

Children's coping styles and trauma symptoms after an explosion disaster

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Abstract

Background: The negative impact of trauma on children and adolescents is well documented. However, few studies have investigated the relationship between coping and trauma and distress symptoms after man-made disasters, especially those not related to war.

Objective: This study investigated the relationship between children's coping styles and their self-reported levels of trauma and distress symptoms after an explosion disaster in a residential area.

Method: Participants were recruited through the local public school that served the affected residential area. A total of 333 children and adolescents from grades 3 through 10 participated in the study 16 months after the explosion. All participants filled out questionnaires to assess their trauma and distress symptoms as well as their coping strategies. The adolescents answered additional questions about pre-, peri-, and post-traumatic factors and filled out questionnaires about their trauma and distress symptoms, including aspects of somatization and negative affectivity.

Results: The following variables were associated with a higher degree of trauma symptoms for children in grades 6 through 10 and explained 39% to 48% of the unique variance in these symptoms: female gender; the experience of traumatic events pre-disaster; the destruction of property or danger to life occurring during the disaster; the experience of traumatic events post-disaster; and the use of self-blame, emotion regulation, wishful thinking, and cognitive restructuring. For the younger children, pre-, peri-, and post-disaster factors were not measured. However, female gender and the use of self-blame as a coping strategy explained 26% of the variance in trauma symptoms.

Conclusions: This study generally supports the findings of the limited literature addressing coping skills after man-made disasters. However, contrary to previous findings in community samples after episodes of terrorism, adaptive coping strategies such as cognitive restructuring were found to influence the variance of trauma and distress symptoms.

Keywords: children; disaster; coping strategies; trauma symptoms

Introduction

The negative impact of natural and man-made trauma on children and adolescents is well documented (1). However, little is known about the variables that influence the post-traumatic adjustment process. Knowledge of this process is of great importance for the family members and professionals that wish to help and support children after a trauma, and coping strategies have been suggested as relevant factors. Lazarus and Folkman (2) defined coping as "constantly changing cognitive and behavioral efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person" (p. 141);

this definition still seems to be at the core of the concept and to cover a range of ways of coping. In a literature review, Skinner and colleagues (3,4) identified more than 400 subtypes of coping skills that have been studied. Different conceptualizations of these coping styles have been attempted, but there is still continued debate regarding how the different subtypes should be organized. Skinner and colleagues (3,4) argued that the most commonly used distinctions of approach versus avoidance, emotion-focused versus problem-focused, and engagement versus disengagement do not adequately classify and distinguish between specific coping styles, because coping skills typically serve multiple functions and

are multidimensional. Instead, these researchers suggest that coping strategies may be structured with regard to how the strategy improves or is meant to improve the fit between the individual and the context. In line with this is the fact that the actual adaptive functioning of a strategy is not inherent in the strategy; rather, it may vary on the basis of a specific individual in a specific context and how the strategy may or may not realign the individual and the context. Understanding children's coping styles after a disaster and how such coping styles may relate to other aspects of the disaster and the subsequent mental health of the affected children is of great importance for the planning and execution of post-disaster interventions. Such an understanding may also help to identify children who may benefit from more extensive support.

Coping strategies used by children and adolescents have been studied in relation to juvenile illness (4-6), suicidal ideation (8,9), hypothetical situations (e.g., dealing with a friend being diagnosed with AIDS) (10), natural disasters (8,11,12), and man-made disasters (e.g., traffic accidents, fires) (13,14) but mostly in relation to war or terrorism (14-17). Weisenberg and colleagues (18) studied coping behaviors in a sealed room during a scud missile attack in relation to post-traumatic stress disorder (PTSD) in 492 children. Three weeks after the end of the war the children were asked to document their present and retrospective experiences and feelings related to the missile attacks. More severe stress reactions were found among children who reported more behaviors directed at threats in the situation (e.g., checking gasmasks and the seal of the room) and reduced emphasis on avoidance and distraction activities. This pattern of coping was more likely among children from lower grades as compared with higher grades. Paardekoooper and colleagues (17) studied the coping strategies of 345 refugee children in Uganda and compared them with 80 non-refugee children. The refugee children were found to use more coping strategies, especially wishful thinking, self-blame, social support, cognitive restructuring, and problem solving.

