



Trauma experience in children and adolescents: An assessment of the effects of trauma type and role of interpersonal proximity



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ABSTRACT

The psychiatric sequelae associated with childhood experience(s) of trauma is complex and distinguishable from that of adult trauma exposure. Categories of impairment associated with experiences of early trauma include internalizing and externalizing emotional and behavioral problems, posttraumatic stress symptomatology, and dissociation. The present study assessed the relationship between the type of trauma experience (i.e., non-interpersonal or interpersonal) and the manifestation of a wide range of psychiatric symptomatology using prospective longitudinal data from a community sample of ethnically diverse children and adolescents ($N = 1676$; ages 4–18). The study also examined the relationship between different types of trauma experiences (e.g., direct, vicarious, interpersonal) and levels of various symptom domains (e.g., anxiety, posttraumatic stress, conduct problems). A number of factors relevant to the relationship between early trauma experience and subsequent impairment including temperament, socioeconomic status, sex, and age were included in the analyses. Results indicated that interpersonal traumas involving significant interpersonal proximity were associated with externalizing problems (i.e., oppositional defiant and conduct problems). Direct trauma experiences and emotionality were positively associated with almost all symptom domains. Implications for the relationship between trauma and developmental psychopathology are discussed.

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1. Early trauma experiences in children and adolescents: An assessment of the effects of trauma type and role of interpersonal proximity

Histories of childhood trauma are widespread in adolescent and adult psychiatric populations (van der Kolk, 2005). Childhood trauma, specifically in the form of physical, emotional, and sexual abuse, is highly correlated with future psychiatric care, as well as poor mental and physical health throughout the lifespan (Felitti et al., 1998; Finkelhor, Ormrod, & Turner, 2009a). Over 3 million abuse or neglect reports involving children are reported every year and very young children are disproportionately represented in this group (Child Welfare Information Gateway, 2012). Due to their underdeveloped coping skills, young children are especially likely to experience negative outcomes resulting from trauma (Briggs-Gowan, Carter, & Ford, 2012; Lieberman & Knorr, 2007; Scheeringa & Zeanah, 1995). Trauma experiences, especially those

which begin at an early age, are prolonged, lack immediate restorative experiences, and/or involve the caregiving system, can disrupt psychological, neurobiological, relational, and cognitive development (Cook et al., 2005). Survivors of early trauma frequently exhibit impairment in the following areas: emotion, behavior regulation, attention, posttraumatic distress, and dissociation.

2. The impact of childhood trauma on psychological development and functioning

Poorly regulated affect is reflected in a number of commonly exhibited behaviors of abuse victims, including aggressiveness against self and others, dissociative behaviors, concentration difficulties, distrust of others, mood swings, and impulsivity (Schore, 2001; Van der Hart, Nijenhuis, & Steele, 2005). Seemingly inappropriate and problematic behavior is frequently exhibited by traumatized children (Cook et al., 2005). Traumatized children may exhibit rigidly controlled behavior patterns such as inflexible rituals and rigidly controlled eating habits, as well as undercontrolled behaviors including aggression, self-injurious behaviors, and frozen avoidance reactions (van der Kolk, 2005). Importantly, research indicates that youth who have experienced a variety of trauma-types are at increased risk for psychopathology and problematic behaviors (Cloitre et al., 2009; Finkelhor, Ormrod, Turner,

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& Holt, 2009b; Ford, Elhai, Comor, & Frueh, 2010; Ford, Wasser, & Connor, 2011b; Turner, Finkelhor, & Ormrod, 2010). Likewise, research suggests that individuals who have directly experienced traumatic incidents are more likely to experience mental health problems than those who have experienced vicarious traumas (e.g., witnessing domestic violence; Copeland, Keeler, Angold, & Costello, 2007; Ford et al., 2010). For example, Ford et al. (2010) found that in a large sample of adolescents, abuse and assault victims were more likely to have psychiatric diagnoses compared to those who witnessed violence.

Interpersonal violence and victimization have been indicated as risk factors associated with both internalizing (e.g., depression, anxiety) and externalizing (e.g., oppositionality, impulsivity) problems (Finkelhor et al., 2009a,b; Ford, Gagnon, Connor, & Pearson, 2011a; Turner et al., 2010). Such findings have been replicated in large community (e.g., Finkelhor et al., 2009a,b), and clinical samples (Ford et al., 2011a,b). Interestingly, among a sample of children and adolescents receiving outpatient psychiatric care, interpersonal traumas were significantly associated with externalizing problem severity and youth with a history of noninterpersonal trauma exhibited higher scores on an internalizing problems measure (Ford et al., 2011a,b). However, Ford et al. (2011a,b) found that after controlling for the effects of interpersonal traumas, the relationship between noninterpersonal traumas and internalizing problems was nonsignificant. These findings are consistent with other research that indicates that noninterpersonal traumas are more consistently linked to internalizing than externalizing problems (Ford et al., 2000).

