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Looking beyond posttraumatic stress disorder in children: Posttraumatic stress reactions, posttraumatic growth, and quality of life in a general population sample

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ABSTRACT

Objective: In order to broaden the view beyond posttraumatic stress disorder (PTSD) in children, we examined to what extent posttraumatic stress reactions, posttraumatic growth, and quality of life were related to each other and to traumatic exposure in the general population.

Method: 1,770 children of 36 randomly selected primary schools (mean age = 10.24 years, 50% boys) reported in October/November 2006 on their worst experience (traumatic exposure was considered present when the described event fulfilled the A1 criterion for PTSD of the DSM-IV TR) and filled out the Children's Responses to Trauma Inventory, the Posttraumatic Growth Inventory for Children, and the KIDSCREEN-27. Correlational and hierarchical linear regression analyses were carried out in a multiple imputation format.

Results: Posttraumatic stress reactions were strongly related to posttraumatic growth (r = .41, p < .01) and quality of life (r = -.47, p < .01). The latter two variables were weakly related; positively when controlling for posttraumatic stress reactions (r = .09, p < .01), negatively when not (r = -.12, p < .01). Children who were exposed to trauma reported more posttraumatic stress reactions (β = .12, p < .01), more posttraumatic growth (β = .09, p < .01), and less quality of life (β = -.08, p < .01) than non-exposed children (effect sizes were small).

Conclusions: Negative and positive psychological sequelae of trauma can co-exist in children, and extend to broader areas of life than specific symptoms only. Clinicians should look further than PTSD alone and pay attention to the broad range of posttraumatic stress reactions that children show, their experience of posttraumatic growth, and their quality of life.

INTRODUCTION

Many children are exposed to traumatic events such as community violence, sexual abuse, serious accidents, and natural disasters.[1] Although reported prevalence rates of exposure vary considerably between studies, ranging from 15%[2] to 84%,[3] even the lowest rates indicate that exposure to trauma is a rather common experience in childhood. Research on the psychological consequences of traumatic experiences for children is expanding. Until now, studies have mainly focused on posttraumatic stress disorder (PTSD) which has been found to be the most prevalent disorder after traumatic exposure.[4]

However, several problems arise in using the construct of PTSD with regard to children. First, it was designed to describe adult symptoms. Several studies have indicated that children's reactions to trauma differ from adult reactions.[5,6] Although some developmental modifications have been made in the DSM-IV,[7] they do not appear to be fully adequate in describing children's symptoms.[8,9] Second, the existence of the construct of PTSD even in adults is subject to debate. Criticisms concern, for example, the disregard of studies reporting resiliency in survivors, the nonspecificity of PTSD symptoms to traumatic experiences, and the influence of political opinions on the formulation of the disorder.[10] Finally and most notably, studying only a pathologic reaction to trauma in children may lead to a narrow view from which it is difficult to direct general prevention programs or specific treatment plans. A broader view is necessary, taking into account not only PTSD, but also the wide range of posttraumatic stress reactions, both negative and positive psychological sequelae, and specific reactions as well as general well-being. Studying constructs that cover these areas, such as posttraumatic stress reactions, posttraumatic growth, and quality of life, will enable a better understanding of threats and opportunities in prevention and treatment, and will further the theoretical understanding of psychological processes in children after trauma.

The construct of posttraumatic stress reactions in children has been proposed in order to encompass the broad range of psychosocial symptoms that children may experience after traumatic exposure.[11] It includes not only the PTSD symptoms of reexperiencing the trauma, avoidance and numbing, and increased arousal,[7] but also other reactions having empirical value, such as feelings of guilt,[12] psychosomatic complaints,[13] regressive behavior,[14] and separation anxiety.[15] Although the construct was proposed years ago and has been mentioned in theoretical articles,[5,11] few empirical studies include all of these reactions.

The construct of posttraumatic growth was initially described in adults and concerns positive sequelae of trauma. As a result of the struggle with highly challenging life crises, the experience of positive change may occur. This change may take place in three domains: perception of self (e.g., considering oneself no longer a victim but a survivor), interpersonal relationships (e.g., becoming closer to relatives and friends), and philosophy

of life (e.g., changing priorities).[16] Because children's appraisal of events and capacity to verbalize emotional states are not yet fully developed, questions have been raised about the applicability of the construct of posttraumatic growth to children. However, recent findings with children who had experienced a road traffic accident[17] and child survivors of a hurricane[18] suggest that children are able to experience significant growth.