After 9/11, community studies of children and adolescents not directly involved in the disaster have focused on understanding how these individuals cope with terrorism (15,16). Cardena and colleagues (15) studied the differential effects of coping styles and demographics on post-traumatic reactions in 3134 individuals in a nationwide representative sample 3 weeks after 9/11. The sample included 405 teenagers. For the whole sample, the main conclusions were that coping styles—aside from active coping and positive reframing—accounted for almost 30% of the variance in stress reactions. The

coping strategies of seeking emotional support, self-blame, denial, venting, and behavioral disengagement accounted for most of this variance. The authors reported that the teen group also demonstrated a very similar pattern. However, these results were not reported separately. The authors suggested that it was primarily the use of maladaptive strategies (e.g., self-blame, denial, venting, behavioral disengagement) and not the use of adaptive strategies that explained the variance in distress and that intervention strategies should focus on identifying and reducing maladaptive strategies. Furthermore, acute distress was related to being a New York resident; this confirms an association between exposure and greater distress, which has also been described in relation to natural disasters (8,11,12,19). Lengua and colleagues (16) studied the degree of PTSD symptoms in a community-based sample of children one month after 9/11. The study included both pre- and post-attack measures and found that both pre- (dispositional) and post-trauma (situational) coping contributed to the degree of PTSD symptoms. It was found that 9/11 post-trauma avoidant coping predicted a higher degree of PTSD symptoms. The likelihood of using 9/11 post-trauma avoidant coping was reduced or increased in relation to the tendency to use active or avoidant coping, respectively, prior to 9/11.

Stallard and colleagues (13) studied 97 children 6 weeks and 8 months after the children were in traffic accidents. They found that younger children and those with PTSD used more coping strategies than older children and those without PTSD. Children with PTSD were more likely to report the use of distraction, social withdrawal, emotional regulation, and blaming others as coping strategies. Jones and Ollendick (14) reported findings from two studies of children's and adolescents' coping in the context of residential fire using comprehensive interviews 3 months after the fire occurred. In 46 children between the ages of 8 and 16 years, they found avoidant coping to be related to heightened levels of fear. They further investigated the potential predictors of coping strategies in 92 children between the ages of 9 and 13 years. They investigated demographic variables, total resource loss, impact of negative life events, social support, self-worth, and coping efficacy as potential predictors of the frequency and type of coping strategies, which were grouped as active coping, distraction strategies, avoidance, and support seeking. The results showed that none of the included variables significantly predicted differences in the use or frequency of coping strategies. Despite this divergent finding, current studies of the coping of children in relation to man-made disasters seem to support the

importance of investigating coping in relation to post-traumatic stress reactions. A higher degree of post-traumatic symptoms are related to a higher number of strategies used. Across the different coping measures used, it seems to be the use of more avoidant coping strategies that contributes the most; however, the results are still mixed. Pre-disaster coping, gender, age, and disaster exposure are of relevance for understanding the coping strategies used. These findings are in line with studies of coping in relation to natural disasters (8,11,12,19).

