

Posttraumatic stress disorder reactions among children with learning disabilities exposed to terror attacks

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Abstract

Posttraumatic stress disorder (PTSD) reactions were examined among adolescents exposed to terror attacks. In the first stage, 56 children with learning disabilities (LDs) were compared with 48 nonclinical controls aged 14 to 18 years. Posttraumatic stress disorder in children with LD was significantly higher than in the control group. Next, hierarchic regression predicting PTSD reactions among children with LD was performed. Results revealed that personal exposure to terror, past personal threatening life events, avoidant and anxious attachment, and the anxious attachment \times threatening past events interaction contributed significantly to the explained variance of PTSD. Examination of the source of this interaction revealed that adolescents high in anxious attachment who underwent more threatening past life events were more prone to PTSD when exposed personally to terror attacks. The findings suggest that adolescents with LD have difficulties in cognitive processing of traumatic events. This group of adolescents is in double jeopardy for developing PTSD symptoms if they personally experienced threatening events in the past and are characterized by anxious attachment. The anxious attachment damages their self-regulation, intensifies their distress, and exacerbates the risk for PTSD. Hence, special attention and specific intervention are needed for youth with LD to enhance their coping strategies.

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1. Introduction

Terrorism is a relatively new phenomenon in the United States, but residents of Israel have lived with terror attacks for years. Since September 2000, the Israeli society has been exposed to continual terrorism, including attacks with knives and firearms, drive-by shootings, intrusions into homes, and suicide bombings.

According to the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision* (DSM-IV-TR) [1], posttraumatic stress disorder (PTSD) is induced by experiencing, witnessing, or confronting events that “involved actual or threatening death or serious injury, or a threat to physical integrity of self or others.”

Children and adolescents around the world who live in areas of war and political conflict have been examined and

diagnosed as having heightened levels of posttraumatic symptoms that tend to cluster around the triad of PTSD symptoms: intrusiveness, avoidance and psychic numbing, and hypervigilance (DSM-IV-TR) [1]. They manifest signs of reexperiencing the traumatic event, trying to avoid dealing with the emotions that arise from the experience, and a range of other signs of increased physiological arousal [2]. Among those studied were Israeli children during the Gulf War [3] and other children around the world (eg, Kuwait [4], Bosnia [5], Lebanon [6]).

Traumatic exposure during adolescence has the potential to change the trajectory of a young life by escalating into PTSD and a wide variety of other incapacitating emotional and behavioral difficulties [7,8]. But not all adolescents develop PTSD after exposure to a traumatic event. Among the risk factors for developing PTSD, the literature mentions the type of the trauma, the level of the exposure, age, premorbid function (eg, anxiety, depression, behavioral disorders), and social support and copying behaviors [9]. Multiple and chronic traumas such as war increase the risk for PTSD. Concerning

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the level of exposure, Durakovic-Belko et al [10] and Saige [11] have shown that 25.2% of Lebanese children developed PTSD through direct exposure, 55.6% through observation, 5.6% through verbal transmission, and 13.5% through combined pathways. Saltzman et al [12] suggested that intrinsic risk factors for children are low ability to appraise the magnitude of danger and catastrophic consequences and the poor self-regulation. Learning disabilities (LDs) were described as interfering with the ability to appraise the life-threatening event and with self-regulation [13].

The aim of this study was to shed light on PTSD reactions among a special group of adolescents with LD, who have unique difficulties in processing the threatening information, thus at greater risk for developing PTSD [13]. A diagnosis of learning disorders indicates achievements in reading, mathematics, or written expression that are substantially below that expected for age, schooling, and level of intelligence. Demoralization, low self-esteem, and deficits in social skills may be associated with learning disorders. There may also be underlying abnormalities in cognitive processing (eg, deficits in visual perception, linguistic processing, attention, memory, or a combination of these) that often precede or are associated with LD [1].

Coping with traumatic stress involves the child's capacity for appraising, processing, and encoding the traumatic information and the maintenance or resolution of the traumatic memories and associated emotions [7,8]. Exposure to traumatic events damages self-control and emotional regulation, marked by less organized thinking and a mix-up of cognition, affect, and sensation and a loss of perspective and feeling for the future [14].

Learning disabilities in adolescents can interfere with the processing and appraisal of threatening-traumatic information [8]. It is recognized that many children with LD can encounter difficulties in tasks involving the processing of audio and visual-spatial information. These children also have a low span of apprehension. They are disproportionately vulnerable to processing load because of their high level of distractibility, which impedes their capability for information processing [15]. Learning disabilities can therefore be assumed to impose a unique burden in confronting stressful events and hinder the processing of the traumatic information. Children with LD may appraise stress conditions as more threatening and less manageable, which would make them more vulnerable to PTSD reactions.

