Published in final edited form as:

Child Abuse Negl. 2018 June ; 80: 301–311. doi:10.1016/j.chiabu.2018.04.005.

The Impact of Patterns of Trauma Exposure among Low Income Children with and without Histories of Child Maltreatment

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Abstract

Previous research has revealed a large prevalence of trauma experienced by children, creating high risk for the development of psychopathology. Research investigating the negative impacts of child maltreatment and other traumas has typically examined these experiences individually, controlling for co-occurring traumas, or has combined these experiences into a general variable of risk, thereby obscuring the complex relationships among environmental traumas and maltreatment. The current study expands on previous research by elucidating relationships between multiple contexts of overlapping traumas and maltreatment experienced by children, and by categorizing how these experiences join together to impact internalizing and externalizing symptomatology. Participants included 316 maltreated children and 269 nonmaltreated children ($M_{age} = 9.4$, $SD = .88$) who attended a summer day camp research program for low-income children. Latent Class Analysis (LCA) identified three differential patterns of trauma exposure across children: 1) community violence and loss; 2) pervasive trauma; and 3) low trauma. Covariate analyses demonstrated that child maltreatment was significantly associated with class membership, suggesting that maltreated children were more likely to experience diverse traumas extending beyond their maltreatment experiences (pervasive trauma class). A two-way analysis of variance also demonstrated that trauma latent class membership and child maltreatment each represented unique predictors of internalizing and externalizing symptoms, with each having an independent effect on symptomatology. This investigation provides unique insight into the differential impact of patterns of trauma exposure and child maltreatment, providing support for further research and clinical practice addressing multiple levels of a child's ecology.

Keywords

childhood maltreatment; trauma; community violence; latent class analysis

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Introduction

Research on the prevalence of childhood trauma has revealed an enormous presence of violence and chronic stress occurring during childhood, reaching epidemic proportions (Lanius, Vermetten, & Pain, 2010). Specifically, the National Child Traumatic Stress Network (NCTSN) defines trauma as an experience that “threatens the life or physical integrity of a child or someone important to that child,” frequently resulting in feelings of terror or hopelessness that overwhelm a child’s capacity to cope. (NCTSN, 2017). Large-scale national surveys of children have demonstrated an extreme number of children who have directly experienced or witnessed such events, including physical or sexual assault, shootings, stabbings, child abuse and neglect, as well as various other forms of family and community violence (Finkelhor, Vanderminden, Turner, Shattuck, & Hamby, 2016; Finkelhor, Turner, Shattuck, & Hamby, 2015). Growing up in a dangerous or threatening environment has been associated with numerous adverse consequences, creating significant developmental hurdles in children across both biological and psychological domains of development (McLaughlin et al., 2016; De Bellis & Zisk, 2014). Experiencing trauma during childhood can lead to impairments in cognitive functioning, personality, internalizing and externalizing behavior problems, post-traumatic stress symptoms, and disruptions in biochemical stress response systems (Cicchetti & Toth, 2015; Phefferbaum, 1997; McEwen & Wingfield, 2010). Children exposed to various forms of trauma are also at heightened risk for psychopathology lasting throughout adulthood (Cicchetti & Toth, 2015; Schoedl et. al, 2010), highlighting the lasting effects of exposure to trauma early in life.

Although there is a multitude of research published on the impact and prevalence of both trauma exposure/poly-victimization and maltreatment specifically, most of this work has either investigated these two concepts individually, or has combined these experiences into a general variable of risk, obscuring the complicated relationships between maltreatment and broader environmental traumas (Felitti et al., 1998; Turner & Butler, 2003). As a result, very little research has evaluated the interconnections between child maltreatment and other forms of trauma. In one example of research examining variation in the associations of various childhood adversities with PTSD, McLaughlin and colleagues (2017) analyzed data from a large, nationwide sample collected by World Mental Health Surveys. Results indicated that physical and sexual abuse, neglect, and parent psychopathology all predicted similar odds of developing PTSD, whereas interpersonal loss, parental maladjustment, serious physical illness, and economic adversity did not predict PTSD. Such findings highlight the importance of considering the type of traumas associated with heightened PTSD vulnerability. However, it is unlikely that such types of trauma occur independently, and research on polyvictimization has demonstrated that the majority of children impacted by trauma or maltreatment experience multiple forms of violence, abuse, or neglect that overlap with each other (Adams et al., 2016; Vachon, Krueger, Rogosch, & Cicchetti, 2015). As a result, examining the unique effects of forms of trauma may not represent the true experiences of children who are exposed to many different forms of trauma and maltreatment. Consequently, more research examining the patterns and interactions among various experiences is necessary to provide a more accurate and realistic portrayal of children’s overlapping exposures to trauma and/or maltreatment.

Cicchetti & Lynch (1993) introduced an ecological-transactional perspective to study the integration of community violence and maltreatment experiences, through which we can evaluate the ways that multiple levels of a child's ecology influence and interact with each other in shaping developmental trajectories. This perspective highlights the complexity inherent in children's environments, as each contextual level is thought to exert influence on both the individual child and on events in the surrounding levels of ecology (Lynch & Cicchetti, 1998; Lynch & Cicchetti, 2002; Cicchetti & Valentino, 2006; Jaffee et al., 2007). Consequently, ecological-transactional models propose that in order to assess context comprehensively, researchers must investigate elements from each level of the ecology. Lynch & Cicchetti further developed this ecological-transactional approach to examining the mutual relationships among community violence and child maltreatment in a 1998 manuscript, in which the authors found that children with higher levels of violence in their community were more likely to be physically abused and experience severe neglect (Lynch & Cicchetti, 1998). Interestingly, the authors also found bidirectional relationships between exposure to community violence and maltreatment over a 1-year period, drawing attention to the interplay occurring between these levels of environmental violence. These results are consistent with more recent literature that indicates a positive correlation between environmental violence/stress and child maltreatment, suggesting that these experiences are typically overlapping in children (Coulton et al., 2007; Fowler et al., 2009; Stith et al., 2009).