Furthermore, traumas that occur in the context of interpersonal relationships, or that involve betrayal of important bonds, are more highly correlated with later distress and mental health problems than are non-relational traumas (DePrince & Freyd, 2004; Turell & Armsworth, 2003). Despite research examining trauma within close interpersonal relationships among adults, to date, research has not yet examined the role of interpersonal proximity, trauma experience, and mental health problems among children and adolescents. Although Freyd and colleagues have examined the impact of traumas involving different levels of perpetrator-induced betrayal on mental health symptoms in adults (Freyd, Klest, & Allard, 2005; Martin, Cromer, DePrince, & Freyd, 2013), most researchers to date have examined interpersonal traumas dichotomously (i.e., interpersonal vs. non-interpersonal traumas; e.g., Forbes et al., 2012; Ford et al., 2011a,b; Fowler, Allena, Oldham, & Frueh, 2013; Lilly & Valdez, 2011; Luthra et al., 2009). While such studies have produced robust findings, there is a dearth of knowledge regarding the effects of traumas involving differing levels of interpersonal closeness. In other words, it is yet unclear how traumas involving various types of relationships, regardless of whether or not the individual involved is a victim or perpetrator, impacts mental health outcomes in youth. The current study examined whether and how degree of interpersonal proximity of trauma was related to internalizing and externalizing problems among an urban high risk sample of youth.

3. Additional risk factors

From a developmental psychopathology perspective (cf. Cicchetti, 1989, 1993), numerous risk and protective factors interact over the course of development. Thus in any modern study examining the environmental effects such as traumatic experiences on psychopathology, it is critical to include other likely risk factors in model building. Past research has suggested that there are a number of general factors that place youth at greater risk for the development of mental health problems. For instance, the literature on childhood trauma consistently states that the

detriment incurred by childhood abuse and trauma is partially dependent upon the timing of the trauma (Kaplow & Widom, 2007). Generally speaking, younger and less-developed children are at most risk for post-trauma harm in part because they lack social, emotional, cognitive, and neurobiological capacities associated with understanding and healthy coping with stressful events. In addition, temperament, specifically emotionality, has been found to be a significant predictor of internalizing and externalizing problems in youth (cf. Muris & Ollendick, 2005 for a review). Prospective research indicates that a difficult or highly emotional temperament at a young age is associated with internalizing symptoms (Caspi, Henry, McGee, Moffitt, & Silva, 1995), attention problems, delinquent, and aggressive behavior (Gjone & Stevenson, 1997). When compared to other facets of temperament, emotionality has been found to be the strongest predictor of behavioral and emotional problems (Gjone & Stevenson, 1997). Prospective research also suggests that temperament is a risk factor for the development of PTSD symptoms following a traumatic event. For instance, among adults who experienced noninterpersonal traumatic events (e.g., motor vehicle accidents, natural disasters); emotional reactivity predicted more severe PTSD symptoms at follow-up (Strelau & Zawadzki, 2005; Zawadzki & Popiel, 2012). Finally, the research suggests that minority ethnocultural background is significantly related to internalizing problems (Anderson & Mayes, 2010), externalizing disorders (Ford et al., 2011a,b), and PTSD symptomatology (cf. Kearney, Wechsler, Kaur, & Lemo-Miller, 2010 for a review), female youth tend to have higher rates of internalizing problems (Costello, Mustillo, Erkanli, Keeler, & Angold, 2003), PTSD symptomatology (Stewart et al., 2004), and dissociation (Silberg, Stipic, & Taghizadeh, 1997) whereas male youth tend to exhibit more externalizing problems (Card, Stucky, Sawalani, & Little, 2008), and low familial socioeconomic status is related to both internalizing and externalizing problems in youth (Shanahan, Copeland, Costello, & Angold, 2008).

4. Significance of present study

The present study builds upon extant literature in a variety of ways. The examination of prospective longitudinal data of children of three different age cohorts provided important information about the developmental nature of various symptomatic areas and their antecedents. To date, the majority of research on the relationship between trauma and youth psychopathology has involved measurements of trauma at a single time point, while the present study assessed for trauma history at three time points. This study also included traumas that involved close-others as victims, as well as perpetrators, of various traumas. The involvement of a known or close other in a trauma is herein referred to as *interpersonal proximity (IP)* or high, medium, and low interpersonal traumas (see Section 6 for more information about the operationalization of this construct). Adult-focused research can suffer from a number of problems associated with the recall of childhood experiences such as forgetfulness and memory bias. Thus, the present study contributed to the research on trauma and post-trauma sequelae by examining a large, prospective community sample of youth, including the examination of the effects of a wide variety of traumas including direct experiences of trauma, and vicarious experiences of trauma including witnessing trauma, and having knowledge of trauma. The larger range of traumas assessed provided information regarding which types of trauma are and are not related to problematic emotional and behavioral symptoms. The current study also assessed a wide variety of symptom domains including affective problems, anxiety, disruptive behavior problems, attention problems, post-traumatic stress symptomatology, and dissociation. Only a handful of studies (e.g., Ford et al., 2000; Ogawa, Sroufe,

Weinfeld, Carlson, & Egeland, 1997; Spinazzola et al., 2005) have accounted for the numerous comorbid problems exhibited by child trauma survivors.

5. Aims and hypotheses of the present study

The present study sought to assess the effect of trauma type and the role of interpersonal proximity in trauma experience on multiple symptom domains, including affective, anxiety, somatic, attention-deficit hyperactive, oppositional defiant, conduct, post-traumatic, and dissociative problems, while the effects of age, sex, ethnicity, and temperament were controlled for. Our hypotheses were: (1) the number of traumas in which the respondent is directly involved would significantly and positively predict psychological and behavioral problems; (2) direct trauma experiences would be a better predictor of outcome variable scores compared to vicarious traumas (i.e., witnessed and known traumas) for all symptom domains; (3) the amount of traumas involving high interpersonal proximity would positively and significantly predict outcome levels; and (4) high interpersonal traumas would be a better predictor of outcome variable scores compared to traumas involving lower amounts of interpersonal proximity.

