

10-2010

Exposure to Potentially Traumatic Events in Early Childhood: Differential Links to Emergent Psychopathology

Margaret J. Briggs-Gowan

University of Connecticut School of Medicine and Dentistry

Julian D. Ford

University of Connecticut School of Medicine and Dentistry

Kimberly J. McCarthy

University of Connecticut School of Medicine and Dentistry

Follow this and additional works at: http://digitalcommons.uconn.edu/uchcres_articles

 Part of the [Psychiatry and Psychology Commons](#)

Recommended Citation

Briggs-Gowan, Margaret J.; Ford, Julian D.; and McCarthy, Kimberly J., "Exposure to Potentially Traumatic Events in Early Childhood: Differential Links to Emergent Psychopathology" (2010). *Articles - Research*. 30.
http://digitalcommons.uconn.edu/uchcres_articles/30

Published in final edited form as:

J Child Psychol Psychiatry. 2010 October ; 51(10): 1132–1140. doi:10.1111/j.1469-7610.2010.02256.x.

Exposure to potentially traumatic events in early childhood: differential links to emergent psychopathology

Margaret J. Briggs-Gowan¹, Alice S. Carter², Roseanne Clark³, Marilyn Augustyn⁴,
Kimberly J. McCarthy¹, and Julian D. Ford¹

¹ Department of Psychiatry, University of Connecticut Health Center, USA

² Department of Psychology, University of Massachusetts Boston, USA

³ Department of Psychiatry, University of Wisconsin School of Medicine and Public Health, USA

⁴ Department of Pediatrics, Boston University, USA

Abstract

Objective—To examine associations between exposure to potentially traumatic events (PTEs) and clinical patterns of symptoms and disorders in preschool children.

Method—Two hundred and thirteen referred and non-referred children, ages 24 to 48 months ($MN = 34.9$, $SD = 6.7$ months) were studied. Lifetime exposure to PTEs (family violence and non-interpersonal events) and recent stressful life events were assessed with the Preschool Age Psychiatric Assessment (PAPA) and Child Life Events Scale. Child psychiatric symptoms and disorders were assessed with parent-reports in the PAPA, a comprehensive, developmentally sensitive interview. Sociodemographic risk, parental anxiety and depressive symptoms (Center for Epidemiologic Studies Depression, Beck Anxiety Inventory), and child developmental level (Mullen Scales of Early Learning) also were assessed.

Results—Violence exposure was broadly associated with psychiatric status in the areas of depression, separation anxiety, posttraumatic stress, and conduct problems, whereas potentially traumatic non-interpersonal exposure was associated with phobic anxiety. The majority of the associations between violence exposure and preschoolers' symptoms were significant even when other key factors, including economic disadvantage and parental mood and anxiety symptoms, were controlled statistically. However, parental depressive/anxious symptoms may have partially or fully mediated the relationships between violence exposure and depressive and conduct symptoms.

Conclusions—Evidence of robust associations between violence exposure and early childhood internalizing and externalizing disorders and symptoms highlights the need for longitudinal prospective research concerning neurodevelopmental mechanisms and pathways. Findings underscore the relevance of assessing trauma exposure, particularly interpersonal violence, to identify young children at risk.

Keywords

Early childhood; symptoms; disorders; posttraumatic stress; violence; contextual risk

Early childhood is now believed to be an important developmental period in which substrates of long-term emotional health are laid down (Shonkoff & Phillips, 2000). Basic science with animals and humans has indicated that early adverse experiences may have lasting effects on organisms' stress-responses, brain structures, and affective processing (Crowe & Blair, 2008; De Bellis & Van Dillen, 2005; Pine, 2007). Evidence of stress-related decrements in functioning among older children and adults are consonant with these basic science findings, indicating increased risk for psychopathology among individuals exposed to potentially traumatic events, such as natural disasters, injuries and violence (Copeland, Keeler, Angold, & Costello, 2007; Ford et al., 2000; Kessler, 2000). Despite increasing focus on the impact of early adverse experiences, surprisingly little is known about *how* the effects of early exposures manifest in children younger than 5 years, *whether specific types* of events (e.g., violence exposure) are particularly detrimental, and *whether* these effects are independent of key contextual factors, such as economic disadvantage and parental symptoms. These issues are examined in a cross-sectional sample of referred and non-referred 2- and 3-year-old children who were recruited for a study of early childhood psychopathology (not trauma exposure).

In accordance with the diagnostic criteria for posttraumatic stress disorder (PTSD) in the DSM-IV (Association, 2000), potentially traumatic events are here defined as involving actual or perceived harm or threat to the life or physical integrity of the child or of another individual. Emerging evidence from studies of young children (under age 6 years) has revealed broad associations between internalizing and externalizing symptoms and a variety of potentially traumatic events, including car accidents, injuries, burns, physical and sexual abuse, domestic violence, and natural disasters (Levendosky, Huth-Bocks, Semel, & Shapiro, 2002; McDonald, Jouriles, Briggs-Gowan, Rosenfield, & Carter, 2007; Meiser-Stedman, Smith, Glucksman, Yule, & Dalgleish, 2008; Meyer, Robert, Murphy, & Blakeney, 2000; Mongillo, Briggs-Gowan, Ford, & Carter, 2009; Scheeringa, Zeanah, Myers, & Putnam, 2003; Swenson et al., 1996). These types of events also have been linked to PTSD symptoms in young children (Bogat, DeJonghe, Levendosky, Davidson, & von Eye, 2006; Meiser-Stedman et al., 2008; Mongillo et al., 2009; Scheeringa, Wright, Hunt, & Zeanah, 2006; Scheeringa et al., 2003; Swenson et al., 1996) and greater likelihood of meeting developmentally modified criteria for PTSD (Meiser-Stedman et al.; Scheeringa, 2009; Scheeringa et al., 2003). The one early childhood study that explicitly examined whether potentially traumatic events were related to psychiatric disorders other than PTSD revealed increased risk for separation anxiety and oppositional defiant disorder (Scheeringa et al., 2003). While providing important evidence of broad linkages between trauma-exposure and early psychopathology, because these studies focused on either single types of exposure or on broad sets of exposure, they have not addressed whether different types of exposures are associated with different forms of psychopathology.

