Posttraumatic Stress Disorder in Infants and Young Children Exposed to War-Related Trauma
Ruth Feldman, Ph.D., AND Adva Vengrober, M.A.

Objective: Although millions of the world’s children are growing up amidst armed conflict, little research has described the specific symptom manifestations and relational behavior in young children exposed to wartime trauma or assessed factors that chart pathways of risk and resilience. Method: Participants included 232 Israeli children 1.5 to 5 years of age, 148 living near the Gaza Strip and exposed to daily war-related trauma and 84 controls. Children’s symptoms were diagnosed, maternal and child attachment-related behaviors observed during the evocation of traumatic memories, and maternal psychological symptoms and social support were self-reported. Results: PTSD was diagnosed in 37.8% of war-exposed children (n = 56). Children with PTSD exhibited multiple posttraumatic symptoms and substantial developmental regression. Symptoms observed in more than 60% of diagnosed children included nonverbal representation of trauma in play; frequent crying, night waking, and mood shifts; and social withdrawal and object focus. Mothers of children with PTSD reported the highest depression, anxiety, and posttraumatic symptoms and the lowest social support, and displayed the least sensitivity during trauma evocation. Attachment behavior of children in the Exposed-No-PTSD group was characterized by use of secure-base behavior, whereas children with PTSD showed increased behavioral avoidance. Mother’s, but not child’s, degree of trauma exposure and maternal PTSD correlated with child avoidance. Conclusions: Large proportions of young children exposed to repeated wartime trauma exhibit a severe posttraumatic profile that places their future adaptation at significant risk. Although more resilient children actively seek maternal support, avoidance signals high risk. Maternal well-being, sensitive behavior, and support networks serve as resilience factors and should be the focus of interventions for families of war-exposed infants and children. J. Am. Acad. Child Adolesc. Psychiatry, 2011;50(7):645–658. Key words: PTSD, war-related trauma, toddlers, preschoolers, attachment theory.
cane Katrina,4 the September 11th terrorist attack,5 natural disasters,6,7 motor vehicle accidents,8 or exposure to domestic violence,9-11 taking into account the developmental sensitivities, assessment difficulties, and specific symptom manifestations at this age group.12 All studies demonstrated a distinct and detectable PTSD constellation in young children after traumatic experiences that involve a real threat to the physical integrity of the self or significant others.13,14 Research on children exposed repeatedly to war, typically assessing older children or adolescents, has similarly underscored the long-term effects of wartime experiences on children’s well-being, emotional reactivity, and mental and physical health.15-17 It has been further emphasized that the assessment of PTSD in young children should be accompanied by direct observations of the child’s emotional reactions to the evocation of traumatic memories in addition to maternal reports, in particular, the increase in secure base behaviors or signs of withdrawal and numbing, which mark the child’s nonverbal distress to trauma reminders. However, we are aware of no study that included formal observations of young children’s behavior during the evocation of traumatic memories as coded by individuals blind to the child’s psychiatric diagnosis.

Theoretical models of childhood PTSD posit that the study of risk and resilience after trauma should be viewed from a perspective that takes into account multiple levels of the child’s ecology, including the mother’s mental health and emotional resources, the nature of the mother–child relationship, and the family’s broader social support networks.2,18-22 In particular, the study of resilience, defined as positive outcome despite significant adversity,23 may benefit from research on the correlates of war-related childhood PTSD. Among the central controversies in the study of resilience is uncertainty in the measurement of risk. Not only is it impossible to ascertain the accuracy of young children’s reports, but environments marked by chronic early stress differ substantially from one another, underscoring the question of whether resilient children are those who experienced less adversity.24 War exposure offers a “natural experiment” in which all children are exposed to the same or highly similar traumatic experiences over a lengthy period; yet, individual differences in the child’s biological and social provisions may chart specific pathways to the development of the disorder in some children but not in others. Consistent with the view that resilience is a process reflecting natural human adaptation,25 war exposure may offer a context to describe child and family factors that function to enhance positive adaptation in the face of chronic stress.26

Since the early work of Anna Freud and Dorothy Burlingham on young children during World War II,27 it has been suggested that the mother’s emotional adaptation serves as a “defensive wall” against the effects of war on the child and plays an important role in the development of the child’s disorder and in its symptom severity and trajectory over time. Studies assessing children’s traumatic responses to war and terrorism across the globe, following the 9/11 terrorist attack,28 the war in Lebanon,29 military violence in Gaza,30 SCUD missiles in Iraq,31 the wars in Kosovo32 and Bosnia-Hercegovina,17 or the Oklahoma City bombing,32 demonstrate that the mother’s posttraumatic symptoms, depression, and anxiety meaningfully increase the risk of childhood PTSD. Similarly, the family’s support networks serve as a buffer against maternal psychopathology and increase the mother’s ability to contain her own and the child’s distress.