At the same time, personal resources might serve as protective factors [16,17]. The protective factors have received little attention in the empirical literature on children or adolescents exposed to terror and war. Among personality traits, research linked children's intelligence, perceived self-efficacy, and optimism to posttrauma reactions and recovery. Others have also emphasized the importance of good communication skills as a means of enabling children to process the events [18], whereas Durakovic-Belko et al [10] reported that cognitive appraisal and coping strategies (eg, problem solving, reinterpretation, expression of emotions) serve as

protective factors in predicting PTSD among adolescents in Sarajevo. One of the personality resources that can be perceived as having "inoculation effect" in coping with traumas is secure attachment [19].

Attachment theory offers a valuable perspective to exploring the risks and protective factors as well as the personal resources that might mediate between the traumatic event and the development of PTSD.

1.1. Attachment theory and coping

Bowlby [20] suggested that early child-caretaker relationships are internalized as mental models generalized to all of the child's interpersonal ties and remain relatively stable later in life. Parental responsiveness and availability provide the child with a secure base used to organize experiences and handle distress. Following the line of reasoning of Bowlby [20], Ainsworth et al [21] described 3 attachment styles in infancy: anxious-avoiding, anxious-ambivalent, and secure. This typology was later validated also among adolescents and adults (see Ref [22] for an extensive review).

Since the mid-1990s, scores of studies have shown that a person's attachment style, assessed with fairly simple, 2-dimensional self-report measures, is a powerful predictor of various psychological phenomena including self- and social schemas, self-regulation of stress and emotion, the quality of social and romantic relationships, and more. Attachment security (ie, relatively low scores on the avoidance and anxiety dimensions) is related to positive conceptions of self and others, curiosity and interest in exploration, cognitive openness and information-processing flexibility, relationship commitment, and relationship satisfaction [22].

Attachment theory also emphasizes the contribution of attachment style to distress management [20]. Attachment patterns are especially salient in facing danger and threats to one's life. There is evidence that attachment style determines the vulnerability to posttraumatic distress. Individuals with secure attachment are found to be better protected from PTSD reactions when confronting stressful life events than individuals with insecure attachment [23]. Secure attachment, it has been argued, is an inner resource that facilitates adjustment and improves well-being in adverse situations. Findings show that secure persons perceive themselves in a positive and coherent way, possess good problem-solving skills, tend to view stressful situations optimistically, and believe that others will help them in time of need. These qualities enable them to confront stress with a sense of mastery, to choose effective coping strategies, and to make use of social support in stressful situations [23]. Several studies provide evidence that secure attachment buffers the detrimental psychological effects even of traumatic stressors such as missile attacks [24], extreme life-threatening conditions [25], and captivity [26]. Insecure attachment, by contrast, is viewed as a risk factor that may detract from the individual's resilience in times of stress. Individuals with an insecure attachment style have less confidence in their ability to cope with difficulties and have poorer problem-solving skills, view difficult

situations as less controllable and more threatening, and tend to distrust others, which leads them to be more anxious, hostile, and distressed in stressful situations [22]. Avoidant persons have been found to deal with distress by deactivating attachment needs, suppressing bad thoughts and feelings, inhibiting any display of distress, and relying on repressive/dissociative mechanisms [23]. Anxious persons have been found to approach distress in a hypervigilant way, to hyperactivate bad thoughts and memories, and to rely on passive ruminative ways of coping [23]. This attitude exacerbates distress and facilitates its spreading to other areas [27].

These studies indicate that a secure attachment style can protect and moderate the traumatic influence of life-threatening conditions, whereas an anxious attachment style predisposes individuals to higher distress and makes them more vulnerable in face of adversity. Although there is an abundance of studies examining adults facing life-threatening conditions, only a few studies examine the moderating role of attachment among adolescents who were exposed to terror events.

Our aims in the present study were 2-fold: to explore PTSD reactions among adolescents with LD (compared with non-LD) and to examine the contribution of attachment style and of having personally experienced threatening life events to predicting PTSD. We hypothesized that adolescents with LD are at high risk for developing PTSD compared with the control group and that exposure to threatening life events and insecure attachment are predictors for PTSD symptoms after involvement in a terror attack.

2. Method

2.1. Participants

A sample of 104 boys aged 14 to 17 years, in grades 8 to 11, who were exposed in the previous 2 to 6 months to terror attacks (eg, suicide bombings or shootings at buses and cars) was divided into 2 groups. Group 1 consisted of 56 adolescents attending special school for the learning disabled (mean age, 14.08 years; SD, 1.3 years); group 2, the control group, consisted of 48 nonclinical adolescents learning in regular schools in Jerusalem (mean age, 13.46 years; SD, 0.72 years).

The students with LD were unable to cope with the curricular demands and attend regular schools. None of these adolescents have mental retardation. All of them were administered intelligence tests by their municipal school psychologists who recommended their referral to the special LD school.