Although we know that the layers of violence and trauma experienced by children are often correlated, more work is needed to explore the transactional and interactional effects of these ecological levels. Cicchetti and Lynch (1993) proposed that community violence may serve to moderate the relationship between child maltreatment and adolescent mental health outcomes, though there is little known about the interaction of these contexts to support this. Uhrlass and Gibb (2007) evaluated interaction effects and found that stressful life events mediated, but not moderated, the effects of childhood emotional maltreatment. Similarly, Manly et al. (2013) found that the relationship of child neglect and children's externalizing symptoms was mediated by neighborhood crime rates. Maughan & Cicchetti (2002) also found no significant interaction effects of interadult violence and maltreatment status on childhood behavior problems, suggesting instead an indirect relationship between interadult violence and children's behavior that is likely explained through the effects of child maltreatment. Lynch & Cicchetti (1998) found that maltreated children from high-violence communities consistently demonstrated higher internalizing/externalizing symptoms than nonmaltreated children from low-violence communities, suggesting a purely additive rather than interactive effect of child maltreatment and community violence on child functioning. Alternatively, trauma exposure might have more prominent impact on individuals without a history of child maltreatment, possibly because they have limited experience with highly stressful or dangerous environments and therefore may be more sensitive to such events. Trauma experiences may also lead to negative outcomes regardless of maltreatment history. Research has found support for child maltreatment moderating the effects of environmental stress on depression, suggesting that the risk of a child developing depressive symptoms is much higher after experiencing environmental or relational stressors among maltreated

children (Harkness et al., 2006). Overall, our understanding surrounding the interactions between child maltreatment and environmental trauma remains limited and often conflicting.

An important method for investigating such nuanced relationships between multifaceted, overlapping experiences of trauma involves person-centered approaches, such as Latent Class Analysis or Latent Profile Analysis. Person-centered methods provide awareness into the natural clustering of experiences across individuals, allowing us to better understand the complex systems of trauma across a sample and identify meaningful subgroups of individuals within a sample (Bergman, von Eye, & Magnusson, 2006). These techniques also enable researchers to take into account multi-systemic influences by integrating information from multiple informants across several domains and contexts, as utilized in this paper. Because trauma experienced by children can occur in varying, intersecting levels of their ecology, person-centered methods may be a critical tool in elucidating the relationships between maltreatment and trauma experiences, and categorizing how those experiences join together to impact mental health outcomes. Rather than looking at the effects of one set of trauma experiences while controlling for the concurrent effects of another, person-centered models emphasize understanding the individual as a functioning whole, rather than on the individual characteristics or variables themselves. In recent years, research has increasingly begun to incorporate person-centered methodology (e.g., Latent Class Analysis) to uncover the natural clustering of childhood trauma and maltreatment experiences.

Nooner et al. (2010), for example, sought to identify meaningful groups of maltreatment experiences using LCA. Four classes of maltreatment were identified: 1) no physical or sexual abuse; 2) high physical abuse/low sexual abuse; (3) no physical abuse/moderate sexual abuse; and (4) high physical and sexual abuse. Latent groups were also shown to demonstrate validity in relationship to CPS reports, another indicator of abuse. Berzenski & Yates (2011) aimed to extend this line of research by examining the impact of patterns of multiple child maltreatment subtypes in a large sample of undergraduate students. Given the significant overlap in maltreatment and trauma experiences within maltreated individuals, the authors sought to identify specific constellations of physical abuse, sexual abuse, emotional abuse, and domestic violence exposure. Although previous literature investigating maltreatment subtypes has reported on subtype-specific effects while controlling for the effects of other types, Berzenski & Yates (2011) sought instead to examine the more nuanced experience of patterns of multiple maltreatment. Results indicated that specific groupings of maltreatment had qualitatively distinct associations with child functioning. Specifically, children experiencing emotional maltreatment, either alone or in combination with other maltreatment subtypes, were more likely to develop internalizing symptoms (e.g. anxiety, depression), whereas children who experienced a combination of both physical and emotional maltreatment were more likely to display conduct-related problem behaviors (Berzenski & Yates, 2011).

Taking a similar approach, Cecil et al. (2014) used Latent Profile Analysis (LPA) to examine the relationships between maltreatment experiences, community violence, and mental health outcomes. LPA was used to categorize maltreatment experiences, resulting in the identification of 3 classes describing children with low, moderate, and severe levels of maltreatment. Analyses of the interactive relationships among maltreatment classes and

community violence experiences revealed additive effects in relation to externalizing behaviors, post-traumatic stress, and dissociation symptoms. However, interaction effects were found between child maltreatment and community violence in one domain of child functioning—anger (Cecil et al., 2014). The low maltreatment group experienced the steepest increase in anger in response to increasing levels of community violence, surpassing anger levels reported by the most severe maltreatment group. Such results support the hypothesis that groups of children with less severe abuse or neglect might also be at substantial risk for negative outcomes, perhaps due to these children having increased sensitivity to atypical trauma experiences.