Although little research has focused on observed mother–child interactions, war exposure may provide a unique vantage point to study the attachment system and its ability to function as a “secure base”33 during periods of continuous stress. Conditions of stress and uncertainty activate the attachment system and have traditionally been used to assess individual variability in its parameters.34 Children experiencing consistent maternal sensitivity tend to increase the use of secure base behaviors during moments of distress, such as proximity seeking or heightened focus on mother, which reciprocally elicit more sensitive caregiving.35 In fact, Bowlby’s seminal formulations on the attachment system and its three phases of attachment, separation, and loss36-38 were based on observations of young children’s reactions to repeated wartime trauma and the role of secure base behaviors and the mother’s sensitive response in repairing momentary disruptions to the attachment relationship. Such mechanisms were thought to protect against the avoidance and numbing associated with the loss of attachment bonds, which results from the mother’s prolonged inability to function.
as a secure base. In support, animal and human studies have demonstrated that maternal proximity and sensitive caregiving provide “external regulators” that buffer against the hyperarousal, anxiety, and bio-behavioral disorganization caused by maternal separation, whereas prolonged separation and the decompensation of the mother’s regulatory functions results in hypoactivity and biological and behavioral withdrawal. It can thus be expected that sensitive mothering and children’s increased use of secure base behaviors would chart a resilience pathway and may buffer against the development of PTSD. On the other hand, the avoidant behavioral response typical of loss would mark a risk pathway and correlate with greater posttraumatic symptomatology in young children. Avoidance as a signal of more pathological reaction to war-related trauma has similarly been reported in older children and adults.

In light of the above, the current study examined the development of PTSD in infants and young children 1.5 to 5 years of age exposed to war-related trauma over a lengthy period. A large cohort of Israeli children living at the border of the Gaza Strip and exposed to daily rockets and terrorist attacks were observed with their mothers and compared with nonexposed matched controls. Two major goals guided the study: (1) to describe the PTSD constellation in infants and young children following war-related trauma in terms of specific symptoms, developmental regression, and observed attachment-related behavior, including secure base and avoidant behavior during the evocation of traumatic memories, and (2) to assess maternal correlates of childhood PTSD related to both observed maternal sensitivity and mental health factors. We sought to chart maternal and child risk and resilience pathways to the development of PTSD and thus, a special focus were the differences between war-exposed children who developed PTSD and those exposed to the same wartime trauma who did not develop the disorder (Exposed-No-PTSD children).

Our specific hypotheses were: (1) a subgroup of war-exposed children would develop the early childhood PTSD syndrome and exhibit the typical symptoms in the re-experiencing, avoidance, and hyperarousal domains. (2) With regard to child risk and resilience factors, we hypothesized that children with PTSD would show greater developmental regression in the cognitive, social, and daily living domains, and would exhibit more behavioral avoidance during the evocation of traumatic memories, whereas Exposed-No-PTSD children would display more secure base behaviors during trauma evocation. (3) Regarding maternal risk and resilience factors, we expected that mothers of PTSD children would report higher depression, anxiety, and posttraumatic symptoms and lower social support as compared with mothers of Exposed-No-PTSD children, whereas mothers of Exposed-No-PTSD children would display greater sensitivity during trauma evocation. Finally, (4) attachment-related maternal and child behavior during the evocation of traumatic memories—maternal sensitivity, child secure base behavior, and child avoidant behavior—would each be independently predicted by components of the child’s ecology, including maternal, child, and contextual factors.

METHOD
Participants
Participants included 232 children 1.5 to 5 years of age (mean age = 33.08 months, SD = 10.89 months) and their mothers (mean age = 31.27 years, SD = 5.55 years, range = 22.3–47.4 years). Of the children, 47.6% were male and 47.1% were firstborn. Maternal and paternal education averaged 3.88 (SD = 1.44) and 3.51 (SD = 1.49) respectively on a scale of 1 (elementary school) to 4 (college education). Among mothers, 31.6% worked full-time and 42.6% worked part-time, and 11% were single mothers.

A total of 148 families comprised the war-exposed group. These included children living in the same neighborhoods in the town of Sderot, located 10 km from the Gaza border. Citizens of Sderot were exposed repeatedly to rocket attacks over a period of several years, had only 15 seconds to enter protected spaces after hearing the alert sirens, and were exposed to frequent mortar shelling to which no alert signals were provided. Testing was conducted during a period of repeated rocket and missile attacks (January 2006–October 2008). During this period rocket attacks on Sderot occurred unpredictably and continuously several times a month, and all children were seen at least 1 month after the period these attacks began. Visits were not conducted during the day of the attack or within the next 2 to 3 days.

Recruitment was conducted through clinicians living in Sderot or in neighboring cities who were familiar with the clinical and childcare services for this age; once recruitment had begun, participants helped identify eligible friends and neighbors. Advertisements for study participation were posted in all childcare loca-
Practices across Sderot, and the great majority of families approached (>90%) agreed to participate. It can thus be assumed that the majority of young children growing up in these frontline neighborhoods participated in the study and exclusion criteria included only those who were physically or mentally handicapped (e.g., severe autism, mental retardation). Family received $80 in vouchers for their participation.

A total of 84 nonexposed children were recruited as controls from towns within the greater Tel-Aviv area (e.g., Or Yehuda, Pardes Katz) that were equivalent to the town of Sderot in terms of population size, socioeconomic composition, and housing and employment opportunities. These areas were not exposed to war-related trauma during the study period, and controls were matched to the exposed group in age, gender, birth order (firstborn/last born), maternal and paternal age and education, and maternal employment and marital status. Before home visits, control families were screened by phone for major traumatic events in the child’s life (e.g., terror exposure, motor vehicle accidents, physical or sexual abuse), and those reporting such trauma were excluded. The study was approved by the University’s Institutional Review Board, and all mothers signed informed consent.

