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Disasters and Depressive Symptoms in Children: A Review

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Abstract

Background—Disasters are destructive, potentially traumatic events that affect millions of youth each year.

Objective—The purpose of this paper was to review the literature on depressive symptoms among youth after disasters. Specifically, we examined the prevalence of depression, risk factors associated with depressive symptoms, and theories utilized in this research area.

Methods—We searched MEDLINE, PsycInfo, and PubMed electronic databases for English language articles published up to May 1, 2013. Reference lists from included studies were reviewed to capture additional studies. Only quantitative, peer reviewed studies, conducted with youth under the age of 18 years, that examined postdisaster depressive symptoms were included. Seventy-two studies met inclusion criteria. Prevalence of depressive symptoms, disaster type, correlates of depressive symptoms, and theories of depressive symptoms were reviewed.

Results—Only 27 studies (38%) reported on prevalence rates among youth in their sample. Prevalence rates of depression among youth postdisaster ranged from 2% to 69%. Potential risk factors were identified (e.g., female gender, exposure stressors, posttraumatic stress symptoms). Theories were examined in less than one-third of studies ($k = 21$).

Conclusions—Given the variability in prevalence rates, difficulty identifying a single profile of youth at risk for developing depressive symptoms, and lack of a unifying theory emerging from the studies, recommendations for future research are discussed. Use of established batteries of assessments could enable comparisons across studies. Merging existing theories from children's postdisaster and depression literatures could aid in the identification of risk factors and causal pathways.

Keywords

disaster; children; depression; review; theory

Disasters are destructive, potentially traumatic events. Disasters may include events that are natural (e.g., tornadoes, floods, hurricanes) or man-made (e.g., 9/11, nuclear explosions; Furr, Comer, Edmunds, & Kendall, 2010). Unfortunately, disasters are common and affect millions of children each year (Guha-Sapir, Vos, Below, & Ponserre, 2012; Seballos, Tanner, Tarazona, & Gallegos, 2011).

After disasters, many youth (i.e., children and adolescents) report posttraumatic stress (PTS) symptoms (Bal, 2008; Comer et al., 2010; Dyb, Jensen, & Nygaard, 2011; La Greca et al., 2013; La Greca, Silverman, Lai, & Jaccard, 2010; Yelland et al., 2010) and/or depressive symptoms (Goenjian et al., 1995; 1996; Grant, Hardin, Pesut, & Hardin, 1997; Hardin, Weinrich, Weinrich, Hardin, & Garrison, 1994; Lai, La Greca, Auslander, & Short, 2013; Papadatos, Nikou, & Potamianos, 1990). Several metaanalyses and reviews have summarized the literature on youth PTS symptoms postdisaster (Alisic, Jongmans, van Wesel, & Kleber, 2011; Furr et al., 2010; Trickey, Siddaway, Meiser-Stedman, Serpell, & Field, 2012). However, no reviews of youth postdisaster depressive symptoms exist. Thus, we have limited knowledge about prevalence rates of youth postdisaster depression and risk factors that contribute to depressive symptoms. This information is needed, as depressive symptoms are associated with negative life outcomes (e.g., poor academic functioning, substance use, suicide attempts; Birmaher et al., 1996; Horowitz & Garber, 2006). The purpose of this paper was to review the literature on youth postdisaster depressive symptoms, in order to understand how depression is elicited by trauma exposure (Galea, Nandi, & Vlahov, 2005; Trickey et al., 2012) and to inform future directions for research and treatment.

Our first aim was to examine prevalence rates of youth postdisaster depression. These rates have not yet been assessed. We characterized prevalence rates of youth depression by disaster type (i.e., natural or man-made), as man-made disasters may have different consequences for mental health (Galea et al., 2005).

