research team conducted six sessions of group therapy for the children. Research instruments were constructed by the lead researchers based upon instruments currently being used in other

parts of the United States. The OSU PTSD Screener was a brief ten-question instrument based upon DSM-IV criteria. Two other instruments were also utilized, the OSU-PTSD Inventory and the OSU Children's DSM-IV Questionnaire, which were factor-analysed to examine the underlying dimensions of PTSD. Finally, all instruments were correlated with the Behavior Assessment System for Children to examine concurrent validity. Factor analysis of the OSU Children's DSM-IV Questionnaire yielded six symptom clusters. Two were consistent with current DSM-IV-TR categories, Avoidance and Re-experiencing. An Arousal factor did not emerge. The other factors are Interpersonal Alienation, Interference with Daily Functioning, Anxiety/Physical Symptoms and Foreshortened Future (Evans and Oehler-Stinnett, in press). The Interpersonal Alienation factor includes difficulties and anger with others. While several PTSD websites indicate these as symptoms in children, they have not been well documented in the literature. Garrison and colleagues (1995) noted that irritability or outbursts occurred in 30 percent of the children in the Hurricane Andrew study compared to 35 percent of these children reporting having more problems with friends and more anger since the tornado. When examined closely, the same 35 percent of the children reported feeling different from others since the tornado, even people in their same community who had survived the same experience. Daily Functioning and Anxiety/Physical Symptoms scales allow inclusion of these issues in assessing children in a more systematic way, rather than considering them related symptoms in a qualitative fashion only. Finally, the Foreshortened Future items separated into a factor that appears to be a severity indicator. In Garrison's 1995 study, only 8.6 percent of the children indicated that they felt they would not live to adulthood, marry or have children compared to one-third of the children in this study acknowledging that they worry they might die before they grow up, don't feel they will marry or live to have children. Additionally, the children's perception of social support at home and in the community did not appear to ameliorate this symptom. Continued research on more inclusive assessment of PTSD in children who are severely impacted by natural disasters is encouraged.

### **Experiences unique to each type of natural disaster**

While there are many commonalities across natural disasters, unique features include geographic location and frequency; predictability, suddenness and warning time; severity/intensity; destruction method; sights and sounds during; injury, damage and deaths; duration; aftermath and preparation and prevention methods (American Red Cross [ARC], 2005; FEMA, 2005). Knowledge of the specific experiences of

child victims is important in understanding their psychosocial functioning following the disaster. Differing frequencies according to geographic location require people to know their local common natural disasters and precipitating conditions. Prediction and warning time varies; hurricanes have extended warning periods allowing for evacuation, tornadoes may have minutes and earthquakes may have little to no warning time. Some parts of the world have better warning systems which have greatly reduced deaths in high risk areas but contributed to increased population density, exposure to trauma and disaster relief costs (FEMA, 2005). Greater prevention and mitigation efforts can include avoiding building in high risk areas, building and retrofitting to withstand the disaster and education for and warning heed by the public. In areas of the world with fewer warning capabilities and the inability to relocate, mortality rates and property damage are particularly devastating and child PTSD rates are much higher. The lack of a comprehensive early warning system for the tsunami resulted in greater catastrophe. There is now an impetus to create an early warning system (Platform for the Promotion of Early Warning, 2005).

Frequency of natural events also impacts people's actions. Persons used to more frequent events with low severity, such as in tornado alley, are more likely to have awareness and knowledge of the disaster. However, they may underestimate potential severity and be less likely to take precautions when warnings are issued (ARAC, 2005; FEMA, 2005). Also, because even in high frequency areas there is uncertainty about exactly where an event will occur (e.g. where the tornado or hurricane will land), people 'bet' that it won't be where they live. The inability to predict the precise location of hurricanes in time for large populations to evacuate makes it difficult to continually evacuate the coast to keep children safe, as was evidenced with the attempt to evacuate Houston for Hurricane Rita. The Red Cross indicates that mothers are more likely to take warnings seriously and must override those who do not want to take shelter. While the psychological literature routinely reports women's greater concerns as pathology, children in our tornado study reported being very afraid because their fathers went out into the storm. Preliminary data from the tsunami also suggests that 75–80 percent of adult fatalities were women, perhaps because they could not save themselves or their children and the men were out on fishing boats (Oxfam, 2005). More active prevention and intervention by the men in families and communities could be comforting to their dependents.