6. Methods

6.1. Sample

The current study obtained its sample from the Project on Human Development in Chicago Neighborhoods (PHDCN): Longitudinal Cohort Study (Earls & Visher, 1997). The PHDCN assessed factors that influence development and antisocial behavior in a community sample of Chicago youth ($N=6000$) over three time periods between 1994 and 2002. Participants were composed of a random sample of individuals from 80 neighborhood clusters, stratified by racial/ethnic composition and socioeconomic status (cf. Sampson, Raudenbush, & Earls, 1997 for more information on neighborhood sampling). Data was collected from both caregivers and youth approximately every 2.5 years. The project employed a variety of strategies to inform the public about the project including the use of brochures, presentations, and handouts, as well as working with community leaders and policymakers (Earls & Buka, 1997). Detailed descriptions of the methods employed by the PHDCN can be found in the project's published technical manual (Earls & Buka, 1997). Participants included 3 of the 7 cohorts from the PHDCN sample, as these were the only subjects who completed the Child Behavior Checklist for school-age youth at all time points. All youth and caregivers were consented or assented. Participants were eliminated from the sample if they were missing data for an entire measure at any wave of data collection.

The sample consisted of 1676 youth ages 4–18 (wave 1 $M=8.84$; $SD=2.48$; range 4–13; wave 2 $M=10.86$; $SD=2.46$; range 6–16; wave 3 $M=13.38$; $SD=2.47$; range 9–18). The sample was composed of 841 (50.2%) females and 835 (49.8%) males and familial socioeconomic index (SEI) score ranged from 0 to 97 ($M=42.31$; $SD=17.90$). Major ethnic groups of youth included Hispanic ($n=816$; 48.7%), African American ($n=556$; 33.2%), Caucasian ($n=241$; 14.4%), Asian ($n=28$, 1.7%), Native American ($n=15$, 0.9%), other ($n=15$, 0.9%), and Pacific Islander ($n=5$, 0.3%).

6.2. Instruments

6.2.1. My exposure to violence (My ETV; Selner-O'Hagan, Kindlon, Buka, Raudenbush, & Earls, 1998)

My ETV is a highly structured interview used to examine youth participant exposure to violence. My ETV assesses both lifetime

Table 1
Trauma-type information.

	Known traumas
Wave 1	Family members been hurt by a violent act? ^a Family members been killed by a violent act? ^a Close friends been hurt by a violent act? ^b Close friends been killed by a violent act? ^b
Wave 2/3	Found out that someone you knew had been shot, but not killed? ^b Found out that someone you knew had been killed? ^b Found out that someone you knew had killed themselves? ^b Found out that someone you knew ever died suddenly or been seriously injured? ^b Found out that someone you knew had been raped? ^{a, b} Witnessed traumas
Wave 1	Seen someone shoved/kicked/punched Seen someone get attached w/a knife
Wave 2/3	Seen someone get chased when you thought they could really get hurt Seen someone get hit, slapped, punched or beaten up Seen someone get attacked with a weapon Seen someone else get shot (doesn't include BB, or toy gun) Seen someone else get shot at Seen a serious accident where someone else was very badly hurt or died Seen someone else get killed as a result of violence (shot, stabbed, beaten to death)? Seen someone threaten or seriously hurt another person (including being threatened with a weapon)? Direct traumas
Wave 2/3	Been chased? Been hit, slapped, punched or beaten up? Been attacked with a weapon? Been shot? Been shot at? Been in a serious accident where someone else was very badly hurt or died? Been sexually assaulted, molested or raped? [*] Someone threatened to seriously hurt you? Found a dead body? Been in a natural disaster (fire, tornado, earthquake)?

^a High interpersonal proximity.

^b Medium interpersonal proximity.

^{*} Administered to cohorts 9 and 12 only at wave 2.

Wave 1 questions assessed past life experience (e.g., Have you ever seen someone shoved, kicked or punched?).

Waves 2 and 3 assessed past year experience (e.g., In the past 12 months, how many times have you been chased?).

and past-year exposure to different events that were either witnessed, or personally experienced (including having knowledge of a trauma). For most traumas, information about the individual(s) involved in the trauma was collected, as well as information related to the frequency of the event occurrence in the last year. There are differences between the versions of the instrument administered at each wave and thus trauma variables were measured differently at each wave (see Table 1 for more details). In other words, the types of trauma included in a particular trauma category sometimes differed between waves depending on the questions administered at each data collection period. The instrument has exhibited high internal consistency ($\alpha = 0.68-0.93$), test-retest reliability ($r = 0.75-0.94$) and construct validity (Selner-O'Hagan et al., 1998).

6.2.2. Revised-child behavior checklist for ages 6–18 (CBCL/6-18; Achenbach & Rescorla, 2001)

The CBCL is a parent-report instrument that includes 113 items that assess different types of problematic behavior and emotions in youth. The validity and reliability for this instrument has been established as excellent (Nakamura, Ebesutani, Bernstein, & Chorpita, 2009). Six theoretically constructed DSM-Oriented