All participants lived in Jerusalem or in the Jewish settlements in Judea and Samaria and were exposed extensively to life-endangering circumstances and uncertainty about their safety during the violent Intifada that began in September 2000. Two months before the study, participants in group 1 (the adolescents with LD) witnessed a terrorist attack by a suicide bomber while they were waiting for their school transportation. Two students were killed and 10 injured

in this attack. A portion of the adolescents were at the scene of the attack, others were on their way to school, and others waited anxiously at school to hear what happened to their peers.

The groups were matched by age and levels of personal exposure to terror attacks.

Among the LD group, 14.4% reported personal involvement in terror attacks and 45.3% reported close acquaintance with victims of terror attacks (eg, family members or close friends). In the nonclinical group, 22.4% reported personal involvement and 22.9% reported close acquaintance with victims of terror attacks. χ^2 Analysis revealed no difference between groups in the personal exposure to terror attacks ($\chi^2_1 = 6.77$; $P = .09$). There was a difference between the groups in the acquaintance with victims of terror attacks, as the LD group knew more people who were exposed to terror attack than the nonclinical group.

2.2. Procedure

The study was conducted in 2 stages. In the first stage, the PTSD reactions of students from special school for learning-disabled adolescents were compared with those of age-matched children learning in regular schools in Jerusalem. The second stage was aimed at the children with LD, who answered a questionnaire concerning past personal threatening life events (eg, involvement in car accidents, serious illness requiring hospitalization, death in the family, family violence) and attachment styles. At this stage, the possible predictors of PTSD (exposure levels to terror attacks, threatening past events, attachment styles) were examined. The adolescents with LD were instructed to ask questions if they did not understand an item. In these cases, the questionnaire was read to them out loud and the items not properly understood were simplified.

All parents gave their consent for their children's participation in the study, and after given an explanation of the nature of the study, the children gave a verbal consent too.

2.3. Measures

2.3.1. Exposure to terror attacks

Participants completed a form indicating their levels of involvement in terror attacks, including personal exposure and close acquaintance with victims of terror attacks (family members or close friends). The list contained details regarding the nature of the terror exposure: whether the adolescent was personally injured or witnessed the event, the place and nature of the attack, proximity to the event, and level of personal acquaintance with the victims.

The LD group also completed a form of traumatic past events (involvement in car accidents, serious illness requiring hospitalization, death in the family, and family violence).

2.3.2. Child Posttraumatic Stress Reaction Index

The Child Posttraumatic Stress Reaction Index (CPTSD-RI) [28] is a 20-item self-report scale designed to assess

Table 1
Comparing the LD and control groups in PTSD subscales

	LD (n = 56)	Controls (n = 48)	F _{3,105}
Intrusiveness	16.38 (4.32)	12.22 (3.11)	31.78*
Avoidance	14.73 (3.90)	12.17 (3.49)	12.78*
Hypervigilance	13.92 (3.80)	11.78 (3.37)	9.45**

Values are expressed as mean (SD) unless otherwise indicated.

* $P < .001$.

** $P < .01$.

posttraumatic stress reactions of children aged 6 to 16 years after exposure to a broad range of traumatic events. The scale has been found valid in detecting the intensity and number of PTSD symptoms according to the psychiatric diagnostic classification [29]. Among the items are DSM-IV PTSD symptoms from each of the 3 main criteria (reexperiencing, avoidance and numbing, and increased arousal) [30]. Participants indicated their responses to each item on a 4-point Likert scale, with scores ranging from 0 (not at all) to 4 (all the time). A substantial number of studies have demonstrated the high reliability and validity of the CPTS-RI; Cronbach α reliability found for the test was .89 [31]. Following the proposal of Nader [30], we added 16 questions to the original index, some of them to meet DSM-IV-TR criteria and others to examine somatization, regressive behaviors, survivors' guilt, and pessimistic views of the world and future. The remaining were exposure questions. A total of 36 questions were administered. The A [2] criteria included 4 items describing the horror, fear, helplessness, and stress involved in experiencing terror events; the B criteria, covering reexperiencing, included 13 items; the C criteria, treating avoidance, included 11 items; and the D criteria, portraying increased arousal responses, included 8 items.

Cronbach α reliability was .90.

2.3.3. Attachment Styles Classification Questionnaire (multi-item measure of adult attachment experience in close relationships)

This self-report questionnaire measures the 2 attachment dimensions, anxiety or avoidance, with 2 reliable 18-item Likert scales, based on factor analyses of previous measures [32]. The 2 scales (anxiety and avoidance) are reliable both in internal consistency (Cronbach α of .94 for avoidance and .91 for anxiety) [32] and from the test-retest point of view and have high construct, predictive, and discriminant validity

[33]. The reliability and validity of the scales have been demonstrated repeatedly [32,34]. Low scores in the anxiety and avoidance dimensions indicate a secure attachment pattern. The 2 scales were conceptualized as independent and, like the 2 discriminant functions reported by Ainsworth et al [21], have been found to be uncorrelated in most studies.