Two types of exposures are postulated to relate to different symptom manifestations and are prevalent in childhood: family violence (Knickerbocker, Heyman, Slep, Jouriles, & McDonald, 2007) and potentially traumatic non-interpersonal events (Copeland et al., 2007). Family violence includes both interparental violence witnessed by the child and physical violence directed toward the child. In older children, family violence exposure has been linked to internalizing problems (e.g., depression, suicidality, anxiety, posttraumatic stress) (De Bellis & Van Dillen, 2005; Margolin & Gordis, 2000). Such associations are linked theoretically not only to the effect of witnessing violence on the child, but also to the impact of caregiver exposure to traumatic violence on parenting (Scheeringa, 2009) and the betrayal of trust in sustaining relationships and social and economic resources that may follow the violent incident (Freyd, Klest, & Allard, 2005; Walter, Hall, & Hobfoll, 2008). Family violence exposure also has been associated with some externalizing problems (e.g., oppositional-defiance; conduct and substance use problems) (De Bellis & Van Dillen, 2005;

Ford et al., 1999; Margolin & Gordis, 2000). Intergenerational transmission of victimization and victimizing has been shown empirically (Widom, Schuck, & White, 2006) to contribute to the relationship between family violence and externalizing behavior problems, consistent with social learning theory (Patterson, Forgatch, Yoerger, & Stoolmiller, 1998).

Non-interpersonal potentially traumatic events do not involve the intentional acts of other person(s), and include car accidents, injuries, burns, animal attacks, and natural disasters. In older children, these types of events have been associated with internalizing problems, such as depression, anxiety, phobias, and posttraumatic stress, but not with externalizing behavior problems except for ADHD (Ford et al., 2000; Meyer et al., 2000; Olofsson, Bunketorp, & Andersson, 2009; Wozniak et al., 1999). Non-interpersonal potentially traumatic events may lead to internalizing problems as a result of reducing a child or family's relational or other resources or through direct conditioning of fear/anxiety, but they do not involve the modeling of violence or betrayal of trust that have been theorized to be the link between violence exposure and externalizing problems.

A recent epidemiologic study indicated that nearly one-quarter of 3-year-old children had lifetime exposure to family violence or non-interpersonal potentially traumatic events (Mongillo et al., 2009). However, whether these forms of exposure are differentially linked to internalizing and externalizing problems in early childhood has not been investigated. The present study addresses this gap by examining the effects of potentially traumatic events on young children while also accounting for contextual factors that may influence the development or severity of internalizing and externalizing problems. For example, as violence exposure is more likely to occur within the context of poverty (Margolin & Gordis, 2000), it is important to disentangle their effects. Additionally, studies of older trauma-exposed children have indicated that poorer outcomes tend to be associated with parental psychopathology (cf., Scheeringa, 2009), indicating the need to distinguish the effects of exposure from those of parental psychopathology. Such associations may be explained by partially overlapping models: a Parenting model, in which children do poorly because caregiving is disrupted by parental psychopathology; a Bidirectional model, in which children display emotional/behavioral problems and parents' symptoms are in response to the child's difficulties; and a Shared genetic vulnerability model, in which parental psychopathology is transmitted via vulnerability genes (Scheeringa, 2009). Evidence that parental symptoms mediate associations between exposures and children's symptoms would lend support to these models. Such patterns also could reflect distortions in parents' reports about their children, as parental symptoms, including posttraumatic stress, have been associated with a tendency for some parents to overestimate children's symptoms (Briggs-Gowan, Carter, & Schwab-Stone, 1996; Kassam-Adams, Garcia-Espana, Miller, & Winston, 2006). Finally, incorporating recent life events in models may provide added precision, as young children may display transient behavioral perturbations following stressful life events or transitions (e.g., birth of a sibling, change in childcare).

Although theoretically important, these issues have received limited attention in studies of young children. Only two studies have identified independent associations between children's symptoms and family violence (McDonald et al., 2007) and broadly defined potentially traumatic events (Mongillo et al., 2009), independent of parental depressive/anxious symptoms and sociodemographic risk. The present study therefore was designed to replicate those studies' findings in an independent sample of young children and to determine whether the association between potentially traumatic events (PTEs) and subsequent problems holds true for family violence exposure and non-interpersonal events and for internalizing and externalizing problems, as well as whether sociodemographic or parent factors can partially or fully account for observed associations.

Hypothesis 1: Violence exposure and non-interpersonal PTEs will be differentially associated with symptoms and disorders. Specifically, violence exposure will be associated with anxiety, PTSD, depressive and externalizing problems, whereas non-interpersonal events will be related to only to anxiety, PTSD and depressive problems. *Hypothesis 2:* Associations between PTEs and children's symptoms will be independent of sociodemographic risk. *Hypothesis 3:* The relationship between violence and non-interpersonal events and children's symptoms will be mediated by parental mood and anxiety symptoms.

