

# Normative Posttraumatic Distress of Non-disaster Exposed Children in a Disaster Prone Area

Caleb W. Lack & Maureen A. Sullivan  
Oklahoma State University, Department of Psychology

## Introduction

The vast majority of children who survive a natural disaster will suffer some negative effects (Russoniello et al., 2002). For some children, these effects persist well beyond the immediate post-disaster period, causing significant distress and impairment in functioning. 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. While there has been a great deal of research examining the reactions of children to various disasters, there has been little research that examines how children living in a disaster-prone area react to disaster.

A few studies indicate that actually being exposed to a disaster may not be necessary to develop PTSD symptoms. Several studies conducted in different parts of Oklahoma have found higher than normal rates of posttraumatic stress symptoms (PTSS), even in children not directly exposed to a disaster. Oklahoma is somewhat geographically unique in that it is situated directly in "Tornado Alley" and experiences an average of 54 tornadoes a year (National Weather Service, 2002). Indeed, one recent study found highly elevated levels of distress 13 months after initial exposure to a disaster, with 52% of the sample reporting moderate to very severe posttraumatic distress (Lack & Sullivan, 2003). After an additional six months (19 months post-disaster), close to 40% of the children were still reporting moderate to severe distress. Romero (1997) found that 66% of a sample of Oklahoma children with no record of direct, in vivo tornado exposure in the past five years had moderate or higher levels of PTSS, as measured by the Reaction Index (Frederick, Pynoos, & Nader, 1992). It should be noted that this sample was collected during tornado season, which could have caused a sensitization effect. While such an effect has not been found in research using tornado-exposed samples (Lack & Sullivan, 2003), the same may not hold true for non-exposed samples.

One possible contributor to tornado-related distress may be the high rate of vicarious exposure that many Oklahomans get during tornado season. This consists of tornado drills at school and home, television programs being interrupted by "breaking news" about tornado warnings or watches, and television programs and specials related to tornadoes. The purpose of the current study was to measure tornado-related posttraumatic distress outside of and during tornado season in children who had not been directly exposed to a tornado during the past five years but were highly at-risk for experiencing one, as well as examine the role that vicarious exposure could play in maintaining that distress.



## Method

### Procedure

To choose a sample that was unlikely to have exposure to a tornado, meteorological data were examined, and a town that had not had a tornado within a 10 mile radius in five years was targeted for participation. The first data collection occurred in November, when risk of tornados is lower. A follow-up assessment took place in early May, at the height of tornado season. Data were gathered from the elementary school in the non-exposed town. Children in grades 3-6 and their parents were targeted as participants.

### Measures

Parents completed a Demographic Questionnaire, a Tornado Exposure Questionnaire (TEQ) used in previous Oklahoma disaster research (Lack & Sullivan, 2004), and Behavior Assessment System for Children – Parent Rating Scales (BASC-PRS; Reynolds & Kamphaus, 1992). The TEQ was administered to screen out those participants who had been exposed to a tornado in the past five years, as well as gather information on vicarious exposure to tornadoes through television, school presentations, and other means. At the first assessment, children completed the Frederick Reaction Index (RI; Frederick, Pynoos, & Nader, 1992) and the BASC – Self-report of Personality (BASC-SRP). Both BASCs and the RI were again given at the second assessment.

### Participants

An original sample of 73 children and their parents participated in the first assessment. To illustrate the difficulty of finding a non-exposed sample in a disaster-prone area such as Oklahoma, parental screeners indicated that 30 of these children had actually been exposed to a tornado in the past five years, leaving a truly non-exposed sample of 43 participants. The majority of the sample identified as Caucasian (76.9%), with self-identified American Indians (20.5%) the second largest group. The children ranged in age from 8-12 years, with mean age of 10.34 years ( $SD = 1.15$ ). Children were spread across grades 3-6 (9.8% in 3rd grade, 29.3% in 4th grade, 29.3% in 5th grade, 31.7% in 6th grade). More females than males participated in the study (56.1% vs. 43.9%).

## Results

### Tornado Exposure Questionnaire (TEQ)

As mentioned above, only 43 of the original sample of 73 children were truly non-exposed. In addition to screening out those participants who were exposed to a tornado, the primary purpose of the TEQ was to determine the level of vicarious exposure that children have received to tornadoes. The average number of times the families reported having taken shelter due to threat of tornadoes in the past year was 1.24 ( $SD = 1.59$ , range 0-5). The average estimate by parents for how often their child was exposed to disaster related media outside the home was 2.26 ( $SD = 2.99$ , range 0-10). Parents estimated their children spent 2.53 ( $SD = .96$ ) hours watching TV on weekdays and 3.51 ( $SD = 1.60$ ) hours on Saturday and Sunday. The majority of the sample (66.7%) reported never turning the channel if a television program is interrupted by a weather alert that shows footage of tornadoes currently happening. For specific disaster-related programming, most parents reported that their children see movies (92.6%), programs on TV (78.6%), and special reports (82.3%) at least several times a year that are related to natural or man-made disasters.