scales were created for this instrument, including affective, anxiety, attention-deficit/hyperactivity (ADHD), conduct (CD), oppositional defiant (ODD), and somatic problems (Achenbach & Rescorla, 2001). Reliability, convergent and divergent validity has been demonstrated for all scales (Nakamura et al., 2009). Notably, the full scale was administered at wave 1 but a shortened version was given during subsequent data collection times. Due to the revised nature of the CBCL administered in the PHDCN, the current study assessed 9 of the 13 affective problems scale items, 4 of the 6 items anxiety scale items, 3 of the 7 ADHD scale items, and 14 of the 17 CD scale items. All items were available for both the ODD and somatic problems scales. The 3-item dissociation subscale was created by a panel of clinical child psychology experts across the country and has exhibited convergent validity (Sim et al., 2005), construct validity, and internal consistency (Hulette et al., 2008). Lastly, the current study assessed the CBCL-posttraumatic stress problems scale (PTS; 13 of the 14 scale items were used) which is purported to be a marker for PTSD and is included as a 'problem-oriented scale' in the standard CBCL output (Achenbach & Rescorla, 2001). Reliability for this scale has been demonstrated in previous research (Ruggiero & McLeer, 2000). Due to the revised versions of the scales used in the present study, bivariate correlations were run between the full and partial scale total scores at wave 1 to assess the validity of the partial scales. Results from these analyses indicate that the partial scales can be considered valid measures of the psychological and behavioral problems they purport to measure (for all scales, $r \geq 0.90$; $p < 0.001$). Reliability for the partial scales was also supported in the current sample, as evidenced by Cronbach's alpha's ranging from 0.45 to 0.75 (anxiety and dissociation scales exhibited $\alpha < 0.60$).

6.2.3. Emotionality, activity, sociability, and impulsivity temperament survey (EASI; Buss & Plomin, 1984)

The EASI is a 40-item parent-report survey developed to assess four domains of temperament (emotionality, activity, sociability and impulsivity) in children between the ages of 2 and 6. The domains were developed via exploratory factor analysis and convergent validity has been indicated for each domain (Windle, 1989). For the purposes of this study, the emotionality domain was assessed. The emotionality scale has exhibited strong test-retest reliability ($r = 0.72$) (Buss & Plomin, 1984). The EASI was administered at wave 1.

6.2.4. Family socioeconomic status (SES)

Family SES was based on an imputed indicator variable in the PHDCN data for maximum parental SES reported at wave 1. For most families, the SES measure reflected scores on the Duncan socio-economic index of social status (SEI; Reiss, 1961), which ranges from 0 to 100, with 100 considered the highest social stratification level. For those missing SEI scores (14.5% of the current sample), a maximum SES score was imputed by PHDCN researchers based on maximum reported parental education level and salary.

6.3. Data analytic strategy

Descriptive statistics measuring the prevalence of different trauma experiences (i.e., the seven types of trauma described below) were assessed. The present study utilized a longitudinal data analysis technique known as multilevel modeling (MLM) using SPSS version 19 software. MLM is widely considered to be one of the best analytic tools for describing developmental patterns and identifying predictors of development (McCartney, Burchinal, & Bub, 2006).

This study was adequately powered to detect effects (McCartney et al., 2006). Youth were defined as the Level 2 unit of analysis and repeated time points nested within each child was defined

as the Level 1 unit. Two models were created for each of the 15 dependent variables. First, individual growth was examined in Model 1. Growth models provide information about whether or not participants change on an outcome over time (e.g., whether levels of affective problems change throughout the study) and whether or not this change is significantly different compared to others in the sample (i.e., whether or not there are different types of change trajectories observed in the sample; Heck, Thomas, & Tabata, 2010). Additionally, results from growth model analyses allow one to determine whether or not participants exhibit variability in initial outcome level.

Second, the effects of non-invariant covariates (e.g., sex, ethnicity) and time-varying predictors (e.g., total number of direct trauma experiences in last year) on the dependent variable of interest were examined in Model 2. Additionally, the amount of variance accounted for by the added predictors (i.e., whether or not, and how much, they accounted for change in growth and/or initial levels of an outcome between participants) was examined in Model 2 (i.e., the all predictors model) by examining differences between growth trajectories in Models 1 and 2. In other words, the effects of non-invariant covariates and time-varying predictors were accounted for (i.e., controlled for) in each of the eight all predictors models.

6.4. Predictors

Type of trauma was divided into three categories obtained from items on My ETV: (1) known traumas (e.g., knowing that a family member was killed by violence), (2) witnessed traumas (e.g., witnessed someone get beaten up), and (3) direct traumas (e.g., being shot) (see Table 1 for details). *Degree of interpersonal proximity (IP)* was defined according to the role of the individual involved in the trauma. *Interpersonal proximity* was designed to measure the closeness (i.e., proximity) of the relationship between the participant and the victim/perpetrator of the trauma. *High IP* was indicated if the answer to the relevant question on the My ETV scale was answered as someone in the participant's family, including a parent or sibling. *Medium IP* was indicated if the participant indicated that the individual involved was someone they knew, another relative, a person they knew that they were very close with, a friend, a teacher, or a policeman. While policemen may not have personal relationships with participants, they are public figures responsible for protecting the safety of community members, and thus a moderate level of trust is assumed. *Low IP* was indicated if the respondent answered with a neighbor, a schoolmate, or someone they knew but were not close to and the specification didn't fall under the category of either a policeman or a teacher (e.g., an acquaintance you are not close to, schoolmate). If the respondent indicated that a stranger or gang member was involved in the trauma event, the incident was categorized as a *non-interpersonal trauma* (this category also included natural disasters). The category of non-interpersonal trauma is congruent with prior research that assessed interpersonal and non-interpersonal traumas (e.g., Ford et al., 2011a,b; Green et al., 2000).