Procedure

Child PTSD. Trained clinicians with a background in early childhood development and psychopathology visited families at home and diagnosed the child’s PTSD using the Diagnostic Classification: Zero-to-Three Revised (DC:0-3R). Clinicians received extensive training on the clinical features of PTSD at this age and its specific behavioral manifestations; how to interview mothers and elicit information on young children’s emotional state; the specific symptom manifestations at this age; how to approach mothers and children living under continuous war-related trauma; the specific DC 0-3R criteria for diagnosing early childhood PTSD and the information that should be collected on the nature and proximity to the traumatic event, child emotional reaction, specific symptoms in the various symptom clusters; and how to provide a developmentally sensitive evaluation of the child’s developmental regression. Clinicians were supervised by a senior clinical child psychologist and a child psychiatrist, and cases were conferred every few weeks.

The home visit was intended to diagnose the child in his/her natural ecology and to enable the observation of maternal and child behavior during the evocation of traumatic memories. Such observations have been advocated as central for the diagnosis of PTSD in young children. Information was collected during one afternoon visit that lasted approximately 3.5 to 4 hours (with breaks). A second visit was scheduled to collect questionnaires and additional information if data were missing.

Home visits began with the clinician interviewing the mother and collecting detailed information for the diagnosis of PTSD, including the specifics of the trauma exposure, the child’s and family members’ degree of exposure, and the child’s emotional reaction to specific events, including description of incidences of exposure, the child’s proximity to the explosion, whether the child or family members were injured and how severely, and the child’s behavioral expression of fear, horror, and other emotions in response to each traumatic exposure (criterion A). The clinicians then elicited the mother’s detailed description of the child’s specific posttraumatic symptoms. The re-experiencing domain (criterion B) is typically observed in young children through the expression of trauma reminders in words or gestures during play or daily activities, compulsive or repetitive play that re-creates elements of the traumatic events, or repeated thoughts, flashbacks, or freezing in response to trauma reminders. The avoidance domain (criterion C) is often observed at this age through a set of behaviors indicating disengagement, such as social withdrawal, constriction of affective range, lack of interest in daily activities, or avoidance of people or places that remind the child of the trauma. Based on previous research at this age, only one symptom in the avoidance category is required to diagnose PTSD in young children. The hyperarousal category refers to behavioral and physiological agitation expressed in difficulties in falling asleep or remaining asleep, concentration problems, exaggerated startle, hypervigilance, tantrums or unexplained anger outbursts, or quick mood shifts; two symptoms are required in this category for the diagnosis of PTSD at this age. Information on a fourth category of symptoms, fears and aggression, was collected, as suggested by the DC 0-3R criteria but is not required for the diagnosis of PTSD. Similarly, as per the guidelines, detailed information was collected on the child’s developmental regression, defined as a skill the child had mastered but lost after an intense period of trauma exposure, and mothers were asked about developmental regression in the various domains.

After the clinical interview, mothers were asked to rate the child’s symptoms on a list of 58 posttraumatic symptoms that were compiled after a year of pilot study in Israeli and Palestinian war-exposed locations. The pilot included extensive interviews conducted with parents, caregivers, and therapists living in war zones on the typical symptoms young children exhibit after repeated exposure to war-related violence. The final list of 58 symptoms included symptoms detailed by the DC 0-3R as typical of young children after trauma and additional symptoms described by parents and clinicians during the pilot. For each symptom, each mother rated if she had not noticed the symptom in her child (score = 0) and if she did, whether the child exhibited the symptom infrequently (1 = once a week or less) or frequently (2 = daily or every 2-3
days). Scores were then summarized into the “re-experiencing” (7 items), “avoidance” (13 items), “hyperarousal” (11 items), “fears and aggression” (13 items), and “developmental regression” (14 items). Possible score ranges were as follows: re-experiencing, 0 to 14; avoidance, 0 to 26, hyperarousal, 0 to 22; and fears and aggression, 0 to 26.

In terms of developmental regression, mothers first rated the child’s overall regression on a scale of 1 to 10 and then rated specific symptoms of developmental regressions in the social (e.g., staying alone at a friend’s house, four items), emotional (e.g., intense fear when put to sleep, five items), and daily-living (e.g., toilet training, five items) domains, which were summed for each category. Control mothers were interviewed in the same manner. Mothers were asked to describe events the child experienced as “traumatic” or emotionally difficult during the past few months and both interview and symptom list followed the same procedure as the exposed group. Mothers described mildly “traumatic” events in the child’s life, such as loss of a grandparent, illness in the family, or moving to a new neighborhood.

Maternal Psychopathology. Mothers’ depression was assessed with the Beck Depression Inventory, maternal anxiety with the State-Trait Anxiety, and maternal PTSD symptoms with the Post-traumatic Diagnostic Scale. Mothers also completed the Social Support Scale.