The aims of the present study were to increase the understanding of coping strategies during the posttraumatic adjustment process and to assess how the use of coping strategies may be associated with subsequent trauma symptoms in children after they had experienced an explosion disaster. The disaster investigated was a firework accident in a residential area of approximately 2000 residents. The fire started in a container outside of a firework factory. Because the fire could not be controlled, police warnings were sent out, and the area was evacuated. The explosion occurred during the late afternoon of November 3, 2004, and measured 2.2 on the Richter scale. The explosion resulted in one death, €100 million in property damage, and long evacuation periods. It took 3 to 4 days before the area was approachable. Ultimately, 355 houses were damaged; of these, 175 of were uninhabitable, 75 were burned out, and the reconstruction of the damaged houses ranged from months to years. Fifty-two percent of the children had their homes damaged by the explosion. A previous study by Elklit (20) found that, at 3 months after the accident, 13% of the adults included from the affected area met the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* criteria for PTSD as compared with 1% of adults from a similar type of residential setting that was not directly affected by the accident. The study further found that disputes with insurance companies were significantly associated with PTSD. This indicates that, after the explosion, there was an extended period characterized by both a high degree of concrete and practical reminders of the disaster as well as added practical demands on the families. Although this particular disaster was not an act of war or terror, it was characterized by the significant destruction of houses in a small area and resulted in evacuation, a long period of displacement for many families, and a long period of reconstruction.

On the basis of the previous studies of coping in relation to man-made disasters, it was predicted that higher levels of distress would be associated with younger age, female gender, and higher levels of disaster exposure. Although the findings related to coping strategies are mixed, there is a tendency to

find a relationship between more avoidant coping strategies (e.g., withdrawal, denial, blaming others or self) and higher degrees of later trauma symptoms. It is thus likely that avoidant strategies are more strongly associated with the current degree of trauma symptoms.

Method

Subjects

The potential pool of subjects for the current study consisted of 455 children in grades 3 through 10 who attended a public school that served the residential area affected by the firework accident. The final sample consisted of 333 children (73% of all students) for whom parental consent to participate in the study was obtained. The sample was distributed as follows: 51 third graders, 38 fourth graders, 29 fifth graders, 38 sixth graders, 63 seventh graders, 47 eighth graders, 47 ninth graders, and 20 tenth graders. The sample included 167 girls and 165 boys; one child did not state his or her gender. Non-participating children did not differ from participating children with regard to grade or gender.

Procedure

Data were collected as part of a larger study investigating PTSD among children after exposure to a disaster (21). Data were obtained 16 months after the explosion. Participants in grades 3, 4, and 5 ($n = 118$) were gathered into small groups at their school that included one researcher and 6 to 8 children. The children were told that the purpose of the study was to understand their reactions to the explosion. The second author guided the children through the KIDCOPE checklist, which is described in the "Coping styles" section later in this article. Each item was read aloud to the children as a group, and individual participants were helped as needed. Subjects in grades 6 through 10 ($n = 215$) filled out different evaluation instruments at school with the second author present; more information about these instruments is also found in the measures section of this article. Confidentiality was emphasized, and openness was encouraged.

Measures

As a result of the age distribution of the participants, the measures used to collect data vary to some degree. Pre-, peri-, and post-disaster information are only collected for the older children, and an additional measure of trauma symptoms was added for this group as well.

Demographic information related to gender and grade level was collected for all children. Peritraumatic information was collected from the older children (grades 6 through 10), and this included

distance from the factory during the explosion, degree of experienced life danger to self or others, and destroyed property. The older children also described their experience of any potentially traumatic events before or after the disaster being studied.

Coping styles: The KIDCOPE self-report instrument (22) was used primarily for its brevity and its previous use in similar studies. The version developed for children between the ages of 7 and 12 years was used for all participants. The tool consists of 15 items that reflect 10 different coping strategies. The children were asked to think about a specific situation and to then rate each item with regard to their use of a specific coping strategy (yes/no) and the perceived effectiveness of that strategy using a 3-point Likert scale (1 = not at all; 2 = somewhat; 3 = very much). Five coping strategies were assessed by two items: 1) distraction (try to forget it; do something else to forget it); 2) social withdrawal (stay on your own; keep quiet about the problem); 3) problem solving (try to sort out the problem by thinking of answers or talking to someone about it; try to sort it out by doing something); 4) emotional regulation (shout, scream, and get angry; try to calm yourself down); and 5) wishful thinking (wish the problem had never happened; wish you could make things different). These five strategies were coded as positive for use if at least one of the two items were endorsed. The remaining five coping strategies were measured by one item each: 1) cognitive restructuring (try to see the good side of things); 2) self-blame (blame yourself for causing the problem); 3) blaming others (blame someone else for causing the problem); 4) social support (try to feel better by spending time with family or friends); and 5) resignation (do nothing because the problem could not be fixed). The psychometric properties of the KIDCOPE instrument have been reported and indicate acceptable reliability and moderate correlations when assessing coping strategies across two similar situations ($r = .56-.71$) and moderate correlations in test-retest reliability for the same personal situation over 3 to 7 days ($r = .41-.83$) (22).

