

LONG-TERM PREDICTION OF POSTTRAUMATIC DISTRESS IN TORNADO EXPOSED CHILDREN

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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. This distress can lead in turn to impairments in social relationships and academic functioning that can have serious long-term consequences. However, what are the best predictors of long-term distress? Many factors, including initial exposure to the trauma (Vernberg et al., 1996), attributional style (Greening, Stoppelbein, & Docter, 2002), and coping strategies (Polusny et al., 1999) have been proposed as possible determinants. Each of these factors has been found to be significantly related to long-term distress. In previous research, however, these predictors have been examined individually and not simultaneously, so that the relative and combined effects of these factors are not known.

The current study was designed to address this gap, by examining multiple factors and their effect on the long-term distress in children exposed to a devastating tornado. The factors examined were initial exposure to the tornado, attributions about the tornado, and coping style. It was hypothesized that each of these factors would be significantly related to long-term distress, but specific hypotheses regarding the relative and combined effects were not made due to the lack of previous research and theory to draw upon.

Method

Procedure

At the time of the 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. Data were gathered from two elementary schools in Southwest Oklahoma, with children in grades 3-6 solicited as participants.

Measures

Parents completed a Demographic Questionnaire and a Tornado Exposure Questionnaire (TEQ) that were unique to this study. Children completed a parallel TEQ with age-appropriate language; Frederick's Reaction Index (RI; Frederick, Pynoos, & Nader, 1992), a measure of the level of post-traumatic stress symptoms; the Kidcope (KC; Spirito, Stark, & Williams, 1988), a measure of coping strategies and efficacy; and the Trauma Attribution Checklist (TAC; Knight & Sullivan, 2002), a measure designed to assess attributions made by children following a traumatic experience.

Participants

One hundred two children ages 8-12 enrolled at one of two public elementary schools in rural southwestern Oklahoma towns participated in the current study. Participants received small prizes at the 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 between 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).

Results¹

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's Reaction Index (RI)

The RI has a range of scores from 0 to 80. The average RI total score was 27.20 ($SD = 14.19$), which is in the moderate range, with scores ranging from 1 to 70. 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.

Trauma Attribution Checklist (TAC)

The TAC has a range of 0 to 48. Each scale of the TAC has its own range. For the Attribution of Responsibility scale the range is 0 to 18, while the subscales that compose it have ranges of 0 to 8 (Self-blame), 0 to 4 (Other-blame and God-blame), and 0 to 2 (No-blame). The Importance of Attributing Responsibility scale ranges from 0 to 6; both the Expectations/ Hypervigilance and Search for Meaning scales range from 0 to 10. The Expectations subscale ranges from 0 to 6, with the Hypervigilance subscale ranging from 0 to 4. Finally, the Omen Formation scale has a range of 0 to 4.

The average total TAC score was 14.30 ($SD = 7.91$), with a range from 0 to 38. The Attribution of Responsibility scale had a mean score of 4.67 ($SD = 2.86$). It was divided into the subscales of Self-blame ($M = 1.84$, $SD = 1.80$), Other-blame ($M = 0.54$, $SD = 0.83$), God-blame ($M = 1.02$, $SD = 0.95$), and No-blame ($M = 1.14$, $SD = 0.89$). The Importance of Attributing Responsibility scale had a mean of 0.71 ($SD = 1.17$). The Expectations/ Hypervigilance scale mean score was 3.78 ($SD = 1.48$). The Expectations subscale had a mean of 2.00 ($SD = 1.56$) and the Hypervigilance subscale had a mean of 1.78 ($SD = 1.40$). The Search for Meaning scale had a mean of 3.13 ($SD = 2.56$), and the Omen Formation scale had a mean of 1.37 ($SD = 1.06$).

Results²

Kidcope (KC)

The mean number of coping strategies endorsed was 7.60 out of a possible 10 ($SD = 3.10$). Frequency scores were computed for each of the coping strategies to determine how many children reported using each strategy after the tornado. In addition, group mean efficacy scores were computed for each of the strategies to determine how effective the children believed the strategies had been. Wishful thinking, cognitive restructuring, and distraction were the coping strategies reported most frequently, while self-criticism and blaming others were the least frequent. The strategies of social support, cognitive restructuring, and distraction were reported to be the most efficacious, while other-blame and self-criticism were reported to be the least effective.