Our second aim was to identify risk factors for youth postdisaster depressive symptoms. This knowledge is important for understanding youth postdisaster depression and its causes. Clinically, this information is needed to create tailored postdisaster interventions. Risk factors for postdisaster depressive symptoms may differ from those identified in the general depression literature. For example, among youth studied after a terrorist bombing in Israel, bombing-related perceived stress was associated with youth depressive symptoms (Shahar, Cohen, Grogan, Barile, & Henrich, 2009). Thus, specific disaster-related risk factors may need to be considered when designing postdisaster interventions.

In this study, we examined the following risk factors: child characteristics (i.e., age and gender), disaster exposure stressors (e.g., perceiving you might die during the disaster, actual life-threatening events such as a tree falling on your home, seeing someone be hurt or injured), and PTS symptoms. We expected that older age might be a risk factor for depressive symptoms, given that adolescence is a “critical period” of vulnerability for depression (Jacobs, Reinecke, Gollan, & Kane, 2008). We also expected that female gender would be a risk factor for depressive symptoms, based on research in the general depression literature identifying female gender as a risk factor (Cole, Peeke, Martin, Truglio, &

Seroczynski, 1998). Further, we expected disaster exposure stressors to be associated with greater depressive symptoms, given associations between stressors and depressive symptoms generally (Hyde, Mezulis, & Abramson, 2008). We also expected PTS symptoms to be associated with depressive symptoms, as these symptoms are often comorbid postdisaster (Goenjian et al., 2011; Lai et al., 2013).

As our final aim, we summarized theories utilized to understand postdisaster depressive symptoms in youth. Currently, it is unclear whether youths' postdisaster depressive symptoms are best understood from a general depressive symptom framework, a disaster framework, or both. Numerous conceptual theories have been developed to understand depression generally (Abramson, Metalsky, & Alloy, 1989; Beck, 1993), but these theories may not apply postdisaster, due to factors unique to the postdisaster environment. At the same time, postdisaster frameworks of youth functioning after disasters have focused on PTS symptoms (Ehlers & Clark, 2000; La Greca, Silverman, Vernberg, & Prinstein, 1996). It is unknown whether these frameworks may apply to postdisaster depressive symptoms. A summary of current conceptual theories being tested in this area are needed to guide future research.

Method

This review followed current guidelines on reporting systematic reviews (Moher, Liberati, Tetzlaff, & Altman, 2009). We conducted a literature search for studies examining disasters and depressive symptoms; we included any article published up to May 1, 2013. The initial search was conducted using MEDLINE, PsycInfo, and PubMed. Searches were conducted by crossing two sets of keywords: 1) disaster*, brushfire*, earthquake*, fire*, flood*, hurricane*, manmade disaster*, natural disaster*, posttraumatic stress*, PTSD, terrorism, tornado*, trauma*, tsunami*, or bomb; and 2) adolescent*, child*, schoolchild*, youth, and depress*.

Next, the following journals were searched for studies regarding trauma, youth psychopathology, and depression in youth: Journal of Traumatic Stress, American Journal of Psychiatry, Archives of General Psychiatry, Journal of Consulting and Clinical Psychology, Journal of Abnormal Child Psychology, Journal of Abnormal Psychology, Journal of Affective Disorders, Journal of Anxiety Disorders, Behaviour Research and Therapy, British Journal of Psychiatry, Depression and Anxiety, Development and Psychopathology, European Child and Adolescent Psychiatry, Journal of the American Academy of Child and Adolescent Psychiatry, Journal of Child Psychology and Psychiatry, Journal of Clinical Child and Adolescent Psychology, and Pediatrics.

Searches for authors identified as experts in the field of disasters and depressive symptoms among youth were then conducted. Finally, we manually searched the reference lists of each study included in the review.