Maternal and Child’s Behavior During the Evocation of Traumatic Memories. During the maternal PTSD interview, which lasted approximately 1 hour, children were present in the room and a trained assistant followed the child and videotaped the mother and child’s behavior throughout the interview. Tapes were later coded for maternal and child behavior during trauma evocation. Maternal behavior, emotional state, narrative coherence, and awareness of the child’s distress, and the child’s emotions and behaviors to trauma reminders were coded offline by raters blinded to maternal and child psychiatric information along 35 scales (20 for mother and 15 for child) each rated from 1 (low) to 5 (high). The instrument was based on the Coding Interactive Behavior, a well-validated coding system for adult and child behavior during interactions. The system has shown good psychometric properties and sensitivity to adult and child interactive behavior related to age, culture, biological and social-emotional risk conditions, and the effects of intervention. The maternal sensitivity construct of the CIB has been associated with the child’s attachment behavior, including secure base and avoidant behavior, during a separation–reunion episode. Interrater reliability was conducted for 46 (20%) interactions and reliability averaged 93%, intraclass $r = 0.91$.

Three composites were created on the basis of previous research. Maternal sensitivity ($\alpha = 0.82$) included the following items: consistency of the maternal style, appropriate range of affect, reflective ability on the child’s state and behavior, coherence of narrative, awareness of the child’s distress, and maternal supportive presence. Child secure base behavior included: regressive behavior (e.g., thumb-sucking), child reliance on mother (e.g., “Get me this.”), child focus on mother and increased vigilance, proximity-seeking behaviors, whine/cry/call to mother, and child cuddling on mother ($\alpha = 0.84$). Child avoidant behavior included child gaze aversion, emotional withdrawal, moving away from mother’s arms’ reach, and increased and inappropriate preoccupation with objects ($\alpha = 0.81$).

Statistical Analysis

Multivariate analysis of variance (MANOVA) with group (PTSD, Exposed-No-PTSD, and control) and child gender as the between-subject factors examined differences in three clusters, i.e., child PTSD symptoms, maternal psychological symptoms, and maternal and child interactive behavior. Post hoc comparisons with Scheffé tests followed significant main effects. Three hierarchical regression equations predicted maternal and child attachment-related behavior (maternal sensitivity, child secure base behavior, and child avoidant behavior) from maternal, child, and contextual factors, and Pearson’s correlations assessed associations between the predictor variables. The sample provides sufficient power to detect small effect sizes.

RESULTS

PTSD Syndrome in Young Children

Of the 148 children exposed to repeated war-related trauma, 56 were diagnosed with PTSD (37.8%) and 92 were classified as Exposed-No-PTSD. No child in the control group was diagnosed with PTSD, $\chi^2 = 262.4, p < .000$. No differences in demographic factors emerged between children who did or did not develop PTSD apart from child age: PTSD children were older (mean = 36.22 months, SD = 10.36 months) than Exposed-No-PTSD children (mean = 31.50 months, SD = 10.18 months), $F(df = 1, 147) = 6.97, p = .009$. We thus measured differences in the prevalence of PTSD in toddlers versus preschoolers. Among the 92 exposed toddlers (1.5–3 years), 24 were diagnosed with PTSD (26.08%). However, among the 56 exposed preschoolers (3–5 years), 25 received a diagnosis of PTSD (44.6%), $\chi^2 = 5.81, p = .016$. These findings indicate a significantly greater risk for developing PTSD in exposed preschoolers as compared with toddlers.

Children presented a range of posttraumatic symptoms unique to this age group. MANOVA
assessing children’s symptoms in the three symptom clusters (re-experiencing, avoidance, hyperarousal) with group (PTSD, Exposed-No-PTSD, control) and child gender as the between-subject factors showed an overall main effect for group, Wilks $F(df/11005 = 6, 441)/7.86, p < .001, ES = 0.11$. Univariate analyses with post hoc comparisons show that PTSD children presented the most symptoms in all symptom clusters as compared with Exposed-No-PTSD children, who showed significantly more symptoms in all clusters than controls (Table 1). No child gender effects were found.

Figure 1 presents the most prevalent symptoms in each symptom cluster that were observed in more than 60% of children diagnosed with PTSD (23% of exposed children). As seen, most PTSD children re-created the trauma in play, speech, and gestures; showed social withdrawal, increased interest in objects, and constriction of social life; and had difficulties in sleep, mood regulation, and self-quieting.

Although all children experienced the same traumatic events, the degree of direct exposure differed (e.g., some homes were hit while mothers or child were present). Child proximity to the traumatic event correlated with the number of child avoidance symptoms, $r = 0.29, p < .01$, but not with other types of symptoms. Similarly, the mother’s proximity to the event correlated with the child’s avoidance symptoms, $r = 0.31, p < .01$. Children in the PTSD and Exposed-No-PTSD groups did not differ in the degree of proximity to the trauma. However, mothers of PTSD children reported greater proximity to the traumatic event (mean = 3.87, SD = 1.24) than mothers of Exposed-No-PTSD children (mean = 2.78, SD = 2.21), $F(df/11005 = 1,147) = 4.37, p < .05$. No correlations were found between the number of child symptoms or PTSD diagnosis and the number of days since the last attack.