Trauma symptoms: Two measures were used to assess trauma symptoms. An adapted version of Darryl (21,23) was used for all children. Darryl is a cartoon-based measure of PTSD symptomatology; for this study, it was adapted to address the fireworks explosion. Darryl consists of both general pictures and pictures that address three symptom clusters: re-experiencing, avoidance and/or affective numbing, and hyperarousal. The summed scores provide a measurement of symptom severity. Elklit and colleagues (21) provided a detailed description of the measure, including an analysis of the estimated

prevalence of probable PTSD and the validity and reliability of the measure. They found an estimated prevalence of probable PTSD of 17% for the children in grades 3, 4, and 5 and of 11% for the children in grades 6 through 10.

The Trauma Symptom Checklist (TSC) (24,25) was used for the older children. TSC is a scale that addresses somatization in addition to depression and anxiety. Depression and anxiety are highly comorbid with PTSD in adolescents (1,26). Among school-aged children, posttraumatic symptoms continue to be expressed behaviorally to a notable degree and may include regressive behaviours. School children may not be capable of abstractly interpreting the somatic affective experiences inherent in PTSD symptomatology (e.g., anxiety, re-experiencing), and they may consequently describe these experiences by listing physiological symptoms, such as stomachaches and headaches (27). This focus was the primary reason for including the TSC. Krog and Duel (24) identified negative affectivity and somatization in a factor analysis of data from 4152 cases identified in 16 studies of trauma populations in which the original version of the TSC by Briere and Runtz (25) was used. In accordance with the recommendations of Krog and Duel (24), a 26-item version of the TSC was selected. All items in this instrument are rated using a 4-point Likert scale (1 = not occurring; 4 = occurs very often). The dissociation subscale had 5 items ($\alpha = .69$), the negative affectivity scale had 10 items ($\alpha = .81$), and the somatization subscale had 11 items ($\alpha = .80$). The α for the total scale was .90. The mean inter-item correlations for the three subscales were between .26 and .31, thereby indicating optimal discriminatory power (28). In this study, TSC scores were collected for children in grades 6 through 10, and the total scores were used as more complex measures of distress.

Analyses

Due to the large age span of the children included, separate analyses were made for younger children (grades 3, 4, and 5) and older children (grades 6 through 10). Correlations between coping style usage (reported as the percentage of subjects endorsing the strategy) and coping style efficacy (mean efficacy scores ranging from 0 to 4, with higher numbers being more effective) were investigated with the use of the procedure described by Jeney-Gammon and colleagues (8). Correlates for each strategy are shown in Table 1. Coping style usage and efficacy were found to be highly correlated (p -values of $<.001$; r values of $>.53$). Due to this high level of intercorrelation and the higher association between coping style usage and TSC scores (as compared with coping style efficacy and TSC scores), the following

analyses were based only on coping style usage. Chi-squared tests for independence (with Yates's correction for continuity) were used to investigate potential differences in the use of coping strategies by younger children (grades 3, 4, and 5) and older children (grades 6 through 10). Because of the number of analyses, a Bonferroni adjustment with a p -value of less than .005 as the criterion for significance was made to control for the overall Type I error rate. For the younger children, hierarchical multiple regression analysis was used to investigate the relationship between demographic variables and PTSD-related symptoms as measured by the adapted Darryl test. For the older children, hierarchical multiple regression analysis was used to investigate the relationships among demographic variables, the

experience of potentially traumatic events pre-disaster, peri-traumatic factors, the experience of potentially traumatic events post-disaster, and both the adapted Darryl test and the TSC.