Study Selection

The initial search identified 353 articles. Abstracts of these articles were examined to determine if articles met inclusion criteria (Figure 1). Criteria were derived from a

metaanalysis on youth PTS symptoms postdisaster (Furr et al., 2010). *Tier 1.* Only quantitative, peer reviewed studies conducted with youth were included. Studies had to include youth under the age of 18 years as part of their sample. Reviews, qualitative studies, case studies, non-peer reviewed publications, and reports were excluded. *Tier 2.* All studies had to examine depressive symptoms (demonstrated by including a measure of depression) after exposure to distinct, identifiable disasters, which we defined as “events that are relatively sudden, highly disruptive, and time-limited (even though the effects may be longer lasting), and public (affecting youth from more than one family)” (Vogel & Vernberg, 1993). Studies examining child abuse, war, or political violence were excluded. *Tier 3.* To ensure that findings were generalizable to youth exposed to disasters, studies examining a broad age spectrum that did not look at youth specifically were eliminated. In addition, studies that examined a highly specialized, treatment seeking population (e.g., depressive symptoms among treatment seeking youth) were excluded. This process yielded 72 studies that met inclusion criteria.

Data Synthesis

For the current study, we chose a narrative synthesis of the literature, which allowed for a summary of the current state of the literature on youth postdisaster depressive symptoms. Utilizing a narrative synthesis also allowed us to identify and examine relevant studies in more detail, so that we could make recommendations for future research specifically as it relates to the measurement and prevalence of depression, evaluation of risk factors, and use of theories.

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Coding of Studies

Criteria used in this study were derived from criteria used in past metaanalyses examining children’s PTS reactions to traumatic events (Alisic et al., 2011; Furr et al., 2010). Each study was examined for reported prevalence rates of depressive symptoms. Type of disaster was coded as *natural* or *man-made*.

Due to the lack of unifying conceptualizations regarding postdisaster depressive symptoms among youth, we utilized a conservative approach and recorded all potential risk factors that were examined in relationship to depressive symptoms. To identify theories utilized, we examined whether studies included statements about theories, aims, or hypotheses related to depressive symptoms (following methodology outlined by Alisic et al., 2011). A study was coded as including *theory* when it referred to “theory,” “conceptualization,” “framework,” “grounded,” and “underpinnings” in the title, abstract, or introduction. A study was coded as including *aims* when it utilized words such as “purpose,” “aim,” “objective,” and “this study sought to.” Finally, a study was coded as including *hypotheses* when the terms “hypothesis” or “we expected” were utilized.

Results

Aim One: Prevalence Rates of Depression

Across the 72 studies examined in this review, 18 (25%) studies utilized a categorical definition for assessing depression (e.g., presence or absence of clinically significant depression assessed through the Kiddie Sads), 39 (54%) utilized a continuous measure of depression (e.g., the Revised Child Anxiety and Depression Scale), and 15 (21%) utilized both a categorical and a continuous definition for assessing depression (e.g., utilizing the Children's Depression Inventory and a cutoff score for clinically significant depression). Only 27 studies (38% of the 72 studies examined) reported prevalence rates of depression among youth in their sample. Of these studies, 20 reported on depressive symptom prevalence rates after a natural disaster, and 7 studies reported on prevalence rates after a man-made disaster.

After exposure to a *natural disaster*, prevalence rates varied widely, from 4% at 18 months post-hurricane among youth (ages 4–17 years) in Puerto Rico (Felix et al., 2011), to 69% among youth (male M age=18.25 years; female M age=17.23 years) assessed two weeks after an earthquake in Greece (Papadatos et al., 1990). Generally, prevalence rates of depression were higher among children assessed less than three months after the natural disaster ($k=4$), when compared to children assessed at time points later than three months postdisaster. For example, in addition to the 69% prevalence rate just reported, prevalence rates were 10% among displaced children (M age=15.51 years) two months after an earthquake in Turkey (Vehid, Alyanak, & Eksi, 2006), 13% among displaced children (ages 7–14 years) two months after the 2004 Tsunami in Thailand (Thienkrua et al., 2006), and 32% among children (ages 7–12 years) assessed less than one month after exposure to Hurricane Gustav (Salloum, Carter, Burch, Garfinkel, & Overstreet, 2011). In contrast, depression prevalence rates were lower when youth were assessed one year or more after a natural disaster. For example, 6% of youth (peak age was 9–10 years) assessed one year after a tsunami reported clinically significant depressive symptoms (Piyasil et al., 2008), and 5.5% of youth (grades 4–9) reported clinically significant depression when assessed one year after a tsunami (Piyasil et al., 2008).

