

PTSD Symptoms in Children and Adolescents 28 Months After a Flood: Age and Gender Differences

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The present study examined the prevalence and predictors of posttraumatic stress disorder symptoms (PTSD) in a sample of 533 students (aged 11 to 21), 28 months after the 1997 Flood in southwestern Poland. The results show that 18% of the participants met all diagnostic criteria for PTSD. Based on hierarchical multiple regression analyses, PTSD criteria symptoms were positively correlated with the degree of exposure to trauma experienced during the disaster. A three-way interaction of trauma, age, and gender showed that more PTSD symptoms were observed among the younger participants and girls than among the older boys. The results confirm the need of research testing culturally sensitive implementation of mental health programs for young victims of disasters, taking into account their age and gender.

Available studies of children and adolescents after disasters show enormous divergences in the occurrence of PTSD symptoms, ranging from 0 to 95% (Saigh, Yasik, Williams, Sack, & Koplewicz, 1999). Among factors influencing the rate of PTSD, the power of stressors connected with the catastrophe, the degree of exposure to trauma and the amount of time elapsed since the event have emerged as critical variables (Green et al., 1991).

In a number of disasters studies with children and adolescents their age and gender have been considered as important predictors of negative outcomes. For instance, Chen, Lin, Tseng, and Wu (2002) in the study carried out one year after an earthquake in Taiwan showed a distinct division by age and gender in the prevalence of PTSD symptoms. Elementary school girls had more severe symptoms than junior high school boys. Green et al. (1991) found fewer PTSD symptoms in the youngest group and the boys exposed to Buffalo Creek floods (aged 2 to 15).

Although the existing literature is not yet conclusive about age effect on the vulnerability of children and ado-

lescents following a disaster, the research evidence that focuses on trauma confirms that these groups react differently following a traumatic experience. In his review, Vernberg (1999) suggests that children are at greater risk of PTSD than adolescents because they have not only a more limited understanding of the surrounding world, but also have fewer coping skills and less opportunity to participate in community systems that help people cope with the disaster.

The research presented here is an attempt to estimate the prevalence of symptoms relevant for the diagnosis of PTSD and to identify predictors of PTSD in children and adolescents 28 months after a natural disaster. The following two questions were addressed. What was the level of PTSD symptoms in the examined group of children and adolescents? Was the presence of the symptoms related to gender and age of the respondents? It was hypothesized that trauma experienced during a disaster would be the most important predictor of PTSD symptoms. Consistent with prior research findings it was predicted that younger

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children would reveal more PTSD symptoms than older children. It was also expected that girls would show more PTSD symptoms than boys. To understand potentially differential patterns of youth's reactions to trauma, gender and age were considered as moderating variables and interactive effects of trauma exposure, gender, and age were also explored.

METHOD

Participants and Procedure

The background of the present study was the flood in southwestern Poland in June 1997. Published studies suggest that this disaster had a strong influence on the psychological and social functioning of Poles living in the affected area (Bokszczanin, 2003; Kaniasty, 2003).

Data were collected 28 months after the flood in elementary schools, gymnasiums (middle schools), and high schools located in the affected areas. The study took place in the schools at times arranged with the headmasters, with the teachers present. Sixty-five percent of potential participants from the elementary schools and gymnasiums received written permission from parents and took part in the study. High school students could decide about their participation in the study on their own. Thirty-three high-schoolers (10% of 326 students) refused to participate. The questionnaires were collected in groups of 10 to 15 by pairs of trained university students. The procedure lasted about 45 minutes. Of the 533 participants, 320 were girls and 213 boys, and 239 were younger adolescent students of elementary schools and gymnasiums (aged 11 to 15; $M = 13.62$, $SD = 1.13$). The older group included 293 high school students (aged 16 to 21; $M = 17.82$, $SD = 1.44$).