6.5. Covariates

To control for the effects of added risk factors, we included emotionality, race, sex, age, and SES as covariates. *Emotionality* was measured continuously based on the mean score from the EASI-Temperament Emotionality subscale. *Race* and *sex* were measured categorically and *age* and family *socioeconomic status (SES)* was measured continuously.

6.6. Outcomes

Problem behaviors and *psychological problems* scores included anxiety, affective problems, somatic problems, ADHD, ODD, CD,

and dissociation. Scores were calculated by taking the total of the item-scores of the CBCL subscale and were measured continuously (Achenbach & Rescorla, 2001).

7. Results

7.1. Preliminary analyses

Descriptive analyses indicated that 93.7% of the sample experienced at least one type of trauma (i.e., witnessed, known, or direct) throughout the time of the study (see Table 2 for more information regarding frequency of trauma-type experiences). In regard to traumas involving interpersonal proximity (i.e., low, medium and high levels of interpersonal proximity), 62.3% of participants reported experiencing at least one interpersonal trauma throughout the course of the study.

7.2. Growth models

The initial levels and trajectories of the outcome variables were examined first. Youth varied significantly in their initial levels on all outcome variables, as indicated by the significant variance of the random intercepts (p values <0.001). Youth also exhibited variability in growth trajectories for all outcome variables, indicated by significant variance of random slopes (p values <0.01). In other words, youth exhibited variability in both their baseline levels of symptoms (at wave 1) as well as the change in their symptoms over time.

7.3. All predictors models

7.3.1. Growth trajectories

Initial levels and trajectories of the outcome variables were also examined in the All Predictors Models (i.e., Model 2). Given that eight models were run, we sought to guard against Type I error by utilizing a conservative significance level ($p < 0.01$). Youth varied significantly in their initial levels of ADHD and ODD, as indicated by significant variance of the random intercepts ($ps < 0.01$, see intercept in Table 3). Results indicated that the variance of the random slopes was nonsignificant for all outcomes excluding dissociation (p values >0.01 , see time in Table 3) suggesting that after adding the predictors to the growth model, the variance in these outcome variables was significantly reduced (i.e., the predictors accounted for a significant amount of the observed variance between participants). Results indicated that the addition of predictors to the Dissociation analysis only partially explains the observed variance among participants, as indicated by significant variability in growth trajectories ($p < 0.01$).

7.4. Covariates

7.4.1. Emotionality

Scores of emotionality positively predicted all outcomes (see Table 3).

7.4.2. Socioeconomic status

Parental socioeconomic status, as measured by the socioeconomic index (SEI), was not significantly related to any of the outcomes.

7.4.3. Age

Age was significantly and positively associated with Affective ($b = 0.10$, $t(2218) = 4.74$, $p < 0.001$), Somatic ($b = .06$, $t(2141) = 3.56$, $p < 0.001$), Dissociation ($b = 0.03$, $t(2180) = 2.73$), $p < 0.01$), and PTS

Problems over time ($b = 0.03$, $t(2203) = 3.01$, $p < 0.01$). Age was negatively associated with ADHD ($b = 0.07$, $t(2212) = -4.69$, $p < 0.001$).

7.4.4. Sex

Compared to males, females exhibited significantly higher levels of somatic problems ($b = 0.29$, $t(1673) = 3.83$, $p < 0.001$) over time. Males exhibited significantly higher levels of parent-reported ADHD ($b = -0.43$, $t(1720) = -6.60$, $p < 0.001$), and CD ($b = -0.40$, $t(1712) = -3.34$, $p < 0.01$) compared to females.

7.4.5. Ethnicity

Hispanic youth exhibited significantly higher levels of anxiety ($b = .44$, $t(1681) = 4.17$, $p < .001$) compared to white youth over time. Additionally, Asian youth exhibited significantly less ODD ($b = -1.28$, $t(1667) = -3.43$, $p < 0.01$) compared to white youth across the course of the study. African American participants exhibited significantly higher levels of Somatic Problems ($b = 0.44$, $t(1688) = 3.48$, $p < 0.01$), ADHD ($b = 0.31$, $t(1712) = 2.86$, $p < 0.01$), ODD ($b = 0.32$, $t(1710) = 2.03$, $p < 0.05$), and CD ($b = 0.57$, $t(1707) = 2.94$, $p < 0.01$) compared to white youth over time.

7.5. Predictors

7.5.1. Direct trauma

Results indicated that for the full sample, change in youth's direct trauma experiences was positively associated with Affective ($b = 0.06$, $t(2823) = 3.08$, $p < 0.01$; see Table 3), ADHD ($b = 0.05$, $t(2616) = 4.28$, $p < 0.001$) ODD ($b = 0.11$, $t(2580) = 6.20$, $p < 0.001$), CD ($b = 0.09$, $t(2546) = 4.10$, $p < 0.001$), Dissociation ($b = 0.03$, $t(2588) = 2.95$, $p < 0.01$), and PTS ($b = 0.13$, $t(2630) = 4.32$, $p < 0.001$) (i.e., all symptom domains excluding anxiety and somatic problems) scores over time.

7.5.2. Witnessed trauma

Scores on the CD scale were positively and significantly predicted by change in the number of experienced witnessed traumas ($b = 0.03$, $t(2733) = 3.07$, $p < 0.01$).

7.5.3. Known trauma

Known traumas were unrelated to all outcome variables.

7.5.4. High interpersonal trauma

Change in high IP trauma was positively related to ODD ($b = 0.24$, $t(2588) = 2.69$, $p < 0.01$) and CD ($b = 0.38$, $t(2555) = 3.44$, $p < 0.01$).