After exposure to a *man-made disaster*, prevalence rates of depressive symptoms also varied widely, from 2% among an exposed sample of children (M age=11.7 years) assessed five years after a fireworks explosion (Boer, Smit, Morren, Roorda, & Yzermans, 2009) to 34% of youth (M age at follow-up was 21.3 years) assessed 5 to 8 years after the Jupiter disaster (Bolton, O'Ryan, Udwin, Boyle, & Yule, 2000). However, prevalence rates reported were generally under 10% (Boer et al., 2009; Breton, Valla, & Lambert, 1993; Comer et al., 2010; Dirkzwager, Kerssens, & Yzermans, 2006; Hoven et al., 2005).

Aim Two: Correlates of Depressive Symptoms

Child Characteristics—Seven articles examined relationships between age and depressive symptoms (see Table 2). No clear relationships between age and depressive symptoms emerged from these studies. Some studies found that younger age was associated with higher levels of depressive symptoms (Kronenberg et al., 2010; McDermott & Palmer,

2002), while other studies found that older age was associated with higher levels of depressive symptoms (Bokszczanin, 2002; Liu et al., 2011; Thienkrua et al., 2006).

Specific associations between gender and depressive symptoms were examined in 18 articles (Table 2). The majority of these studies ($k=11$; 61% of these articles) found that female gender was associated with higher levels of depression (Aber et al., 2004; Bokszczanin, 2002; Fan et al., 2011; Gershoff et al., 2010; Giannopoulou et al., 2006; Goenjian et al., 2011; Hardin et al., 1994; Kronenberg et al., 2010; Roussos et al., 2005; Warheit et al., 1996; Weems et al., 2007). However, two studies found the converse, that male gender was associated with higher levels of depressive symptoms (Ek i et al., 2007; Kolaitis et al., 2003), and four studies found no association between gender and depressive symptoms (Kar & Bastia, 2006; Lai et al., 2013; McDermott & Palmer, 1999; Tang et al., 2010). Finally, one study found an interaction between gender and age in a sample of youth (grades 4–12) assessed six months after the Sutherland Bushfire (McDermott & Palmer, 2002). Younger males reported lower levels of depressive symptoms, but there was no main effect of gender in that study. Overall, it appears that female gender may be a major risk factor for depressive symptoms postdisaster.

Disaster Exposure Stressors—Relationships between a general concept of “exposure” and depressive symptoms were examined in 24 studies (Table 2). Of these articles, 16 found significant associations between exposure and depression symptoms, while 8 studies found no difference in depressive symptom levels between those exposed to a disaster and those not exposed.

Across studies, several *specific* exposure stressors were examined in relationship to depressive symptoms: being injured (Ek i et al., 2007; Jia et al., 2010), witnessing the disaster (Fan et al., 2011), losing a family member or loved one (Ek i et al., 2007; Fan et al., 2011; Goenjian et al., 2009; Jia et al., 2010), knowing someone who was hurt or ill (Goenjian et al., 2011; Jia et al., 2010), perceived life threat (i.e., fear during the earthquake; C. Kilic, Kilic, & Aydin, 2011; McDermott & Palmer, 2002; Thienkrua et al., 2006), and loss/disruption (Kolaitis et al., 2003; Lai et al., 2013; Shahar et al., 2009).

In addition, other significant life events or stressors, *not necessarily related* to disasters, emerged as risk factors for depression. Significant relationships to depression have been reported for the following risk factors: community violence (Salloum et al., 2011), life stressors (Fan et al., 2011; Kronenberg et al., 2010; Roussos et al., 2005; Salloum et al., 2011; Warheit et al., 1996; Wickrama & Kaspar, 2007), adversity (Giannopoulou et al., 2006), and restricted travel after a disaster (Comer et al., 2010).