Results

The usages of coping strategies for younger and older children are presented in Table 1. The use of coping strategies only differed significantly for younger and older children for cognitive restructuring ($\chi^2(1, 330) = 9.02; p = .003; phi = .17$) and emotion regulation ($\chi^2(1, 328) = 9.62; p = .002; phi = -.18$.) Older children used cognitive restructuring more frequently, whereas younger children used emotion regulation more frequently.

TABLE 1. Usage of KIDCOPE coping strategies across subjects

Strategy	Percentage of subjects using strategy (n)				
	Grades 3, 4, and 5 ^a		Grades 6 through 10 ^b		Total group ^c
Distraction	71	(83)	57	(120)	62 (203)
Social withdrawal	66	(77)	74	(156)	71 (232)
Cognitive restructuring	61	(71)	77	(164)	71 (235)
Self-blame	1	(1)	7	(15)	5 (16)
Blaming others	13	(15)	14	(29)	13 (44)
Problem solving	60	(69)	63	(135)	62 (204)
Emotional regulation	73	(85)	55	(117)	62 (202)
Wishful thinking	87	(101)	78	(165)	81 (266)
Social support	69	(79)	64	(136)	66 (215)
Resignation	37	(43)	24	(50)	29 (93)
Total use of strategies mean (standard deviation)	5.42	(2.05)	5.13	(1.83)	5.24 (1.91)
Range	0-9		0-9		0-9

^aTotal n varies from 114 to 117, ^bTotal n varies from 208 to 213, ^cTotal n varies from 324 to 330

TABLE 2. Summary of hierarchical multiple regression for variables predicting post-traumatic stress disorder symptoms as measured by the adapted Darryl test for children in grades 3, 4, and 5 (younger) and children in grades 6 through 10 (older)

Predictor	Grades 3, 4, and 5		Grades 6 through 10	
	ΔR^2	β	ΔR^2	β
Step 1	.09*		.12***	
Gender		.27*		.21**
Grade		-.04		-.01
Step 2	.17**		.17***	
Distraction		.15		.03
Social withdrawal		.14		.13
Cognitive restructuring		-.01		-.19**
Self-blame		.23*		.19**
Blaming others		.05		-.04
Problem solving		.07		.01
Emotion regulation		.05		.11
Wishful thinking		-.02		.18*
Social support		.08		.12
Resignation		.04		-.06
Total R ²	.26***		.29***	

* $p < .05$; ** $p < .01$; *** $p < .001$

Hierarchical multiple regression analysis was used to investigate the ability of demographic variables to predict the level of PTSD symptoms as measured by the adapted Darryl test. During Step 1, the demographic variables gender and grade were entered; during Step 2, the use of specific coping strategies was entered. Total variance explained by the model as a whole was 26% ($F(12, 88) = 2.53; p < .01$) for the younger children and 29% ($F(12, 168) = 5.82, p < .001$) for the older children. Final beta values are presented for all variables in Table 2. For the younger and older children, the demographic variables contributed 9% and 12% of the unique variance in distress, respectively, while the use of coping strategies contributed 17% and 17% of the unique variance, respectively. In the final model, gender (but not grade) was statistically significant for both grade groups. For the younger children, self-blame was the only coping style that was statistically significant, but it represented the positive response of one child only. For the older children, the reported use of cognitive restructuring, wishful thinking and

self-blame were statistically significant. With the reported use of cognitive restructuring associated with lower symptom level and the reported use of wishful thinking and self-blame associated with higher symptom level.

For the older children, three additional steps were added to the model to further explore the variation in their levels of PTSD-related symptoms. The demographic variables gender and grade were entered during Step 1, the experience of potentially traumatic events pre-disaster was entered during Step 2, the peri-traumatic factors: distance from the factory at the time of the explosion, degree of experienced or feared danger to own or other's life, destroyed property were entered during Step 3, and the experience of potentially traumatic events post-disaster was entered during Step 4. Coping variables were entered during the final fifth step. The model was investigated for both the adapted Darryl test and for the TSC. Final beta values are presented for all variables in Table 3.