Another analysis by Ford, Elhai, Connor, & Frueh (2010) examined latent classes of trauma exposures in a national sample of adolescents. LCA demonstrated six classes of trauma exposure, four of which were characterized by high probability of poly-victimization. Results further suggested increased risk of developing more severe internalizing and externalizing problems among the poly-victimized adolescents. However, there is also emerging evidence that various profiles of poly-victimization in youth are associated with their own distinct mental health outcomes and demographic variables, showing critical diversity within individuals who experience multiple traumas.

For example, Adams et al. (2016) utilized LCA in order to identify and characterize patterns of trauma and maltreatment exposure within a large, ethnically diverse, multisite, clinical sample of adolescents. Results yielded five profiles, and all but one profile represented patterns of poly-victimization. These patterns of multiple trauma and maltreatment exposure characterized more than half of the sample, and patterns were distinguished by number of trauma and/or maltreatment types, whether emotional abuse occurred, and whether emotional abuse occurred over single or multiple periods of development. Importantly, these trauma and maltreatment latent classes all showed unique correlations with various demographic characteristics and mental health outcomes. For example, male participants were more likely to be in the “loss/violence” class, whereas females were more likely to be in the “emotional abuse” and “high exposure” classes. This finding suggests that the term “poly-victimization” is not unidimensional and is instead comprised of various patterns of experiences with distinct correlates. The authors argue that previous research on poly-victimization has largely collapsed experiences of poly-victimization or simply counted the number of traumatic events experiences, ignoring the different combinations of overlapping traumas that may be more common among specific groups of individuals or that may be related to specific mental health outcomes (Spinazzola et al., 2014). As Adams et al. (2016) suggest in their paper, more effort is needed to identify and characterize patterns of poly-victimization within various populations.

To our knowledge, no previous research has used person-centered approaches, as opposed to variable-centered methodology, to evaluate the ways in which child maltreatment might be associated with patterns of trauma experiences. LCA has primarily been used to classify maltreatment experiences, though there little is known about the patterns of more general trauma experiences, or the relationship between those patterns and children’s maltreatment history. The present study intended to examine the ways in which these experiences coalesce by using LCA to identify patterns of trauma experiences within a large, racially diverse

sample of school-aged children. To further investigate the relationships among these ecological layers, covariate analyses were conducted to evaluate whether specific profiles of trauma experiences were more frequent based on maltreatment status. Secondary analyses then sought to examine the joint and unique impact of child maltreatment and trauma latent class membership on the development of internalizing and externalizing psychopathology. Such research into the patterns and interactions among trauma exposure and maltreatment is a critical step in improving our understanding of the various associations among distinct trauma experiences within maltreated and nonmaltreated youth, and what clinical impact various patterns of trauma exposure may have on children. Clinically, insight into the clusters of trauma exposure and maltreatment experiences could provide significant information for intervention and prevention programs addressing symptoms of trauma.

A multi-domain approach was used to consider the full ecological context of trauma exposure during childhood, incorporating experiences of community violence, loss or illness, domestic violence, and accidents/disasters, as reported by children and mothers. It was hypothesized that overall maltreatment status would differentially be associated with a pattern of pervasive, wide-spread trauma across most domains measured, suggesting that maltreated children might be more likely to be nested within a context of trauma that extends beyond their maltreatment experiences. With respect to the clinical impact of trauma class membership, it was also hypothesized that children who belong in the latent class characterized by pervasive trauma exposure would also experience more severe symptoms of both internalizing and externalizing behavior problems, irrespective of maltreatment status. Similarly, it was hypothesized that maltreated children would experience significantly more internalizing and externalizing symptoms, irrespective of trauma class membership.

Methods

Participants

Participants included 585 children, aged 8-12 years old ($M = 9.4$, $SD = .88$) and 51.3% male, all of whom attended a summer day camp research program in upstate New York designed for school-aged low-income children. The sample included both maltreated children ($n = 316$) and nonmaltreated children ($n = 269$). The racial and ethnic composition of the children, as identified by their mothers, was diverse: 66.9% identified as being African American, 21.3% Latino, 20.5% Caucasian, and 11.4% identified with other racial backgrounds. 37.8% of the mothers reported that they were married or living with a partner as though married, and 62.2% of the families were headed by a single parent with no current partner living in the home. The maltreated and nonmaltreated children were comparable in terms of gender, age, socioeconomic status, and race. Parents of all maltreated and nonmaltreated children provided informed consent for their child's participation, as well as consent for the examination of any Department of Human Services (DHS) records associated with the family.

Maltreated children were recruited by a DHS liaison, who evaluated Child Protective Services reports in order to identify children with a history of child abuse and/or neglect. The maltreated group was comprised of predominantly families of low socioeconomic status, a finding that is consistent with national demographic characteristics of maltreating

families (Sedlack, et al., 2010). Accordingly, demographically comparable nonmaltreated children were recruited from families receiving Temporary Assistance for Needy Families. DHS record searches within New York state were conducted to confirm the absence of any documented maltreatment or receipt of any preventative services for those at risk for maltreatment. Trained research assistants also completed interviews with each mother in the nonmaltreatment and maltreatment group to verify any DHS involvement and prior maltreatment experiences, using the Maternal Maltreatment Classification Interview (Cicchetti, Toth, & Manly, 2003).

