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Child Neglect and the Development of Externalizing Behavior Problems: Associations With Maternal Drug Dependence and Neighborhood Crime

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Abstract

Given the high prevalence of child neglect among maltreatment subtypes, and its association with exposure to additional environmental adversity, understanding the processes that potentiate child neglect and link neglect to subsequent child externalizing psychopathology may shed light on key targets for preventive intervention. Among 170 urban low-income children (ages 4–9) and their mothers, this 5-year prospective study examined the effects of early neglect severity and maternal substance abuse, as well as neighborhood crime, on children's later externalizing behavior problems. Severity of child neglect (up to age 6 years) mediated the relation between maternal drug dependence diagnosis (MDDD), determined at children's age of 4 years, and children's externalizing behavior problems at age 9. Rates of neighborhood crime mediated the link between presence of child neglect and children's externalizing behavior problems. The roles of MDDD, child neglect, and community violence in the development of child psychopathology are discussed in terms of their implications for intervention.

Keywords

child neglect, community violence, child externalizing behavior problems, maternal substance abuse, developmental psychopathology

As research on child maltreatment has evolved, increasing evidence has documented the complexities inherent in the etiology and sequelae of neglect and abuse. Extant literature illustrates that a number of interrelated processes interact to influence the developmental processes of adaptation and maladaptation for maltreated children. A developmental psychopathology framework underscores the transactional influences of multiple risk and protective factors at different levels of children's environments that impact their development (Cicchetti & Lynch, 1995; Cicchetti & Valentino, 2006). According to a transactional–ecological model of maltreated children's development, examining children's functioning over time requires inclusion of familial as well as environmental contextual factors (Cicchetti & Valentino, 2006). Children who experience maltreatment are more likely to develop externalizing behavior problems, such as aggression and delinquent behavior; these behaviors place them at risk for future adverse outcomes across multiple domains, including academic achievement, interpersonal relationships, and physical and mental health (Cicchetti & Valentino, 2006; Jaffee, Caspi, Moffitt, Polo-Tomas, & Taylor, 2007; Rogosch, Oshri, & Cicchetti, 2010). In addition, factors such as parental substance abuse and exposure to community violence may increase children's risk of developing externalizing behavior problems,

and it is important to disentangle the impacts of these risks by examining family and neighborhood contexts simultaneously.

The associations between child maltreatment and subsequent externalizing behavior problems have been well established (Cicchetti & Valentino, 2006). More recently, however, dimensions of maltreatment, such as the impact of particular subtypes of maltreatment or their severity on child development, have begun to be examined in detail (Manly, 2005). In particular, child neglect has been associated with increased aggressive behavior, but the role of neglect in contributing to externalizing behavior has been somewhat more ambiguous than that of other subtypes, in part because of the relative "neglect of neglect" in research literature until recent years (Hildyard & Wolfe, 2002).

Burgeoning research has examined processes through which neglect emerged as a potent environmental risk factor that

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exerted deleterious influences across the life span from childhood to adulthood (Oshri, Tubman, & Burnette, 2012; Widom, Dumont, & Czaja, 2007). Multiple individual, interpersonal, and environmental factors have been implicated in associations between early child neglect and later externalizing symptomatology (Cicchetti & Valentino, 2006). For example, neglect has been shown to impact externalizing behavior directly as well as indirectly through emotion regulation (Kim & Cicchetti, 2010). In addition, other particular forms of neglect such as unstable living arrangements, verbally harsh discipline, lack of well child pediatric care, lack of food, and untreated behavior problems have been shown to predict aggression and externalizing behavior in preschool (English, Thompson, Graham, & Briggs, 2005). Knutson and his colleagues found that supervisory neglect played a mediating role in predicting aggression for socioeconomically disadvantaged families (Knutson, DeGarmo, & Reid, 2004; Knutson, DeGarmo, Koeppl, & Reid, 2005). Finally, in a nationally representative adolescent health study, supervisory and physical neglect were associated with increased risk of perpetrating violence in adolescents (Fang & Corso, 2007; Hussey, Chang, & Kotch, 2006).

Although supervisory and physical neglect have been linked to subsequent externalizing behavior, less is known about the underlying contextual processes, in the micro- and exosystems (e.g., within the home and at the community level), that link early child neglect with later childhood development of psychopathology. For example, parental substance use can impede competent parenting and may contribute to developmental pathways through which neglect impacts child functioning (Barnard & McKeganey, 2004; Dunn et al., 2002). In addition, studies from the LONGSCAN project have documented the association between neglect in early childhood and subsequent externalizing behavior, which may be related in part to families' residence in dangerous neighborhoods (Dubowitz, Pitts, & Black, 2004). Conversely, positive neighborhood factors were found to reduce aggressive behavior for neglected children (Yonas et al., 2010). Therefore, the goals of this study are the following: (a) to document the association between maternal substance dependence and child neglect, (b) to examine the linkages between child neglect and development of child externalizing behavior problems, and (c) to examine whether increased levels of neighborhood crime underlie the association between children's early caregiving environment and their subsequent development of externalizing behaviors during school-age years.

Maternal Substance Use and Neglect

Understanding the pathways through which neglect impacts children's development depends in part on examining the contexts in which neglect is embedded. Neglect frequently co-occurs with familial risk factors, including poverty, social isolation, domestic violence, and parental psychopathology (Cicchetti & Valentino, 2006). Parental substance use is frequently cited as a risk factor for neglect, and neglected children with substance abusing parents are particularly at risk for developing behavior problems and possibly future substance

use problems themselves (Dunn et al., 2002). In the fourth National Incidence Study (Sedlak et al., 2010), perpetrators' drug use was reported in 15% of physical neglect cases, according to the stringent Harm Standard for defining maltreatment. Other assessments have estimated that the frequency of substance abuse in child welfare cases is as high as 70% (Gaudin, 1993). In a review of child neglect within substance-abusing families, Dunn and colleagues (2002) highlighted that both neglected children and children of drug-abusing parents are likely to exhibit externalizing behavior problems. The association between parental substance use disorder and child neglect remained significant, even after social support, parental comorbid depression, and antisocial behavior were controlled (Dunn et al., 2002). Neglect was found to be more severe for children whose parents had a lifetime substance abuse disorder than for those without such diagnosis (Dunn et al., 2002). Therefore, existing evidence supports the association between substance abuse and increased risk for neglect. In order to disentangle the impact of parental drug use and neglect on children's outcomes, it is necessary to examine whether parental drug use increases the likelihood and severity of neglect early in development, as well as the direct and indirect effects of maternal drug use on children's behavior over time.