3. Results

3.1. Stage I: PTSD reactions among the LD and control groups

One-way analysis of variance (ANOVA) revealed significant differences in the total PTSD scores between the LD and the control groups (57.64 ± 13.28 and 45.28 ± 11.08 , respectively; $F_{1,101} = 26.09$; $P < .001$). Significant differences were also found in the 3 PTSD subscale scores: intrusiveness, avoidance, and hypervigilance. Multivariate ANOVA (MANOVA) with repeated measures yielded significant differences between the groups in the 3 PTSD subscales ($F_{3,99} = 11.26$; $P < .001$) (Table 1).

The 2×2 MANOVA was carried out to examine whether the differences between the groups are related to the levels of personal involvement in terror attacks. The differences between the groups remained significant ($F_{3,103} = 9.73$; $P < .001$).

The MANOVA did not yield a significant difference between those who were personally involved and those who were not exposed personally to terror attacks ($F_{3,103} = 0.49$; $P > .05$). No significant interaction groups \times personal involvement was found ($F_{3,103} = 2.43$; $P = .069$), whereas in the ANOVA, significant interaction was found for groups \times avoidance ($F_{1,105} = 4.24$; $P < .05$) and groups \times hypervigilance ($F_{1,105} = 6.69$; $P < .05$) for each PTSD subscale.

To understand these interactions, Simple Main Effect analyses were performed, comparing adolescents who were personally involved in terror attacks with those who were not in each of the groups. Table 2 presents the mean and SD of these comparisons. No significant difference was found in the controls between those who were exposed to terror and those who were not. By contrast, in the LD group, significant differences were found in avoidance ($F_{1,58} = 3.11$; $P < .05$) and in hypervigilance ($F_{1,58} = 5.36$; $P < .05$). Thus, it appears that personal involvement was associated with PTSD levels only in the LD group.

Table 2
Mean and SD of personal involvement in terror attacks among the LD and control groups

	LD (n = 56)		Controls (n = 48)		F _{1,58} (among the LD)
	Personal involvement in terror attacks	Non-personal involvement	Personal involvement in terror attacks	Non-personal involvement	
Intrusiveness	1.85 (.46)	1.60 (.42)	1.19 (.15)	1.23 (.34)	
Avoidance	1.68 (.43)	1.43 (.37)	1.11 (.16)	1.24 (.38)	3.11*
Hypervigilance	1.65 (.52)	1.34 (.33)	1.06 (.11)	1.21 (.37)	5.36*

* $P < .05$.

3.2. Stage II: predicting PTSD in the LD group

To investigate the factors that may affect PTSD reactions among the LD group, we examined the occurrence of past threatening life events.

As shown in Table 3, whereas events experienced personally affected the levels of PTSD (overall score), threatening events in the family did not. It is possible that the absence of significant impact on the PTSD level of these events is due to the low frequency of events such as death or violence in the family in this sample.

3.3. Hierarchical regression for predicting PTSD in the LD group

The second objective of the study was to examine the contribution of a series of independent variables to the prediction of PTSD levels in the LD group. To examine the overall contribution of the different independent variables to the explanation of the variance in PTSD and to check whether the interactions between those predictors contribute to the explanation of the variance in PTSD, a hierarchical regression was performed. In the first step of the hierarchical regression analysis, personal involvement in terror attacks and exposure to terror by personal acquaintance were entered. The second step included past personal threatening life events. In the third step, the attachment dimensions were entered, and in the fourth step, the interactions. The criterion for entering the regression function in this step was the level of significance ($P < .05$), and the interaction between anxious attachment \times past threatening event was entered (Table 4). All these variables explained 37% of the PTSD variance.

In the first step, 2 variables were entered, personal involvement in terror attacks and exposure to terror by personal acquaintance, and only the former contributed significantly (9%) to the explained variance of PTSD. In the second step, past personal threatening life events contributed 10% to the explained variance of PTSD. In the third step, anxious and avoidant attachment contributed another 9%. As can be seen from the β coefficient in Table 4, the greater the insecure attachment (avoidant or anxious), the higher the level of PTSD. Avoidant attachment contributed more than anxious attachment. In the fourth step, the anxious attachment \times past threatening event interaction added 9% to the explained variance of the PTSD.

To examine this interaction, adolescents with LD were divided into 2 groups: high and low in anxious attachment.

Table 3
Occurrence of past threatening life events among the LD group

Past threatening life events	Yes		No		$F_{1,58}$
	Mean	SD	Mean	SD	
Car accident	61.50	13.22	54.99	12.10	3.77*
Hospitalization	61.12	12.94	54.11	11.93	4.75*
Death in the family	59.36	13.87	55.76	11.82	1.18
Family violence	58.48	16.22	57.21	12.38	0.07

* $P < .05$.