For the recruited children in the maltreatment group, New York state DHS records were coded in order to classify descriptions of maltreatment experiences using the Maltreatment Classification System (MCS; Barnett, Manly, & Cicchetti, 1993). Coding of the DHS records was conducted by trained research assistants, doctoral students, and clinical psychologists. Coders were required to meet acceptable reliability with criterion standards before coding actual records for the study. Kappas ranged from 0.90 to 1.00 for the presence of each of the maltreatment subtypes, and intraclass correlations ranged from 0.83 to 1.0 for severity ratings of individual subtypes of maltreatment. The MCS is a well validated system used to identify the presence of neglect, emotional maltreatment, physical abuse, and/or sexual abuse. *Neglect* involves to the failure to provide for the child's basic physical needs (i.e., adequate food, shelter, clothing, and medical treatment), as well as the lack of supervision, moral-legal neglect, and/or education neglect. *Emotional maltreatment* involves extreme thwarting of the child's basic emotional needs for psychological safety and security, self-esteem, acceptance, and age-appropriate autonomy. *Physical abuse* is described by nonaccidental infliction of physical injury on the child, such as bruises, welts, burns, choking, or broken bones. Lastly, *sexual abuse* includes attempted or actual sexual contact between the child and a family member or other caregiver, for the purposes of that person's sexual satisfaction or financial benefit. Among the children with a history of maltreatment, 71.8% had experienced neglect, 58.9% emotional abuse, 27.2% physical abuse, and 8.5% had experienced sexual abuse. Additionally, the majority of children (60.1%) had experienced multiple types of maltreatment.

Procedure

Data were collected within a week-long summer day camp environment, providing a naturalistic and supportive setting in which each child's behavior and peer interactions could be observed. All maltreated and nonmaltreated children attended the camp free of charge for five consecutive days and seven hours per day, during which they were placed in groups of eight to ten children of the same sex and age. In addition to the children participating in recreational activities throughout the week, both children and their caregivers also completed research assessments conducted by trained research assistants and graduate students, who served as camp counselors (see Cicchetti & Manly, 1990, for detailed descriptions of camp procedures). Measures investigated in this analysis include self-report and parent-report questionnaires, as well as coded DHS records, providing a multi-informant and multi-perspective view of each child's exposure to trauma.

Measures

Children's Exposure to Community Violence (CMVL; Richters & Saltzman, 1990)—*Children's Exposure to Community Violence (CMVL; Richters & Saltzman, 1990)* was designed to evaluate the presence of community and home violence in participants. The CMVL is a 22-item self-report questionnaire that assesses the amount of lifetime exposure (either as a victim or witness) to extreme community and home violence.

The Life Events Checklist (LEC; Johnson & McCutcheon, 1980)—*The Life Events Checklist (LEC; Johnson & McCutcheon, 1980)* is a widely-used self-report measure used to identify the presence of a broad range of adverse life events that have occurred in the past year, and it is widely used among children and adolescents with various psychiatric symptoms. The LEC contains 46 different life events, and for any events that did occur, respondents are asked to rate whether the experience was “good” or “bad.” In our analyses, only scores for events rated as “bad” were included in the analysis. In addition, items that related to normative life stress (e.g., “failing to make an athletic team” or “arguments with parents”), as opposed to trauma-related experiences, were omitted from the analysis. After removing these items, the remaining items were associated with experiencing major illness in oneself or loved one, or the death a loved one.

UCLA PTSD Index for DSM-IV Adolescent Version (Pynoos, Steinberg, & Rodriguez, 1999)—*UCLA PTSD Index for DSM-IV Adolescent Version (Pynoos, Steinberg, & Rodriguez, 1999)*. The UCLA PTSD Index is administered to screen for lifetime trauma exposure, as well as the presence of trauma-related symptoms. The measure includes a 12-item screening self-report checklist of “very scary, dangerous, or violent” experiences, for which participants rated “yes” or “no” in response to whether each traumatic event has ever happened to them.

Children Depression Inventory (CDI; Kovacs, 1981)—*Children Depression Inventory (CDI; Kovacs, 1981)*. The CDI is a widely used and well-validated self-report questionnaire assessing depressive symptomatology in school-age children. For each item, children chose from among three option statements, depicting increasing levels of depressive symptoms to characterize their experiences in the past 2 weeks. For the current sample, the internal consistency (Cronbach's alpha) for the CDI was .857.

The Pittsburgh Youth Survey—*The Pittsburgh Youth Survey (PYS; Loeber, Farrington, Stouthamer-Loeber, & Van Kammen, 1998)* is a child self-report measure of delinquent behavior and substance use. Items assess children's involvement in a range of antisocial behavior, including aggressive behavior; cheating; stealing; running away; skipping school; damaging property; setting fires; as well as use of tobacco, alcohol, marijuana, and glue sniffing. Children report if they have ever engaged in the behaviors and if the behaviors occurred within the past 6 months. For the current study, only current symptoms (within the past 6 months) were examined.

Conflict Tactics Scale (CTS2; Straus et al., 1996)—*Conflict Tactics Scale (CTS2; Straus et al., 1996)*. The CTS2 was designed to obtain information about parental domestic

violence and is a well-validated measure of psychological aggression, physical assault or injury, and sexual coercion toward a romantic partner within the past year. The CTS2 was completed by mothers who reported being in a current marital or dating relationship.

Data Analytic Plan & Specification of Latent Class Model

To create a person-centered categorization of trauma experiences, a Latent Class Analysis (LCA) was performed. LCA models seek to identify an underlying categorical latent variable that divides a population into mutually exclusive and exhaustive latent classes (Goodman, 1974), estimating the probability of respondents' class memberships and probabilities of categorical item responses within a class. To begin specifying the categorical indicators of trauma exposure used within the LCA, a factor analysis was initially conducted using all items from the CMVL in order to classify items within this measure. The CMVL is the most comprehensive and relevant measure of many diverse forms of trauma exposure used within this study, and as a result, categorizing items within this measure was conducted to begin distinguishing among items with similar content. Results yielded 3 factors: (1) witnessing extreme community violence (e.g., "I have seen somebody get shot"), (2) threats or attempts of victimization (e.g., "somebody threatened to kill me"), and (3) community delinquency and crime (e.g., "I have seen drug deals" or "I have seen somebody get arrested"). The third factor was extremely prevalent across all participants (endorsed by 90.1% of the sample) and therefore was excluded from the analysis, given that it represented common features of low-income neighborhoods as opposed to indicators of trauma exposure.

