

Patterns of Community Violence Exposure During Adolescence

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Abstract This study examined cross-sectional and longitudinal patterns of community violence exposure and malleable predictors of these exposure patterns among a community sample of 543 urban African American early adolescents (45.3% female; mean age: 11.76). In each of grades 6, 7, and 8, latent class analyses revealed two patterns of community violence exposure: high exposure and low exposure. For the majority of participants, experiences with community violence were similar at each grade. Impulsive behavior and depressive symptoms distinguished adolescents in the high and low exposure classes in grade 6. Implications for interventions to prevent community violence exposure are discussed.

Keywords Community violence exposure · Adolescence · Latent class analysis

Introduction

A substantial body of research describes the high rates of community violence exposure among adolescents, and the numerous negative physical and mental health consequences that may result from youth witnessing and victimization by community violence. This research indicates that youth exposed to community violence display increased aggression and conduct problems, and depressive and anxious symptoms, including problems with concentration, symptoms of post traumatic stress, as well as Post Traumatic Stress Disorder (e.g., Cooley-Quille et al. 2001; Fitzpatrick et al. 2005; Gorman Smith and Tolan 1998). Community violence exposed youth also show increased academic problems (Henrich et al. 2004; Overstreet and Braun 1999; Schwartz and Gorman 2003) and increased suicidal thoughts and behaviors (Flannery et al. 2001; Vermeiren et al. 2002), in addition to their physical injuries. Given these possible adverse consequences, there has been increased interest in understanding youth risk for initial exposures and repeated exposures to community violence. In addition, recent research has endeavored to understand variations in outcomes among youth who have experienced community violence exposure.

The frequency, type, severity, and timing of youth community violence exposure may be relevant for understanding the consequences of community violence exposure, as well as risk for community violence exposure. For example, youth with single or acute experiences with violence may differ from youth who have chronic exposure in terms of the outcomes associated with their exposure and the risk factors associated with their exposure. Relatedly, youth might be similar in terms of the types or severity of violent events experienced, with some youth more likely to experience victimization and others more likely to have

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vicarious exposure to community violence. If so, interventions targeting community violence exposed youth should be tailored to youth's witnessing and victimization history (Aisenberg and Mennen 2000; Cohen et al. 2003). Identification of youth who report similar frequency and types of community violence exposure may aid in developing interventions for community violence exposed youth and youth at risk for exposure. Thus, the goals of the present research are to identify youth with similar patterns of exposure to community violence, and examine risk factors for those exposure patterns.

Types of Community Violence Exposure

Several types of community violence exposure have been described in the literature, including witnessing, victimization, and hearsay, with most research focusing on assessment of witnessing and victimization (Guterman et al. 2000; Trickett et al. 2003). Most research has examined counts of the number of events in these categories. However, as noted by Selner O'Hagan and colleagues (1998), summing the number of violent events experienced may result in a loss of information, particularly when items within a particular category vary in severity or intensity. This may be especially problematic because individuals reporting the same number of violent events may be heterogeneous in terms of the types of community violence they have experienced, which may be linked with different consequences.

Although prior research has not explored whether youth can be classified or grouped according to the type of community violence experienced, typologies of victimization have been described in the peer victimization and child maltreatment literatures. For example, Holt and Espelage (2003) used cluster analytic methods to examine heterogeneity in the victimization experiences (i.e., peer victimization, abuse in dating relationships, and sexual abuse) of a diverse sample of high school students, and found distinct groups characterized by type of victimization and the number of victimizations experienced. Psychological distress was greater among youth who had been victimized than youth who had not been victimized; among youth who had been victimized, psychological adjustment varied according to the type of victimization experienced (Holt and Espelage 2003). Similarly, Felix and McMahon (2006) examined patterns of peer victimization and sexual harassment in a sample of middle school students. Cluster analyses revealed a low victimization cluster and high victimization clusters characterized by type, with these clusters differentially associated with internalizing problems. Nylund and colleagues (2007b) examined types of peer victimization in a sample of middle school students and identified three groups of adolescents who were similar

in terms of the severity of victimization, rather than type (physical vs. relational) of peer victimization they experienced: a *victimized class*, who had high probability of endorsing several victimization items; a *sometimes victimized class* who had a moderate probability of endorsing victimization items; and a *rarely victimized class* who had a low probability of endorsing victimization items. Depressive symptoms varied across these classes, and were higher among students in the victimized class. Similar classifications of the type and frequency of community violence exposure may be informative.