### Frederick's Reaction Index (RI)

The RI has a range of scores from 0 to 80. The average RI total score at the first assessment was 22.53 ( $SD = 12.14$ ), which is in the mild range of PTSS, with scores ranging from 2 to 56. The average RI total score for the second assessment was 16.18 ( $SD = 6.85$ ). Table 1 shows the distribution of RI scores across the degree of distress for both assessments.

**Table 1**

### Degree of PTSD Symptoms as measured by the Reaction Index

Degree of Symptoms	Time 1	Time 2
	%	%
No PTSD Symptoms (Range 0-11)	15.0 ( <i>n</i> = 6)	18.2 ( <i>n</i> = 4)
Mild PTSD Symptoms (Range 12-24)	50.0 ( <i>n</i> = 20)	68.2 ( <i>n</i> = 15)
Moderate PTSD Symptoms (Range 25-39)	22.5 ( <i>n</i> = 9)	6.9 ( <i>n</i> = 3)
Severe PTSD Symptoms (Range 40-59)	12.5 ( <i>n</i> = 5)	0.0 ( <i>n</i> = 0)
Very Severe PTSD Symptoms (Range 60-80)	0.0 ( <i>n</i> = 0)	0.0 ( <i>n</i> = 0)
Total RI Score		
Mean	22.53	16.18
SD	(12.14)	(6.85)

## Results (cont.)

### Behavior Assessment System for Children (BASC)

The BASC is a measure of both specific and general psychological difficulties in children. T-scores of 60-70 indicate at-risk areas, while T-scores of 70 and above indicate areas of clinically significant difficulties. Table 2 shows the BASC-PRS scores, while Table 3 shows BASC-SRP scores for both assessment periods.

**Table 2**

### BASC-PRS scores at Times 1 and 2

Scale	Time 1	Time 2
	Mean ( <i>SD</i> )	
Behavioral Symptoms Index	50.47 (11.48)	50.09 (11.81)
Externalizing Problems	49.40 (10.97)	48.91 (12.75)
Internalizing Problems	48.93 ( 9.50)	49.73 (10.02)
Depression	48.70 (11.00)	49.32 (10.48)
Anxiety	54.14 (10.12)	51.09 ( 9.14)

**Table 3**

### BASC-SRP scores at Times 1 and 2

Scale	Time 1	Time 2
	Mean ( <i>SD</i> )	
Emotional Symptoms Index	51.03 (11.92)	48.68 (11.69)
Clinical Maladjustment	49.22 (11.20)	47.00 ( 9.93)
School Maladjustment	48.73 (11.42)	50.55 (12.99)
Depression	52.37 (10.67)	50.82 (11.29)
Anxiety	48.30 (10.91)	45.23 ( 9.91)

## Results (cont.)

### Changes in Distress and Psychological Symptoms

We hypothesized that there would be a change in RI scores between assessments. While there was a slight change in scores, this was not significant ( $t = 1.692$ ,  $p = .106$ ). Thus, scores remained stable across these two times. The hypothesis that general distress would not differ between assessment times was supported. There were no significant differences on either the parent or child versions of the BASC.

### Relationship between Vicarious Exposure and Distress

To examine the potential relationship between level of reported tornado-related distress, as measured by the RI, and various means of vicarious exposure, correlation analyses were undertaken. No significant relationships were found between RI scores and the number of times that the family had taken shelter due to threat of a tornado (Time 1  $r = -.158$ ; Time 2  $r = .242$ ), viewing of disaster related movies (Time 1  $r = -.004$ ; Time 2  $r = .245$ ) or television programs (Time 1  $r = -.300$ ; Time 2  $r = -.129$ ), or how often parents turn the channel if programming were interrupted with tornado-coverage (Time 1  $r = .059$ ; Time 2  $r = -.113$ ). A statistically significant relationship between RI score and the number of times a child was exposed to disaster-related presentations outside of the home was found at Time 2 ( $r = .632$ ,  $p = .004$ ), but not at Time 1 ( $r = -.042$ ,  $p = .042$ ).

## Discussion

While the small sample size of the current study limits the strength of any conclusions drawn from these data, further research in several areas is indicated. The lack of relationship between the majority of vicarious exposure variables and distress at either assessment period was surprising. Previous research with disaster-exposed populations has found that the child's perceived exposure is more predictive of distress than parent-reported "actual" exposure (Lack & Sullivan, 2004). This may also be the case with vicarious exposure, but this was unfortunately not assessed in this study. Future research could more closely examine how much exposure the children feel that they have had over the past year.

The decrease in PTSS from outside to inside of tornado season went against expectations. It should be mentioned, however, that the tornado season in spring 2005 was unusually quiet, and that the month of May itself had no tornadoes. This lack of cues may have contributed to the decrease in distress. More studies examining non-disaster exposed children in disaster prone areas may find this to be a common pattern when the threat of a disaster is lowered for some reason.

Please address correspondence regarding this poster to: Caleb W. Lack, Department of Psychology, 215 N. Murray Hall, Stillwater, OK 74078 or to [caleb@caleblack.com](mailto:caleb@caleblack.com)

Presented at the annual meeting of the Association for Behavioral and Cognitive Therapies, Washington, DC, November 2005