Due to high presence of item content overlap within the CMVL, LEC, and UCLA PTSD Index, it was necessary to include only the unique items from the LEC and UCLA PTSD Index that had unique content not already captured by the CMVL. This was done by examining the content of items on the LEC and UCLA PTSD Index and removing items that overlapped in content with items on the CMVL. Unique items from these two measures related to: (1) the death or illness/injury of a loved one, (2) illness/injury to oneself, and (3) experiencing a natural disaster or serious accident, such as a car accident. These three categories were identified by three researchers with extensive experience with children exposed to trauma, each of whom inspected the non-overlapping items from the CMVL, LEC, UCLA PTSD and agreed upon the categories used as trauma indicators within the analysis using group consensus. Lastly, 2 subscales from the CTS2 completed by mothers of participating children were also included as trauma indicators: (1) physical abuse directed at the respondent, and (2) psychological abuse directed at the respondent. Taking into account the 2 factors identified from the CMVL factor analysis, the 3 categories of unique items extracted from the LEC and UCLA PTSD index, and the 2 subscales within the CTS2, a total of 7 trauma indicators were created. Each of the 7 indicators was dichotomized as being either present (1) or not at all present (0) and used as binary indicators in the latent class model. The only item that was not coded in this manner is the CTS subscale of Psychological DV, in which children scoring 1 SD above the mean were coded as 1, and others 0. This item was coded differently due to the presence of higher endorsement rates of psychological domestic abuse (44%); to eliminate some of the psychological abuse that may be more common experiences within low-income communities (as opposed to trauma

exposure), only parents who indicated higher levels of psychological abuse were included in this indicator. Psychological domestic violence represents a critical disruption in a child's sense of trust and safety in relation to a caregiver, and as a result, it was important to include some form of this traumatic type of experience in the analysis. Components and frequency rates of endorsement for each indicator can be found in Table 1.

To investigate whether overall maltreatment status influences the likelihood that an individual belongs to a particular latent class, maltreatment status was added into the LCA model as a covariate. Trauma class membership, as determined by the LCA, and maltreatment status were then entered into a two-way analyses of covariance (ANCOVA), using gender as a covariate, to investigate the impact of both trauma latent class membership and child maltreatment on the CDI and PYS, representing the dependent variables. Gender was included as a covariate in order to control for potential gender differences in the development of both internalizing and externalizing symptoms. Levels of internalizing and externalizing symptoms were represented by the CDI ($M = 7.32$, $SD = 7.01$) and the PYS ($M = 2.84$, $SD = 3.44$), respectively.

Results

The 7 binary trauma indicators, in addition to maltreatment status as a covariate variable, were entered into the LCA analyses using Mplus version 7.0 (Muthen & Muthen, 2012). A series of 4 LCAs were conducted that specified 2-5 class solutions. Consistent with recent recommendations (Collins & Lanza, 2010), the Akaike information criterion (AIC), Bayesian information criterion (BIC), sample-size adjusted BIC (aBIC), Bootstrapped Likelihood Ratio Test (BLRT), and substantive interpretability were utilized to determine that the three class solution was the optimal fitting model, compared to two, four, or five class models. The three class solution demonstrated the lowest values for the AIC, BIC, and aBIC, suggesting that this was the best fitting model examined. In addition, the BLRT found that the three class solution was a better fitting model than the two class solution ($p < .001$), and the four and five class solutions were not found to be significantly better than the three class solution according to the BLRT analysis. Particular weight was given to the BLRT and the BIC indices, as recent literature has suggested that these indices provide the most reliable indicators of the true number of classes (Nylund, Asparouhoy, & Muthen, 2007). Goodness of fit statistics for all class solutions are presented in Table 2.

Table 3 presents the prevalence estimates for the three latent classes and the probability of meeting positive criteria for each of the seven trauma indicators. According to the model, 46.2% of the sample belonged to a latent class labeled "community violence and loss." Members of this class were likely to witness extreme community violence, experience threats or attempts of victimization of community violence, and experience the severe illness, injury, or death of a loved one. Children in this class were highly unlikely to witness any forms of domestic violence at home, and the likelihoods of experiencing natural disasters/accidents and illness/injury to oneself were also low. The second latent class, labeled the "pervasive trauma" class, was the smallest trauma profile and encompassed 19.5% of the sample. This class was characterized by the high probability of endorsing most trauma indicators, with domestic violence exposure being the most prevalent within this

class. Children in this class evidenced a very strong probability of witnessing both physical and psychological domestic violence at home, as well as a high probability of witnessing extreme community violence, experiencing threats or attempts of victimization of community violence, and experiencing the severe illness, injury, or death of a loved one. Lastly, the third trauma class represented children experiencing “low trauma” and included 34.3% of the sample. Children belonging to this class were not likely to endorse any of the trauma indicators, representing a group of minimally-exposed children.