The construct of quality of life originates from somatic medicine, emphasizing clients' subjective view of their life circumstances.[19] Quality of life is conceptualized in many ways but regularly as a multidimensional construct covering physical, emotional, behavioral, social, and mental components of well-being.[20] Recently, the construct has begun to be explored in young populations with regard to mental health. Sawyer and colleagues[21] reported, for example, that children with a mental disorder had a worse quality of life than children with a physical disorder in many areas, such as in the social and school domains.

The purpose of our study was to explore the role of posttraumatic stress reactions, posttraumatic growth, and quality of life in relation to each other and in relation to traumatic exposure. Our knowledge to date is mainly based on studies in convenience samples of exposed children only, which provides incomplete information on how children typically respond to trauma.[1] Therefore, we studied a large sample of children in the general population. We expected to find significant positive relationships between posttraumatic stress reactions and posttraumatic growth[17] and between posttraumatic growth and quality of life, and a significant negative association between posttraumatic stress reactions and quality of life. With regard to traumatic exposure, we anticipated significantly more posttraumatic stress reactions, more posttraumatic growth and a lower quality of life in exposed children than in non-exposed children.

METHODS

Participants

The data were collected in October and November of 2006 in Utrecht, a province in the middle of the Netherlands with urban as well as rural regions. Thirty-six randomly selected schools participated in the study, with 3,787 potential respondents in the last four grades of primary school (in these grades children are aged 8-12 years). A total of 1,770 children, whose parents signed informed consent (according to an opting-in procedure) and who were present on the day of data collection, filled out the questionnaire. The mean age of the children was 10.24 years (SD = 1.21 years). The sample comprised 882 boys and 888 girls (both 50%), which was in accordance with the national population (51% of primary school children are boys,[22] χ^2 = .97; p = .33).

Measures

Demographic characteristics. The children reported their age, gender, and grade level.

Exposure. The children were asked to describe their worst experience ever and to indicate how long ago it took place. Traumatic exposure was considered present when the described event fulfilled the A1 criterion for PTSD of the DSM-IV-TR.[23] Two raters independently decided whether the event fulfilled the criterion or not. In case of disagreement (Cohen κ was 0.58), a third rater made the final decision. Criterion A2 for PTSD was not examined.

Posttraumatic stress reactions. The Children's Responses to Trauma Inventory (CRTI, revised version,[24] psychometrics described by EA and RJK, Chapter 4) consists of 34 items. Children answer, on a five-point Likert scale, to what extent a reaction to a traumatic event was present during the past seven days (scores range 1 to 5). The measure contains four subscales: intrusion (7 items), avoidance (11 items), arousal (6 items) and other child-specific responses (i.e., relevant reactions not mentioned in the DSM-IV; 10 items). Other child-specific responses include feelings of guilt, regressive behavior, reckless behavior, fear of the dark, fear of going to the toilet at night, separation anxiety, sadness, crying, feeling tired, and psychosomatic complaints. Cronbach's α was .92 for the total scale and .81, .80, .72, and .78 for the respective subscales.

Posttraumatic growth. The Posttraumatic Growth Inventory for Children (PTGI-C,[25] psychometrics of an earlier version described by Cryder et al.[18]) is an adaptation of the Posttraumatic Growth Inventory, which is frequently used with adults.[26] The 10 items have a four-point Likert scale and a 'don't know' option. There are no subscales. For the Dutch version, a back translation procedure has been carried out. Cronbach's α in the current study was .85.

Quality of life. The KIDSCREEN-27[27] (psychometrics described by Ravens-Sieberer et al.[28]) is a 27-item instrument that covers five dimensions of quality of life: physical well-being (5 items), psychological well-being (7 items), autonomy and relationship with parents (7 items), peers and social support (4 items), and school environment (4 items). The questions concern the last seven days and answers are given on a five-point Likert scale. Cronbach's α was .72, .77, .75, .75 and .69 for the respective subscales and .89 for the total scale.

Procedures

The study protocol was approved by the Medical Ethics Committee of the University Medical Center Utrecht. The construction of the questionnaire placed the measure on quality of life ahead of the measures for exposure, posttraumatic stress reactions, and

posttraumatic growth in order to prevent biased answers, although the topic of the research was openly announced in the introduction. Children filled out the questionnaire in a quiet classroom setting but could ask for explanations of difficult words when necessary, and were free to participate or not (there was 100% participation). Schools, parents, and children were informed about possibilities of receiving psychosocial support.