Parental substance abuse is expected to increase the likelihood of neglect, for example, by adversely affecting families' financial circumstances through undermining maintenance of employment, diverting money away from basic necessities, and reducing parents' ability to provide adequate supervision and to be physically and psychologically available to support their children's healthy development (Child Welfare Information Gateway, 2001). Addicted mothers have demonstrated less involvement and responsiveness with their children, and sociodemographic risks and children's behavior also contribute to parenting difficulties in substance abusing families (Suchman & Luthar, 2000). Parents with substance abuse disorders share many characteristics of maltreating parents, including frequent histories of maltreatment in their families of origin, psychiatric disorders, and impulsivity (Dunn et al., 2002). Maternal substance abuse has been shown to exert a direct effect on neglect severity and is associated with higher rates of neglect than physical abuse (Dunn et al., 2002). Maternal substance use disorders also play a moderating role between parental histories of maltreatment and their likelihood of neglecting their children as well as mediating the relation between comorbid parental psychiatric diagnoses and child neglect (Dunn, Mezzich, Janiszewski, Kirisci, & Tarter, 2001).

Parenting skills of substance using parents may be compromised not only by the pharmacological effect of drugs but also by the expense and time associated with obtaining drugs, and the antisocial contexts in which drug use typically occurs (Dunn et al., 2002). Inconsistencies between periods of stability and parental relapse can contribute to lapses in provision of children's basic needs for food, clothing, and shelter, as well as potentiate access to dangerous substances (Barnard & McKeganey, 2004). Substance-abusing parents are more likely to be involved in court proceedings, but less likely

to comply with court orders (Barnard & McKeganey, 2004). Parental drug use can undermine parent–child relationships and result in more insecure attachment relationships, more negative parenting practices, and less supervision than in families without a substance using parent (Barnard & McKeganey, 2004). Additionally, substance abusing parents may expose children to criminal activity associated with using and obtaining drugs, which may also increase their risk of exposure to community violence (Dunn et al., 2002).

Neglect and Neighborhood Conditions

Although neglect commonly is associated with acts of omission rather than commission, neglectful parenting typically overlaps with families' exposure to violence within and outside the home. Maltreated children often live in an environmental context in which multiple risk factors are present at several levels of the ecology, such as neighborhoods with high concentrations of poverty and elevated crime rates (Coulton, Korbin, Su, & Chow, 1995). In a longitudinal follow-up of maltreated and nonmaltreated children, subsequent criminal behavior among maltreated children was influenced by neighborhood conditions, and the interaction between family and neighborhood characteristics yielded a more comprehensive understanding of antisocial behavior than either variable alone (Schuck & Widom, 2005). Neighborhood characteristics were related to both maltreatment and criminality over time. Child maltreatment predicted residence in less desirable neighborhoods as these children reached adulthood, which mediated the relation with subsequent illicit drug use (Chauhan & Widom, 2012). Among maltreated children, disadvantaged neighborhoods had the greatest impact on neglected children, in part because neglectful parents failed to provide for their children and were least likely to protect them from harm (Schuck & Widom, 2005). Widom and her colleagues found that the relations between individual and neighborhood characteristics were dynamic and bidirectional over time. They have emphasized the importance of examining the etiology and consequences of maltreatment with regard to transactions among familial, neighborhood, and other levels of influence (Chauhan & Widom, 2012). Neglected children responded to neighborhood disorder with more antisocial behavior in adulthood; however, these studies did not address how neighborhood factors impacted children's early development.

Neighborhood Crime and Development of Child Externalizing Behavior Problems

Maltreated children are more likely than nonmaltreated children to exhibit heightened externalizing symptomatology, including behavior problems at home and at school (Cicchetti & Valentino, 2006; Hildyard & Wolfe, 2002; Scannapieco, 2008; Oshri, Rogosch, Burnette, & Cicchetti, 2011). Additionally, a number of studies have demonstrated that exposure to violence in the community can create a mental health burden on children with respect to risk for externalizing problems (Lynch, 2003).

Violence exposure correlates positively with aggression and antisocial behavior (Miller, Wasserman, Neugebauer, Gorman-Smith, & Kamboukos, 1999; Schwab-Stone et al., 1995). All forms of violence exposure appear to have some effect on child psychopathology—hearing about violence in the community, witnessing it, and being personally victimized (Stein, Jaycox, Kataoka, Rhodes, & Vestal, 2003). Because maltreated children often live in neighborhoods in which violence is prevalent, it is difficult to differentiate the contributions of maltreatment experiences and violence exposure in increasing children's risk of developing externalizing behavior problems (Cicchetti & Valentino, 2006). However, neglected children, who often lack parental supervision, may develop externalizing behavior problems by virtue of their increased risk of community violence exposure. Thus, neighborhood violence is likely to serve as a putative mediator to externalizing behavior problems for neglected children.

Lynch and Cicchetti (1998) applied an ecological–transactional perspective toward understanding the interplay between neighborhood violence and family systems. In their study, community violence and child maltreatment each had unique effects on the well-being and symptomatology of children. A higher proportion of maltreated children compared with nonmaltreated children reported being exposed to high levels of community violence, supporting the hypothesis that high levels of violence in the exosystem would be associated with the occurrence of child maltreatment in the microsystem. Witnessing violent events in the community was associated with higher levels of aggression and acting out behavior. The interaction between maltreatment status and violence exposure was not significant; however, there was an additive effect of these two forms of ecological adversity. Children who were both exposed to high levels of community violence and maltreated by their families displayed worse externalizing behavior than children exposed to only a single ecological adversity. Within the maltreatment group, severity of neglect experiences made the strongest unique contribution to variance in children's adaptation, even when other forms of maltreatment were considered.

In studies of physically abused children, Jaffee and colleagues found that maltreated children had higher rates of antisocial behavior than nonmaltreated children, even after controlling for genetic transmission of antisocial behavior (Jaffee, Caspi, Moffitt, & Taylor, 2004). Antisocial behavior was determined to be partially mediated by environmental factors, and parental substance abuse impacted the functioning of maltreated children (Jaffee et al., 2007). Children living in violent neighborhoods were less likely to be resilient, and exposure to neighborhood and familial stressors compromised children's functioning (Jaffee et al., 2007). It is unclear whether similar processes may exacerbate the impact of neglect on the development of externalizing psychopathology.