7.5.5. Medium interpersonal trauma

Results indicate that the number of medium IP traumas was not significantly related to any of the outcome variables.

7.5.6. Low interpersonal trauma

Low IP traumas were not significantly related to any of the outcome variables.

7.5.7. Non-interpersonal trauma

None of the outcomes were significantly related to non-interpersonal traumas.

8. Discussion

The current study explored the ways in which direct, witnessed, known, high interpersonal, medium interpersonal, low interpersonal, and non-interpersonal traumas influenced various symptom domains over time. The symptom domains examined included affective, anxiety, somatic, attention deficit hyperactivity, oppositional defiant, conduct, post-traumatic stress, and dissociative problems. Temperament, and sociodemographic characteristics,

Table 2
Descriptive analysis results for trauma experiences.

	Wave 1			Wave 2			Wave 3		
	n (%) ≥ 1	Mean	SD	n (%) ≥ 1	Mean	SD	n (%) ≥ 1	Mean	SD
Known trauma	708 (42%)	1.18	1.71	687 (41%)	0.77	1.27	687 (41%)	0.88	1.71
Witnessed trauma	469 (28%)	5.21	34.6	1106 (66%)	3.38	4.9	1123 (67%)	3.84	5.91
Direct trauma	–	–	–	607 (36%)	0.95	1.93	470 (28%)	0.86	2.41
Any trauma ^a	754 (45%)	6.4	35.1	1286 (76%)	5.1	6.44	1376 (82%)	5.58	8.21
No IP trauma	268 (16%)	0.54	3.47	167 (10%)	0.17	0.78	135 (8%)	0.17	0.9
Low IP trauma	30 (2%)	0.02	0.18	460 (27%)	1.09	2.34	793 (47%)	1.82	2.68
Medium IP trauma	521 (31%)	0.57	0.99	395 (24%)	0.53	1.34	565 (34%)	0.78	1.49
High IP trauma	406 (24%)	0.33	0.64	102 (6%)	0.08	0.36	159 (10%)	0.13	0.46
Any IP trauma ^b	650 (39%)	0.92	1.43	567 (34%)	1.7	3.57	845 (50%)	2.72	4

Note. At wave 1, respondents were asked to report the exact number of times they experienced a trauma. In subsequent waves, trauma frequency was measured categorically with “10 or more times” as the highest option.

^a Variable represents a combination of known, witnessed and direct trauma variables.

^b Variable represents a combination of low, medium, and high interpersonal proximity trauma variables.

including sex, age, ethnicity, and socioeconomic status, and their effects on the symptom domains, were also assessed. The present study employed longitudinal data from an ethnically diverse sample (ages 4–18).

Results from the present study shed light on the complex nature of trauma outcomes in youth. Direct trauma experiences significantly predicted all outcome variables excluding anxiety and somatic problems. Additionally, a history of witnessed trauma

Table 3
Parameter estimates for CBCL fixed effects.