PTS symptoms—Overall, 20 studies directly examined PTS symptoms as a factor associated with youth depressive symptoms postdisaster (Table 2). All of these studies reported significant, positive associations between PTS and depressive symptoms. For example, Goenjian and colleagues (1995) assessed youth with varying levels of exposure to the Spitak Earthquake. When youth were assessed 1½ years after the earthquake, PTS and depressive symptoms were correlated at $r=.55$. Similarly, PTS and depressive symptoms

were correlated at $r=.54$ in a sample of youth assessed four months after the Asian Tsunami (Wickrama & Kaspar, 2007).

Aim Three: Theories Utilized in Disaster Research

Most studies contained stated aims ($k=57$; Table 1). Some aims were broad. For example, one study aimed “[t]o determine prevalence and correlates of probable mental disorders among New York City, public school students 6 months following the September 11, 2011, World Trade Center attack” (Hoven et al., 2005). Other aims were more specific. One study aimed “to investigate the effects of parental psychopathology on the traumatic stress and depression of earthquake survivor-children 4 years after the earthquake” (Kilic et al., 2011).

Hypotheses about depressive symptoms were explicitly stated in less than one-third of the studies examined ($k=22$). As an example of stated hypotheses, Salloum and colleagues (2011) “hypothesized that...exposure to Hurricane Gustav...will be associated with increased symptoms of PTSD and depression.”

Theories were examined in less than one-third of studies ($k=21$; see Tables 1 and 3). Sixteen different theories were described (Table 3). Two theories were derived directly from general depression theories (e.g., appraisal theories, reduced response-contingent theories, attribution theory); ten distinct theories were framed in the disaster and traumatic stressor literature (e.g., a developmental approach to disasters; trajectories of distress; stress models of disasters, stress vulnerability hypothesis; disaster contextual ecological model; conservation of resources; secondary depression; dose exposure models; a model by Hardin et al., 1994; a model by La Greca et al., 1996). Finally, four theories fell into an “other” category, and covered biological models of allostatic load, developmental models (i.e., Bronfenbrenner model), and stressor models (e.g., social support stress buffering, Skinner hierarchical coping). Overall, 10 studies (14%) included aims, hypotheses, and an explicit theory.

Discussion

This study is the first to systematically document the burden of depression among disaster-exposed youth. Disasters are associated with elevated rates of depression among youth. Prevalence rates in this review ranged from 2% to 69% (Boer et al., 2009; Papadatos et al., 1990). Prevalence rates for depression among youth in the general population range from 1% to 9% (Costello, Erkanli, & Angold, 2006; Horowitz & Garber, 2006). However, it is clear that there is wide variability in reported prevalence rates of youth postdisaster depression. This variability may be partly due to differences in disasters, methodology, or due to challenges associated with conducting research after disasters (Bonanno, Brewin, Kaniasty, & La Greca, 2010). Nevertheless, this review establishes the importance of assessing depressive symptoms as part of children’s potentially broad range of reactions to disasters. This is not currently common practice among postdisaster studies of youth. For example, 159 of the original 353 articles identified in this review did not include a measure of depression.

Regarding risk factors, no single profile of youth at risk for developing depressive symptoms emerged. This may indicate that we have not identified the best predictors of depressive symptoms, or it may indicate that many risk factors lead to postdisaster depressive symptoms. Wide variability of depression prevalence rates observed in this review may provide additional evidence that many factors influence the development of youth postdisaster depressive symptoms.

When we examined child characteristics, findings were mixed. In line with hypotheses, there was a body of evidence that female gender is a risk factor for depressive symptoms postdisaster. At the same time, we expected older age to be a risk factor for depressive symptoms in this study. However, some studies found associations between younger age and depressive symptoms, while other studies reported that older age was a risk factor for depressive symptoms. Although findings for child characteristics were mixed, child characteristics have been found to have small to medium effect sizes in relationship to PTS symptoms after disasters (Trickey et al., 2012). It may be an important area to continue to assess in order to determine how postdisaster interventions might be targeted towards different age and gender groups.