Disasters also vary by severity and intensity. The National Oceanographic and Atmospheric Administration (NOAA, 2005) and other agencies use scales to predict and record intensity of events, with more severe events occurring with less frequency. Severe events, with their

greater devastation, lead to greater traumatic experiences and symptoms. The speed with which an event such as a hurricane makes landfall or a fire moves through a forest impacts the amount of damage and injury that occur, while the size impacts the amount of people and land affected. For example, the large hurricanes in the Southeast US in 2004 caused evacuation warnings to be issued from the Texas coast to Florida. The F 5/6 tornado that hit Oklahoma in 1999 had record winds of close to 360 mph over a mile wide that destroyed entire towns. The Hayman fire was the greatest in Colorado history (Hayman Fire Case Study, 2003). More frequent and severe natural events are predicted, making disaster preparedness and intervention a high priority for prevention of mental health difficulties. The amount of injury, damage and death endured and observed varies by type and severity of disaster. Destruction method and sights and sounds during disasters can be different. For example, children in tornadoes report hearing winds that sound like loud trains and see clouds and funnels, which become feared stimuli. Storms produce thunder. Children in hurricanes report feeling high winds and pressure drops, and victims of Katrina report hearing unearthly sounds. Children in disasters involving water, such as hurricanes and floods, report being caught in water or seeing water rise and destroy property and have a high risk of drowning or losing a pet. Disasters combining wind and water are more likely to result in death for those without protection. A wildfire and a tornado can destroy everything in their paths. Earthquakes, landslides, mudslides and avalanches involve movement of solid substances; children caught in their path can be carried, crushed or smothered by falling earth or debris. They may see or feel their own injuries. Children may also see hail, heavy rain, dust, sand, snow or ice blown in sheets that can cause injury or death. Following the disaster, they may see and smell water-soaked objects, contamination, wind-carried odors, disease and death. Tsunami survivors tell haunting tales of hearing people begging them for help and screaming and seeing people lose their grip and drown. (See ARC, 2005; National Association of School Psychologists, 2005 for other descriptions of experiences during natural disasters). People trapped in Katrina had to watch as the most vulnerable were airlifted and they were left behind.

Duration of natural events also varies. Even devastating events such as hurricanes and tornadoes are over in a brief amount of time. Long-term flooding, drought and extreme temperatures may last for extended periods of time. These disasters, while not causing as much property damage, have devastating effects on agriculture and are linked to wide-scale famine. Drought consistently accounts for the largest number of deaths annually worldwide, and this problem is only expected to get worse. The Food and Agriculture Organization of the

UN (2005) estimates that with predicted climate changes, developing countries will have an increase in the already over 450 million undernourished people due to loss of agriculture productivity, and mortality rates are particularly high for young children in these circumstances. Even for survivors, growth is stunted and accompanied by poor cognitive development and learning problems. The worldwide population explosion compounds these problems, and there is a call for large scale health and mental health programming.

In the aftermath of natural disasters, people must try their best to endure and recover. Multiple studies and data by the International Committee of the Red Cross indicate that confronting loss and damage takes a toll on coping resources. Those who lost loved ones or pets must not only deal with the trauma itself, but process grief compounded by complicated mourning from traumatic death and survivor guilt. Those who have lost their home and/or possessions, including special memorabilia, must sort through remains to try to salvage tangible symbols of their lives, and find alternate living arrangements. In major disasters, multiple family members and friends are affected, making it difficult to find a support system. In the Oklahoma tornado, a sophisticated warning system saved most lives, immediate and intensive disaster and mental health services were implemented by FEMA, long-term rebuilding was paid for by insurance and FEMA, the tight-knit community was supportive, and the children now attend a school with a storm shelter below the band hall. Despite these services under the best circumstances, children continued to show trauma symptoms. In high service areas, the poor, those without insurance, and areas hit in which a disaster is not declared are the most negatively impacted. In parts of the world where building construction is poor, warning systems are minimal and disaster relief is not immediate and substantial, secondary trauma from damage and lack of resources intensifies the problems faced by victims. These include lack of clean drinking water, disease prevention and management, medical supplies and care, sanitary toilet facilities, agricultural capability, child care and educational facilities for children. Mental health resources are scarce. Studies following earthquakes in these areas show substantially higher rates of PTSD. School personnel following the tsunami are left with the task of trying to hold school and normalize daily activities for children in villages where only a quarter of them survived, and many of these are now orphans. Obviously, mental health services must be conducted within the context of immediate survival needs and readiness for services, and service providers should liaison with coordinating agencies such as the World Health Organization, the International Red Cross, and the United Nations Children's Relief Fund who are making tremendous strides but have much rebuilding to continue.