Table 4
Hierarchical regression analysis for predicting PTSD among adolescents with LD

Predictors	β	B	SE B	R^2
Step 1				
Personal involvement	.30*	10.62	4.75	0.09*
Exposure by personal acquaintance	-.08	-2.01	3.33	
Step 2				
Personal involvement	.26*	9.22	4.53	0.19*
Exposure by personal acquaintance	-.09	-2.42	3.16	
Past personal threatening life events	.33**	9.22	3.49	
Step 3				
Personal involvement	.26*	9.45	4.37	0.28**
Exposure by personal acquaintance	-.11	-2.83	3.05	
Past personal threatening life events	.25*	6.96	3.50	
Avoidant attachment	.31**	3.05	1.28	
Anxious attachment	.21*	3.13	1.91	
Step 4				
Personal involvement	.26*	9.44	4.10	0.37**
Exposure by personal acquaintance	-.13	-3.40	2.89	
Past personal threatening life events	.24*	6.68	3.32	
Avoidant attachment	.22*	2.15	1.26	
Anxious attachment	.28*	4.12	1.85	
Anxious attachment \times past threatening event	.32**	3.64	1.40	

* $P < .05$.

** $P < .001$.

In each group, the correlations between PTSD and past threatening life events were calculated. The correlations between past events and PTSD were insignificant among those who were low in anxious attachment ($r = 0.20$; $P > .05$), but were significantly correlated among adolescents with LD with high anxious attachment ($r = 0.63$; $P < .001$). In other words, those who were high in anxious attachment and underwent more threatening past events were more prone to PTSD when exposed personally to terror attacks.

4. Discussion

This is one of the few studies to examine adolescents' posttraumatic stress reactions while in the midst of ongoing terror events. The study examined a sample of adolescents who exposed daily to the threat of terror, either by personally witnessing suicide bombings or shootings or by constant exposure to an atmosphere of vulnerability to terror attacks. Another unique aspect of this study is the prediction of PTSD reactions among adolescents with LD by the inclusion of acerbating (past threatening events) and protective (secure attachment) factors.

The results of the study indicate significantly higher PTSD scores (overall and on the intrusion, avoidance, and hypervigilance subscales) in the LD group than in the

controls, while controlling statistically the levels of exposure to witnessing of terror attacks.

These differences support the notion that LD hinders adolescents coping with traumatic events, as it interferes with the encoding and processing of information, which play a crucial role in the construction of meaning to the psychological significance of the event. In addition, LD reduces the sense of self-efficacy [15,35] and is generally manifested in higher levels of PTSD. McNally [36] suggests that school and learning problems are risk factors for developing PTSD. Learning disability increases misappraisals [8], undermines concentration, narrows the focus of attention, and impairs the encoding of the traumatic information, hence resulting in fragmented memories, misinterpretation of the event, and the DSM-IV PTSD symptom: “inability to recall an important aspect of the trauma” [29], followed by reexperiencing the trauma [36]. The memory disturbances cause poor elaboration and contextualization of the traumatic event and raise the risk for developing PTSD [37]. Furthermore, these risk factors for developing PTSD increase the probability of cognitive biases for events related to external harm and somatic sensations [37], leading to hypervigilance and the activation of trauma-related representations by many internal and external cues [38].

The major findings of the study concern the prediction of PTSD among adolescents with LD. Acerbating and protective factors were examined. Among the acerbating factors were threatening life events experienced in the past and insecure attachment; secure attachment was a protective factor. The hierarchic regression revealed that personal experience of traumatic events, either personal exposure to terror attack or threatening events experienced in the past (eg, hospitalization or car accident), had the greatest effect on PTSD reactions, whereas acquaintance with terror victims and past traumatic experiences in the family did not significantly contribute to the prediction of PTSD. These findings call to question those of the literature about near-miss victims of catastrophic events and indirect/vicarious exposure to traumatization [39–41] and can be explained by the severe impact of personal first hand experiences in facing death, which exceeds that of events occurring in the family or that of close acquaintance with terror victims.

The regression shows that when threatening events experienced in the past were entered in the second step, they aggravated the influence of present exposure to terror attacks, indicating that personally experiencing threatening events in the past generates vulnerability to PTSD. These findings support the vulnerability perspective; according to which, prior experience of a traumatic event erodes self-confidence and mastery, depletes coping resources, and reduces the ability to withstand subsequent stress.