Regarding stressors, disaster exposure was a risk factor for depressive symptoms in many, but not all of the studies reviewed. Also, several nonspecific exposure stressors (non-disaster related) were identified as risk factors for depressive symptoms. Finally, PTS symptoms were a risk factor for depressive symptoms. Based on information from this study, clinical interventions might consider including a focus on helping children cope with stressors after disasters. This is not currently common practice (Comer et al., 2010). Interventions might also consider assessing and targeting comorbid symptoms, as PTS symptoms emerged as a risk factor for depressive symptoms.

This review is the first to identify current theories being utilized to understand youth depressive symptoms postdisaster. No unifying theory emerged from the studies that were synthesized. Thus, the etiology of youth postdisaster depression remains unclear. A variety of theories were examined across articles, and theories were predominantly adapted from the disaster and traumatic stress literature. In contrast, only two studies utilized general depression theories. However, no studies tested competing theories within the same article. Thus, it remains an important question in the field as to whether postdisaster depressive symptoms are unique from or similar to general depressive symptoms. Future studies that test disaster/trauma theories against depression theories are needed in order to elucidate this question. However, given that numerous studies have found a significant association between youth PTS and depressive symptoms postdisaster, it is likely that disaster/trauma theories best explain the presence of postdisaster depressive symptoms in youth. Further, a unifying theory for child reactions to disasters will need to incorporate the multiple risk factors this review identified as associated with depressive symptoms: child characteristics, exposure stressors, and broad psychological symptoms (e.g., PTS). The role of environmental factors (e.g., social support) will also need to be considered.

Several limitations should be considered when evaluating this paper. First, causality is difficult to determine in the relationship between risk factors and depressive symptoms.

Many studies in this review were cross-sectional, and few studies contained pre- and post-disaster ratings of depressive symptoms. This is common in the disaster literature, due to the unpredictable nature of all disasters. However, this limited our ability to draw conclusions about the timing of risk factors and depressive symptoms. Although risk factors may contribute to depressive symptoms, it is also possible that depressive symptoms may increase the presence of some stressors such as non-disaster related stressors (e.g., loss of friends). Second, study selection decisions may have influenced findings. For example, in this study we excluded studies that included highly specialized, treatment seeking populations. Thus, we may have identified depressive symptoms with a more limited range and variability than exists in the larger population of youth exposed to disasters. It is also possible that we failed to identify articles that are germane to this systematic review, either through articles falling after our inclusion date of May, 2013 (e.g., Weems et al., 2013), or through articles being overlooked. This would affect findings by failing to include pertinent information. Finally, findings were limited by heterogeneity in disaster research designs, and this likely contributed to variability in our findings. For example, not all of the studies reviewed in this article reported prevalence rates of depression, limiting our ability to comment on prevalence rates across all studies. Further, studies examined various risk factors for depressive symptoms postdisaster, limiting comparisons across studies.

To move the disaster research field forward, researchers might consider using established batteries of assessments to enable comparisons across studies and build consensus. At a minimum, studies should include a measure of depressive symptoms. Further, it would be helpful if studies utilized similar measures of depressive symptoms. This would allow direct comparisons of means and variability between samples.

In summary, this review has yielded key findings regarding youth postdisaster depression. This review highlights that any unifying theory of child reactions to disasters will need to include depressive symptoms. However, should this theory be built from a depression theory or from a postdisaster theory? Based on this review, this remains an open question. No studies jointly tested these types of theories against each other. This type of testing is needed to guide theory. For example, researchers from fields of depression and disasters should consider collaborating on investigations. Depression cognitive appraisal theorists (e.g., Grant et al., 1997) could assess youth negative appraisals, while postdisaster depression theorists who focus on disaster and recovery stressors (e.g., Felix et al., 2011) would assess stressors. If these factors were studied jointly, relative contributions of these factors in predicting youth postdisaster depression could be assessed and form the bases of theory testing. A second open question in creating a unifying theory of child reactions to disasters is whether depression arises as a symptom secondary to PTS in youth after disasters, or whether depression develops independently of PTS symptoms. This review suggests that depression may arise as a symptom secondary to PTS symptoms after disasters. However, more longitudinal studies are needed that assess youth PTS and depression at multiple timepoints close to a disaster, in order to better understand the etiology and timing of youth distress.