Method

Participants

The sample was comprised of 213 24- to 48-month-olds living with a custodial parent who was able to participate in English or Spanish. Referred children were recruited from seven child psychiatry and developmental and behavioral pediatric clinics and early intervention sites providing assessment and/or treatment services for mental health and developmental delays in states in the Northeast and Midwest. Non-referred children were recruited from the same communities as the referral sites. Two-hundred and sixty-four parents consented and 221 (83.4%) completed the study protocol. Four children suspected of having or diagnosed with autism spectrum disorders or global cognitive delays and three children with incomplete data were excluded. Because it was not the focus of the study, one child with a history of sexual abuse was excluded. The final sample size was 213.

The mean age of child participants was 34.9 months ($STD = 6.7$ months) and most were boys ($n = 152, 71.4\%$). The sample was ethnically diverse (46% Caucasian/White, 27% African American/Black, 15% Hispanic, 3% Asian, 7% multi-ethnic minority, 2% other). Respondents were biological mothers (87%), biological fathers (4%), adoptive/foster parents (5%), and other relatives (4%). Mean parental age was 34.0 years ($SD = 7.7$). Twenty parents had not attained a high school education and 20% had a high school education. Most parents (71%) had a spouse/partner. Approximately 45% of families were living in poverty. Forty-eight percent of children were referred; these children were similar to non-referred children in sociodemographic characteristics, violence exposure, and non-interpersonal exposures ($p > .05$).

Procedures

Clinic staff introduced the study to referred families. Non-referred children were recruited in pediatric clinics by research assistants and posted fliers describing a study interview and developmental assessment for young children. Informed consent was obtained by clinic staff or study personnel. Parents completed questionnaires and a semi-structured child psychiatric interview. Research assistants administered a standardized developmental assessment to children. Ethical guidelines for mandated reporting of maltreatment were followed. No reports to child protective services were necessary because each reported incident already had agency-involvement. Visits lasted approximately 2½ hours and occurred in participant homes or study offices. Parents received \$50 to \$80 for their time. Compensation varied due to variations in protocol length, because some measures were included in intake procedures at some sites. All procedures were approved by University Institutional Review Boards.

Primary measures

Potentially traumatic events exposure was assessed with the PTSD section of the Preschool-Age Psychiatric Assessment (PAPA; Egger et al., 2006), which assesses lifetime exposure to events involving actual or perceived harm or threat to the life or physical integrity of the child or of another individual (APA, 2000). *Non-interpersonal events* included: vehicular

accident; poisoning; accidental burning; near drowning; accidental serious fall; animal attack; natural disaster; and fire. *Violence exposure* included events directed toward the child (physical abuse; physical violence from a non-family member; kidnapping or captivity) or witnessed by the child (events causing or having potential to cause death/severe injury). Witnessed family violence also was assessed with two items from the Child Life Events Scale (Carter & Briggs-Gowan, 1998) (i.e., Seen someone hit, push or kick a family member; Seen someone use a weapon to threaten or hurt a family member). The CLES has acceptable reliability and validity (Mongillo et al., 2009).

Life events—Exposure in the previous three months to ‘stressful’ life events (i.e., events that are potentially stressful but not likely traumatic) was assessed with the PAPA. Examples of these events are: new children in home; parental separation/divorce; new parent figure; moving; childcare change; reduction in standard of living; parental hospitalization; and separation from parent for a week or longer.

The *PAPA*, a semi-structured interview for developmentally appropriate assessment of DSM-IV symptoms and disorders in 2- to 5-year-old children (Egger et al., 2006), was administered to parents. Computerized diagnostic algorithms require symptom presence at a frequency beyond levels typical for preschool children. The following disorders were analyzed: oppositional defiant disorder (ODD), conduct problems (3+ symptoms of conduct disorder), attention-deficit hyperactivity disorder (ADHD), separation anxiety (SAD), specific phobia and depressive disorders (major depression, dysthymia, and depression-NOS, i.e., 3 symptoms). Symptoms are abstracted from the algorithm (0 = absent, 1 = present). The *PAPA* has acceptable retest reliability (Egger et al., 2006). The PTSD section was administered whenever any events were reported.

Covariates

Parents reported about child age and sex, ethnicity, parental education, marital status, income, and receipt of public assistance. Economic disadvantage was defined as poverty-level income following Federal guidelines based on household income and size and/or receipt of public income assistance. Developmental level was assessed with overall composite score of the *Mullen Scales of Early Learning* (Mullen, 1995), a norm-referenced standardized administered assessment of cognitive, language, and motor development.

Parental depressive and anxiety symptoms were measured with validated self-report symptom checklists, the *Center for Epidemiologic Studies Depression Inventory* (CESD; Radloff, 1977) and the *Beck Anxiety Inventory* (BAI; Beck, Epstein, Brown, & Steer, 1988).