Anxious or avoidant attachment (entered in the third step) increased this vulnerability. Converging evidence has demonstrated the role of early life trauma [42,43] and of insecure attachment [44] in the development of PTSD and other trauma-related disorders. Individual variations in attachment

system functioning play a crucial role in determining the extent to which PTSD ensues from exposure to trauma. Disruptions in optimal functioning of the attachment system can prevent the restoration of emotional equanimity and thereby contribute to PTSD formation. In such cases, a traumatized person may fail to find inner representations of security or external sources of support and comfort, which may then interfere with the regulation of distress and might prevent resolution of the trauma and enhance the likelihood of prolonged PTSD. Attachment-related strategies are important in regulating the intensity and frequency of posttraumatic intrusion and avoidance tendencies. High levels of anxious attachment exacerbate the likelihood of posttraumatic intrusion symptoms, whereas avoidant attachment exacerbates the avoidance symptoms [25]. Research that studied Israeli undergraduates coping with missile attacks in the Gulf War [24] revealed that persons with anxious attachment style exhibited heightened reliance on maladaptive emotion-focused coping, experienced higher levels of depression and anxiety after the war, and had more severe PTSD symptoms of intrusion and avoidance, whereas those with an avoidant attachment style relied more on distancing coping with the missile attacks, denied or suppressed anxiety and depression, and expressed distress indirectly through higher somatization and hostility after the war and more severe posttraumatic avoidance responses.

Research about extreme life events and traumatic experiences and their interaction with the attachment system is sparse. In examining the interaction between anxious attachment and personally past threatening events (entered in the fourth step of the regression), the study seeks to shed light on the vulnerability for developing PTSD. This interaction seems to indicate that those who are high in anxious attachment and underwent more past threatening life events are more prone to PTSD when exposed personally to terror attacks. It can be assumed that the helplessness at the core of the trauma experience is aggravated by the difficulties imposed on this group of adolescents by their LD, which hinders their sense of efficacy and depletes their inner resources because of prolonged feelings of underachievement [45], which in turn also aggravate the anxious attachment.

Attachment patterns are critical in regulating distress. Attachment behavior is assumed to be activated in dangerous and threatening situations [20]. The activation of attachment-specific response to trauma may explain why some victims deactivate and others hyperactivate their distress. Individuals with secure and insecure attachment styles (either anxious or avoidant) differ in their access to negative memories and in the ways in which they regulate painful emotions [46]. Whereas secure attachment mitigates the negative effects of stress and the pathogenic effects of extreme traumatic stress [47] and serves as an inner resource related with positive appraisal of stressful events and a feeling of ability to cope with it [23], anxious attachment aggravates the perception of threat and obstructs affect regulation by exaggerating the sense of distress [22]. Anxious attachment pattern was related with a

poor repertoire of self-regulatory skills, vigilance for cues of danger, and a tendency to exaggerate threatening aspects of the environmental transactions, including rumination on potential threats, which occupies the working memory [22].

This is consistent with the model of Lazarus and Folkman [48] of stress and coping, which emphasizes the critical role played by the appraisal processes in the regulation of distress and the mobilization of coping efforts. Although the attachment system is designed to cope with threats and to regulate distress, individuals characterized by anxious attachment are less equipped with regulatory devices [22] and are therefore more prone to develop PTSD, especially if the current trauma is further encumbered by threatening experiences in the past.

4.1. Limitations

Several limitations of the study must be taken into account. First, the study provides a “snapshot” of the adolescents coping with terror attacks 2 to 6 months after experiencing the traumatic event, and therefore follow-up research is warranted. Second, the sample is distinctive in 2 ways, as it included only boys who attended special school for the LD. Therefore, findings are confined to this special group of male adolescents and cannot be generalized to other victims of terror attacks. Third, diagnoses other than LD (eg, attention-deficit/hyperactivity disorder, depressive disorders, anxiety disorders), which might have contributed to the understanding of the difficulties of these adolescents, were not examined. Fourth, we did not rate the intensity of PTSD (as doubtful, mild, moderate, severe, and very severe) and were therefore unable to compare our findings with those of other research examining children or adolescents exposed to terror and war. Moreover, the absence of clinical assessment, in addition to the CPTSD-RI, whether children met all the criteria for PTSD, undermines to some degree the sway of our results. Finally, participants were exposed to a variety of terror attacks that ranged from being personally at the scene of a suicide bombing or shooting on a bus to seeing an exploded bus with dead and injured people around; this variety probably blurred our results.

More research into the relationship between LD and attachment patterns is needed.

The risk and protective factors for exposure to traumatogenic events must be identified systematically in planning interventions for this group of adolescents.

4.2. Clinical implications and conclusion

Our findings indicate that adolescents with LD have greater PTSD symptoms (overall and on the intrusion, avoidance, and hypervigilance subscales) than the control group. It can be assumed that the higher level of PTSD is the result of their difficulties in the cognitive processing of the life-threatening events they experienced [10]. Adolescents are in double jeopardy for developing PTSD symptoms when they have personally experienced threatening events in the past and are characterized by an anxious attachment.