Impetus for the Current Study

This study followed an urban high-risk low-income sample of children from ages 4 to 9 years in order to examine the role of

Table 1. Demographics Table.

Descriptors	Maltreated, $N = 111$ (%)	Nonmaltreated, $N = 59$ (%)	Test statistics[a] (χ^2)
Gender of child (female)	52.3	52.5	.971(1) n.s.
Minority status (nonwhite)	89.2	84.7	.402(1) n.s.
Mother's marital Status (single)	85.6	78.0	.209(1) n.s.
History of public assistance	95.5	91.5	.209(1) n.s.
Employment status (employed)	30.5	60.4	13.73(1)*

Note. [a]Pearson chi-square.
*$p < .01$.

maternal drug dependence as a risk factor for child neglect and the subsequent development of child externalizing behavior problems. Additionally, the role of community violence was examined for neglected children to test the extent to which neighborhood crime contributes to externalizing behavior. One model sought to delineate pathways from maternal drug dependence to child externalizing behavior via severity of neglect. A second model examined the link between presence of neglect and subsequent externalizing behavior via violence in children's neighborhoods.

There are several demographic variables that have been implicated in the etiology and the sequelae of child neglect. These include disproportionate minority representation, unemployment, single parenthood, and poverty in the child welfare system (U.S. Department of Health and Human Services, Administration for Children and Families, Administration on Children, Youth and Families, Children's Bureau, 2011). Similarly, gender has been related to emergence of child psychopathology. Thus, we controlled for minority status, receipt of public assistance, employment, marital status, and gender effects in the analyses to ascertain the impact of ecological risk factors above and beyond these demographic variables. Drawing upon extant literature, the following hypotheses were tested:

1. Maternal drug dependence diagnosis (MDDD; by children's age of 4 years) will increase the risk of more severe child neglect between the ages of 4 to 6 years as well as externalizing behavior problems by age 9. Neglect severity will mediate the relation between maternal substance abuse and children's externalizing behavior problems at age 9.
2. Neglectful families are expected to live in more dangerous neighborhoods that exacerbate children's risk of exhibiting externalizing behavior. Specifically, presence of early child neglect (prior to age 4) will be associated with increased risk of living in neighborhoods with higher crime rates. This association with neighborhood crime between ages 4 and 6 years will mediate the relation between child neglect and the development of child externalizing behavior problems by age 9.

Method

Participants

Participants in this investigation included 170 high-risk urban children and their caregivers from upstate New York. All children were living with their biological mothers at the time of enrollment. Eighty-three percent of the children were from single parent families. Seventy-five percent of the caregivers in the sample had less than a high school education. The sample was ethnically diverse, with the majority from minority backgrounds (88% in the total sample; see Table 1). Children were recruited as preschoolers at the age of 4 and were followed through age 9. Over the 5 years of the study, retention rates were 85.3%. Across the time points of the study, 170 families were assessed at age 4, 160 families were assessed at age 5, 156 families participated at age 6, and 145 families participated at age 9. Teacher ratings at age 9 were available for 139 children (82% of the sample).

Recruitment of maltreated children ($N = 111$) focused on children who had been identified through the Department of Human Services (DHS) as having documented histories of physical neglect. A DHS staff member who was assisting with the project identified eligible children and made the initial contact with families to ascertain interest in participation and to obtain permission to share their contact information with the project team.

To obtain a demographically matched comparison group, nonmaltreating families ($N = 59$) were selected randomly from the County recipients of Temporary Assistance for Needy Families (TANF). Because the majority of maltreating families referred to Child Protective Services (CPS) are socioeconomically disadvantaged and receiving public assistance (95.5% in the current study; Gaudin, 1999; Sedlak et al., 2010), utilization of TANF lists provided access to a demographically similar population (see Table 1).

In the initial contact, consents were obtained to verify nonmaltreatment status by reviewing DHS central registry data. Medical records also were reviewed to confirm nonmaltreatment status. However, analyses suggested that although the two groups were demographically matched in minority status, marital status, and history of public assistance, the groups differed in employment status (See Table 1). Specifically, 41.8% of the mothers from the maltreated families were employed compared to 79.8% of the mothers in the nonmaltreatment group; therefore, employment status was included as a covariate.

Procedure

At the initial assessment, mothers signed informed consent and permission for their children's participation, according to procedures approved by the University Institutional Review Board. Participating families completed initial assessments of children's functioning and the family environment, including demographic information on socioeconomic status, children's race and ethnicity, and maternal symptoms of substance dependence and abuse. Family addresses were used to link with neighborhood community crime statistics. Follow-up laboratory visits were conducted with children when they were

approximately 5 and 6 years old. During these visits, parents provided updated information on demographic changes during the prior year. Follow-up visits at age 9 assessed children's psychopathology. In addition to parental consent, children gave assent for their participation at age 9. Parents signed consent for their children's teachers to be contacted at the end of fourth grade to complete questionnaires regarding children's behavior in the classroom, and school records were obtained.

Measures

Child neglect and abuse histories. Permission to review DHS records was obtained from all participating families. Histories of maltreatment were coded using the Barnett, Manly, and Cicchetti (1993) Maltreatment Classification System (MCS), which captures detailed information from CPS records by obtaining systematic data from the narrative and investigation determinations contained in DHS records, rather than relying on CPS labels (Manly, 2005). This system captures information on the occurrence of multiple subtypes of maltreatment, including extensive information on severity, and the developmental period during which it occurred. For each report, presence and absence of each subtype is determined based on operational definitions of each category, and severity codes are determined within each subtype.

Neglect is coded when there is evidence that a caregiver failed to exercise a minimum degree of care in meeting the child's needs or failed to take adequate precautions to ensure the child's safety. Neglect can range from frequently missed meals, unsanitary living conditions, and failure to provide adequate supervision to severe malnutrition, gross inattention to medical needs, or endangering the child in life-threatening situations. Neglect severity was scored on a 1 to 5 scale, with 5 indicative of events that were life-threatening or likely to result in serious physical consequences and 1 indicative of neglect that was relatively mild but still rose to the level of attention by authorities. Adequate reliability for coding of maltreatment subtypes and severity was obtained with intraclass correlations ranging from .81 to 1.0 across subtypes.