Analytic plan

Associations between exposures and child symptoms and disorders were initially examined with bivariate tests (i.e., chi-square, Fishers’ Exact test and point-biserial correlations). Next, multivariate linear regression models were evaluated in a forward selection procedure: Step 1 covariates; Step 2 exposures (i.e., violence, non-interpersonal, life events); and Step 3 parental depressive/anxious symptoms. This approach allowed examination of whether exposure variables were uniquely associated with symptoms when models included (a) covariates and (b) parental symptoms and provided insight into possible mediation by parental symptoms of the relationship between exposure and child symptoms. All models included child age, sex, developmental level and referral status, and additional covariates associated with both exposures and symptoms ($p < .10$). Because they were highly correlated ($r = .66$) a composite parental symptom variable was calculated as the mean of the standardized CES-D and BAI scores. The magnitude of regression effects reflecting the amount of variance accounted for by individual variables in the model (*partial R*²) were

interpreted as small (.01–.058), medium (.059–.137) or large (> .137) following recommended criteria (Cohen, 1988). Logistic regression analyses were not conducted due to the limited statistical power. For hypothesis-testing analyses $p < .01$ was required.

Results

Exposures, life events and other risks

Twenty-five (11.7%) children had experienced family violence (23 witnesses, 5 victims). No child had been removed from his/her home due to abuse. Thirty children (14%) had experienced non-interpersonal exposures (13 accidental burns, 9 serious falls, 5 car accidents, 4 poisonings, 2 near drowning, 1 animal attack, 1 fire, and 1 natural disaster). Only six children had experienced multiple non-interpersonal events, therefore this variable was dichotomized. Eighty children (38%) had experienced one or more recent stressful life event ($MN = .5$, $SD = .8$). Approximately 23% of parents reported clinical levels of parental depressive symptoms and 11% reported clinical levels of anxiety.

Associations between exposures and disorders

Ninety-two children met criteria for psychiatric disorder(s). None met criteria for DSM-IV PTSD or developmentally modified PTSD. Compared with unexposed children, psychiatric disorders were more likely among children exposed to violence [81.8% versus 40.0%, respectively, $OR = 6.8$, 99% *Confidence Interval* (CI) = 1.5–30.6, $p < .001$] or non-interpersonal events [(67.9% versus 40.8%), $OR = 3.1$, 99% $CI = 1.0$ –9.3, $p < .01$].

Bivariate associations between exposures and disorders are presented in Table 1. As expected, violence exposure was significantly associated with SAD and CP, and there was a trend-level association with ADHD. Contrary to expectations family violence was not associated with Specific Phobia, depressive disorders, or ODD. Consistent with expectations, more limited effects were observed for non-interpersonal exposures, which were significantly associated with specific phobia only.¹ Although the odds ratios between non-interpersonal exposures and SAD and ODD were non-significant they were similar in magnitude to the odds ratio for specific phobia. This lack of significance may be related to the lower prevalence levels of these disorders relative to specific phobia.

Associations among exposures and symptoms—Violence exposure was significantly associated with symptoms of depression, SAD, PTSD, ADHD, and conduct problems (Table 2). Non-interpersonal events were not significantly associated with symptoms.

Related risk factors—Children's symptoms correlated significantly with several child-level and contextual factors (Table 2). However, symptoms were not related to minority ethnicity, marital status, or parental education ($r = -.08$ to $.09$, *ns*), except for the correlation between ADHD and parental education ($r = .16$, $p < .05$).

As shown in Table 3, exposures correlated with one another violence exposure (but not non-interpersonal events) was significantly associated with several factors, including economic disadvantage (80% of violence-exposed versus 40% of non-exposed) and parental depressive/anxious symptoms (48% of violence-exposed versus 22% of non-exposed reported clinical levels of symptoms). Minority ethnicity, parental education, and single parenting were associated with violence exposure ($\chi^2 = 3.6$ –9.9, $p < .05$ to $.01$) but not children's symptoms ($p > .10$); thus, they were not covaried in models.

¹Remained significant in a logistic regression controlling for covariates and parental symptoms ($OR = 3.1$, 99% $CI = 1.0$ –9.8).

Multivariate models—Multivariate linear regression models were used to further examine associations between exposures and symptoms. As shown in Table 4, results of the depressive symptoms model indicated that violence exposure (but not non-interpersonal events) was uniquely associated with symptoms independent of socioeconomic covariates (Step 2) ($partial R^2 = .023$). However, this association was not significant when parental depressive/anxious symptoms were added to the model (Step 3). A test for mediation was significant ($Sobel = 2.74, p < .01$), suggesting that parental symptoms mediated the association between violence exposure and children's depressive symptoms.

The SAD model indicated that although both violence and non-interpersonal events were initially correlates, only violence exposure was associated with symptoms independent of covariates (Step 2, $partial R^2 = .074$) and parental affective symptoms (Step 3, $partial R^2 = .071$). Parental affective symptoms also explained unique variance in SAD symptoms ($partial R^2 = .04$). In the case of PTSD symptoms, violence exposure (but not non-interpersonal events) was associated with symptoms independent of covariates (Step 2, $partial R^2 = .094$) and parental affective symptoms (Step 3, $partial R^2 = .093$). Parental affective symptoms explained additional unique variance in PTSD symptoms ($partial R^2 = .049$).

As shown in Table 5, violence exposure was not associated with ADHD symptoms independent of socioeconomic risk. However, ADHD symptoms were positively associated with recent life events ($partial R^2 = .036$) and parental symptoms ($partial R^2 = .067$). In the conduct problems model, violence exposure (but not non-interpersonal events) was positively related to symptoms when covariates were in the model (Step 2, $partial R^2 = .041$), but not when parental symptoms were added to the model (Step 3, $partial R^2 = .021$). A follow-up test indicated significant mediation of the relationship between violence exposure and conduct problems by parental symptoms ($Sobel = 2.67, p < .01$).