Anxious attachment damages their self-regulation, intensifies their distress, and exacerbates the risk of PTSD. Therefore, special attention must be paid to youths with LD who are more vulnerable to PTSD, by planning special programs for individual, group, or family intervention, to support the processing of traumatogenic information and promote their coping with the threatening experiences to which they were exposed. At the diagnostic level, professionals who evaluate these youths’ distress and plan therapeutic interventions must view both poles (the traumatic and the LD factors) as well as the developmental stage of identity consolidation. Intervention could be approached from the angle of attachment relationships. Promoting parental support and their availability and sensitivity to their children’s difficulties in processing life-threatening events might make them more responsive to the special needs of their children and enhance their coping strategies.

References

- [1] American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders*. Washington (DC): APA; 2000.
- [2] Perin S, Smith P, Yule W. Practitioner review: the assessment and treatment of post-traumatic stress disorder in children and adolescents. *J Child Psychol Psychiatry* 2000;41:277–89.
- [3] Schwarzwald J, Weisenberg M, Solomon Z, Waysman M. What will the future bring? Thoughts of children after missile bombardment. *Anxiety Stress Coping* 1997;10:257–67.
- [4] Nader KO, Pynoos R, Fairbands LA, Al-Ajeel M, Al-Asfour A. A preliminary study of PTSD and grief among the children of Kuwait following the Gulf crisis. *Br J Clin Psychol* 1993;32:407–16.
- [5] Papageorgiou V, Frangou GA, Lordanidou R, Yule W, Smith P, Vostanis P. War trauma and psychopathology in Bosnian refugee children. *Eur Child Adolesc Psychiatry* 2000;9(2):84–90.
- [6] Mackoud MS, Aber JL. The war experience and psychosocial development of children in Lebanon. *Child Dev* 1996;67:70–88.
- [7] Solomon K, Bryant RA. Posttraumatic stress disorder in children, the influence of developmental factors. *Clin Psychol Rev* 2002;22:163–88.
- [8] Pynoos RS, Steinberg AM, Piacentini JC. A developmental psychopathology model of childhood traumatic stress and intersection with anxiety disorders. *Biol Psychiatry* 1999;46(11):1542–54.
- [9] Lonigan CJ, Phillips BM, Richey JA. Post traumatic stress disorder in children: diagnosis, assessment, and associated features. *Child Adolesc Psychiatr Clin N Am* 2003;12:171–94.
- [10] Durakovic-Belko E, Kulenoviv A, Dapic R. Determinants of posttraumatic adjustment in adolescents from Sarajevo who experienced war. *J Clin Psychol* 2003;59:27–40.
- [11] Saige PA. The development of posttraumatic stress disorder following four different types of traumatization. *Behav Res Therapy* 1991;14:247–75.
- [12] Saltzman WR, Layne CM, Steinberg AM, Arslanagic B, Pynoos RS. Developing a culturally and ecologically sound intervention program for youth exposed to war and terrorism. *Child Adolesc Psychiatr Clin N Am* 2003;12:319–42.
- [13] McCarthy J. Post-traumatic stress disorder in people with learning disability. *Adv Psychiatr Treat* 2001;7:163–9.
- [14] Chemtob CM, Nakashima J, Carlson JG. Brief treatment for elementary school children with disaster-related posttraumatic stress disorder: a field study. *J Clin Psychol* 2002;58:99–112.
- [15] Weiler MD, Harris NS, Marcus DJ, Bellinger D. Speed of information processing in children referred for learning problems: performance on a visual filtering test. *J Learn Disabil* 2000;33:538–50.