Before the age of four, 111 children were maltreated and 59 had no documented history of maltreatment. By age 9, seven additional children from the nonmaltreated comparison group had been reported to CPS for maltreatment. To reflect maltreatment histories indicative of neglect in early development, these children were considered as nonmaltreated controls for analyses of neglect prior to age 4. Before age 4, within the maltreated group, 97 children (87%) had reports of physical neglect, including reports of Lack of Supervision, Failure to Provide, and Moral/Legal Maltreatment (Barnett, et al., 1993). Neglect severity ranged from 1 to 5, with 70% of the neglected sample scoring in the moderately high range (3–4 on the 1–5 scale). Although the sample was originally recruited with a focus on physical neglect, other subtypes were also present before age 4; 18 children (16%) had indicated physical abuse reports and 61 children (55%) had emotional maltreatment; no children were sexually abused at the preschool time point. Fourteen

children were maltreated but did not have neglect in their CPS records. Children with any subtype other than neglect were excluded from the analyses in order to capture the unique effects of neglect. Thus, 42 neglected children and 59 nonmaltreated children were included in the analyses.

Demographics. The *Demographics Interview* (Cicchetti & Carlson, 1979) was utilized to obtain maternal reports of information about race/ethnicity and socioeconomic status, including receipt of public assistance and education.

Maternal drug dependence. The *Diagnostic Interview Schedule*, Version IV (DIS-IV, Robins, Marcus, Reich, Cunningham, & Gallagher, 1998) alcohol and drug abuse modules were administered to mothers as part of the age four initial assessment. Because the DIS-IV is a structured diagnostic interview, it is designed to be administered by trained lay interviewers who are not required to be clinicians, yet the resulting diagnostic information is calculated according to likelihood of diagnostic classification. The interviewers were Bachelor's level full-time Research Assistants with backgrounds in psychology or related fields who received training in engaging high-risk diverse populations, diagnostic interviewing, and the DIS-IV specific procedures. Maternal diagnosis of drug dependence endorsed within these modules was utilized. We focused on drug dependence diagnoses because of their association with neglect (Black & Dubowitz, 1999). Reliability and validity of this measure have been provided in several studies and in large collaborative multisite projects (see Eaton & Kessler, 1985).

Neighborhood crime. Violence in the exosystem was assessed through the use of crime reports within census tracts. Government census tracts provide units of analysis for which numerous types of data are readily available. We focused on data pertaining to violent crime within census tracts. Children's addresses at ages 4, 5, and 6 were mapped relative to annual Police Department crime statistics for the census tract in which they lived at each time point. The total number of violent crime incidents (including homicide, rape, aggravated assault, and robbery) was recorded per geographic area. Across census tracts, these incidents ranged from 3 to 147 (range of means across the three time points 35.68–40.05; modes 21.0–30.0). These data gave us approximations of neighborhood violence that provided a backdrop for children's experiences of violence. These factors were expected to mediate the effects of microsystem exposure to maltreatment as a result of the added stress they create for families. Although, census tracts do not necessarily represent the neighborhood as it would be defined by the residents themselves (Coulton et al., 1995), data based on census tracts have been used successfully in a number of studies examining the functioning of high-risk samples (Aber, Jones, Brown, Chaudry, & Samples, 1998; Korbin, Coulton, Chard, Platt-Houston, & Su, 1998).

Child externalizing behavior problems. Teachers are considered reliable raters of externalizing behaviors; therefore, teachers'

Table 2. Correlations among variables, with means, standard deviations, and numbers of subjects per variable.

Variables		1	2	3	4	5	6	7	8	9	10
1	DDDx										
2	Neg Sev	.265**									
3	Pres Neg	.158*	.862**								
4	Crime4	.198*	.156	.120							
5	Crime5	−.084	.081	.115	.451**						
6	Crime6	−.013	.075	.178*	.393**	.568**					
7	AGT9	.050	.134	.091	.168	.181*	.080				
8	RBT9	.114	.152	.147	.164	.154	.034	.779**			
9	ODT9	.119	.134	.068	.099	.099	.070	.926**	.708**		
10	CDT9	.083	.180*	.177*	.196*	.168	.048	.882**	.930**	.778**	
	M	.15	2.04	.57	36.460	39.232	40.054	61.180	60.072	59.691	61.834
	SD	.361	1.825	.496	24.699	21.349	19.771	11.173	8.653	9.410	11.455
	N	163	170	170	152	139	130	139	139	139	139

Note. DDDx = Maternal Drug Dependency Diagnosis; Neg Sev = Severity of neglect up to age 6; Pres Neg = Presence or not of neglect; Crime4 = Sum of all Crime at T1 age 4; Crime5 = Sum of all Crime at T2 age 5; Crime6 = Sum of all Crime at T3 age 6; AGT9 = TRF Aggressive Behavior *T* Score age 9; RBT9 = TRF Rule Breaking Behavior *T* Score age 9; ODR9 = TRF Oppositional Defiant Problems *T* Score age 9; CDT9 = TRF Conduct Problems *T* Score age 9.

ratings of externalizing behavior problems were utilized from the *Teacher Report Form* (TRF). The TRF (Achenbach & Rescorla, 2001) is a widely used, standardized 113-item checklist designed to obtain teacher ratings of externalizing behavioral problems for children aged 6 to 18. The TRF has strong psychometric properties, and ratings on this instrument have been shown to correlate with clinic-referred status and psychiatric diagnoses (Edelbrock & Achenbach, 1985; Edelbrock & Costello, 1988; Kasius, Ferdinand, van den Berg, & Verhulst, 1997). The internal consistency of the subscales within the current sample was high (Cronbach's α = .951).

Analytic Plan

All structural equation modeling (SEM) analyses were performed using M-plus version 6.10 (Muthén & Muthén, 1998–2010). To account for nonnormality, all of the model-based analyses were conducted using maximum likelihood estimation with and without the robust standard errors (MLR; Yuan & Bentler, 2000); the models with the optimal fit were selected. Traditional maximum likelihood methods assume the distributions of the continuous variables in the model are multivariate normal. The normal distribution assumption is problematic in mediation models as the product coefficients used to evaluate mediation rarely meet this assumption (Preacher & Hayes, 2008; Shrout & Bolger, 2002). Thus, in the current study, mediation significance (i.e., indirect effect estimates) was determined via a bootstrapping technique (MacKinnon, Fairchild, & Fritz, 2007), by using 10,000 sample replicates of the indirect effects' product coefficients.