Discussion

Consistent with clinical and basic science research suggesting early childhood as a period of particular vulnerability to adverse experiences, parents reported elevations in a wide range of symptoms and disorders among 2- and 3-year-old children who had been exposed to potentially traumatic events. As expected, these associations were particularly evident in relation to family violence exposure, which was positively associated with symptoms and disorders of depression, anxiety, and disruptive behavior. In contrast, non-interpersonal exposure was primarily associated with anxiety. Furthermore, observed associations were largely independent of the effects of economic disadvantage and either independent of or mediated by parental depressive/anxious symptoms. Although replication and extension with a longitudinal design are clearly needed, our findings suggest that exposure to PTEs may confer significant risk for psychopathology beginning early in life.

Family violence was related to an array of other factors, including poverty and parental affective symptoms. As hypothesized, findings suggested that parental affective symptoms may fully or partially mediate the relationship between family violence and depressive and conduct symptoms; however, a longitudinal design is required to establish true mediation. By contrast, the lack of mediation in models for separation anxiety and posttraumatic stress symptoms may suggest direct effects of violence on early-emergent anxiety (van der Kolk, Roth, Pelcovitz, Sunday, & Spinazzola, 2005). Treatment of depressive or conduct problems in traumatized young children thus may be enhanced by providing parents with treatment for their own affective distress. Whether parental affective distress also should be addressed as a moderator of treatment outcome for posttraumatic anxiety is more uncertain in light of the absence of evidence that it mediated the relationship between violence exposure and anxiety

or posttraumatic stress symptoms. Somewhat unexpectedly given prior associations in young children (Scheeringa et al., 2003), violence exposure was not associated with oppositional-defiant disorder. Yet, the overall patterns linking it with conduct and ADHD symptoms suggest that violence exposure does contribute to preschool manifestations of disruptive behavior, as has been shown with oppositional-defiance and other externalizing problems in older children (Ford et al., 1999).

In contrast with the broad correlates of violence exposure, non-interpersonal PTEs were unrelated to other adversities (except violence exposure). Non-interpersonal exposures were significantly and uniquely associated with specific phobia, with no evidence of mediation by parental depressive/anxious symptoms. The absence of association with depression or conduct problems suggests that these events may be primarily related to phobic anxiety, but not more generalized internalizing or externalizing problems in young children. Further research is needed to determine for whom and under what circumstances early-emergent phobic anxiety will become chronic and severe or develop into PTSD later in childhood.

Violence exposure, but not non-interpersonal exposures, also was associated with lower developmental attainment, suggesting that violence exposure may be associated with difficulties along multiple developmental lines (Ford & Smith, 2008; van der Kolk et al., 2005). However, it also may reflect the association between violence exposure and other risks known to impact developmental functioning (e.g., poverty). Irrespective of the direction of causality, these patterns highlight the importance of multi-domain assessment of violence-exposed children to ensure developmentally appropriate intervention.

Evidence linking violence exposure with early-emergent symptoms and disorders suggests that empirical investigation of the processes involved in exposure-related pathways may prove fruitful in this developmental period. Several processes are plausible. Using a *Shared genetic vulnerability model*, for example, the observed associations may reflect gene–environment interactions, with anxiety and disruptive behavior most likely among genetically vulnerable children (Kim-Cohen et al., 2006; Pine, 2007). Observed patterns also may reflect underlying attention bias to threat, which has been linked to anxiety, PTSD and trauma-exposure in older individuals (Pine, 2007). These types of biases also have been theorized to be involved disruptive behaviors, such as reactive aggression (Crowe & Blair, 2008). As threat-related biases appear to be responsive to treatment (Pine, 2007), elucidating their role in trauma-response may have significant clinical implications. Finally, prospective research examining the roles of PTSD symptoms (e.g., hyperarousal and avoidance) in developmental pathways is warranted, as they may interfere with children’s engagement in age-appropriate activities (e.g., peer interactions, learning activities) and thereby impede developmental progress (Crowe & Blair, 2008; Margolin & Gordis, 2000).

Strengths of this study include the large community and clinical sample of children from ethnically diverse and often socioeconomically disadvantaged families, use of developmentally sensitive assessments, specification of exposure types, and consideration of contextual risk factors. Limitations include the cross-sectional design, which prevents causative interpretations and the sampling of referred and non-referred children, which precludes generalization to normative samples. The sampling approach also may have constrained our ability to identify PTSD. Further, because parental PTSD symptoms were not assessed, their influence on parental reports cannot be evaluated. However, concern about parental reporting biases may be somewhat assuaged because several findings were independent of parental mood and anxiety symptoms. Similarly, given the potentially negative effects of parental PTSD and other psychopathologies on caregiving and related detrimental effects on children (Ruscio, Weathers, King, & King, 2002; Scheeringa, 2009), it will be important to extend this work with careful assessment of the parent-child

relationship and parental psychopathologies (e.g., depression, anxiety, PTSD, substance use/abuse, and antisocial personality). Finally, although traumatic events were assessed using behaviorally anchored definitions for qualifying events, the degree of objective danger or life-threat (PTSD Criterion A1) and immediate subjective reaction (PTSD Criterion A2) were not formally assessed, no external corroboration (e.g., child welfare) was obtained, and some important PTEs occurred too infrequently to allow specific analyses in this sample (e.g., loss). Future studies that include careful assessment of PTSD criterion A (Ford et al., 2000) and explore specific effects of other important exposures, including traumatic loss, natural disasters, and acts of terrorism, are needed.