### Table 1: Posttraumatic Symptoms, Developmental Regression, Maternal Symptoms, and Observed Behavior in War-Exposed Children With Posttraumatic Stress Disorder (PTSD), Exposed Children Without Posttraumatic Stress Disorder (Exposed-No-PTSD), and Controls

<table>
<thead>
<tr>
<th></th>
<th>PTSD (a)</th>
<th>Exposed-No-PTSD (b)</th>
<th>Controls (c)</th>
<th>Univariate $F$</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
<td>M</td>
</tr>
<tr>
<td><strong>Posttraumatic symptoms</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Re-experiencing</td>
<td>7.52</td>
<td>3.20</td>
<td>4.62</td>
<td>1.34</td>
</tr>
<tr>
<td>Avoidance</td>
<td>15.61</td>
<td>3.47</td>
<td>8.27</td>
<td>4.56</td>
</tr>
<tr>
<td>Hyperarousal</td>
<td>17.89</td>
<td>5.73</td>
<td>11.83</td>
<td>4.66</td>
</tr>
<tr>
<td><strong>Developmental regression</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall regression</td>
<td>7.78</td>
<td>2.92</td>
<td>3.55</td>
<td>1.62</td>
</tr>
<tr>
<td>Emotional</td>
<td>4.87</td>
<td>3.14</td>
<td>2.66</td>
<td>1.87</td>
</tr>
<tr>
<td>Social</td>
<td>4.94</td>
<td>2.88</td>
<td>2.59</td>
<td>2.20</td>
</tr>
<tr>
<td>Daily living</td>
<td>3.65</td>
<td>2.60</td>
<td>2.29</td>
<td>2.03</td>
</tr>
<tr>
<td><strong>Maternal psychological symptoms</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depression*</td>
<td>8.10</td>
<td>7.81</td>
<td>6.31</td>
<td>5.84</td>
</tr>
<tr>
<td>Anxietyb</td>
<td>40.18</td>
<td>10.73</td>
<td>37.68</td>
<td>9.56</td>
</tr>
<tr>
<td>Posttraumatic symptomsc</td>
<td>6.82</td>
<td>11.80</td>
<td>3.64</td>
<td>7.47</td>
</tr>
<tr>
<td><strong>Maternal and child behavior</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>during trauma evocation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mother sensivityd</td>
<td>3.02</td>
<td>0.64</td>
<td>3.28</td>
<td>0.55</td>
</tr>
<tr>
<td>Child secure base behaviord</td>
<td>2.54</td>
<td>0.83</td>
<td>2.93</td>
<td>0.98</td>
</tr>
<tr>
<td>Child avoidant behaviora</td>
<td>2.18</td>
<td>0.75</td>
<td>1.54</td>
<td>0.79</td>
</tr>
</tbody>
</table>

Note: Information on child PTSD symptoms and developmental regression were based on a maternal questionnaire of 58 items including symptoms described by the Diagnostic Classification of Mental Health and Developmental Disorders of Infancy and Early Childhood (DC 0-3R) and symptoms compiled in war-exposed Israeli and Palestinian locations. M = mean.

*Measured with the Beck Depression Inventory.

**Measured with the State-Trait Anxiety Inventory.

cMeasured with the Posttraumatic Diagnostic Scale.

dCoded on a scale of 1 (low) to 5 (high) using the Coding Interactive Behavior Manual.

*p < .05, **p < .01, ***p < .001.
Finally, because of differences in the definition of preschool PTSD between the DC:0-3R and the alternative criteria, according to which there is no need for expressing intense fear and horror during the traumatic event (A2), the re-experiencing expressed in repetitive play is not necessarily trauma related (criterion B), and only one hyperarousal symptom is required for diagnosis (criterion D), we examined the prevalence of PTSD according to the alternative criteria. This resulted in the inclusion of 14 additional children in the PTSD group, leading to a total of 70 children diagnosed with PTSD (47% of exposed group).

Child Risk and Resilience Factors
MANOVA assessing the child’s developmental regression in the three domains (emotional, social, daily living) with group and child gender as the between-subject factors showed an overall main effect for group, Wilks $F(df = 6, 441) = 4.27, p < .001, ES = 0.08$. Univariate analysis with post hoc comparisons indicated that PTSD children showed greater developmental regression in all domains compared with Exposed-No-PTSD children, who showed significantly more regression than controls who displayed little or no regression (Table 1). Analysis of variance (ANOVA) assessing the child’s overall regression revealed that PTSD children showed significantly greater regression than Exposed-No-PTSD children, who showed greater regression than controls (Table 1).

MANOVA assessing the three attachment-related behavior scores (i.e., maternal sensitivity, child secure base behavior, and child avoidant behavior) showed an overall main effect for group, Wilks $F(df = 6, 441) = 3.98, p < .001, ES = 0.08$. With regard to child factors, univariate tests (Table 1, Figure 2) with post hoc comparisons showed that Exposed-No-PTSD children showed the highest levels of secure base behavior, control children scored lower, and PTSD children exhibited the least amount of secure-base behaviors.
However, PTSD children displayed the highest level of avoidant behavior, Exposed-No-PTSD children showed less, and controls exhibited little or no avoidant behavior.

Maternal Risk and Resilience Factors.
MANOVA assessing maternal psychological symptoms (depression, anxiety, PTSD) with group and child gender as the between-subject factors showed an overall main effect for group, Wilks $F(df = 6, 441) = 5.22, p < .000, ES = 0.07$. Univariate tests (Table 1) with post hoc comparisons showed that mothers of PTSD children scored the highest on symptoms of depression, anxiety, and PTSD, mothers of Exposed-No-PTSD children scored lower, and mothers of controls scored the lowest (Figure 3). ANOVA with post hoc comparisons indicated that mothers of PTSD children had lower social support (mean = 17.96, SD = 10.79) than mothers of Exposed-No-PTSD children (mean = 19.84, SD = 10.99), whose social support did not differ from controls (mean = 22.42, SD = 9.62), $F(df = 1, 231) = 3.83, p = .023$. Finally, we examined correlations between maternal PTSD symptoms with the child’s overall symptoms and the number of symptom in each symptom-cluster. Maternal PTSD correlated with the child’s overall posttraumatic symptoms, $r = 0.25, p < .01$, and with the number of the child’s avoidance symptoms, $r = 0.33, p < .001$.