Longitudinal Patterns of CV Exposure

Examination of the longitudinal pattern of community violence exposure also may further clarify our understanding of risk for and consequences of youth experiences with violence. Cumulative stress models suggest that chronic, repeated exposure to stressors results in serious negative consequences for youth, more serious than for youth with single exposures, fewer exposures, or multiple low exposures over time (Gerard and Buehler 2004). Similarly, chronic exposure to community violence may have different consequences than less frequent exposure. As noted by Selner O'Hagan and colleagues (1998), however, research examining community violence exposure often has not distinguished between chronic and acute exposure to community violence, likely due to methodological constraints such as use of frequency scales and cross-sectional research designs. Frequent exposure is often labeled as chronic (e.g., White et al. 1998), although summing the number of exposures to community violence reported at a single assessment does not necessarily provide information about the whether these experiences are chronic, especially for measures assessing prior exposure over a short interval. Assessments of lifetime exposure to community violence may provide more information about the chronicity of exposure, although it is often not possible to discern the specific timing of exposures.

The criminology literature distinguishes two types of repeat victimization that have relevance for understanding longitudinal patterns of community violence exposure. *Multiple victimization* refers to the frequency of victimization during a particular study period; *chronic victimization* is victimization that occurs in more than one study period. Multiple victimization is generally the only measure of repeat victimization that can be obtained in cross-sectional studies, whereas assessment of chronic victimization requires prospective or retrospective longitudinal data. While examination of multiple victimization has been common in the criminology literature, there have been comparatively fewer examinations of patterns of victimization over time. As an exception, Menard and Huizinga

(2001) examined the annual and cumulative prevalence of victimization over a 5 year period for youth participating in the Denver Youth Survey (DYS), a longitudinal study of youth residing in Denver neighborhoods characterized by social disorganization and high crime rates. The majority of preadolescent and adolescent youth in this high risk sample were repeat victims, reporting more than one victimization during each year (multiple victimization), as well as victimization in two or more years of the 5 year study (chronic victimization). More than one-third of the participating youth were intermittent victims, with one or more years intervening between victimization experiences. Consistent with prior research (e.g., Lauritsen and Davis Quinet 1995), victimization experiences were disproportionately concentrated in a small proportion of the sample. Specifically, nearly half of the total victimization incidents reported by the total sample were reported by the 10% of youth victims who experienced the highest victimization.

Results from longitudinal studies indicate that prior exposure to community violence predicts later exposure (e.g., Lambert et al. 2005), suggesting some stability in these experiences with violence. Similarly, the delinquency literature has documented that prior victimization consistently predicts future victimization (Lauritsen and Davis Quinet 1995; Menard 2000), evidence of chronic victimization. Additionally, some research indicates that prior victimization predicts subsequent victimization even after controlling for patterns of routine activities and lifestyle characteristics that may provide opportunities for victimization (Wittebrood and Nieuwebeerta 2000). Overall, the available research suggests different patterns of adolescent exposure to violence and victimization that may be characterized by frequency and timing. In terms of longitudinal patterns of community violence exposure, there is likely stability in these experiences over time, with some individuals experiencing repeated exposures over time compared to individuals with fewer or no exposures. Moreover, multiple and chronic experiences with community violence may be concentrated in a small number of adolescents.

Predictors of Community Violence Exposure

Routine activities and lifestyle theories (Cohen and Felson 1979; Hindenlang et al. 1978) highlight four types of risks that increase the likelihood of crime and victimization: proximity to crime areas, exposure to criminal activities, target attractiveness, and low guardianship or parental monitoring (Miethe and Meier 1994). Specifically, these theories propose that individuals with these characteristics are more likely to find themselves in dangerous situations and in settings with increased opportunities for involvement in violence. Models describing the development of antisocial behavior highlight similar processes (e.g.,

Patterson et al. 1992), with particular attention to the importance of low parental monitoring and deviant peer affiliation as processes that increase youth involvement in violence. Consistent with these models, prior research indicates higher exposure to community violence among youth involved in delinquent activities and affiliating with deviant peers (Lambert et al. 2005; Weist et al. 2001), and among youth who experience significant amounts of unstructured and unsupervised time (Richards et al. 2004).