TABLE 3. Summary of hierarchical multiple regression of variables predicting post-traumatic stress disorder symptoms as measured by the adapted Darryl test and the Trauma Symptom Checklist for children in grades 6 through

Variable	Adapted Darryl test		Trauma Symptom Checklist	
	ΔR^2	β	ΔR^2	β
Step 1	.12***		.06**	
Gender		.25**		.13*
Grade		-.03		.02
Step 2	.03*		.05**	
Pre-disaster traumatic events		.13		.16**
Step 3	.13***		.20***	
Destroyed property		-.20**		-.25***
Danger to life (self/other)		-.08		-.15*
Distance to explosion		-.10		-.10
Step 4	.00		.02*	
Post-disaster traumatic events		.02*		.14*
Step 5	.11**		.16***	
Distraction		.02		.08
Social withdrawal		.11		.10
Cognitive restructuring		-.14*		-.14*
Self-blame		.17*		.21*
Blaming others		-.09		.07
Problem solving		-.05		-.11
Emotion regulation		.12		.29*
Wishful thinking		.17*		.02
Social support		.07		-.02
Resignation		-.05		-.04
Total R ²	.39***		.48***	

* $p < .05$; ** $p < .01$; *** $p < .001$

For the adapted Darryl test, the total variance explained by the model as a whole was 39% ($F(17, 145) = 5.38; p < .001$). In Step 1, the demographic variables contributed 12% of the variance in distress ($p < .001$). In Step 2, the experience of potentially traumatic events pre-disaster explained 3% of the variance in distress ($p = .027$). In Step 3, the peri-

traumatic stressors explained 13% of the variance in distress ($p < .001$). In Step 4, the experience of potentially traumatic events post-disaster did not add significantly to the model. Finally, in Step 5, the usage of specific coping strategies explained an additional 11% of the variance in distress ($p = .005$) after controlling for the previous variables. In the final

model, gender, destroyed property, cognitive restructuring, self-blame, and wishful thinking were statistically significant.

For the TSC, the total variance explained by the final model as a whole was 48% ($F(17, 160) = 8.75; p < .001$). In Step 1, the demographic variables explained 6% of the variance in distress ($p = .006$). In Step 2, the experience of potentially traumatic events pre-disaster explained 5% of the variance ($p = .004$). In Step 3, the peri-traumatic stressors explained 20% of the variance in distress ($p < .001$). In Step 4, the experience of potentially traumatic events post-disaster explained 2% ($p = .021$). In Step 5, the coping strategies explained an additional 16% of the variance in distress after controlling for the previous variables. In the final model, gender, the experience of life danger to self or others, destroyed property, the experience of potentially traumatic events post-disaster, cognitive restructuring, emotion regulation, and self-blame were statistically significant.

Discussion

The study investigated the self-reported use of coping strategies after an explosion disaster. It adds to the very limited literature on coping after man-made disasters that are not linked to war or terror. The results confirmed previous results, which showed that increased levels of trauma symptoms were associated with female gender and higher levels of disaster exposure. Grade level did not significantly contribute to the variance in psychological distress. The presence of a link between coping style and trauma symptoms varied in relation to the grade level of the child and the specific measure of psychological distress. The only coping style that was found to contribute significantly to the variance in trauma symptoms for younger children was self-blame. However, this strategy was only reported by one of the younger children, thereby limiting any interpretation of this result. For the older children, cognitive restructuring, wishful thinking and self-blame contributed significantly to the variance in trauma symptoms. This association was still significant after controlling for pre-, peri-, and post-disaster factors. However, when using a broader measure of symptoms that included somatization, negative affectivity, and dissociation, emotion regulation, self-blame and cognitive restructuring contributed to the variance. Emotion regulation and self-blame were associated with higher symptom level and cognitive restructuring was associated with lower symptom level. Contrary to the study by Cardena and colleagues (15), this study supports the relevance of cognitive restructuring for decreasing symptom levels to some degree. An important difference is that, in the present study, the included

children were all directly affected by or living in the affected area, whereas this was not the case in the community study by Cardena and colleagues (15). The use of cognitive restructuring may be more important when the disaster exposure is more direct.