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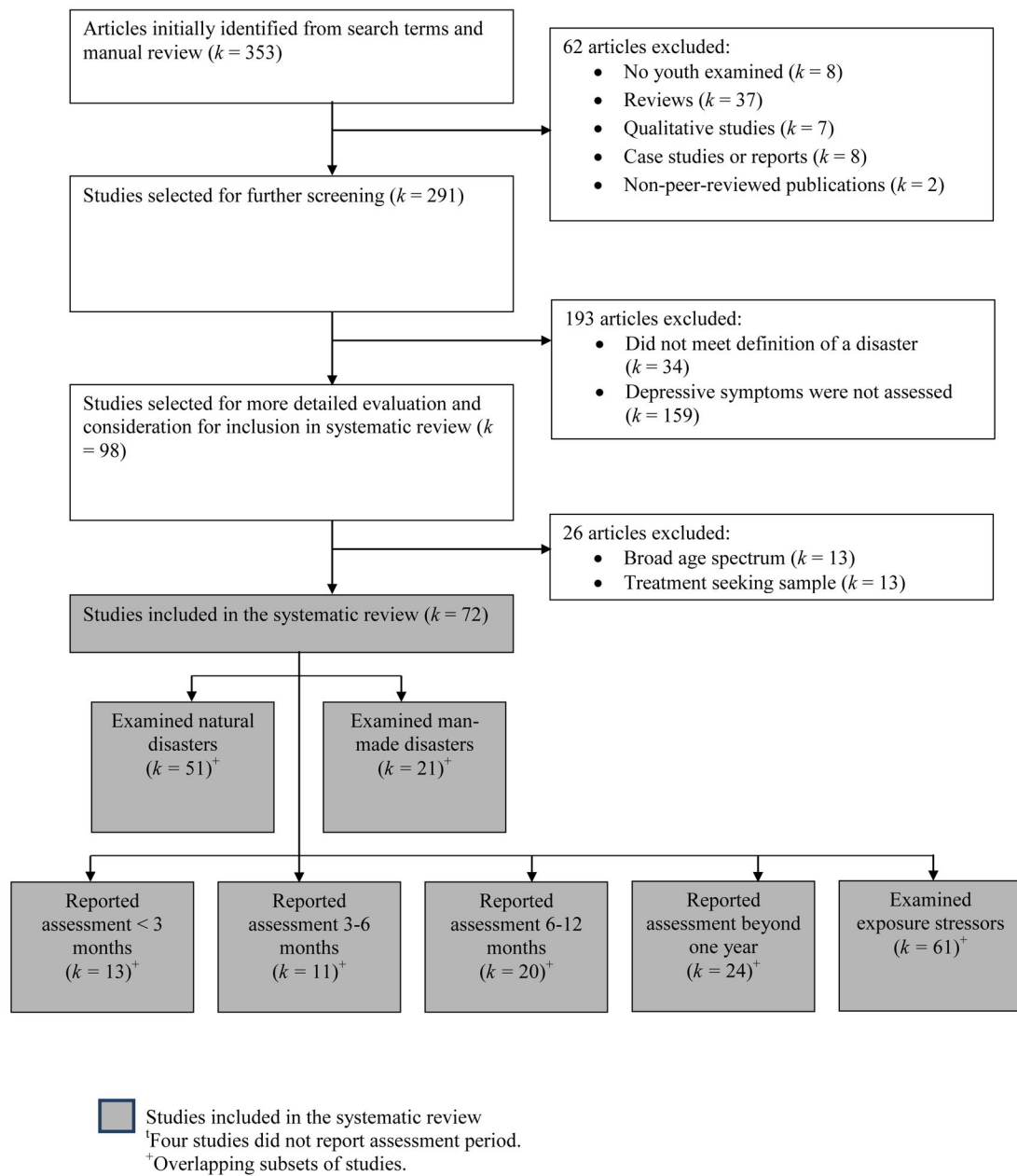


Figure 1.
Flow chart of candidate articles.