In terms of observed maternal behavior, mothers of control children showed the highest levels of sensitivity, mothers of Exposed-No-PTSD children showed lower, and mothers of PTSD children exhibited significantly lower sensitivity than mothers of Exposed-No-PTSD children (Table 1).

Predicting Maternal and Child Attachment-Related Behaviors
Three regression equations were computed predicting maternal sensitivity, child secure base behaviors, and child avoidance behavior. Predictors included maternal, child, and contextual factors for a full ecological model, were the same in each regression, and were entered in five blocks. In the first block, demographic factors were entered, including child age (in months), maternal age, and maternal education, to partial out variance related to demographic conditions. In the second block, the mother’s mental health...
factors were entered: depression, anxiety, and PTSD. In the third block, the family social support was entered. In the fourth block, the child overall developmental regression was entered. In the fifth block, the child’s PTSD diagnosis was entered to examine whether child psychiatric diagnosis predicted additional variance above and beyond all factors in the model.

Before computing the regressions, correlations were examined between the predictor variables and significant correlations are reported. Maternal education correlated with greater social sup-

### TABLE 2 Predicting Maternal Sensitive Containment and Child Avoidance Behavior During the Evocation of Trauma

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Maternal Sensitivity</th>
<th>Child Secure Base Behavior</th>
<th>Child Avoidant Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Beta</td>
<td>R² Change</td>
<td>F Change</td>
</tr>
<tr>
<td>Child age</td>
<td>−0.06</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mother age</td>
<td>0.09</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mother education</td>
<td>−0.24§</td>
<td>0.06</td>
<td>5.37**</td>
</tr>
<tr>
<td>Mother depression</td>
<td>−0.18§</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mother anxiety</td>
<td>−0.27</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mother posttraumatic symptoms</td>
<td>−0.33§</td>
<td>0.10</td>
<td>7.42**</td>
</tr>
<tr>
<td>Social support</td>
<td>0.19§</td>
<td>0.03</td>
<td>3.82§</td>
</tr>
<tr>
<td>Child developmental regression</td>
<td>−0.25§</td>
<td>0.04</td>
<td>4.31§</td>
</tr>
<tr>
<td>Child PTSD</td>
<td>−0.16</td>
<td>0.01</td>
<td>2.43</td>
</tr>
</tbody>
</table>

Note: R² total 0.25, F[0.216] = 7.86, p < .001, 0.28, F[0.216] = 8.36, p < .001 0.23, F[0.216] = 7.11, p < .001. PTSD = posttraumatic stress disorder. §p < .04, **p < .01.
port \((r = 0.27, p < .001)\) and less maternal depression \((r = -0.21, p < .01)\) and less maternal PTSD symptoms \((r = -0.19, p < .05)\). Maternal age correlated with less maternal anxiety \((r = -0.22, p < .01)\). Maternal depression correlated with anxiety \((r = 0.62, p < .001)\) and maternal PTSD symptoms \((r = 0.32, p < .001)\), and maternal anxiety and PTSD were interrelated \((r = 0.25, p < .001)\). Social support was associated with lower depression \((r = -0.40, p < .001)\) and maternal PTSD symptoms \((r = -0.26, p < .001)\). Finally, child developmental regression correlated with greater maternal PTSD symptoms \((r = 0.24, p < .01)\). The three behavior scores were interrelated: Maternal sensitivity correlated with more secure base behavior \((r = 0.27, p < .001)\) and less avoidance \((r = -0.26, p < .001)\), and children’s secure base behavior correlated with less avoidant behavior \((r = -0.33, p < .001)\).

Results of the three regressions (Table 2) indicate that all models were significant and the predictor variables tested here cumulatively explained 25%, 28%, and 23% of the variance in mother sensitivity, child secure base behavior, and child avoidant behavior respectively. Independent predictors of maternal sensitivity included maternal education, less maternal depression and PTSD, greater social support, and less child developmental regression. Independent predictors of child secure base behavior included lower child age, less maternal depression and PTSD, greater social support, and no PTSD diagnosis. Independent predictors of child avoidant behavior included higher child age, maternal depression, maternal PTSD, and child PTSD diagnosis.

**DISCUSSION**

Although the numbers of young children around the world growing up amidst armed conflict appear to increase each decade, very little is known about the psychological growth, posttraumatic symptoms, and observed behavioral manifestations of infants and young children exposed to war-related trauma over a lengthy period. This study is among the first to provide a detailed account of the early childhood PTSD constellation in a large cohort of children exposed to war and terror in terms of specific symptoms, developmental regression, and attachment-related maternal and child behavior during the evocation of traumatic memories. Child diagnosis was examined from an ecological perspective and included, in addition to maternal reports, structured observations of behavior. Theoretically, war exposure was viewed as a “natural experiment” that enabled a unique context to examine risk and resilience pathways differentiating children who developed the full-blown disorder from those exposed to the same trauma who were more resilient. The present results may thus contribute to the general discussion on resilience and shed light on the functioning of the attachment system under conditions of chronic stress and uncertainty.