Covariate Results and the Role of Maltreatment

To investigate the relationships between maltreatment and trauma class membership within the model, estimated odds ratios were evaluated. The odds ratio reflects the increase in odds of belonging to a class relative to a reference class, corresponding to a one-unit increase in the covariate. Results from odds ratio analyses indicated that maltreatment status was significantly associated with class membership. Among the maltreated children, the estimated odds of belonging to the “pervasive trauma” class were 4.9 times higher than the odds of belonging to the “community violence and loss” class ($OR = 4.9, p = .001$) and 4.3 times higher than the odds of belonging to the “low trauma” class ($OR = 4.3, p = .001$). Thus, the “pervasive trauma” class was highly represented by maltreated children. Maltreatment status was not significantly related to differences in class membership between the “community violence and loss” and the “low trauma” classes.

Analyses of Covariance Results

Because this study aimed to examine the associations among multiple levels of ecology and clinical outcomes, two-way ANCOVA was utilized to examine the interaction and main effects of maltreatment status (coded as being either present or not present) and latent patterns of trauma exposure on symptomatology, while covarying for the impact of gender. To conduct this analysis, posterior probabilities were extracted from the 3-class latent class model to determine each individual’s most likely class membership. Maltreatment status and class membership were then entered as independent variables into two two-way ANCOVAs to examine the unique and interactive effects of maltreatment status and class membership on measures evaluating symptoms of depression (CDI) and conduct disorder (PYS), while controlling for the impact of gender differences in the development of symptomatology.

No significant interaction effect between class membership and maltreatment status on symptoms of depression was found, $F(2, 550) = .391, p = .677$. However, main effect analyses revealed that maltreatment status and trauma latent class membership each represented unique contributors to internalizing symptomatology. Maltreatment status was significantly associated with symptoms of depression above and beyond the effects of trauma latent class membership and gender, $F(1, 550) = 4.506, p = .034$. Specifically, maltreated children displayed higher levels of depressive symptoms than did nonmaltreated children. The main effect of trauma latent class membership was also significantly associated with symptoms of depression above and beyond the effect of child maltreatment, $F(2, 551) = 10.343, p < .001$. Post-hoc group comparison results revealed that children in the “community violence and loss” class reported significantly higher levels of symptoms than did children in the “low trauma” class on the CDI ($p < .001$), with a mean difference in total

CDI score of 2.754. All other comparisons of latent class membership with respect to levels of depression were nonsignificant. Estimated marginal means of symptom levels on the CDI for maltreated and nonmaltreated children across each latent class can be found in Table 4.

Results from the second ANCOVA, which examined the impact of child maltreatment and trauma latent class membership on symptoms of conduct disorder while again controlling for gender, revealed similar patterns. No significant interaction effect between class membership and maltreatment status on symptoms of conduct disorder was found, $F(2, 552) = 2.12, p = .121$. The main effect of maltreatment status on symptoms of conduct disorder was significant, $F(1, 552) = 3.762, p = .048$, such that maltreated children scored higher on the PYS than did nonmaltreated children. Trauma latent class membership was also associated with symptoms of conduct disorder, $F(2, 552) = 12.477, p < .001$. Post-hoc group comparison results found that children in the “community violence and loss” class reported significantly higher levels of symptoms than did children in the “low trauma” class on the PYS ($p < .001$), with a mean difference in total PYS score of 1.41. Additionally, children in the “pervasive trauma” class also reported significantly higher levels of externalizing symptoms than did children in the “low trauma” class ($p < .023$), with a mean difference in total PYS score of 1.596. There was no significant difference in symptoms of conduct disorder between the “community violence and loss” and “pervasive trauma” classes. Estimated marginal means of symptom levels on the PYS for maltreated and nonmaltreated children across each trauma latent class can be found in Table 5.

Discussion

This study provides an important contribution to understanding how patterns of trauma coalesce in low-income children, and how such patterns may be distinctly associated with symptomatology. Because of the significant overlap in trauma experiences, person-centered methods are uniquely able to examine the impact of various groups of overlapping experiences. This approach contrasts with examining trauma experiences independently or grouping them together into a general variable of risk, both of which potentially risk concealing the more complex associations among experiences of violence and trauma. From an ecological-transactional perspective, this study conducted an LCA to identify latent relationships among traumas in multiple layers of a child’s ecology: being a witness or victim to community violence, natural disasters or serious accidents, the death/injury of loved ones, personal illness or injury, and domestic violence. LCA identified 3 groups of children experiencing distinct patterns of trauma at home and in the community: 1) the “community violence and loss” class (46.2% of the sample); 2) the “pervasive trauma” class, characterized by a high probability of experiencing trauma across domains and a particularly high likelihood of experiencing domestic violence (19.5% of the sample); and 3) the “low trauma” class (34.3% of the sample). While the co-occurrence of these risk factors is well known in clinical and research settings, previous research has provided little information about the clinical impact of complex and distinct patterning of overlapping traumatic experiences. The prevalence rates for each class highlight the high amounts of violence experienced by both maltreated and nonmaltreated children, with about 65% of the sample experiencing extreme community violence and loss.