Combined with prior work in this area, our results suggest that potentially traumatic events, especially family violence, may be potent and unique risk factors for clinically significant psychopathology in young children. Findings further underscore the importance of assessing trauma exposure and symptoms in young children, as well as the critical need to convey messages about the importance of early detection and treatment of trauma-exposed young children to professionals who see young children (e.g., pediatric health providers, early childhood educators, etc.). Scientifically, evidence of robust associations between violence exposure and early psychopathology reveal the potential for fruitful research concerning genetic, neurodevelopmental, and family processes involved in early developmental pathways.

Acknowledgments

We acknowledge the generosity of the families, pediatricians, psychologists, and early interventionists who made this study possible. We especially thank Drs. Ronald Angoff, Nancy Brown, Elizabeth Caronna, Rita Esposito, Brian Forsyth, Kathleen Hipke, and Darcy Lowell. Special thanks goes to Lauren Wakschlag for comments on this manuscript.

This study was supported by a National Institute of Mental Health grant (Briggs-Gowan, R01MH 66645).

References

- American Psychiatric Association (APA). Diagnostic and statistical manual of mental disorders: Text revision DSM-IV-TR. 4. Washington, DC: American Psychiatric Association; 2000.
- Beck AT, Epstein N, Brown G, Steer RA. An inventory for measuring clinical anxiety: Psychometric properties. *Journal of Consulting and Clinical Psychology*. 1988; 56:893–897. [PubMed: 3204199]
- Bogat GA, DeJonghe E, Levendosky AA, Davidson WS, von Eye A. Trauma symptoms among infants exposed to intimate partner violence. *Child Abuse and Neglect*. 2006; 30:109–125. [PubMed: 16466789]
- Briggs-Gowan MJ, Carter AS, Schwab-Stone M. Discrepancies among mother, child, and teacher reports: Examining the contributions of maternal depression and anxiety. *Journal of Abnormal Child Psychology*. 1996; 24:749–765. [PubMed: 8970908]
- Carter, AS.; Briggs-Gowan, MJ. Unpublished manuscript. New Haven, CT: 1998. Child Life Events Screener.
- Cohen, J. Statistical power analysis for the behavioral sciences. 2. Hillsdale, NJ: Lawrence Erlbaum Associates; 1988.
- Copeland WE, Keeler G, Angold A, Costello EJ. Traumatic events and posttraumatic stress in childhood. *Archives of General Psychiatry*. 2007; 64:577–584. [PubMed: 17485609]
- Crowe SL, Blair RJ. The development of antisocial behavior: What can we learn from functional neuroimaging studies? *Developmental Psychopathology*. 2008; 20:1145–1159.
- De Bellis MD, Van Dillen T. Childhood posttraumatic stress disorder: An overview. *Child and Adolescent Psychiatric Clinics of North America*. 2005; 14:745–772. [PubMed: 16171701]

- Egger HL, Erkanli A, Keeler G, Potts E, Walter BK, Angold A. Test–retest reliability of the Preschool Age Psychiatric Assessment (PAPA). *Journal of the American Academy of Child and Adolescent Psychiatry*. 2006; 45:538–549. [PubMed: 16601400]
- Ford JD, Racusin R, Daviss WB, Ellis CG, Thomas J, Rogers K, et al. Trauma exposure among children with oppositional defiant disorder and attention deficit-hyperactivity disorder. *Journal of Consulting and Clinical Psychology*. 1999; 67:786–789. [PubMed: 10535245]
- Ford JD, Racusin R, Ellis C, Daviss WB, Reiser J, Fleischer ATJ. Child maltreatment, other trauma exposure, and posttraumatic symptomatology among children with oppositional defiant and attention deficit hyperactivity disorders. *Child Maltreatment*. 2000; 5:205–217. [PubMed: 11232267]
- Ford JD, Smith SF. Complex post-traumatic stress disorder (PTSD) in trauma-exposed adults receiving public sector outpatient substance abuse disorder treatment. *Addiction Research and Theory*. 2008; 16:193–203.
- Freyd JJ, Klest B, Allard CB. Betrayal trauma: Relationship to physical health, psychological distress, and a written disclosure intervention. *Journal of Trauma Dissociation*. 2005; 6:83–104. [PubMed: 16172083]
- Kassam-Adams N, Garcia-Espana JF, Miller VA, Winston F. Parent–child agreement regarding children’s acute stress: The role of parent acute stress reactions. *Journal of the American Academy of Child and Adolescent Psychiatry*. 2006; 45:1485–1493. [PubMed: 17135994]
- Kessler RC. Posttraumatic stress disorder: The burden to the individual and to society. *Journal of Clinical Psychiatry*. 2000; 61(Suppl 5):4–12. discussion 13–14. [PubMed: 10761674]
- Kim-Cohen J, Caspi A, Taylor A, Williams B, Newcombe R, Craig IW, et al. MAOA, maltreatment, and gene–environment interaction predicting children’s mental health: New evidence and a meta-analysis. *Molecular Psychiatry*. 2006; 11:903–913. [PubMed: 16801953]
- Knickerbocker L, Heyman RE, Slep AM, Jouriles EN, McDonald R. Co-occurrence of child and partner maltreatment: Definitions, prevalence, theory, and implications for assessment. *European Psychology*. 2007; 12:36–44.
- Levendosky AA, Huth-Bocks AC, Semel MA, Shapiro DL. Trauma symptoms in preschoolage children exposed to domestic violence. *Journal of Interpersonal Violence*. 2002:150–164.
- Margolin G, Gordis EB. The effects of family and community violence on children. *Annual Review of Psychology*. 2000; 51:445–479.
- McDonald R, Jouriles EN, Briggs-Gowan MJ, Rosenfield D, Carter AS. Violence toward a family member, angry adult conflict, and child adjustment difficulties: Relations in families with 1- to 3-year-old children. *Journal of Family Psychology*. 2007; 21:176–184. [PubMed: 17605540]
- Meiser-Stedman R, Smith P, Glucksman E, Yule W, Dalgleish T. The posttraumatic stress disorder diagnosis in preschool- and elementary school-age children exposed to motor vehicle accidents. *American Journal of Psychiatry*. 2008; 165:1326–1337. [PubMed: 18676592]
- Meyer WJ III, Robert R, Murphy L, Blakeney PE. Evaluating the psychosocial adjustment of 2- and 3-year-old pediatric burn survivors. *Journal of Burn Care and Rehabilitation*. 2000; 21:178. discussion 179–184. [PubMed: 10752752]
- Mongillo EA, Briggs-Gowan M, Ford JD, Carter AS. Impact of traumatic life events in a community sample of toddlers. *Journal of Abnormal Child Psychology*. 2009; 37:455–468. [PubMed: 19034643]
- Mullen, EM. *Mullen Scales of Early Learning*, AGS edition. Circle Pines, MN: American Guidance Service; 1995.
- Olofsson E, Bunketorp O, Andersson AL. Children and adolescents injured in traffic-associated psychological consequences: A literature review. *Acta Paediatrica*. 2009; 98:17–22. [PubMed: 18795910]
- Patterson GR, Forgatch MS, Yoerger KL, Stoolmiller M. Variables that initiate and maintain an early-onset trajectory for juvenile offending. *Developmental Psychopathology*. 1998; 10:531–547.
- Pine DS. Research review: A neuroscience framework for pediatric anxiety disorders. *Journal of Child Psychology and Psychiatry*. 2007; 48:631–648. [PubMed: 17593144]
- Radloff LS. The CES-D Scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement*. 1977; 1:385–401.