It is of interest that some of the major developmental theories that shaped clinical thought were based on the observations of young children exposed to war-related trauma during World War II. These include Anna Freud’s conceptualizations on ego development and defenses, Bowby’s seminal formulations on attachment security and disorganization, and Spitz’s descriptions of early regressive states and children’s anaclitic depression and nonorganic failure to thrive. Combined with the early animal research of Hofer on maternal proximity as providing a set of bio-behavioral hidden regulators and current neurobiological perspectives on childhood trauma, it is clear that continuous war not only exerts a profound effect on children’s biology and behavior but that such setting may provide a unique context to study resilience as a process reflecting natural human adaptation. Unlike conditions of early adversity such as poverty or maltreatment, the cohort of children living in frontline neighborhoods and exposed to the same or similar wartime stressors represents a variety of family adaptation, from excellent to very poor, and a range of attachment histories. As such, differentiating the symptoms that spell risk from those that mark a more resilient course and charting the maternal, child, contextual, and attachment-related correlates of resilience may be of theoretical and clinical importance.

Overall, the data indicate that a large proportion of young children (37.8%) growing up in war zones and exposed to daily shooting, rockets, or missile attacks are likely to develop PTSD, with frequent symptoms of inconsolability and agitation, repeated expression of trauma reminders in daily life, and substantial constriction of social life. Such children also tend to present a marked
developmental regression in the social, emotional, and daily living domains.Specific posttraumatic symptoms observed in more than 60% of the diagnosed children included nonverbal re-experiencing of trauma in words and gestures; frequent crying, night waking, and mood shifts; and symptoms of social withdrawal, such as preference for solitary functional play and increased interest in objects combined with decreased interest in people. These findings may suggest that more than a third of the world’s young children exposed to armed conflict over a lengthy period are likely to present a severe enough psychiatric profile that places their future adaptation at significant risk and requires intense intervention. Between the ages of 1.5 and 5 years, substantial maturation occurs in environment-dependent brain systems implicated in executive control and stress modulation; children enter the social world; and marked strides are noted in the domains of language, symbol formation, empathy, and behavior regulation. The disruptions to the maturation of these skills caused by exposure to repeated war trauma place the future adjustment of such infants at great risk.

Several factors differentiated war-exposed children who did or did not develop PTSD: child age, maternal psychopathology, family social support, and maternal and child attachment-related behaviors. With regard to child age, exposed preschoolers were nearly twice as likely to develop PTSD compared with exposed toddlers. Although these findings require much further research, it is possible that the preschool years mark an especially vulnerable period for young children exposed to chronic stress or trauma. At this stage, children gain linguistic, symbolic, and executive skills that enable them to project to the future, thereby markedly increasing the child’s anxiety, and improve their ability to express fears in words, play, and actions. Similarly, by the preschool years the child has already mastered important milestones and the developmental regression may thus be more notable. On the other hand, as compared with school-age children, preschoolers have not yet developed the formal operative thought, the more refined self-regulatory repertoire, or the focus on social life and the ability to draw comfort from the peer group, placing preschool children 3 to 5 years of age at especially high risk.

Mothers of PTSD children reported more symptoms of depression, anxiety, and PTSD than mothers of exposed children without PTSD, indicating that the mother’s resilience in the face of trauma shapes the child’s psychiatric condition. Moreover, results indicate that the degree of maternal proximity to the traumatic event, not the child’s proximity, differentiated war-exposed children with and without PTSD, highlighting the critical impact of the mother’s posttraumatic state on the child’s disorder, as has long been suggested by Anna Freud. The cross-generation associations between maternal and child’s posttraumatic symptoms further point to the close links between maternal posttraumatic psychopathology and the development of childhood PTSD. These findings are in accordance with much previous research in older children and adolescents on the effects of maternal psychopathology on the child’s reaction to war, natural disasters, or severe accidents. The effect of maternal symptoms on the child’s proneness to psychopathology is likely transmitted through both genetic vulnerabilities and concrete maternal behavior. As seen, mothers of Exposed-No-PTSD children were able to provide more sensitive containment to the child’s distress during trauma evocation, expressed in consistent and predictable style, appropriate range of affect, reflective capacity, awareness of the child’s distress, and the provision of supportive and calming presence to the child’s fears and anxieties. Maternal sensitivity at moments of distress is considered the cornerstone of attachment theory and is thought to provide a regulatory framework for the development of bio-behavioral stress-management systems. Consistent with much research in the attachment tradition, less maternal depression and posttraumatic symptomatology each accounted for unique variance in maternal sensitivity, underscoring the links between maternal emotional state and sensitive behavior. In addition to mental health, mothers of exposed children without PTSD reported greater social support and their support networks did not differ from those reported by controls. Models on childhood PTSD consider social support as an important ecological asset that increases the family’s resilience during periods of extended trauma. At the same time, it is also possible that more resilient mothers are better able to recruit a larger system of support to provide a holding environment for themselves and their children.