Data preparation and analysis

The percentage of missing data was small (2.71%), but could add up to a higher percentage for analyses on sum variables. In order to arrive at unbiased estimates, we applied latent class modeling and two-way imputation for separate scales in a multiple imputation format (number of imputed datasets = 5). Categorical data (including the PTGI-C, which had a 'don't know' option) were imputed using latent class analysis[29] with a 4-class model (Bayesian information criterion = 95111.93), which was computed with Latent GOLD 4.0 software.[30] Scale data from the KIDSCREEN-27 and CRTI were imputed by means of two-way imputation for separate scales[31] using SPSS 12.0.2 software.[32] Respondents with more than 60% missing data on the three measures were excluded, leading to imputed data of 1,686 children.

Full and partial Pearson correlations were computed for the relationships between posttraumatic stress reactions, posttraumatic growth, and quality of life. Hierarchical linear regression analyses with two steps were carried out to estimate the contribution of traumatic exposure to the three variables, controlling for the time elapsed since the event (zero to six months ago vs. more than six months ago), gender, and age. All analyses were carried out on the five estimated datasets with SPSS 12.0.2 software and were combined according to Rubin's rules for multiple imputation.[33]

RESULTS

Relationships among variables

Posttraumatic stress reactions were strongly related to posttraumatic growth; the more children experienced posttraumatic stress reactions, the more they experienced posttraumatic growth ($r = .41$, $p < .01$). The relationship between posttraumatic stress reactions and quality of life was also strong, but negative; children experiencing more posttraumatic symptoms reported a lower quality of life ($r = -.47$, $p < .01$). The relationship between posttraumatic growth and quality of life was significant but small; children reporting more posttraumatic growth reported a somewhat lower quality of life ($r = -.12$, $p < .01$). Partial correlations yielded grossly the same picture for the first two correlations ($r = .41$ and $r = -.46$ respectively) but not for the third; when controlling for posttraumatic

Table 3.1 Means and standard deviations for quality of life, posttraumatic stress reactions, and posttraumatic growth

	All children (N = 1,686), Mean (SD)	Exposed children (N = 246), Mean (SD)	Non-exposed children (N = 1,440), Mean (SD)
Quality of life (KIDSCREEN-27), total score	114.4 (11.7)	112.3 (12.3)	114.8 (11.6)
Physical well-being score[a]	21.0 (3.0)	20.6 (3.5)	21.1 (2.9)
Psychological well-being score[a]	29.4 (3.8)	28.5 (4.3)	29.6 (3.7)
Autonomy and relation with parents score[a]	29.7 (4.0)	29.5 (3.9)	29.7 (4.1)
Peers and social support score[a]	17.4 (2.4)	17.2 (2.5)	17.4 (2.4)
School environment score[a]	16.9 (2.4)	16.4 (2.4)	17.0 (2.4)
Posttraumatic stress reactions (CRTI), total score	65.7 (21.7)	70.9 (22.0)	64.8 (21.5)
Intrusion score	12.8 (5.5)	14.3 (5.6)	12.5 (5.4)
Avoidance score	22.8 (8.2)	24.6 (8.0)	22.5 (8.2)
Arousal score	11.6 (4.7)	12.9 (4.9)	11.3 (4.6)
Other child-specific responses score	18.6 (6.9)	19.2 (7.1)	18.5 (6.9)
Posttraumatic growth (PTI-C), total score	11.7 (7.7)	13.0 (7.6)	11.5 (7.6)

[a] All mean scores for the KIDSCREEN-27 subscales corresponded to t-scores ranging from 45.2 to 54.3, within the normal range.[25] CRTI = Children's Responses to Trauma Inventory, PTGI-C = Posttraumatic Growth Inventory for Children.

stress reactions, the relationship between posttraumatic growth and quality of life turned out to be positive instead of negative (r = .09; for all correlations p < .01). Means and standard deviations of the variables are shown in Table 3.1.

Relationship with exposure

About 1 in 7 children (14%) described a traumatic event as defined by the A1 criterion of the DSM-IV-TR. The sudden death or serious injury of a loved one (parent, sibling, or best friend) was the most frequently described traumatic event, followed by disaster experiences, and accidents (Table 3.2). Examples of experiences that were judged nontraumatic were the divorce of parents, the death of a grandparent, and minor accidents.