The experience of potentially traumatic events pre-disaster and the experience of destroyed property contributed to the unique variance in psychological distress as measured by both the adapted Darryl test and the TSC. However, the contribution of the experience of potentially traumatic events pre-disaster to these two tests was small (3% and 5%, respectively), and the variable only reached statistical significance in the final model for the TSC and not for the Darryl test. For the TSC, the experience of potentially traumatic events post-disaster also contributed 14% of the unique variation in the model.

Non-participants constitute a potential sampling bias. The percentage of eligible children (73%) who obtained parental permission and participated in the study was high. However, the pattern of participation varied markedly in relation to which classroom the children attend (the classrooms to which the children were assigned); this was recognized by the administrative staff of the school from other occasions and attributed to some teachers being very efficient and dedicated to the project. The teachers serving as gatekeepers to the parents appeared to be an important factor in this study and should be addressed in a more effective way in future studies. In addition, the disaster type and the middle-class community in which it occurred may limit generalization regarding the use of coping strategies. Care should also be taken when considering the results indicating that the use of self-blame was a risk factor for PTSD symptoms, because this strategy was only reported by a very limited number of children and adolescents, especially among the younger children.

Time elapsed since the occurrence of disaster is also a potential limitation of this study with regard to the reporting of coping strategies used. The reported use of coping style may have presented differently if the study had been conducted closer to the time of the disaster. Children and other subjects may have difficulty reporting the use of such strategies while they are actually using them in the immediate aftermath of the disaster; when these strategies are discussed further out from the disaster, as in the current study, respondents may report their current experiences of strategies used, which may reflect the strategies used at the time of the disaster, those used during the months after the disaster, and the respondent's level of distress. Still, the reporting of coping strategies at this point in time is related to two

different measures of trauma symptoms, so it does contain important information that may help to identify children in distress and thus improve the direction of support measures. It may also reflect that, for some children, the disaster may affect them for a significantly longer period due to massive destruction, relocation, and strain related to rebuilding a house or struggling with an insurance company. According to the results of the TSC, the links to both pre- and post-disaster traumatic events indicate that the measure may generally pick up on the more general vulnerability of the respondent. If possible, a prospective study design that assesses the use of coping strategies both as close to the disaster as possible and at later time points would be preferable. Ideally, the research would also involve access to pre-disaster measures, but this is rarely possible due to the nature of both man-made and natural disasters. The self-report procedure is valuable because it documents children's experiences of distress, coping, and coping efficiency. However, this is just one part of the picture. A mixed-method research design that includes other informants and observations would be preferable.

Clinical significance

From a practical perspective, the understanding of the relationship between coping strategies and levels of distress may help with the direction of appropriate interventions toward children who are affected by man-made disasters. Implications for intervention could include an emphasis on building a shared understanding and evaluating behaviors and roles in uncontrollable situations to reduce feelings of responsibility that may later turn into self-blame. Cognitive interventions that focus on negative beliefs and on helping with a restructuring process may also be beneficial. During the period after a disaster in which there is significant destruction of homes and property, parents may themselves be affected by increased levels of PTSD and trauma symptoms, as indicated by Elklit (20), and they may also be occupied with practical problems. Therefore, intervention by school staff may ultimately be relevant, and schools may prove to be the best settings for reaching children affected by disaster (21,29,30).

Disclosure

There was no funding involved in the study.

The parents received a letter informing them about the study and if they did not consent that their child should participate, they were asked to return a slip with their signature to the teacher.

The study followed the Nordic ethical guidelines for psychologists, and according to Danish law for this type of study, no other approval is needed.

Conflicts of Interest

The authors declare no conflict of interest.

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