Missing data did not exceed 18% at any time point. No missing data were present on maltreatment status. Missing data were determined to be Missing at Random (MAR; Schafer & Graham, 2002) and were analyzed under missing data theory using all available data via the full information maximum likelihood (FIML) estimation technique (Schafer & Graham, 2002).

The examined SEM models were carefully evaluated in terms of fit by multiple fit indicators. Model fit refers to the ability of a proposed model to reproduce the observed data within a variance–covariance matrix. A good-fitting model is one that is reasonably consistent with the data and therefore does not necessitate respecification. Model fit indices were first determined for the measurement model before evaluation and interpretation of the model paths of the structural model were exercised. For SEM models, a variety of global fit indices were used, including traditional model fit indices conforming to the following statistical criteria (Hu & Bentler, 1999; McDonald & Ho, 2002) for the root mean square error of approximation (RMSEA < 0.08), for the Test of Close Fit ($p > .05$), the Comparative Fit Index (CFI > 0.95), Tucker–Lewis Index (TLI > 0.94), and the standardized root mean square residual (S-RMR < 0.07). Gender, history of public assistance receipt, employment status, marital status, and child minority status were included in all of the analyses in order to control for their potential influence on the examined endogenous variables.

Results

Table 2 summarizes Pearson bivariate correlations among variables included in the structural models as well as means, standard deviations, and sample size.

Test of Measurement Models

Latent factors were constructed for neighborhood crime and externalizing behavior problems. The latent factor for neighborhood crime was defined by the totals of the neighborhood crime data at ages 4, 5, and 6 years to create a construct representing chronic neighborhood conditions over time between initial and follow-up assessments. The externalizing latent construct was defined by teacher reports of aggression, rule breaking, oppositional defiant, and conduct disordered behavior scales from the TRF at children's age of 9 years.
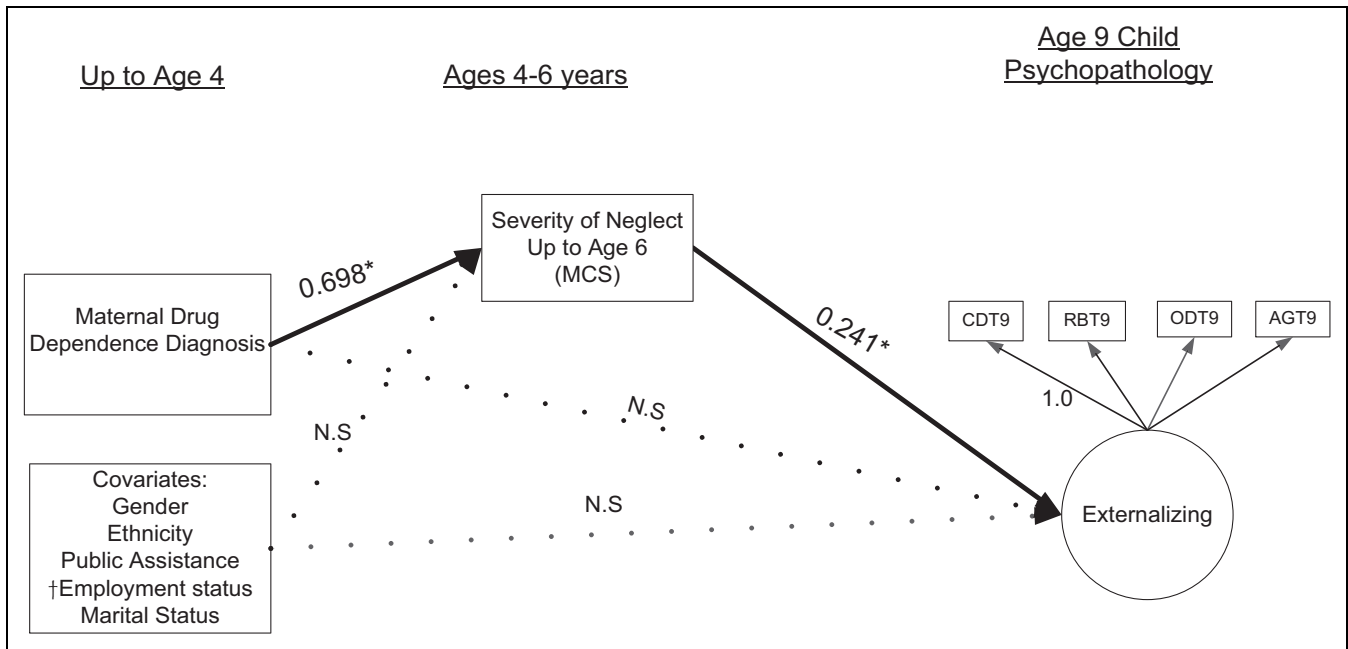
Figure 1. Structural equation model 1: Maternal drug dependence and child externalizing behavior problems via severity of neglect. *Note.* Model fit: CFI = .961; TLI = .930; SRMR < .035; RMSEA < .091; Values represent standardized path coefficients; *p < .05; **p < .001; DIS (DSM-IV) maternal drug dependence diagnosis (1 = met diagnosis; 0 = no diagnosis); MCS = Maltreatment Classification System; AGT9 = TRF-Aggressive Behaviors *T* score at age 9; RBT9 = TRF Rule-Breaking Behavior *T* score at age 9. ODT9 = Oppositional Defiant *T* score at age 9. CDT9 = Conduct Disorder *T* score at age 9. †Families with Neglect history had significantly higher rates of unemployment.

We began by testing measurement models for all of the latent variables. All traditional indices of global fit suggested good fit between the data and the model tested. Most of the standardized factor loadings were large (>.6). The measured variables' loadings on the latent variables were all statistically significant, $p < .001$, signifying that latent variables were adequately measured by their indicators. After inspecting modification indices greater than 4, we allowed error covariance between measures (i.e., rule breaking with oppositional defiant), which were obtained at the same time point. Throughout the analyses, covariates were included. In addition, in order to assure that statistical effects in the models were not related to measurement differences related to child gender, we tested and confirmed measurement invariance (MI) across gender, using a multiple indicators multiple causes (MIMIC) procedure (Muthén, 1989).