Measures

To assess PTSD, the Revised Civilian Mississippi PTSD Scale was used (RCMS; Norris & Perilla, 1996). The scale seemed appropriate because it was systematically used in international research of disasters in the USA and Mexico and was used to examine adult victims of the 1997

Polish flood (Kaniasty, 2003). The Cronbach's alpha was .90 for the whole group, and .89 and .91 for the younger and the older students, respectively. Fifteen items from the RCMS were used to create criteria for PTSD: five Criteria B symptoms (intrusion), five Criteria C symptoms (avoidance/numbing), and five Criteria C symptoms (arousal). These items fit with the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV*; American Psychiatric Association, 1994) classification for PTSD. The total score was counted by adding items recoded as 0 (1 = *not true* and 2 = *slightly true*) and 1 (3 = *somewhat true*, 4 = *very true*, and 5 = *extremely true*; see Norris, Kaniasty, Conrad, Inman, & Murphy, 2002).

To assess the experiences related to the flood, an instrument based on the scale originally created by Vernberg, La Greca, Silverman, and Prinstein (1996) was used. Participants were instructed to answer 1 = yes or 0 = no to each question. Based on eight questions, a 5-point index of traumatic experience was created: 0 if they answered no to all questions (no home damage, no other flood trauma exposure); 1 if their homes were damaged but did not experience any other flood exposure; 2 if they answered yes to any of the three questions assessing the flood exposure that was not life threatening, regardless of whether or not their house was damaged; 3 if they experienced at least one of the four events directly associated with life threatening events and contact with death (regardless of damage to the home); 4 if they experienced any of the events connected with the threat to life as well as any other flood exposure occurrences (again, regardless of losses to their homes).

RESULTS

To meet criteria for PTSD diagnosis, the presence of at least one Criteria B symptom, at least three Criteria C symptoms, and at least two Criteria D symptoms was required. In this sample, there were 105 (19.8%) children and adolescents who met all three criteria. We subsequently checked if the participants met Criteria A for diagnosis as well, which refers to the direct experience of trauma during the flood. Thus, 94 students (17.7%) could have been fully diagnosed for PTSD related directly to the flood.

Table 1. Summary of a Hierarchical Regression Analysis of a Number of Posttraumatic Stress Disorder (PTSD) Criteria Symptoms^a

Predictors	Sum of PTSD criterion symptoms		Intrusion symptoms (B)		Avoidance symptoms (C)		Arousal symptoms (D)	
	β	ΔR^2	β	ΔR^2	β	ΔR^2	β	ΔR^2
Step 1		.070		.096		.040		.027
Trauma	.27***		.31***		.20***		.16***	
Step 2		.008		.004		.001		.036
Gender ^b	.07		.06		-.01		.12**	
Place of Resid. ^c	-.04		-.01		-.01		-.08 ⁺	
Age	.04		-.04		.02		.12**	
Step 3		.006		.007		.002		.007
Age x Gender	.05		.06		.03		.05	
Trauma x Age	-.06		-.07		-.02		-.09 ⁺	
Trauma x Gender	.02		.03		-.02			
Step 4		.012		.009		.009		.009
Trauma x Age x Gender	.12**		.10*		.10*		.10*	

^a $N = 522$ because persons with excessive missing data were dropped from the group.

^b 0 = boys, 1 = girls; ^c 0 = urban, 1 = rural.

⁺ $p < .06$. * $p < .05$. ** $p < .01$. *** $p < .001$.

Table 1 presents hierarchical multiple regression analyses in which dependent variables were as follows: the total sum of Criteria B, C, and D symptoms, the number of Criteria B symptoms (intrusion), the number of Criteria C symptoms (avoidance/numbing), and the number of Criteria D symptoms (arousal). The independent variables, i.e., gender, age, place of residence and trauma were centered and four interaction terms were created, i.e., Trauma \times Age, Trauma \times Gender, Age \times Gender, and Trauma \times Age \times Gender (Aiken & West, 1991).

The trauma indicator was entered in the first step to account for its overall impact on symptomatology. The main effects of gender, age, and place of residence were entered simultaneously in the next block. In step three, two-way interaction terms were included: Age \times Gender, Trauma \times Gender, Trauma \times Age. The three-way interaction—trauma, gender, and age—was entered in the last step.