Of interest were the differences in children’s attachment behavior during trauma evocation, which may chart attachment-based mechanisms
for the development of PTSD in young children. Although the more resilient Exposed-No-PTSD children increased their secure base behavior during the evocation of traumatic memories, PTSD children exhibited high levels of avoidant behavior. According to Bowlby, during moments of distress children with a history of sensitive caregiving increase their secure base behavior, including proximity seeking, heightened vigilance, crying for mother’s attention, and regressive behavior. These high-arousal approach behaviors aim to elicit greater maternal sensitivity, which, in turn, helps to re-establish the child’s physiological and behavioral equilibrium. It thus appears that the child’s high arousal and regressive behavior mark a resilient, rather than risk pathway, which may seem counter-intuitive to mothers and caregivers. Intervention programs for war-exposed families should thus assist mothers in perceiving the child’s regressive needs as a sign of strength and coping and learn to respond to the child’s increased arousal with more sensitive containment.

Child avoidance, on the other hand, emerged as the most notable risk pathway in trauma-exposed young children. During the evocation of traumatic memories PTSD children increased their avoidant behavior, including gaze aversion, emotional withdrawal, increased preoccupation with objects, and physical distancing from the mother, and such children also exhibited the highest level of avoidance symptoms. Consistent with Bowlby’s formulation on loss, avoidance may indicate that the attachment system has not been able to contain the child’s anxieties, that initial attempts to recruit the maternal supportive presence have failed, and that the child has shut down biologically and behaviorally. The link between a more severe course of the mother’s posttraumatic condition and the child’s avoidance is repeatedly seen in the data. Maternal proximity to the traumatic event and the mother’s PTSD symptoms correlated with the child’s avoidance symptoms, not with other types of symptoms, and maternal depression and PTSD predicted the child’s avoidant behavior. Two potential mechanisms may thus be suggested on the links between maternal posttrauma and child avoidance. First, mothers who were more traumatized and depressed exhibited less sensitive containment of the child’s distress, anxiety, and regressive needs and these children may have learned to internalize and ignore their anger, fear, or dependency rather than use more adaptive approach behavior for the processing of trauma. Second, the cross-generation associations between maternal PTSD and the child’s avoidance symptoms point to mechanisms of modeling and social learning. Mothers of PTSD children, who themselves avoided the active reworking of the trauma, modeled the use of avoidant defenses to the child’s traumatic experiences. Similar findings are reported for Palestinian children exposed to repeated military acts in Gaza, which indicated that children whose mothers suffered posttraumatic symptoms and experienced the highest levels of exposure to military aggression presented the highest levels of avoidance symptoms. These data highlight child avoidance—expressed in both daily symptoms and concrete behavior in response to trauma reminders—as an indicator of high risk and are consistent with the adult PTSD literature, which indicates that symptoms of avoidance and numbing are markers of a more severe manifestation of the disorder and chart a worse prognosis.

Maternal and child attachment-related behaviors were independently predicted by components of the child’s ecology, including maternal, child, and contextual factors, thus supporting ecological models of childhood PTSD. Mothers who were less educated, more traumatized and depressed, had lower social support, and had children who displayed greater developmental regression were less sensitive during trauma evocation, and such diminished sensitivity may have further exacerbated the child’s symptoms. Younger children whose mothers were less depressed, had fewer posttraumatic symptoms, and received more social support were able to express more secure base behavior. Finally, avoidant behavior was more prevalent among preschoolers as compared with toddlers, was predicted by maternal depression and PTSD, and was related to the child’s PTSD diagnosis. These findings highlight the mother’s depression, posttraumatic symptoms, and social support networks as central to the formation of her own and the child’s attachment-related behavior during extended periods of stress and emphasize the need to provide interventions to address the emotional needs of mothers raising young children in areas exposed to war-related trauma.

It is important to note that because of the lack of longitudinal data, it is not possible to conclude that maternal psychopathology had a causal effect on the development of the child’s PTSD.
Similarly, because mother and child’s attachment behaviors were assessed after a lengthy exposure to trauma and during the evocation of traumatic memories, it is not possible to determine the child’s attachment classification before trauma onset. These limitations should thus be considered in the interpretation of the findings. Future intervention and longitudinal studies are needed to provide further insights on the effects of trauma on the functioning of the attachment system.

Further research is required to detail the effects of continuous war, terror, and armed conflict on young children’s mental health, behavior regulation, and developmental trajectories. Future research may explore genetic, hormonal, and temperamental risk and resilience pathways in the face of daily trauma, and may assess the interplay between the parenting envelope and the child’s biology in shaping the distinct symptom constellation defined as posttraumatic stress disorder of infancy and early childhood.

REFERENCES


Accepted March 2, 2011
Dr. Feldman and Ms. Vengrober are with Bar Ilan University, Ramat-Gan, Israel.
This study was supported by a National Alliance for Research on Schizophrenia and Depression independent investigator award (R.F.F.).
Disclosure: Dr. Feldman and Ms. Vengrober report no biomedical financial interests or potential conflicts of interest.
Correspondence to Dr. Ruth Feldman, Department of Psychology, and the Gonda Brain Sciences Center, Bar Ilan University, Ramat-Gan, Israel. 52900; e-mail: feldman@mail.biu.ac.il
0890-8567/$36.00/©2011 American Academy of Child and Adolescent Psychiatry
DOI: 10.1016/j.jaac.2011.03.001