Structural model 1. Model 1 (see Figure 1 and Table 3) tested whether neglect severity, up to children's age of 6 years, mediated the link between MDDD, measured at children's age of 4 years, and the factor for externalizing symptoms at children's age of 9 years. There was a very good model fit between the data and the hypothesized mediation model (See Figure 1 for model fit indices). MDDD did not show a direct linear relation with externalizing behavior problems at age nine ($\beta = -.102$; n.s.). However, MDDD significantly predicted neglect severity up to age 6 ($\beta = .698$; $p < .05$). Neglect severity significantly predicted higher scores on the externalizing factor ($\beta = .241$; $p < .05$) at age 9 years. Subsequently,

mediation analyses were performed and confirmed that neglect severity up to age 6 significantly mediated the path from MDDD and externalizing problems ($a \times b = 1.297$; 95% confidence interval [CI] [0.046, 4.132]) at age 9.

Structural model 2. Model 2 (see Figure 2 and Table 4) tested the link between neglect status (confirmed prior to children's age of 4 years) and children's symptoms of externalizing behavior problems at age 9 via neighborhood crime measured between the ages of 4 and 6. The data showed very good fit with the tested model (See Figure 2 for model fit indices). The model results revealed that the presence of neglect approached but did not reach significance in directly predicting externalizing behavior problems at age nine ($\beta = .395$; $p = .057$). Once neighborhood crime was added to the model, there were no significant predictions between neglect and externalizing behavior problems ($\beta = .248$, n.s.). Children neglected prior to age 4 were determined to be living in significantly more violent neighborhoods (reflected in the neighborhood crime factor) measured between children's ages of 4 and 6 years ($\beta = .579$; $p < .01$). Higher factor scores on neighborhood crime predicted increased levels on the externalizing factor ($\beta = .279$; $p < .01$). Subsequently, a bootstrapping procedure was utilized to obtain the product coefficients for the mediation analyses. Results revealed that the link between presence of neglect at age 4 and children's externalizing symptoms at children's age of 9 years was significantly mediated by higher scores on the neighborhood crime factor measured between

Table 3. Variables Examined in Model 1.

Direct effects		$B(\beta)$	SE	Est./SE
Covariates	Externalizing problems			
	→ Maternal drug dependence	−2.396(−0.311)	2.640(0.343)	−0.908(−0.908)
	→ Neglect severity	1.012(0.241)	0.484(0.111)	2.091*(2.173*)
	→ Gender	1.132(0.147)	1.667(0.214)	0.497(0.686)
	→ Marital status	−0.070(−0.009)	1.005(0.131)	−0.070 (−0.070)
	→ Minority status	−2.219 (−0.288)	2.260(0.289)	−0.982(−0.996)
	→Public assistance	−2.514(−0.327)	4.209(0.546)	−0.597(−0.598)
	→Employment status	1.188(0.154)	1.681(0.220)	0.707(0.702)
Neglect severity				
Covariates	→ Maternal drug dependence	1.281(0.698)	0.544(0.290)	2.355*(2.403*)
	→Gender	0.216(0.118)	0.350(0.191)	0.618(0.618)
	→ Marital status	−0.350(−0.191)	0.214(0.116)	−1.638(−1.649)
	→ Minority status	0.322(0.175)	0.594(0.323)	0.541(0.543)
	→Public assistance	0.681(0.371)	0.507(0.274)	1.344(1.357)
	→Employment status	−1.194 (−0.650)	0.341(0.182)	−3.498**(−3.568**)
	Indirect effects	a * b	SE	95% Confidence interval
	Maternal Drug Dep → Neg Sev → Ext	1.297	0.958	[0.046, 4.132]*

Note. → reflects predictive path; Standardized values are in parentheses. Maternal Drug Dependence = Maternal Drug Dependency Diagnosis; Neglect severity = Severity of neglect up to age 6; Minority status = Nonwhite race; Public assistance = Family's current public assistance (1 = *yes*, 0 = *no*); Gender = Sex of child (0 = *female*, 1 = *male*); Employment status (1 = *employed* and 0 = *unemployed*); Mother's marital status(1 = *married*, 0 = *unmarried*). *p < .05. **p < .01.
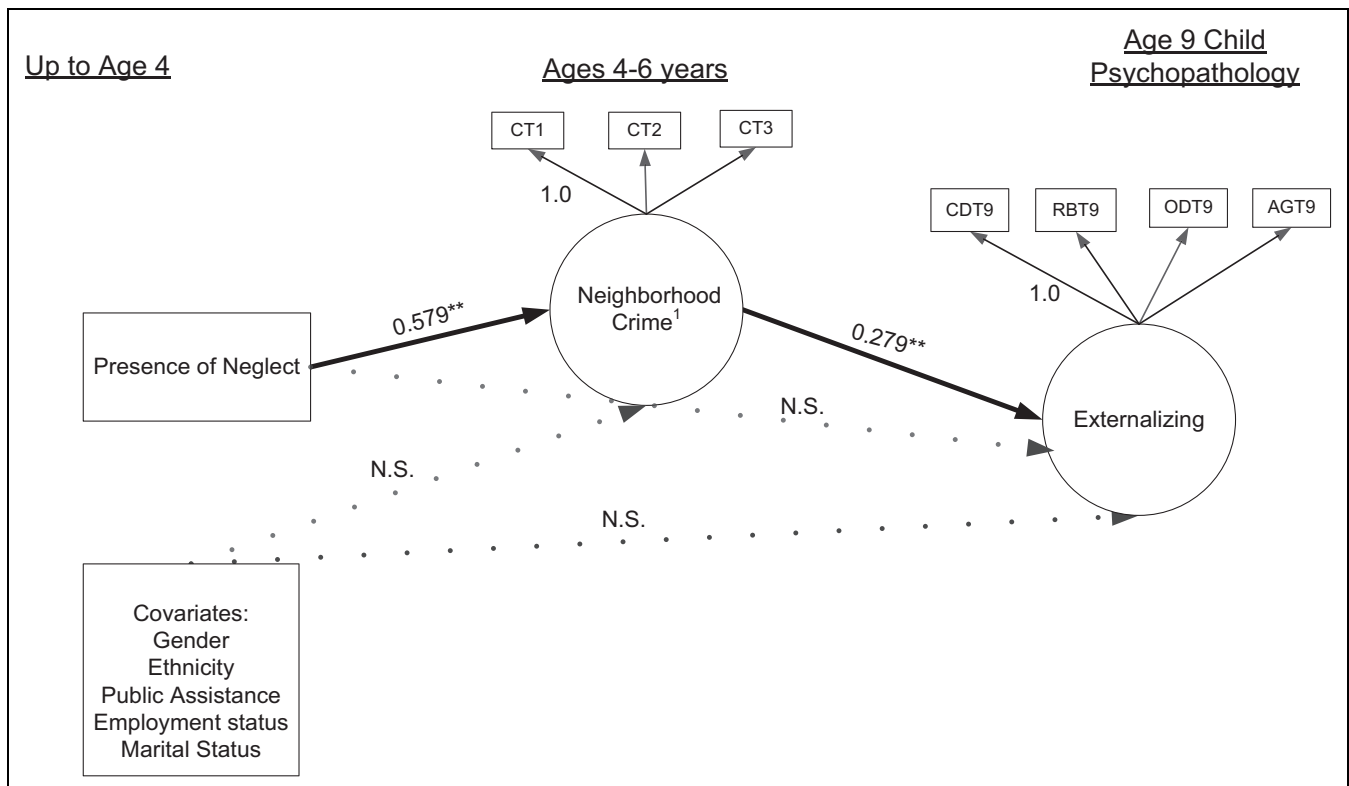