All the predictors entered into the equation, with the sum of criteria symptoms as the dependent variable, explained jointly 10% of the variance, adjusted $R^2 = .08$, $F(8, 513) = 6.93$, $p < .001$. The three-way interaction was also statistically significant, (see Figure 1). The figure reveals that children and adolescents, who experienced

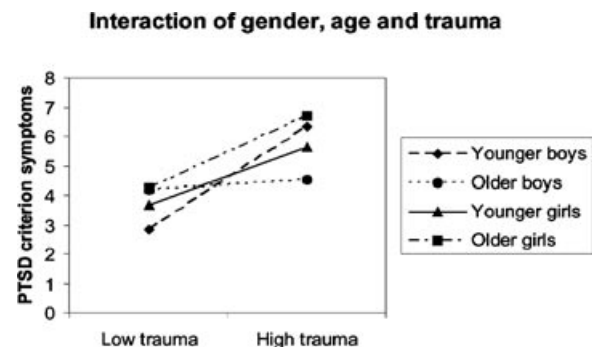


Figure 1. Interaction of gender, age, and trauma. The predicted sum of posttraumatic stress disorder criteria symptoms is also shown.

traumatic events during the flood, exhibited more PTSD symptoms with the exception of older boys.

All variables entered to the equation with Criteria B symptoms explained 12% of the variance, adjusted $R^2 = .10$, $F(8, 513) = 8.45$, $p < .001$. All predictors together explained 5% of the variance in Criteria C symptoms, i.e., numbing/avoidance, adjusted $R^2 = .04$, $F(8, 513) = 3.45$, $p < .001$. The predictors jointly explained 8% of the variance in Criteria D symptoms, adjusted

$R^2 = .07$, $F(8, 513) = 5.50$, $p < .001$. The patterns of the interaction on Criteria B, C, and D symptoms were similar to that shown in Figure 1.

DISCUSSION

The first question considered in this research concerned the prevalence of all symptoms for diagnosing PTSD in the examined group. It was assumed that 28 months after the flood there would still be children and adolescents who could be diagnosed as having all the criteria for PTSD. The presence of all four criteria for *DSM-IV* (A, B, C, and D) was found in 17.7% of the participants in the study. Such a level of detrimental symptoms should be recognized as high.

The second aim of this study was to explore the function of age and gender in predicting postdisaster PTSD. The three-way interaction of trauma, age, and gender was statistically significant for all symptoms criteria. This result underscored the importance of assessing the impact of trauma in the specific context of gender and age of disaster victims (Green et al. 1991). A pattern of this three-way interaction consistently showed that 28 months after the flood children and adolescents who experienced traumatic events expressed a higher level of distress with the exception of older boys. This gender and age based pattern seems to be similar to the results reported by Chen et al. (2002). The authors suggested that the effect can have a universal character and is congruent with the social-cognitive approach (Norris, Foster, & Weishaar, 2002) maintaining that male adolescents tend to report better control of their feelings than female and younger adolescents. On the other hand, research examining coping with disasters documented that of all different coping strategies those aimed at active problem solving are usually most beneficial (Norris, Friedman, et al. 2002). Quite reasonably, the older boys were more directly involved in the postdisaster recovery activities and that involvement may have resulted in increases in self-esteem and feelings of control. These resources, of course, serve protective roles in coping with trauma. Anecdotal evidence supports this interpretation.

The Polish media, when reporting on the recovery following the 1997 flood, frequently highlighted the involvement of boys in rescue and recovery efforts referring to this phenomenon as *the patriotic scout syndrome*. Traditionally scouts are much respected in Poland because of their heroic actions as freedom-fighters during the Nazi occupation of Poland, especially with regard to their bravery and sacrifice in the 1944 Warsaw Uprising. These images of heroic and civic responsibility are cultivated for many young people in Poland and the WWII scouts are still considered as role models.

The hypothesis about the higher vulnerability in younger than older participants was only partly supported by presented analyses and concerned the group of boys. A different pattern emerged in the group of girls indicating that the older girls had more PTSD symptoms than the younger ones, which was also most clearly evidenced in the pattern of the three-way interactions. The studies adopting the feminist/psychodynamic approach (see Norris, Friedman, et al., 2002), which encompasses a developmental perspective on gender, reveal that, in general, older adolescent girls have more symptoms of depression and other mental problems than younger adolescent girls and boys.

The study's methodological limitations, chiefly its correlational and retrospective design, must be noted in the evaluation of its results. Further research focusing on culture-specific factors, such as children's duties and involvement in the postdisaster recovery period or social support received from variety of sources, would be of great significance.

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