The hierarchical linear regression analyses are shown in Table 3.3. (Only the analyses of the total scales are depicted; the tables of the analyses of subscales are available from the corresponding author upon request.) From the regression analyses for posttraumatic stress reactions, a consistent picture arose: the children who reported a worst experience that was categorized as traumatic had significantly more posttraumatic reactions in all domains (intrusion, avoidance, arousal, other child-specific responses, and total of symptoms) than children whose worst experience was non-traumatic (p < .01). Based

Table 3.2 Types of traumatic events described by school children exposed to trauma in a general population sample ($N = 246$)

Event	N	%	Example
Disaster	37	15	Flood due to dike collapse
Accident	32	13	Car accident on the highway
War	0	0	–
Domestic violence	23	9	Witnessing violence between parents
Community violence	46	19	Witnessing physical assault of a boy on the street
Sexual Assault	5	2	Rape
Injury/death of loved one	86	35	Sudden death of brother
Serious medical condition	8	3	Nearly fatal meningitis
Other stressful event	9	4	Witnessing a suicide attempt
Total	246	100	

on normative criteria, 15% of the exposed children showed probable PTSD or probable acute stress disorder. Exposure to trauma also contributed significantly to the experience of posttraumatic growth: exposed children reported more posttraumatic growth than nonexposed children ($p < .01$). Finally, exposure made a significant contribution to overall quality of life: children who described a traumatic event reported lower total quality of life than children whose worst experience was not traumatic ($p < .01$). Physical, psychological, and school well-being were also significantly negatively related to exposure ($p < .05$). The domain of autonomy and relationship with parents and the domain of peers and social support were not significantly related to exposure to trauma.

DISCUSSION

In this study we examined to what extent posttraumatic stress reactions, posttraumatic growth, and quality of life were related to each other and to traumatic exposure in a large sample of primary school children in the general population. Our hypotheses were in large part confirmed. The first main finding consisted of significant associations between the constructs. Posttraumatic stress reactions and posttraumatic growth were strongly and positively related to each other. It suggests that negative and positive psychological sequelae of trauma can coexist in children. Similar observations were made by Salter and Stallard[17]: 37% of young road traffic accident victims who experienced posttraumatic growth also presented with PTSD. In a slightly older sample of adolescent survivors of cancer, posttraumatic growth and posttraumatic

Table 3.3 Hierarchical linear regression analyses

		B	SE	p-value	β	F-value	p-value	R²	ΔR²
Posttraumatic stress reactions									
Step 1	Constant	100.42	4.52	<.01		34.81	<.01	.06	
	Time lag	-4.69	1.18	<.01	-.09				
	Gender	5.30	1.03	<.01	.12				
	Age	-3.31	.43	<.01	-.18				
Step 2	Constant	101.11	4.49	<.01		33.04	<.01	.07	.01
	Time lag	-4.90	1.17	<.01	-.10				
	Gender	5.42	1.02	<.01	.12				
	Age	-3.47	.43	<.01	-.19				
	Trauma	7.42	1.45	<.01	.12				
Posttraumatic growth									
Step 1	Constant	22.72	1.62	<.01		18.74	.01	.03	
	Time lag	.59	.42	.16	.03				
	Gender	.07	.37	.85	.00				
	Age	-1.12	.15	<.01	-.18				
Step 2	Constant	22.90	1.61	<.01		17.23	<.01	.04	.01
	Time lag	.54	.42	.20	.03				
	Gender	.10	.37	.79	.01				
	Age	-1.17	.15	<.01	-.19				
	Trauma	1.87	.53	<.01	.09				
Quality of life									
Step 1	Constant	108.30	2.51	<.01		3.20	.07	.01	
	Time lag	1.37	.65	.04	.05				
	Gender	-.33	.57	.56	-.01				
	Age	.51	.24	.03	.05				
Step 2	Constant	108.05	2.50	<.01		5.27	<.01	.01	.01
	Time lag	1.46	.65	.03	.05				
	Gender	-.38	.57	.50	-.02				
	Age	.57	.24	.02	.06				
	Trauma	-2.74	.82	<.01	-.08				

symptoms were positively associated as well.[34] The results imply that posttraumatic stress reactions and posttraumatic growth should not be seen as psychological sequelae on a continuum with a positive pole on one side and negative pole on the other, but rather as coexistent constructs.

Posttraumatic stress reactions and quality of life were also strongly related to each other in our study, but negatively. Likewise, young adult survivors of childhood cancer showed more impairment on quality of life when they had PTSD than when they were not diagnosed with the disorder.[35] In adult samples (e.g., of patients admitted to intensive care units[36] and patients with depressive and anxiety disorders[37]) similar associations were found. Our results suggest that in children, too, consequences of traumatic exposure extend beyond specific symptoms to broader areas of life.

