

SEASONAL EFFECTS OF NATURAL DISASTERS ON PTSD SYMPTOMS IN CHILDREN

CALEB W. LACK & MAUREN A. SULLIVAN OKLAHOMA STATE UNIVERSITY

INTRODUCTION

The vast majority of children who survive a natural disaster will suffer some negative effects. For some children, these effects persist well beyond the immediate post-disaster period, causing significant distress and impairment in functioning (Pynoos, 1994). Posttraumatic stress symptoms such as reexperiencing the disaster in some manner, persistent avoidance of stimuli related to the disaster, and increased arousal levels can lead to impairments in social relationships and academic functioning that can have serious long-term consequences. The current literature has a large gap in terms of children's long-term reactions to trauma in general. There are very few long-term follow-up studies that examine the reaction of children to disasters, but those which do exist indicate that a significant number of children experience persistent, long-term distress (Shaw, Applegate, & Schorr, 1996). More information of this nature will help to understand maintenance of symptoms over time. While one would expect PTSD symptoms to decline significantly over time, a small number of studies have shown that this is not the case (e.g. McFarlane, Policansky, & Irwin, 1987). It is largely unknown what influence a seasonal disaster that occurs within a specific time of year and garners constant attention during that time may have on the development of PTSD symptoms.

The current study was conducted to examine how PTSD symptoms manifest themselves over time and the possible influence of a seasonal natural disaster. It was expected that severity of PTSD symptoms would be related to the likelihood of a tornado occurring, with out of tornado season data showing the fewest symptoms. This was hypothesized for several reasons. First, anniversary effects may contribute to increased PTSD symptoms. Second, during tornado season, there is an extremely high level of attention given to the weather and the possibility that tornadoes may occur, by both residents and the news media. There is an almost constant barrage of graphics on the television describing places that may be hit by tornadoes and program interruptions that focus on possible severe weather. Therefore, the hypothesis for the current study was that PTSD symptoms in the sample would be highest during tornado season, with symptoms level being lowest out of tornado season.

METHOD

Procedure

At the time of the first data collection roughly one year had passed since a major storm system that spawned multiple F-4 tornadoes swept through the area, causing over \$100 million worth of property damage, including destroying one town's school buildings and over 170 homes and businesses. Data were gathered from two elementary schools in Southwest Oklahoma three times over a six-month period (November, January, and April), covering a time-span of 13, 15, and 19 months after the initial disaster. Children in grades 3-6 and their parents were solicited as participants.

Measures

Parents completed a Demographic Questionnaire and a Tornado Exposure Questionnaire (TEQ) that were unique to this study. At the first assessment, children completed a parallel TEQ with age-appropriate language, the Frederick Reaction Index (RI; Frederick, Pynoos, & Nader, 1992), and two other measures not reported on here. At the follow-up assessments, only the RI was given.

Participants

One hundred and two children ages 8-12 enrolled at one of two public elementary schools in rural southwestern Oklahoma towns participated at the first assessment of the current study. For the second and third assessments, 83 and 81 children of the original sample (81% and 79%, respectively) participated. Participants received small prizes at each assessment as well as their name put into a drawing for \$50. The majority of the sample was Caucasian (90.9%), with a mean age of 10.4 years ($SD = 1.23$). Children were spread across grades 3-6 (21.8% in 3rd grade, 15.5% in 4th grade, 25.5% in 5th grade, 37.3% in 6th grade). The sample was split evenly across gender (47.3% male, 52.7% female).

RESULTS

Tornado Exposure Questionnaire (TEQ)

Although the majority of participants reported no damage to their homes (68.3%), five of the families in the sample experienced a total loss. Parent-report of child fear during the tornado ranged from not at all scared (14%), somewhat scared (20.6%), scared (24.3%), very scared (21.5%), to terrified (19.6%). Only 15% of the parents reported that their child did not currently worry about tornadoes happening, while 33% described their child as currently very or extremely worried about tornadoes. On children's self-report of fear, 17.6% reported being not at all scared, 44.1% reported being somewhat scared, 14.7% reported being scared, and 23.5% reported being very scared.

Only 29.4% of the sample was reported to have received psychological services after the tornado, with those that did mainly having group counseling or individual services at school. Questions assessing viewing of disaster-related television or movies revealed that almost a quarter of parents reported never letting their child watch those types of programs and over 88% of parents reported changing the channel if the television broadcast is interrupted by news about bad weather. When the children were asked how scared or upset they became when bad weather was shown on television, 58.8% reported they were not scared, 32.4% reported being somewhat scared, 5.9% said they were scared by it, and 2.9% reported being very scared.

Frederick Reaction Index (RI)

The RI has a range of scores from 0 to 80. The average RI total score at the first assessment was 27.20 ($SD = 14.19$), which is in the moderate range, with scores ranging from 1 to 70 (see Table 1). According to their self-reports, 10 children experienced no PTSD symptoms, 39 children experienced mild PTSD symptoms, 32 experienced moderate PTSD symptoms, 18 experienced severe symptoms, and 3 experienced very severe symptoms.

The average RI total score at the second assessment was slightly lower at 24.65 ($SD = 13.68$), between the Mild and Moderate PTSD Symptoms classification. For this sample, RI total scores ranged from 4 to 62 (see Table 1). According to their self-reports, 17 children experienced no PTSD symptoms, 34 children experienced mild PTSD symptoms, 18 experienced moderate PTSD symptoms, 14 experienced severe symptoms, and 1 experienced very severe symptoms.