Figure 2. Structural equation model 2: Presence of neglect and child externalizing behavior problems via frequency of neighborhood crime. *Note.* *p < .05; **p < .01; Model fit: CFI = .958; TLI = .939; SRMR < .043; RMSEA < .075; Standardized path coefficients are presented; CT1-CT3 = Neighborhood Crime Data at age 4,5,6. Neglect status (1 = present and 0 = absent) based on the MCS for records up to age 4; AGT9 = TRF-Aggressive Behaviors T score at age 9; RBT9 = TRF Rule-breaking Behavior T score at age 9. ODT9 = Oppositional defiant T score at age 9. CDT9 = Conduct disorder T score at age 9.

Table 4. Variables Examined in Model 2.

Direct effects		$B(\beta)$	SE	Est./SE
Externalizing problems				
Covariates	→ Neighborhood Crime	0.184(0.279)	0.074(0.112)	2.494**(2.478**)
	→ Presence neglect	2.617(0.248)	2.393(0.220)	1.093(1.128)
	→Minority status	−0.014(−0.001)	3.701(0.351)	−0.004(−0.004)
	→Gender	1.258(0.119)	2.150(0.202)	0.585 (0.591)
	→ Employment status	0.841(0.080)	2.100(0.200)	0.401(0.400)
	→ Marital status	−1.054(−0.100)	1.227(0.117)	−0.859(−0.855)
	→ Public assistance	−0.630(−0.060)	6.097(0.577)	−0.103(−0.104)
Neighborhood crime				
Covariates	→ Presence neglect	9.242(0.579)	3.694(0.210)	2.502**(2.758**)
	→Minority status	−18.082(−1.132)	9.542(0.618)	−1.895(−1.832)
	→Gender	1.166(0.073)	3.940(0.241)	0.295(0.302)
	→ Employment status	2.411(0.151)	3.266(0.210)	0.738(0.719)
	→ Marital status	3.230(0.202)	2.434(0.160)	1.327(1.264)
	→ Public assistance	−7.132(−0.447)	6.054(0.409)	−1.178(−1.092)
	Indirect effects	$a * b$	SE	95% Confidence Interval
	Ext → CV → Presence neglect	1.719	1.156	[0.100, 4.849]*

Note. → reflects predictive path; Standardized values are in parentheses.; Neglect severity = Severity of neglect up to age 6; Minority status = Nonwhite race; Public assistance = Family's current public assistance (1 = yes, 0 = no); Gender = Sex of child (0 = female, 1 = male); Employment status (1 = employed, 0 = unemployed); Mother's marital status (1 = married, 0 = unmarried).
*p < .05. **p < .01.

children's ages of 4 to 6 years ($a \times b = 1.719$; 95% CI [0.100, 4.849]). In both models, there were significant paths from gender to the externalizing factor, suggesting that on average the mean score on externalizing problems was higher for males compared to females. Thus, we tested interactions between the main independent variables and gender in the two mediation models. Two-way interaction analyses suggested that gender did not significantly moderate the path from MDDD, child neglect, or neighborhood crime to the externalizing factor.

Discussion

Consistent with prior research, this study highlighted the association between maternal substance abuse, early child neglect, and the development of child externalizing behavior problems in school-age children, while underscoring the risk of community violence as a stressful environmental context exacerbating maladaptation among neglected children. In line with our first hypothesis, maternal drug dependence was associated with increased severity of neglect. The current findings also emphasized the role of severity of neglect associated with maternal drug dependence, such that mothers who met drug dependence diagnoses had more serious failures to meet their children's needs. Perhaps, because of lack of supervision or exposure to illegal behavior among the neglectful families, these children were more vulnerable to development of externalizing behavior problems. These results underscore the importance of examining antecedents of child neglect in order to identify risk factors and develop prevention and intervention strategies that can avert deleterious consequences for children (Dunn et al., 2002). Although maternal drug dependence was found to be a risk factor for neglect, it did not have a direct effect on children's externalizing behavior, in contrast to other

studies of parental substance use (Dunn et al., 2002). Because children of parents with substance use disorders have been found to be more aggressive, impulsive, and dysregulated (Barnard & McKeganey, 2004; Dunn et al., 2002), it is important to delineate the processes through which these behaviors develop. Children with prenatal substance exposure are more likely to be premature, have low birth weight, or have other birth complications that may increase the likelihood of behavior problems. Although examining substance-related birth complications was beyond the scope of this study, the examination of the impact of early familial risk prior to school entry on the development of behavior problems in school elucidates the mediational role of child neglect in impacting children's maladaptive behavior over time. Neglected children are at risk of school difficulty, including erratic attendance, repeating a grade, truancy, and suspensions (Barnard & McKeganey, 2004; Eckenrode, Laird, & Doris, 1993; Kendall-Tackett & Eckenrode, 1996). The results of this study support the link between neglect severity and school behavior problems in elementary school, and it is likely that without intervention, these neglected children will encounter increased risk of school failure and drop out in later school years.