Because maltreatment experiences were also included in the LCA as a covariate, our findings were able to improve our understanding of the relationship between child maltreatment and patterns of additional trauma exposure. In particular, maltreated children were overall found to be significantly overrepresented in the “pervasive trauma” class, compared with nonmaltreated children. Consistent with our hypotheses, such results underscore the idea that child maltreatment is specifically associated with widespread exposure to trauma across several levels of a child’s ecology, especially in relation to domestic violence. This is also consistent with the extant literature demonstrating the strong co-occurrence of child maltreatment and parental domestic violence (Hamby et al., 2010; Jobe-Shields et al., 2015). In addition, there is a large body of previous research demonstrating a “double whammy” or dual exposure effect, in which exposure to both domestic violence and maltreatment has stronger negative effect on clinical outcomes than do domestic violence or maltreatment alone (Herrenkohl et al., 2008; Moylan et al., 2010). While these studies provide important contributions to understanding the joint impact of multiple adversities, they do not take into account the multifaceted and comorbid nature of trauma exposure that also includes witnessing and experiencing community violence, loss, and other traumatic experiences. Thus, while previous research evaluating the impact of child maltreatment often overlooks or controls for these other sources of trauma, the current results illustrate that maltreatment is highly likely to be nested within a broader context of trauma that extends beyond their maltreatment experiences. While previous research evaluating the impact of child maltreatment often overlooks or controls for these other sources of trauma, however, the current results illustrate that maltreatment is highly likely to be nested within a context of trauma that extends beyond their maltreatment experiences.

It is also important to note that maltreatment status was not significantly associated with differences in rates of being in the “low trauma” class versus the “community violence and loss” class, suggesting that many nonmaltreated children also experience considerable amounts of extreme community violence. This result stresses the unfortunate reality that traumatic experiences may be a part of life for many economically disadvantaged children. Although having a history of maltreatment may place children at higher risk for more pervasive exposures to violence and trauma, the majority of children in our sample (maltreated and nonmaltreated) appeared to be at high risk for experiencing or witnessing community violence. Even children in the “low trauma” class demonstrated a 20% likelihood of endorsing that they had witnessed community violence, a surprisingly substantial percentage. Thus, exposure to community violence and crime appears to be ubiquitous for all low income children in this sample, regardless of maltreatment status. In a meta-analysis of research evaluating the impact community violence exposure, Fowler et al. (2009) found that post-traumatic stress symptoms were equally predicted by victimization, witnessing, or hearing about community violence, demonstrating the potential negative impact of violence even for those who are not directly victimized. Children living in violent communities may feel as though they are at constant risk for victimization by gang or crime activity, beatings, stabbings, and shootings, leading them to fear for their own safety as well as the safety of others (Fowler et al., 2009), which could have significant impact on psychological health and functioning. The high numbers of maltreated and nonmaltreated children within our sample who endorsed these types of indirect community violence

exposure reveal a critical need for intervention and prevention programs in all low-income children, not just those with a history of child maltreatment.

Results examining the clinical impact of child maltreatment and the various patterns of trauma exposure add depth to the above findings, revealing that maltreatment status and trauma latent class membership each emerged as significant and unique contributors to the development of psychopathology. Specifically, children with a history of child maltreatment experienced significantly higher levels of symptoms, above and beyond the impact of patterns of trauma exposure. In addition, children in the “pervasive trauma” or “community violence and loss” class experienced significantly higher levels of symptoms than did children in the “low trauma” class, over and above the impact of child maltreatment. Thus, examining multiple levels of trauma exposure in addition to experiences of child maltreatment is critical in understanding the mechanisms of internalizing and externalizing disorders in children. Such findings may be very important in identifying pathways toward the development of psychopathology and the environmental contexts that each influence those pathways, particularly with respect to patterns of pervasive trauma or experiences of severe community violence and child maltreatment.

The current study points to important areas for prevention and intervention for high-risk families. By taking a person-centered approach to understanding the relationships among various trauma experiences, clinicians can begin to anticipate likely constellations of trauma exposure in low-income children and attempt to break those negative patterns early (Jaffee et al., 2007). Furthermore, our results clearly support the creation of intervention/prevention programs that address several levels of ecology through which violence may shape developmental trajectories, in addition to targeting child maltreatment experiences. Our findings show that maltreated children are more likely to experience widespread trauma across contexts than are nonmaltreated children, which in turn is associated with higher levels of symptomatology. In addition, children with a history of maltreatment *and* exposure to pervasive trauma or high levels of community violence may be at highest risk for the development of psychopathology due to these additive experiences. As a result, intervention and prevention programs designed for maltreated children must take into account the prevalence and impact of coexisting and connected trauma experiences in order to prevent the accumulation of more trauma exposure in children’s lives.

Several limitations and areas for future research are evident in this study. First, the data analyzed in this paper are collected from one time-point. However, due to the fact that measures of trauma and maltreatment assessed children’s lifetime exposure, and measures of symptomatology assessed current functioning, it is unlikely that exposure to these events occurred after the development of mental health problems. Statistical limitations also include the use of posterior probability method of extracting most likely latent class membership within the ANCOVA analyses, which introduces a potential for biases. These biases arise from assigning children to a specific class based on their probability of belonging to each class, as opposed to having statistically determined class assignment for each child. Additionally, this bias is particularly enhanced by the presence of a low Entropy value for the current analysis, which indicates decreased classification certainty. Alternative methods to correct this bias, however, do not allow for testing interaction effects. Therefore, due to

this study's goal of examining the individual and joint impact of trauma exposure and child maltreatment, utilizing the posterior probability of class membership within an ANCOVA provided an appropriate method of answering this question. In addition, assessments of community violence were made using self-report questionnaires, rather than a community measure of violence rates (e.g., geocoding methods) that would potentially provide a more accurate image of neighborhood characteristics. Additionally, current exposure to domestic violence was only assessed in caregivers who reported being in a current marital or dating relationship. As a result, historical exposure to domestic violence was not captured. Lastly, the study used a low-income, racially and ethnically diverse sample, which limits generalizability to other populations.