- Ruscio AM, Weathers FW, King LA, King DW. Male war-zone veterans' perceived relationships with their children: The importance of emotional numbing. *Journal of Trauma and Stress*. 2002; 15:351–357.
- Scheeringa, MS. Posttraumatic stress disorder. In: Zeanah, CH., editor. *Handbook of infant mental health*. 3. New York: Guilford Press; 2009. p. 345-361.
- Scheeringa MS, Wright MJ, Hunt JP, Zeanah CH. Factors affecting the diagnosis and prediction of PTSD symptomatology in children and adolescents. *American Journal of Psychiatry*. 2006; 163:644–651. [PubMed: 16585439]
- Scheeringa MS, Zeanah CH, Myers L, Putnam FW. New findings on alternative criteria for PTSD in preschool children. *Journal of the American Academy of Child and Adolescent Psychiatry*. 2003; 42:561–570. [PubMed: 12707560]
- Shonkoff, J.; Phillips, D., editors. *From neurons to neighborhoods: The science of early childhood development*. Washington, DC: National Academy Press; 2000.
- Swenson CC, Saylor CF, Powell MP, Stokes SJ, Foster KY, Belter RW. Impact of a natural disaster on preschool children: Adjustment 14 months after a hurricane. *American Journal of Orthopsychiatry*. 1996; 66:122–130. [PubMed: 8720649]
- van der Kolk BA, Roth S, Pelcovitz D, Sunday S, Spinazzola J. Disorders of extreme stress: The empirical foundation of a complex adaptation to trauma. *Journal of Trauma and Stress*. 2005; 18:389–399.
- Walter, K.; Hall, B.; Hobfoll, S. Conservation of resources theory. In: Reyes, G.; Elhai, JD.; Ford, J., editors. *Encyclopedia of psychological trauma*. Hoboken, NJ: John Wiley & Sons; 2008. p. 157-159.
- Widom CS, Schuck AM, White HR. An examination of pathways from childhood victimization to violence: The role of early aggression and problematic alcohol use. *Violence and Victims*. 2006; 21:675–690. [PubMed: 17220013]
- Wozniak J, Crawford MH, Biederman J, Faraone SV, Spencer TJ, Taylor A, et al. Antecedents and complications of trauma in boys with ADHD: Findings from a longitudinal study. *Journal of the American Academy of Child and Adolescent Psychiatry*. 1999; 38:48–55. [PubMed: 9893416]

Table 1

Associations between exposures and psychiatric disorders (bivariate)

	Disorder N	Violence			Non-interpersonal		
		Non-exposed %	Exposed %	OR (99% CI)	Non-exposed %	Exposed %	OR (99% CI)
Depressive disorders	22	9.6	16.0	1.8 (4-8.4)	10.4	10.0	1.0 (.2-5.2)
Separation anxiety	17	4.8	32.0	9.4 (2.3-38.4)***	6.6	16.7	2.9 (.7-12.5)
Specific phobia	58	25.1	44.0	2.3 (.8-7.2)	24.2	46.7	2.7 (1.0-7.8)*
Attention-deficit hyperactivity disorder	23	9.0	24.0	3.2 (.8-12.5)#	10.9	10.0	.9 (.2-4.9)
Oppositional defiant disorder	18	8.1	12.0	1.5 (.3-8.7)	7.2	17.2	2.7 (.6-11.7)
Conduct problems ^I	16	7.4	35.3	6.8 (1.4-32.4)**	11.5	4.6	.4 (.1-5.8)

Note:

$p < .05$,

* $p < .01$,

** $p < .001$,

*** $p < .0001$; OR = Odds Ratio; CI = Confidence Interval.

^I Analyzed in boys only because all cases of CP were male.