The average RI total score at the third assessment changed very little, at 22.65 ($SD = 11.55$), in the Mild PTSD Symptoms classification, with scores ranging from 2 to 56 (see Table 1). According to their self-reports, 14 children experienced no PTSD symptoms, 36 children experienced mild PTSD symptoms, 24 experienced moderate PTSD symptoms, 7 experienced severe symptoms, and no children experienced very severe symptoms.

Analysis of Variance: Change in Posttraumatic Distress

To test the hypothesis that the children's levels of posttraumatic distress would change over time, a one-way, repeated-measures ANOVA was conducted. Comparing RI total scores at Times 1, 2, and 3 revealed a statistically significant change across the three time periods, $F(1, 61) = 9.246, p = .003$. Pairwise comparisons revealed that there was not a significant difference between Times 1 and 2, but statistically significant differences were present between Time 1 and Time 3, as well as Time 2 and Time 3 (see Table 2).

DEGREE OF PTSD SYMPTOMS AS MEASURED BY THE REACTION INDEX

Degree of Symptoms	Time 1 %	Time 2 %	Time 3 %
No PTSD Symptoms (Range 0-11)	9.8 (n = 10)	20.2 (n = 17)	17.3 (n = 14)
Mild PTSD Symptoms (Range 12-24)	38.2 (n = 40)	40.5 (n = 34)	44.4 (n = 36)
Moderate PTSD Symptoms (Range 25-39)	31.4 (n = 32)	21.4 (n = 18)	29.7 (n = 24)
Severe PTSD Symptoms (Range 40-59)	17.7 (n = 18)	16.7 (n = 14)	8.6 (n = 7)
Very Severe PTSD Symptoms (Range 60-80)	2.9 (n = 3)	1.2 (n = 1)	0.0 (n = 0)
Total RI Score			
Mean	27.2	24.7	22.7
SD	(14.19)	(13.68)	(11.55)

TABLE ONE

PAIRWISE COMPARISONS OF TOTAL RI SCORES AT TIMES 1, 2, & 3

RI Total Score	Mean Difference		
	T1	T2	T3
T1 $M = 26.89$ ($SE = 1.73$)	-----	1.339	4.935**
T2 $M = 25.55$ ($SE = 1.72$)	-1.339	-----	3.957*
T3 $M = 21.95$ ($SE = 1.48$)	-4.935**	-3.957*	-----

* $p = .003$, ** $p = .011$

TABLE TWO

HYPOTHESIZED AND ACTUAL POSTTRAUMATIC DISTRESS ACROSS TIME

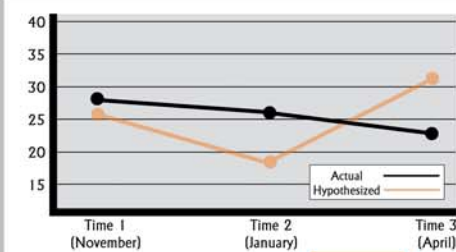


FIGURE 1

DISCUSSION

Interpretation of Results

The major hypothesis posttraumatic distress would vary based on seasonal differences (i.e. risk of tornado occurrence) was not supported by the data. The proposed increase of posttraumatic distress during tornado season and decrease out of tornado season was not observed (see Figure 1). Instead, the current study found a slight, statistically significant decline across time. Overall, however, the degree of posttraumatic distress was found to decline significantly over time, with the group mean dropping from the Moderate to Mild PTSD symptom level, as determined by the RI total score. This drop represents a change of less than 5 points on the total RI score, however. Such a drop could be seen if a child improved moderately on two PTSD symptoms or greatly on only one. Therefore, the clinical significance of the drop in symptomology is called into question. When examining children's scores for subgroups, no persistent pattern was observed. Rather, some children showed increases from assessment to assessment, some decreases, and some no change across the times.

The level of posttraumatic distress experienced at 18 months post-disaster, however, was still more elevated than would be expected based on other types of traumas (e.g. Pynoos et al., 1987). The persistently high level of reported distress in these children is also greater than many other disaster samples that have been examined longitudinally (e.g. Shannon, Lonigan, Finch, & Taylor, 1994). Based on information from parents, teachers, and school officials, though, the vast majority of the children in this sample are functioning well. This seemingly dichotomous finding raises several interesting options for why this is so. Are the children in need of intervention for posttraumatic distress but not receiving services? This seems an unlikely possibility, since neither the teachers nor administration at either school reported many of the students having difficulty adjusting after the tornado. Of course, the students could be displaying their distress in ways that are not obvious, such as lowered academic achievement or aggression. Unfortunately, the current study did not measure those variables to assist in providing an answer.

One possibility is that children have learned to tolerate PTSD symptoms that are a result of tornadoes and so maintain normal functioning. Indeed, the reported levels of distress may not be high when compared to their geographical peers and so not causing them difficulties. Indeed, samples of Oklahoma children that have not been exposed to tornadoes have shown elevations in reported PTSD symptoms similar to other types of disaster samples (Romero, 1997). Local normative samples to help identify those children who are truly experiencing high levels of distress may be needed.

Implications of the Current Study

Several directions for future study are indicated by the current results. These could include structured assessment of disaster-exposed children for impairments in functioning. Areas to be assessed could include emotional and physical health, academic achievement, social functioning, and behavioral problems. The collection of local normative samples would allow to determine how elevated the current disaster sample is when compared to geographical peers that are exposed to similar seasonal differences and attention to weather from the residents and media. A possibility would be a longitudinal study with more frequent assessments, including the assessment of individual characteristics that may explain the persistence of posttraumatic distress symptoms.



Please address correspondence regarding this poster to:
Caleb W. Lack, 215 N. Murray, Stillwater, OK 74078
(405) 744-6028, caleb@caleblack.com



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