In addition to addressing these limitations, there are many areas in which future work could advance the current findings. For example, investigating the relationships between trauma experiences longitudinally is recommended, as it would be important to investigate whether latent patterns of trauma exposure remain stable or vary as children continue to develop and potentially experience further traumas. Future research may also benefit from incorporating other factors that may influence the clinical impact of various patterns of trauma exposure, such as the age at which a trauma occurred, the recency of trauma, gender, type of maltreatment, and other environmental and child factors. Research has shown that this heterogeneity within exposure to adversities is critical in predicting clinical outcomes (e.g., Doom et al., 2014; Busso, McLaughlin, & Sheridan, 2016), demonstrating that children who experience the same event do not necessarily experience the same outcomes.

Despite these limitations, the present study provides important insight about the nuanced relationships among overlapping experiences of trauma and child maltreatment, suggesting the complexity within poly-victimization. While previous research has often looked at forms of community or home trauma as a single combined risk factor or has controlled for coexisting traumas, this investigation instead took a person-centered approach to identify the natural clustering of diverse traumatic experiences in relation to child maltreatment and the clinical impact of those clusters. Such methodology increases our understanding of the intertwined nature of various forms of trauma and maltreatment within economically disadvantaged children. Specifically, results found that maltreatment is associated with experiencing a pervasive pattern of trauma exposure across several domains, which in turn is associated with increased risk for the development of psychopathology. These findings emphasize the clinical importance of examining multiple levels of ecological risk that join together in creating risk. Results support the importance of investigating and treating child maltreatment and other traumas in tandem, and future researchers and clinicians must continue to elucidate these complex relationships among child maltreatment and additional trauma in the community or home.

Acknowledgments

This research was supported by the National Institute of Mental Health (project number R01-MH83979) and the Spunk Fund, Inc.

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Table 1

Individual Items within each of Trauma Indicator and Rates of Endorsement within the entire sample

Trauma Indicators & Individual Items		Measure	% endorsed
Witnessing extreme community violence			
I have seen someone get shot		CMVL	20.1%
I have seen somebody set fire to a house or building		CMVL	17.5%
I have seen somebody get stabbed		CMVL	13.9%
I have seen somebody get robbed		CMVL	27.0%
I have seen somebody get badly burned		CMVL	21.4%
I have seen a dead body outside		CMVL	8.0%
Threats/attempts of victimization of community violence			
Somebody threatened to stab me		CMVL	8.0%
Somebody threatened to shoot me		CMVL	7.8%
Somebody threatened to kill me		CMVL	15.5%
Somebody has tried to rob me		CMVL	21.3%
Disasters/Accidents			
Being in another kind of disaster, like a fire, tornado, flood, or hurricane		UCLA PTSD Index	6.1%
Being in a bad accident, like a very serious car accident		UCLA PTSD Index	11.4%
Illness or Injury to Self			
Having a painful and scary medical treatment in a hospital when you were very sick or badly injured		UCLA PTSD Index	12.9%
Major personal illness or injury		LEC	12.9%
Illness or Injury to Others			
Serious illness or injury of a family member		LEC	30.4%
Death of a family member		LEC	31.8%
Death of a close friend		LEC	4.6%
Serious illness or injury of a close friend		LEC	9.4%
Domestic Violence (physical abuse)			
Presence of physical assault or sexual coercion committed by partner, or injury inflicted by partner		CTS2	15.5%
Domestic Violence (psychological abuse)			
Presence of emotional abuse committed by partner		CTS2	7.6%

Note.

* The percent rate of endorsement for psychological abuse refers to the number of participants who scored above 1 standard deviation of the mean on this subscale, or those who endorsed the highest frequency of events. All other rates of endorsement refer to the number of participants who endorsed the item at any frequency.

Table 2
Latent Class Analyses using Maltreatment Status as a covariate: Goodness-of-Fit Criteria for Various Latent Models.

# of classes	Entropy	AIC	BIC	aBIC	BLRT p-value
2	0.773	4068.007	4137.788	4086.994	–
3	0.593	3993.254	4102.287	4022.922	0.000
4	0.801	3993.939	4141.939	4034.003	0.070
5	0.794	3998.078	4185.614	4049.106	0.667

Note. The bolded values serve to highlight the 3 class model, which was selected as the best fitting model.

Table 3

Item-Response Probabilities for the 3-Class Model, using Maltreatment Status as a Covariate.

Trauma Type	Class 1: Community Violence & Loss	Class 2: Pervasive trauma	Class 3: Low trauma
Witnessing extreme community violence	0.743	0.521	0.211
Threats/attempts of victimization of community violence	0.531	0.449	0.052
Disasters/Accidents	0.249	0.316	0.029
Illness or Injury to Self	0.328	0.224	0.083
Illness or Injury to Others	0.601	0.469	0.347
Domestic Violence (physical abuse)	0.109	0.847	0.119
Domestic Violence (psychological abuse)	0.009	0.800	0.006
Class Prevalence:	52.0%	7.8%	40.2%

Table 4

Mean (SD) PYS Scores by Child Maltreatment Status and Trauma Latent Class Membership.

	Class 1	Class 2	Class 3	Total
Maltreated	3.8671 (4.08)	4.8857 (5.47)	1.7739 (2.40)	3.1672 (3.89)
Nonmaltreated	2.9416 (3.00)	2.4286 (1.90)	1.7547 (2.41)	2.4240 (2.80)

Table 5

Mean (SD) GDI Scores by Child Maltreatment Status and Trauma Latent Class Membership.

	Class 1	Class 2	Class 3	Total
Maltreated	9.0909 (8.02)	9.8857 (8.07)	6.4522 (6.42)	8.1502 (7.54)
Nonmaltreated	7.4526 (6.14)	6.1429 (7.34)	4.6981 (5.49)	6.2480 (6.04)