The second model confirmed that the occurrence of child neglect predicted living in more violent neighborhoods, and neighborhood crime mediated the link between child neglect prior to age 4 and externalizing behavior problems at age 9. Neglect appears to be a vulnerability factor that increases risk of exposure to community violence, and perhaps through parents' failure to adequately supervise or protect their children, living in violent neighborhoods results in increased acting out and antisocial behavior. Whereas Lynch and Cicchetti (1998) found that severity of neglect and victimization by community violence had an additive impact in predicting subsequent externalizing behavior, the current results demonstrated a significant

mediational relation of community crime rates on externalizing behavior problems. The failure of parents to meet children's physical and supervisory needs in early childhood may have contributed to the development of children's difficulty regulating their behavior in the presence of heightened crime in their neighborhoods.

Although the association between child maltreatment and later externalizing symptoms has been established with prior examinations of co-occurring risk factors (Cicchetti & Valentino, 2006; Kolko, Hurlburt, Zhang, Barth, Leslie, & Burns, 2010; Lynch & Cicchetti, 1998; Manly, Kim, Rogosch, & Cicchetti, 2001; Oshri et al., 2011), the current study extends prior research by examining the processes by which early neglect interacts with neighborhood crime to predict children's psychopathology using a multimethod, multi-informant, and prospective longitudinal design. Young children are dependent upon caregivers and require a high degree of parental attention and nurturance and intensive supervision to meet basic physical and emotional needs. Parents who are impaired by their struggles with substance use are less likely to attend to and meet their children's needs in early childhood. Such acts of parenting omission in early development are likely to derail vulnerable children from mastering key developmental tasks and competencies over time, particularly those related to regulating a competent response to stress and adversity. Moreover, parental substance use and child neglect may increase the risk of children's exposure to community violence through caregivers' failure to provide sufficient oversight of their children's behavior. Parents who report symptoms of substance abuse may be exposing their children to moral–legal neglect through witnessing illegal behavior, and interface with criminal perpetrators may increase risk of violence exposure. These experiences may further tax children's already vulnerable stress-response systems and potentially overwhelm their ability to regulate their behavior, resulting in greater risk of maladaptation.

These results highlight important areas for prevention and intervention for high-risk families. An ecological–transactional model emphasizes the bidirectional relations among familial and environmental risk and protective factors, and the development of adverse consequences depends on how these risks accumulate over time (Cicchetti & Valentino, 2006; Jaffee et al., 2007). The earlier clinicians and educators can break these negative patterns in this developmental process, the better the chances for fostering positive adaptation in home, school, and community contexts (Jaffee et al., 2007). Early intervention programs for substance-abusing women and their children can reduce drug and alcohol use, promote positive parenting skills, and improve children's outcomes (Barnard & McKeganey, 2004; Luthar & Suchman, 1999; Nair, Schuler, Black, Kettinger, & Harrington, 2003). A combination of home- and center-based approaches has been recommended for substance-abusing parents and their children, and these interventions are likely to be resource-intensive and to require extensive outreach, persistence, and high-quality treatment with good supervision in order to be effective (Barnard & McKeganey, 2004). Rather than focusing solely on treating

parents' addictions and hoping that reducing substance use will improve family functioning, interventions should incorporate children's needs and family perspectives and include an emphasis on improving parenting and parent–child relationships to reduce the risk of child neglect (Barnard & McKeganey, 2004).

In addition to preventive intervention to address parental substance abuse, reduction of community violence may be important to improve children's adaptation. Neighborhood factors may affect children directly through victimization by violence or indirectly by impacting family stress and parenting practices (Jaffee et al., 2007). In this study, there was an indirect effect of living in violent neighborhoods among a low-income sample. The risks associated with community violence and poverty were evident among neglected children, but the effect of neighborhood crime increased children's behavior problems when factors associated with poverty (receipt of public assistance, unemployment, single parenthood, and ethnicity) were controlled. Thus, interventions should reduce risks both in children's families and in their communities in order to maximize the chances of success and to promote positive adaptation.

Limitations

The current study utilized maltreatment data that were obtained through documentation in DHS records. Some researchers have criticized the use of officially documented records for restricting information about neglect to only those families who come to the attention of authorities and relying on CPS labels to define maltreatment (National Research Council, 1993). However, the use of the MCS (Barnett et al., 1993) improves upon reliance on CPS labels by facilitating operationalization of dimensions within maltreatment and by incorporating narrative descriptions of CPS investigations and determinations with assessments of family functioning and child safety.

Although each subtype was coded separately, multiple subtype occurrence was frequent. In particular, in this sample, 45% of the maltreated sample experienced both physical neglect and emotional maltreatment. The current study addressed the overlap of subtype occurrence by comparing children who experienced only neglect with nonmaltreated children. While this approach permitted more specificity for examining the impact of neglect, it reduced generalizability of the results for the large number of children who experience multiple subtypes. The current results would need to be replicated with a larger sample to disentangle the relative contributions of individual subtypes and subtype combinations or to examine specific subtypes within neglect (e.g., failure to provide compared with lack of supervision).

Furthermore, a larger sample would be necessary to examine additional risk factors in more detail, such as familial violence, specific parenting practices, differentiation of particular drugs or alcohol usage, physiological factors, criminality, and other stressors. The study used multiple sources of information (DHS records, teacher report, parent report, and neighborhood crime statistics); however, each construct was

derived from a single source. Increased incorporation of multiple informants is recommended in future research.

Conclusions

The results of this study highlight the need for strategies to reduce the occurrence of maternal drug dependence, child maltreatment, and crime, and to alleviate their combined and unique effects on children's development. An ecological–transactional model of development emphasizes how the interaction among risk and protective factors at various levels of children's environments can shape their developmental trajectories in the face of adversity. This study addressed the associations among neighborhood crime in the exosystem, neglect and maternal drug dependence in the microsystem, and children's reactions of externalizing behavior problems in the ontogenic development of an impoverished, urban sample. While the co-occurrence of these risk factors is well known in clinical settings, the inclusion of multiple risks in SEM analyses facilitates an examination of the pathways through which these risks impact the unfolding process of children's development from preschool into middle childhood. When followed longitudinally, children who had been exposed to multiple risk factors exhibited increased behavior problems by age 9 relative to children without such risks. Accounting for these risks through structural equation modeling illustrated the complexity of children's adaptation and the pathways of maladaptation related to child neglect. Understanding the impact of community violence on externalizing behavior problems may aid clinicians in tailoring treatment more specifically to the needs of high-risk children. Supporting children to develop resilient functioning in the face of adversity and implementing evidence-based interventions to treat maltreated children are essential for the promotion of more positive development among these children and their families.

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