Finally, at first glance, the relationship between quality of life and posttraumatic growth appeared significant and negative (but weaker than the other two associations), contrary to our expectations. However, after controlling for the influence of posttraumatic stress reactions, the real association turned out to be positive (and significant but small). We could not locate any studies on the relation between quality of life and posttraumatic growth in children, and only one study in adults. The study on adult survivors of bone marrow transplantation found no significant association between quality of life and positive psychological sequelae such as a new philosophy of life or improved family relationships. The authors questioned the assessment of quality of life, however, suggesting that with a different measurement approach a relationship between the constructs have been found.[38] Our findings confirm the existence of an association between these two constructs in children but suggest that the presence of posttraumatic stress reactions overrules its direction.

The second main finding of our study held that posttraumatic stress reactions, post-traumatic growth, and quality of life were significantly related to traumatic exposure. Children who described a traumatic experience reported more posttraumatic stress reactions (on all domains), more posttraumatic growth, and a lower quality of life (on most domains) than children whose worst experience was nontraumatic. This suggests that, along with numerous indications of the impact of trauma in convenience samples, traumatic exposure shows consequences for the well-being of children in the general population as well.

However, traumatic exposure accounted for a very small part of the variation in scores in the children (the proportion of explained variance for the total model was maximally 7%). Unfortunately, studies on posttraumatic stress in children have rarely included a nonexposed reference group, which complicates comparisons. Nevertheless, in a quality of life study in severely injured children, similar small effects were reported.[39] This result may underline the fact that children typically respond well to difficult life circumstances.

Copeland et al.[1] reported that, although potentially traumatic events were fairly common in children (with an estimated life-time prevalence of 54% in children aged 9 to 13 years), they did not often result in posttraumatic stress symptoms (prevalence of PTSD, subclinical PTSD, and merely reexperiencing symptoms was 0.2%, 1.7%, and 10%, respectively, for exposed 9- to 13-year-olds).

In addition, other explanations may play a role in our finding of significant but small effects and will need to be explored in future research. First, subjective exposure rather than objective exposure to trauma may be of influence. Roussos et al.[40] observed in child victims of an earthquake that the objective exposure rate only accounted for 1.7% of variance in PTSD, while the subjective exposure rate accounted for 11%. In adolescent survivors of cancer, perceived treatment severity and life threat, but not objective disease severity, were associated with posttraumatic growth.[34] It is even imaginable that some events judged to be nontraumatic according to the DSM-IV have an impact equal to some traumatic events. For example, parental divorce may have severely distressing effects on children even when the separation is nonviolent.

Second, mediator or moderator variables could play a role in the relationship between traumatic exposure and well-being of children. Factors such as social support, appraisal of the event, and secondary stressors have been confirmed to be of influence in samples of exposed children (e.g., Udwin et al.[41]). In the general population, the experience of multiple traumas and having a history of anxiety disorders turned out to be important factors.[1] Additionally, for primary school children, the behavior of parents may be of importance.[42]

The present study adds to the existing knowledge on children's well-being in relation to traumatic exposure by elaborating on three constructs that extend beyond PTSD, and by measuring these constructs in a developmentally sensitive way in a large population sample of exposed as well as nonexposed children. Nevertheless, the limitations of the study should be taken into account. First of all, the findings rely on self-reports, whereas in mental health research, clinical interviews are seen as the gold standard for data collection. While the reason for choosing self-report was to convey attention to confidentiality and thus avoid socially desirable answers, replication of the study with clinical interviews would be valuable. Second, only the children themselves were asked to report on their reactions. Although some authors state that children themselves are the only appropriate informants for their (posttraumatic) reactions,[43] others show that parents, children, and other informants, such as teachers, can complement each other in reports.[9] It would be worthwhile to include other informants in future studies. Finally, the design of the study was cross-sectional, which makes it impossible to draw conclusions about cause and effect, and therefore warrants replication in longitudinal studies.

Posttraumatic stress reactions, posttraumatic growth, and quality of life are worth consideration in the development of prevention programs and in clinical practice. Prevention programs could take the form of specific classroom lessons about trauma and its possible consequences (including symptoms children may experience as well as the fact that most children show resiliency), serving as psycho-educational material for children and teachers. With the high life-time exposure rates in mind, such prevention programs would be no luxury. With regard to clinical practice, it would be important to start diagnostic activities with a broad perspective as opposed to an approach focused on PTSD criteria only. Clinicians should consider child-specific reactions to trauma, including both positive and negative sequelae. During the therapy itself, in addition to established therapy methods, elaborating on already existent growth experiences in children would be a worthwhile approach to enhance feelings of competency and being in control.[18]

ACKNOWLEDGEMENTS

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