### **Intervention research and recommendations**

School psychologists wishing to assist in disaster mental health have several options but need to be aware of their own competencies and limitations. Interventions are designed to meet the needs of victims during different phases of disaster, for different severity conditions and for different symptomology. Prevention and mitigation activities are also critically important to reduction of mental health problems in anticipation of, during and after disasters. According to the ARC(2005), it is important to note that the majority of victims do not show severe trauma reactions. In fact, some (e.g. Teicher, et al., 2002) indicate that humans have evolved to cope with stress, that most children exposed to trauma do not develop PTSD due to coping strategies, and that adequate coping with trauma in childhood can lead to adaptive responses to stress later in life. Post-traumatic coping and growth must be included in intervention programs, such as recalling lessons learned and preparing better for the likelihood of a reoccurrence. Thus, immediately following the disaster, disaster relief workers concentrate on normalizing the reactions of this large proportion of the population. Emotional numbing allows people to carry out daily functions and recovery, but this does not ensure that they will not suffer long-term effects. Support services, known as psychological first aid, primarily include assisting with salvage, food and shelter and applying for disaster grants and loans. See Shelby and Tedinnick (1995) for a description of typical crisis intervention services as part of a disaster mental health services team following Hurricane Andrew. Note that these services are largely provided without regard for controlled intervention studies. Another common practice which is not thoroughly researched is critical incident debriefing in which large groups of victims are taken through the experience verbally. Results of need for and effectiveness of this treatment are mixed. Dyregrov (1997) outlines the process and structure of effective debriefing for adults. Group debriefing that includes experiences and reactions serves to normalize reactions for those who have similar experiences; after that it is important to focus on coping and future prevention activities.

The World Health Organization (2005) has issued a document titled 'Psychosocial Care and Protection of Tsunami Affected Children: Guiding Principles', which strongly recommends that normalizing appropriate developmental activities be stressed; any intervention be done within the context of the community, culture and religion, preferably by people the children know; and that traditional trauma-counselling not be the first intervention for most children. For example, some villages have set up summer camps for the children to provide activities within a safe environment. Religious considerations include causal attributions for effects of natural disasters such as divine

punishment and miracles, which can impact mental health adjustment. Children's perception of death and rituals used for coping within their community must also be considered. Services being provided through religious organizations, as well as mental health workers, must be sensitive to these issues. These precautions should be heeded with Katrina survivors as well.

During the initial post-disaster period, persons suffering severe trauma are identified through triage, and services for acute stress disorder are provided. Victims evidencing severe symptoms may be in shock, not understand the threat is past, and evidence high anxiety/avoidance, anger/aggression or dissociative symptoms and depersonalization (Osterman and Chemtob, 1999). Adults must take the time to comfort children, ensure their safety and seek professional services for treatment of acute stress disorder diagnosed within the first month post-disaster. More controlled studies are derived from treatment provided some time after a trauma occurs, and focus on victims still experiencing difficulty. Goenjian et al. (1997) showed that adolescents who received psychotherapy had improvement in PTSD symptoms, while symptoms worsened in those not receiving treatment. Exposure therapy, flooding and desensitization all are designed to impact the fear network (Eckley, 2002; Saigh, 1992; Saigh et al., 1999). Other interventions aimed at the physiological level include relaxation which has been established to impact the biological system and reduce the stress response. Relaxation techniques have been examined for broad PTSD in children within the context of desensitization, cognitive-behavioural treatments and psychosocial interventions (Farrell et al., 1998; Mohlen et al., 2005). While effectiveness has been shown, there are no studies examining the technique alone with children in natural disasters. Finally, individual studies report efficacy of alternative treatments involving touch, such as massage (Field et al., 1996) and interaction with dolphins (Faye, 2004). While these techniques require substantial additional study, their efforts to address the physiological components of PTSD in children with alternatives to relaxation treatment deserve further attention. Other physiological interventions include use of psychotropic medications such as anxiolytics, antipsychotics and antidepressants (Bryant and Friedman, 2001; Friedman, 2000; Friedman et al., 2000), with SSRIs most commonly prescribed despite PTSD being classified as an anxiety disorder. Very little research has been done with children, and there is a call for development of appropriate empirically supported psychotropic interventions for PTSD (Friedman, 2000; Friedman et al., 2000), and for integrative treatment programs that include the neuroendocrine and psychosocial systems (Seedat and Stein, 2001).