- [16] Foy DW, Madvig BT, Camilleri AJ. Etiologic factors in the development of posttraumatic stress disorder in children and adolescents. *J Sch Psychol* 1996;34:133-45.
- [17] Hallis D, Slone M. Coping strategies and locus of control as mediating variables in the relation between exposure to political life events and psychological adjustment in Israeli children. *Int J Stress Manag* 1999; 6(2):105-23.
- [18] Phillips D, Prince S, Schiebelhut L. Elementary school children's responses 3 months after the September 11 terrorist attacks: a study in Washington, DC. *Am J Orthopsychiatry* 2004;74:509-28.
- [19] Howard MS, Medway FJ. Adolescents' attachment and coping with stress. *Psychol Sch* 2004;41:391-402.
- [20] Bowlby J. *A secure base*. London: Routledge; 1988.
- [21] Ainsworth MDS, Blehar MC, Waters E, Wall S. *Patterns of attachment: a psychological study of the strange situation*. Hillsdale (NJ): Erlbaum; 1978.
- [22] Mikulincer M, Shaver PR. The attachment behavioral system in adulthood: activation, psychodynamics, and interpersonal processes. In: Zanna MP, editor. *Adv Exp Soc Psychol*, vol. 35. San Diego (Calif): Academic Press; 2003. p. 53-152.
- [23] Mikulincer M, Florian V. The relationship between adult attachment styles and emotional and cognitive reactions to stressful events. In: Simpson JA, Rholes WS, editors. *Attachment theory and close relationships*. New York: Guilford Press; 1998. p. 143-65.
- [24] Mikulincer M, Florian V, Weller A. Attachment styles, coping strategies, and posttraumatic psychological distress: the impact of the Gulf War in Israel. *J Pers Soc Psychol* 1993;64:817-26.
- [25] Mikulincer M, Horesh N, Eilati I, Kotler M. The association between adult attachment style and mental health in extreme life-endangering conditions. *Pers Individ Differ* 1999;27:831-42.
- [26] Solomon Z, Ginzburg K, Mikulincer M, Neria Y, Ohry A. The role of attachment in coping with war captivity. *Eur J Pers* 1998;12:271-85.
- [27] Mikulincer M, Orbach I. Attachment styles and repressive defensiveness: the accessibility and architecture of affective memories. *J Pers Soc Psychol* 1995;68:917-25.
- [28] Fredrick C, Pynoos R, Nader K. Childhood post-traumatic stress reaction index, a copyrighted instrument. In: Weiner J, editor. *Textbook of child and adolescent psychiatry*. Washington (DC): American Psychiatric Press; 1991. p. 339-48.
- [29] American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders*. 4th ed. Washington (DC): APA; 1994.
- [30] Nader KO. Assessing traumatic experiences in children. In: Wilson JP, Keane TM, editors. *Assessing psychological trauma and PTSD*. New York: Guilford; 1997. p. 291-348.
- [31] Carrion VG, Weems CF, Ray R, Reiss AI. Toward an empirical definition of pediatric PTSD: the phenomenology of PTSD symptoms in youth. *J Am Acad Child Adolesc Psychiatry* 2003;41:166-73.
- [32] Brennan KA, Clark CL, Shaver PR. Self-report measurement of adult attachment: an integrative overview. In: Simpson JA, Rholes WS, editors. *Attachment theory and close relationships*. New York: Guilford Press; 1998. p. 46-76.
- [33] Crowell JA, Fraley RC, Shaver PR. Measurement of adult attachment. In: Cassidy J, Shaver PR, editors. *Handbook of attachment: theory, research, and clinical applications*. New York: Guilford Press; 1999. p. 434-65.
- [34] Mikulincer M, Florian V. Exploring individual differences in reactions to mortality salience: does attachment style regulate terror management mechanisms? *J Pers Soc Psychol* 2000;79:260-73.
- [35] Friehe MJ, Swain KD. Helping students with disabilities deal with acts of terrorism. *Commun Disord Q* 2002;23:87-90.
- [36] McNally RJ. Psychological mechanisms in acute responses to trauma. *Biol Psychiatry* 2003;53:780-8.
- [37] Bryant RA. Early predictors of posttraumatic stress disorder. *Biol Psychiatry* 2003;53:789-95.
- [38] Foa EB, Steketee G, Rothbaum BO. Behavioral/cognitive conceptualization of post traumatic stress disorder. *Behav Ther* 1989;20: 155-76.
- [39] American Academy of Child and Adolescent Psychiatry. Practice parameters for the assessment and treatment of children and adolescents with posttraumatic stress disorder. *J Am Acad Child Adolesc Psychiatry* 1998;37:4S-26S.
- [40] Ayalon O. Community healing for children traumatized by war. *Int Rev Psychiatry* 1998;10(3):224-33.
- [41] Gurwitsch RH, Sitterle KA, Young BH, Pfefferbaum B. The aftermath of terrorism. In: La Greca AM, Silverman WK, Vernberg EM, Roberts MC, editors. *Helping children cope with disasters and terrorism*. Washington: American Psychological Association; 2002. p. 327-57.
- [42] McFarlane AC, Yehuda RA. Resilience, vulnerability, and the course of posttraumatic reactions. In: Van der Kolk BA, McFarlane AC, editors. *Traumatic stress: the effects of overwhelming experience on mind, body, and society*. New York: Guilford Press; 1996. p. 155-81.
- [43] Vermetten E, Bremner JD. Circuits and systems in stress: II. Applications to neurobiology and treatment in posttraumatic stress disorder. *Depress Anxiety* 2002;16:14-38.
- [44] Sagi-Schwartz A. Introduction to the special issue: extreme life events and catastrophic experiences and the development of attachment across the life span. *Attach Hum Dev* 2003;5:327-9.
- [45] Hollins S, Sinason V. Psychotherapy, learning disabilities and trauma: new perspectives. *Br J Psychiatry* 2000;176:32-6.
- [46] Mikulincer M, Orbach I, Iavnieli D. Adult attachment style and affect regulation: strategic variations in subjective self-other similarity. *J Pers Soc Psychol* 1998;75:436-48.
- [47] Zakin G, Solomon Z, Neria Y. Hardiness, attachment style, and long term psychological distress among Israeli POWs and combat veterans. *Pers Individ Differ* 2003;34:819-29.
- [48] Lazarus RS, Folkman S. *Stress, appraisal, and coping*. New York: Springer; 1984.