Table 1

Synthesis of study characteristics.

	Characteristic	k (%)
<i>All Studies (k = 72)</i>		
Note that these characteristics are not mutually exclusive.	Aim	57 (79%)
	Hypotheses	22 (31%)
	Explicitly Stated Theory	21 (29%)
	Included Aims, Hypotheses and Theory	10 (14%)
<i>Natural Disaster Studies (k = 51)</i>		
	Earthquake	26 (51%)
	Hurricane	13 (25%)
	Tsunami	7 (14%)
	Flood	3 (6%)
	Bushfire/Wildfire	2 (4%)
<i>Man-Made Disaster Studies (k = 21)</i>		
	Terrorism	9 (43%)
	Boat Disaster	3 (14%)
	Nuclear Waste Disaster	3 (14%)
	Sniper Attack/Shooting	1 (5%)
	Other Explosion	5 (24%)

Table 2**Aim Two: Correlates of Depressive Symptoms**

Article Type	Articles
Child Characteristics	
Age ($k = 7$)	Bokszczanin, 2002; Kronenberg et al., 2010; Lai et al., 2013; Liu et al., 2011; McDermott & Palmer, 1999, 2002; Thienkura et al., 2006
Gender ($k = 18$)	Aber et al., 2004; Bokszczanin, 2002; Ek i et al., 2007; Fan et al., 2011; Gershoff et al., 2010; Giannopoulou et al., 2006; Goenjian et al., 2011; Hardin et al., 1994; Kar & Bastia, 2006; Kolaitis et al., 2003; Kronenberg et al., 2010; Lai et al., 2013; McDermott & Palmer, 1999, 2002; Roussos et al., 2005; Tang et al., 2010; Warheit et al., 1996; Weems et al., 2007
Disaster Exposure Stressors ($k = 24$)	
	Aber et al., 2004; Boer et al., 2009; Bokszczanin, 2002; Dirkzwager et al., 2006; Felix et al., 2011; Fernando et al., 2010; Gershoff et al., 2010; Goenjian et al., 1995, 1996, 2001, 2011; Hardin et al., 1994; Hoven et al., 2005; Karabekiroglu et al., 2008; Lau et al., 2010; Liu et al., 2011; March et al., 1997; Najarian et al., 1996; Roussos et al., 2005; Tang et al., 2010; Vila et al., 1999; Weems et al., 2007; Yule et al., 1990; Zhang et al., 2010
PTS Symptoms ($k = 20$)	
	Aber et al., 2004; Asarnow et al., 1999; Bolton et al., 2000; Catani et al., 2008; Fan et al., 2011; Foa et al., 2001; Goenjian et al., 1995, 2001, 2011; Hsu et al., 2002; Karabekiroglu et al., 2008; Karakaya et al., 2006; Kolaitis et al., 2003; Lau et al., 2010; March et al., 1997; Roussos et al., 2005; Tang et al., 2010; Weems et al., 2007; Whalen et al., 2004; Wickrama & Kaspar, 2007

Table 3

Aim Three: Theories Utilized in Disaster Research

Article Type	Articles
General Depression Theories ($k = 2$)	Grant et al., 1997; Jeney-Gammon et al., 1993
Disaster and Trauma Theories ($k = 15$)	Bokszczanin, 2002; Comer, 2010; Felix et al., 2011; Goenjian et al., 1995, 2001; Hardin et al., 1994; Karabekiroglu et al., 2008; Kilic et al., 2003; Kronenberg et al., 2010; Lai et al., 2013; McDermott & Palmer, 2002; Warheit et al., 1996; Weems et al., 2007; Whalen et al., 2004; Yule et al., 1990
Other Theories ($k = 4$)	Fernando et al., 2010; Salloum et al., 2011; Shahar et al., 2009; Wang et al., 2010