Fixed effect	Affective problems			Anxiety problems			Somatic problems			ADHD problems		
	B	SE	T	b	SE	t	b	SE	t	b	SE	t
Intercept	–0.994	0.31	–3.2	0.472	0.23	2.06	–0.533	0.26	–2.02	1.491	0.22	6.69**
Time	–0.012	0.07	–0.2	–0.085	0.05	–1.6	0.042	0.07	0.6	0.000	0.05	0.0
Emotionality	0.577	0.04	14.4**	0.352	0.03	12.0**	0.248	0.03	7.4**	0.351	0.03	12.2**
SES	–0.002	0.00	–0.7	–0.005	0.00	–2.57	–0.002	0.00	–1.1	–0.002	0.00	–0.9
Age	0.098	0.02	4.7**	0.025	0.02	1.6	0.063	0.02	3.6**	–0.069	0.01	–4.7**
Female sex	0.046	0.09	0.5	0.012	0.07	0.2	0.293	0.08	3.8**	–0.435	0.07	–6.6**
Ethnicity (REF: white)												
Hispanic	0.145	0.15	1.0	0.445	0.11	4.2**	0.059	0.12	0.5	0.200	0.11	1.9
Asian	–0.310	0.37	–0.8	–0.269	0.27	–1.0	0.182	0.31	0.6	–0.277	0.27	–1.0
Pacific Islander	–0.314	0.84	–0.4	–0.064	0.61	–0.1	0.838	0.71	1.2	0.682	0.60	1.1
African American	–0.061	0.15	–0.4	–0.064	0.11	–0.6	0.436	0.13	3.5*	0.308	0.11	2.9*
Native American	0.172	0.49	0.3	0.046	0.36	0.1	0.687	0.42	1.6	0.327	0.36	0.9
Other	–0.294	0.49	–0.6	0.212	0.36	0.6	0.075	0.42	0.2	–0.128	0.35	–0.4
Direct trauma	0.058	0.02	3.1*	0.020	0.01	1.5	0.022	0.02	1.3	0.053	0.01	4.3**
Witnessed trauma	0.017	0.01	1.8	–0.001	0.01	–0.2	0.001	0.01	0.1	0.008	0.01	1.3
Known trauma	–0.016	0.03	–0.6	0.035	0.02	1.8	0.004	0.02	0.2	–0.005	0.02	–0.3
High IP trauma	0.200	0.10	2.1	0.110	0.07	1.5	0.011	0.09	0.1	0.142	0.06	2.2
Medium IP trauma	–0.017	0.04	–0.5	–0.055	0.03	–2.1	0.070	0.03	2.2	–0.040	0.02	–1.7
Low IP trauma	–0.002	0.02	–0.1	–0.011	0.02	–0.7	–0.015	0.02	–0.8	0.024	0.01	1.7
Non-IP trauma	0.032	0.05	0.7	0.022	0.03	0.6	0.027	0.04	0.6	–0.015	0.03	–0.5
Fixed effect												
	ODD problems			CD problems			PTS problems			Dissociation		
	B	SE	t	b	SE	t	b	SE	t	b	SE	t
Intercept	0.831	0.31	2.66*	0.018	0.39	0.0	0.303	0.55	0.6	–0.168	0.16	–1.0
Time	–0.007	0.07	–0.1	–0.036	0.09	–0.4	–0.078	0.12	–0.6	–0.107	0.04	–2.8*
Emotionality	0.669	0.04	16.5**	0.579	0.05	11.1**	1.142	0.07	16.1**	0.213	0.02	10.1**
SES	0.001	0.00	0.4	–0.005	0.00	–1.3	–0.004	0.00	–0.7	0.000	0.00	0.3
Age	0.005	0.02	0.3	0.052	0.03	2.0	0.108	0.04	3.0*	0.030	0.01	2.7*
Female sex	–0.187	0.09	–2.0	–0.403	0.12	–3.4*	–0.163	0.16	–1.0	–0.048	0.05	–1.0
Ethnicity (REF: white)												
Hispanic	–0.053	0.15	–0.4	0.073	0.19	0.4	0.258	0.26	1.0	0.106	0.08	1.4
Asian	–1.284	0.37	–3.4*	–0.947	0.48	–2.0	–0.976	0.65	–1.5	–0.271	0.20	–1.4
Pacific Islander	0.331	0.85	0.4	0.803	1.09	0.7	0.313	1.48	0.2	0.072	0.45	0.2
African American	0.319	0.15	2.1	0.569	0.19	2.9*	0.122	0.26	0.5	0.200	0.08	2.5
Native American	0.303	0.50	0.6	1.265	0.64	2.0	1.367	0.87	1.6	0.299	0.27	1.1
Other	–0.256	0.50	–0.5	–0.405	0.64	–0.6	–0.260	0.87	–0.3	–0.144	0.26	–0.5
Direct trauma	0.107	0.02	6.2**	0.088	0.02	4.1**	0.132	0.03	4.3**	0.030	0.01	3.0*
Witnessed trauma	0.008	0.01	1.0	0.033	0.01	3.1*	0.011	0.02	0.7	–0.001	0.00	–0.2
Known trauma	0.006	0.02	0.2	–0.051	0.03	–1.6	0.009	0.04	0.2	–0.006	0.01	–0.4
High IP trauma	0.240	0.09	2.7*	0.383	0.11	3.4*	0.339	0.16	2.1	0.051	0.05	1.0
Medium IP trauma	–0.014	0.03	–0.4	0.066	0.04	1.6	–0.085	0.06	–1.5	–0.001	0.02	0.0
Low IP trauma	–0.004	0.02	–0.2	–0.038	0.02	–1.5	0.015	0.04	0.4	–0.010	0.01	–0.9
Non-IP trauma	–0.003	0.04	–0.1	0.032	0.05	0.6	0.050	0.08	0.7	0.027	0.03	1.1

* p < 0.01.

** p < 0.001.

experience was significantly associated with conduct problems. A number of symptom areas were significantly associated with interpersonal traumas. Traumas involving high amounts of interpersonal proximity were significantly associated with ODD and CD problems. Finally, the covariates, including emotionality and demographic characteristics, exhibited important relationships with all of the assessed outcome variables.

Emotionality, a component of temperament, significantly and positively predicted levels of all outcome variables. Other research on temperament has similarly found that mental health, post-traumatic stress, dissociation, and behavior problems are strongly associated with high emotionality (Bates, Pettit, Dodge, & Ridge, 1998; Caspi et al., 1995; Gjone & Stevenson, 1997). Results suggesting higher levels of internalizing problems among females and higher levels of externalizing problems among males are also consistent with prior research (Card et al., 2008; Costello et al., 2003). Age results are congruent with past research that indicates that in general, internalizing problems tend to increase gradually from infancy to early childhood (Gilliom & Shaw, 2004). In support of past research that has found that externalizing problems decrease after early childhood (Costello et al., 2003), the current study indicates that ADHD was negatively related to age. Present study findings related to ethnic minority status are consistent with previous research indicating that minority status is significantly related to internalizing and externalizing disorders (Anderson and Mayes, 2010; Ford et al., 2011a,b) and that Asian youth are less likely to exhibit disruptive behavior problems (Loo & Rappaport, 1998).

Results related to direct trauma experience provided support for the first hypothesis, which asserts that direct trauma experience would positively predict levels of the outcome variables. These findings also replicated results from other research that has found that early experiences of trauma increase one's risk for later mental health and behavioral problems (Lieberman & Knorr, 2007; Ogawa et al., 1997; Shields & Cicchetti, 1998).

Vicarious trauma results lent support to prior research that has found that vicarious trauma is associated with post-traumatic symptoms and other psychological problems, but that such impairments are typically lower in severity than those associated with direct trauma experiences (Lerias & Byrne, 2003). Given that direct trauma experiences were linked with considerably more impairment domains compared to vicarious traumas, the second hypothesis, which predicted that direct trauma experiences would be a better predictor of youth problem behaviors and emotions compared to vicarious traumas, was supported.