Regression Analyses

Stepwise multiple regression analyses were used to examine the relationship between level of exposure, number of coping strategies, and attributions, and degree of posttraumatic distress as measured by the total score on the RI (see Table 1). Rather than using the parent's or child's total exposure score, the child's self-reported fear during the tornadoes was used as a measure of exposure due to its greater relationship with total RI score. Analyses were conducted at each assessment period. At Time 1, the TAC total score entered on the first step and accounted for a total of 48.7% of the variance in the total RI score. The child's report of how scared he or she was during the tornado was entered on the second step and contributed an additional 5.4%, for a total $R^2 = .541$ for the model. The number of coping strategies was not found to significantly contribute to the prediction of posttraumatic distress.

To further examine the use of the TAC to predict total RI scores, the five scales of the TAC and the child's self-reported fear during the tornado were entered into a stepwise multiple regression analysis (see Table 2). The TAC Search for Meaning scale alone accounted for 40% of the variance in total RI score. The child's self-reported fear contributed an additional 7.8% to the model on the second step, while the Attribution of Responsibility scale added an additional 7.6% on the third step. The Hypervigilance/ Expectations scale was added on step four for another 1.7%. On the fifth and final step, the Omen Formation scale was added and contributed 1.5%, for a total adjusted $R^2 = .586$ for the model. The TAC scale of Importance of Attributing Responsibility was not found to significantly contribute more to the prediction of posttraumatic distress.

Table 1

Summary of Stepwise Regression Analyses for Exposure, Attributions, and Coping Strategies Predicting Posttraumatic Distress

Variable	Multiple R	R ²	Adjusted R ²	F	Significance of F
Step 1	.702	.493	.487	78.9	< .001
TAC Total Score					
Step 2	.743	.552	.541	49.3	< .001
TAC Total Score					
Child-reported Fear					

Note: Number of coping strategies was excluded from the equation.

Table 2

Summary of Stepwise Regression Analyses for Exposure and Specific Attribution Types Predicting Posttraumatic Distress

Variable	Multiple R	R ²	Adjusted R ²	F	Significance of F
Step 1	.638	.407	.400	59.6	< .001
TAC Search for Meaning					
Step 2	.700	.490	.478	41.2	< .001
TAC Search for Meaning					
Child-reported Fear					
Step 3	.755	.569	.554	37.5	< .001
TAC Search for Meaning					
Child-reported Fear					
TAC Attribution of Responsibility					
Step 4	.768	.590	.571	30.2	< .001
TAC Search for Meaning					
Child-reported Fear					
TAC Attribution of Responsibility					
TAC Hypervigilance/ Expectations					
Step 5	.781	.610	.586	25.9	< .001
TAC Search for Meaning					
Child-reported Fear					
TAC Attribution of Responsibility					
TAC Hypervigilance/ Expectations					
TAC Omen Formation					

Note: The TAC Importance of Attributing Responsibility scale was excluded from the equation.

Discussion

The results of the current study support the idea that the attributions one makes for a disaster, even in children as young as 8 years old, explain a substantial amount of the variance in long-term distress (over 48%). Similar relationships between distress levels and attributions has been found in adult samples that were sexually traumatized as children (Steel et al., 2004) and experienced a natural disaster (Böddvarsdóttir & Elklit, 2004). The current study is one of very few to examine attributions in children, particularly attributions for a disaster. The current results suggest that this is an area where future research is highly needed.

Both initial exposure to a disaster and coping strategies used have previously been found to be strongly related to short-term distress (e.g., Russoniello et al., 2002). The current findings suggest that over longer periods of time (at least 12 months), attributions may play a stronger role in maintenance of distress. While both initial exposure and coping strategies were related to distress, neither were found to be highly predictive of distress compared to attributions. It is possible that initial exposure and coping strategies used may play a key role in the formation of attributions made for the disaster, which in turn significantly affects long-term distress. Future longitudinal research that includes measures of all three of these areas (exposure, coping, and attributions) is needed to address this possibility.



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