Cognitive-behavioural (CBT) interventions can mediate across many

areas of the disorder (Roser and Gazzaniga, 2004). Feeny et al. (2004) review an extensive literature showing the effectiveness of CBT interventions. Shen (2002) found reductions in symptoms with elementary children in China after an earthquake using play therapy techniques that include action with verbal dialogue. Cognitive restructuring techniques show promise for children in natural disasters, given children's cognitive limitations and particularly for those who have misconceptions about the nature and cause of the disaster and their perception of the future (see Salmon and Bryant, 2002 for a call for developmental considerations in PTSD research and treatment). Evidence that children believe that they somehow influenced the disaster (answer yes to question, 'If I had been a better child, the tornado wouldn't have happened'), knew beforehand and did nothing (omen formation), fear they will not survive the future (foreshortened future), feel guilty (survivor guilt) and have anger and anxiety over their perceived loss of safety are all candidates for cognitive restructuring programs.

Several techniques fall under the name of trauma-focused cognitive behavioural treatments, however, and there is not clear evidence on the component that is most critical for treatment of children in general (see Cohen, 2003 for a review). Techniques include 'stress management techniques, psychoeducation, some variant of exposure ..., and cognitive processing' (Cohen, 2003; p. 2). An exposure treatment method widely used with adults is imaginal flooding. Saigh et al. (1996) review this literature and recommend that in treating children, the technique be used within a comprehensive treatment program in a therapeutic relationship and that adjunct procedures such as art and verbal prompts be used. Children should also be carefully screened for contra-indication of this method (e.g. noncompliant or unable to visualize). While this method has been shown to decrease significant PTSD symptoms, there is limited research on children in natural disasters and caution is recommended. Another somewhat controversial technique is Eye Movement Desensitization and Reprocessing for Children. While there are calls for more controlled studies examining the particular components of the therapy that are effective, Chemtob et al. (2002) report a significant decrease in PTSD symptoms in children exposed to a hurricane using this technique.

Models of PTSD in children emphasize cognitive, behavioural and emotional components that must be addressed in comprehensive programs (see Meiser-Stedman, 2002 for a thorough discussion). Brown (1997) reports successful outcomes for a comprehensive program designed for children exhibiting the ADHD-like agitation symptoms found in children following a hurricane. Treatment included behaviour management, cognitive-behavioural techniques and systems-level intervention within a school-based program utilizing parents and teachers.

### **Preparation and education activities**

Schools can also be utilized to provide prevention and mitigation education to children, their families and school personnel. The ARC and FEMA offer extensive programming resources for schools and families. The Masters of Disaster program teaches children about natural disasters and disaster preparedness. Natural disaster facts are typically imbedded in US science curricula in 5th through 7th grades; teachers can be used for resources and for dissemination of mental health resources. It is critical that families also be taught disaster preparedness, as adults are responsible for children's safety. Families should have a disaster plan and supply kit, be aware of the school's plan and policy, be represented in the school crisis plan, and have plans for contacting and meeting loved ones following a disaster. Families must also acknowledge and make known past or chronic stressors that place their children at high risk for poor disaster adjustment. School psychologists should also ensure that their school crisis plan has adequate coverage of natural disasters and that their own plans are secure so that they may provide disaster services if needed. School administrators should implement prevention and mitigation strategies, including building and retrofitting buildings to be more safe, and walking through the physical facilities and securing potential hazards (heavy bookcases, chemical supplies and windows). Simple strategies such as keeping a broom, communication devices and a weather radio in every classroom, are recommended. Schools should have adequate safe shelter and evacuation procedures, along with regular disaster drills. This is particularly crucial for children in order for them to be able to respond appropriately under emergency conditions (Leach, 2004). Supplies should be available to shelter in place, including safe water, emergency survival supplies, first aid and materials to protect property such as boards for windows. Schools should liaison with community emergency management agencies and be prepared to use school facilities for emergency shelters.

Communities need to plan for preventing and lessening losses, including modifying building codes, insurance coverage, providing shelters, an adequate warning system, and knowledge for preparation for specific disasters known to frequent the community. Donations for disaster preparedness kits and weather radios should be solicited so that supplies can be given out (in contrast to simply telling children they need supplies). Finally, adults in charge must listen to their weather radios, heed warnings and take them seriously in order to protect children and families. Following disasters, plans should immediately be put into place, including communication with the media and identifying families with the greatest need. Knowledge and use of available resources and agencies is critical. School psychologists can

seek additional disaster mental health training through the American Psychological Association (APA), the National Association of School Psychologists (NASP) and the International School Psychology Association (ISPA). APA, in conjunction with the American Red Cross, trains licensed psychologists through the Disaster Response Network (APA, 2005). NASP (2005) has created the National Emergency Assistance Team, which responds to traumas and trains school psychologists for emergency responses. In summary, while the literature and the needs of children exposed to natural disasters may seem daunting, school psychologists have prerequisite skills and the opportunity to ameliorate the effects of such disasters with continued professional development and experience.

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