Results from interpersonal trauma analyses lent partial support to the third hypothesis, namely that high interpersonal traumas would significantly and positively predict levels of all outcome variables. Results also indicated that the final hypothesis, which predicted that high IP traumas would be associated with more areas of impairment compared to traumas involving lower amounts of IP, was supported. Lastly, it is important to note that low- and non-interpersonal traumas did not significantly predict levels of any of the outcome variables. However, despite other research that has concluded that interpersonal traumas are associated with more severe impairment compared to noninterpersonal traumas (Atlas & Ingram, 1998; DePrince & Freyd, 2004; Ford et al., 2000), the current study included a limited variety of noninterpersonal traumas and thus conclusions made based on these findings should be made with caution.

8.1. Limitations

Traumas designated as highly interpersonal were found to predict oppositional and conduct problems in the present study, while moderate, low, and non-interpersonal traumas were found

to be unrelated to outcomes. Research indicates that the meaning attached to the trauma and the amount of betrayal subjectively experienced by the trauma survivor, plays an important role in posttraumatic impairment (Cromer & Smyth, 2010). The current study operationalized interpersonal proximity using information about the individuals involved in the trauma experience, yet was limited by the lack of information regarding subjective experiences of social betrayal. Additionally, the present study was limited to the examination of trauma experiences in the year prior to assessments at the second and third waves as well as only a few vicarious lifetime traumas assessed at wave one. The limited number of vicarious and noninterpersonal traumas assessed for in the present study may explain non-significant results related to known traumas, and traumas of low and moderate interpersonal proximity. Given that different questions were administered at different waves, important information about past experiences of trauma may have been missed, particularly at wave one data collection. Moreover, data was collected every two to three years, rather than every 12 months, and thus it is probable that not all traumas experienced during the course of the study were accounted for. Measures of multiple symptom domains contained fewer items than that which is included in the original scales. Thus, the reliability of these measures was somewhat limited despite analyses that lend support to the psychometric strength of the outcomes in the current study. Notably, the anxiety subscale derived from the CBCL-R exhibited poor to moderate reliability which may partially explain its lack of relation to the primary predictors. Lastly, although the ethnic composition of the present sample provided useful information about ethnic differences in trauma outcomes, results may not be generalizable to white youth as only a minority of white youth was represented in the current study.

8.2. Implications

Each symptom domain, excluding anxiety and somatic problems, was significantly predicted by at least one type of trauma experience. These findings speak to the important role of trauma in the etiology of multiple types of childhood psychopathology including emotional and behavioral problems as well as posttraumatic stress symptomatology and dissociation. The current study provides support for emerging diagnostic constructs that incorporate the multifaceted nature of trauma symptomatology in youth (i.e., Disorder of Extreme Stress Not Otherwise Specified, Developmental Trauma Disorder). Additionally, study results suggest that a thorough trauma history should be taken during assessment and incorporated into treatment planning for clinic-referred youth (Ford et al., 2011a,b).

Given the significant findings related to the relationship between interpersonal trauma and externalizing problems in youth, special attention should be given to assessing for possible posttraumatic reactions and interpersonal problems in children and adolescents exhibiting clinically significant externalizing behaviors (van der Kolk, 2005). Treatments aimed at enhancing family support systems and psychosocial functioning among youth with externalizing behaviors and histories of interpersonal trauma should be tested in outpatient and ethnically diverse samples (Ford et al., 2011a,b).

Highly interpersonal traumas were significantly associated with two categories of impairment while non-interpersonal traumas weren't significantly related to any, which is consistent with previous research (DePrince and Freyd, 2004; Turell & Armsworth, 2003). These findings suggest that the role of interpersonal relationships in trauma history and current functioning should be taken into consideration in both assessment and treatment development. Significant results related to ethnic minority status and areas of impairment have important implications for clinical

practice as well. The current findings are congruent with adult research that indicates that ethnic minority adults exhibit more internalizing symptomatology and receive fewer services than white adults (Williams et al., 2007). Thus, clinicians should heed particular attention to the care they provide for ethnic minority youth and ensure that they are educated and skilled in multicultural therapeutic practices.

8.3. Future directions

Empirical studies in this field, especially those which utilize longitudinal data, should obtain full and detailed trauma histories. In order to further elucidate the relationship between noninterpersonal traumas and childhood psychopathology, future studies should include additional noninterpersonal traumas (e.g., car accidents that do not involve a close other), as noninterpersonal traumas have been found to be significantly related to psychological impairment in prior research (Ford et al., 2011a,b). Similarly, the non-significant findings related to traumas involving moderate and low interpersonal proximity suggest that interpersonal proximity may be best measured dichotomously (i.e., noninterpersonal vs. interpersonal) which is congruent with previous research (e.g., Green et al., 2000; Luthra et al., 2009). Additionally, research of this nature should incorporate both the identity of the perpetrator, perceived threat, and the meaning ascribed to the event by the trauma survivor. Research should also ensure that outcomes are measured using full scales, or even full instruments, in order to provide a more reliable assessment of areas of impairment. It is possible that the high rate of trauma exposure may be due to designating a low threshold for a potentially traumatic event (e.g., knowing about someone else's assault qualified as a traumatic event). Future studies may benefit from employing a more conservative definition of trauma in order to better differentiate between those who may or may not have been significantly impacted by their trauma histories. Lastly, the psychometric properties of the trauma categories used in the current study should be explored.

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