Table 2

Associations between symptoms, exposures, and other factors

	Symptoms							
	Depression	Specific phobia	SAD	PTSD	ADHD	ODD	CP	
	MN = .99 SD = 1.41	MN = .46 SD = .60	MN = .60 SD = 1.03	MN = .68 SD = 1.44	MN = 3.50 SD = 4.17	MN = 1.08 SD = 1.48	MN = .50 SD = 1.00	
Exposures								
Violence exposure	.20*	.15	.31***	.37***	.28***	.10	.28***	
Non-interpersonal PTE	.04	.12	.16	.10	.13	.13	-.00	
Life events	.14	.07	.12	.09	.27***	.17	.12	
Other factors								
Age	.13	.11	.03	.13	.08	.14#	.25**	
Sex (1 = boy)	.04	-.01	-.05	-.09	.16#	.10	.18*	
Developmental level	-.23**	-.18*	-.20**	-.18#	-.30***	-.16	-.24**	
Referral status	.40***	.29***	.21*	.27*	.42***	.42***	.34***	
Economic disadvantage	.08	.11	.13	.20#	.27***	.17#	.16#	
Parental affective symptoms	.35***	.24**	.30***	.32**	.39***	.28***	.38***	

$p < .05$,

* $p < .01$,

** $p < .001$,

*** $p < .0001$.

Table 3

Associations among exposures and other factors

	Exposures				Other factors				
	2.	3.	4.	5.	6.	7.	8.	9.	
Exposures									
Violence exposure	.15#	.22*	.18*	-.03	-.17#	.06	.26***	.25**	
Non-interpersonal PTE		.18*	.04	.02	.03	-.01	.02	.10	
Life events			.06	.03	-.05	.13*	.04	.09	
Other factors									
Age				-.11	-.10	.16#	.09	.10	
Sex (1 = boy)					-.14#	.09	.01	.06	
Developmental level						-.34***	-.24***	-.10	
Referral status							.07	.16#	
Economic disadvantage								.20*	
Parental affective symptoms									

$p < .05$,* $p < .01$,** $p < .001$,*** $p < .0001$.

Table 4

Multivariate associations between exposures and children’s internalizing symptoms

	Depression			SAD symptoms			PTSD symptoms		
	Values at entry		Final	Values at entry		Final	Values at entry		Final
	β (SE)	t/F	F	β (SE)	t/F	F	β (SE)	t/F	F
Step 1 (covariates)									
Econ. disadvantage	.07 (.19)	.37	.77	.18 (.15)	1.25	.00	.50 (.27)	.99	.39
Age	.01 (.01)	1.00	.15	-.00 (.01)	-.40	1.61	.02 (.02)	.14	.00
Sex	-.01 (.20)	-.03	.09	-.20 (.16)	-1.30	2.22	-.36 (.29)	1.46	2.62
Developmental level	-.00 (.00)	-1.40	1.04	-.00 (.00)	-1.95	3.05	-.00 (.00)	.01	.02
Referral status	.99 (.19)	5.10***	22.70***	.36 (.15)	2.43†	5.24	.73 (.27)	9.32*	8.31*
Step 2 (exposures)									
Violence	.71 (.29)	5.82*	2.96	.86 (.22)	15.18***	10.63*	1.19 (.34)	12.50**	11.15*
Non-interpersonal	~	~	~	.38 (.19)	3.93#	3.19	.33 (.28)	1.42	~
Life events	~	~	~	~	~	~	~	~	~
Step 3 (Parental symptoms)	.43 (.10)	19.02***	19.02***	.24 (.08)	9.21*	9.21*	.38 (.14)	7.34*	7.34*

p < .05;

* p < .01,

** p < .001;

*** p < .0001;

~ did not meet entry criterion.

Table 5

Multivariate associations between exposures and children’s externalizing symptoms

	ADHD symptoms			Conduct symptoms		
	Values at entry β (SE)	t/F	Final model F	Values at entry β (SE)	t/F	Final model F
Step 1 (covariates)						
Econ. disadvantage	1.59 (.55)	2.87*	4.76#	.20 (.13)	1.52	.06
Age	.01 (.04)	.06	.26	.03 (.01)	3.42**	8.15*
Sex	1.03 (.57)	1.81	2.84	.41 (.14)	2.88*	8.33*
Developmental level	-.01 (.01)	-1.93	3.72	-.00 (.00)	-1.44	1.35
Referral status	2.98 (.54)	5.49***	23.53***	.51 (.13)	3.81**	12.29**
Parental education	.78 (.75)	1.04	.03			
Step 2 (exposures)						
Violence	1.99 (.81)	5.95#	3.08	.66 (.20)	11.04*	6.28#
Non-interpersonal	.77 (.31)	1.87	~	~	~	~
Life events	.97 (.71)	6.17#	8.45*	~	~	~
Step 3 (Parental symptoms)	1.13 (.28)	16.51***	16.51***	.29 (.07)	18.18***	18.18***

$p < .05$;

* $p < .01$;

** $p < .001$;

*** $p < .0001$;

~ did not meet entry criterion.