Demographic and behavioral risks for community violence exposure also have been identified in prior research. In terms of demographic risks, male gender consistently has been associated with increased risk for community violence exposure (e.g., Lambert et al. 2005; Selner O'Hagan et al. 1998; Weist et al. 2001), perhaps because males tend to have earlier access to and more frequent unsupervised time in the neighborhood (Beyers et al. 2003). Thus, they may have more opportunities to become involved in violence as perpetrators and victims. In terms of behavioral risks, research suggests that depressive symptoms exacerbate risk for community violence exposure (Borowsky and Ireland 2004; Lambert et al. 2005), likely because depression is positively associated with risk-taking behaviors including delinquency (Leas and Mellor 2000) and physical fights (Pesa et al. 1997), each of which co-occurs with community violence exposure. These associations between depression and externalizing behavior may occur because some youth may behave in aggressive and violent ways to mask feelings of depression or cope with their distress; these methods for managing their depressive symptoms can increase exposure to violence. On the other hand, routine activities theory suggests that youth who display outward signs of depression may be perceived as attractive targets for violence and therefore may experience more community violence victimization (Miethe and Meier 1994).

In addition to depressive symptoms, aggressive behavior is a consistent predictor of adolescent exposure to community violence (e.g., Borowsky and Ireland 2004; Farrell and Bruce 1997; Lynch and Cicchetti 1998). Aggression typically occurs in dangerous settings where community violence occurs, thereby increasing youth's risk of witnessing and victimization by community violence. Similarly, impulsive behavior may increase risk for community violence exposure because impulsive youth may not take necessary precautions to keep themselves safe and/or avoid dangerous situations. Impulsive youth also may behave aggressively without considering the consequences, one of which may be further violence involvement including witnessing and victimization by community violence.

Regarding risk factors for repeat victimization, heterogeneity hypotheses propose that some individuals experience repeat victimization because of personal

characteristics relevant to victimization such as impulsivity, risk-taking, and aggression (Gottfredson and Hirschi 1990; Lauritsen and Davis Quinet 1995). Relatedly, situational and lifestyle characteristics, as outlined in routine activities and lifestyle theories, may increase risk for repeated victimization. For example, Lauritsen and colleagues (1991) found that victimization experiences resulted in increased delinquent activities, which in turn were associated with future victimization. Similarly, victims who attempt revenge, retaliation, or self protection may expose themselves to possible repeat exposure to violence by behaving in ways that may elicit more aggressive responses from peers (e.g., Schwartz et al. 1993). A victim labeling process also may be at work, and victims may become known to offenders as targets (Wittebrood and Nieuwebeerta 2000). Relatedly, some individuals may be at greater risk for victimization due to individual characteristics such as psychological distress or perceived vulnerability (Finkelhor and Asdigian 1996; Hindenlang et al. 1978). An alternative perspective is that the experience of victimization reduces the risk of future victimization. For example, victims may modify their behavior to avoid high risk situations. This ‘once bitten, twice shy’ hypothesis (Hindenlang et al. 1978) suggesting that individuals who have been victimized will have a lower risk of future victimization has not been supported in empirical studies (e.g., Lauritsen and Davis Quinet 1995; Menard 2000; Osborn et al. 1996; Wittebrood and Nieuwebeerta 2000). The few available studies comparing repeat victims and single victims have not found consistent differences between these groups. Lasley and Rosenbaum (1988) found that the same types of processes related to repeat victimization and single victimization. Similarly, Osborn and colleagues (1996) found that repeat victims and single (i.e., one time) victims did not differ significantly on individual, socioeconomic, residence, or neighborhood characteristics.

The Present Study

The available research on peer victimization and criminal victimization suggests different patterns of victimization experiences distinguished by frequency, type, and chronicity of victimization experiences. Generally, youth with no or few victimization experiences show fewer adjustment difficulties than youth who have been victimized more frequently (e.g., Felix and McMahon 2006; Holt and Espelage 2003). Among youth who have been victimized, adjustment varies according to the type of victimization experienced (e.g., Holt and Espelage 2003). Similar examinations of patterns of community violence exposure are necessary to better understand risks for community violence exposure, to inform preventive interventions for youth at risk of exposure, and to tailor interventions to

reduce the potential negative consequences associated with chronic exposure. Thus, the present study examines patterns of community violence exposure among a community sample of early adolescents to determine whether there are groups of adolescents who report similar types and levels of community violence exposure. Community violence exposure patterns are examined cross-sectionally, as well as longitudinally, to determine whether there is stability in the level or type of community violence exposure during the adolescent years. Given research which highlights prior community violence exposure as a strong predictor of future exposure, it was hypothesized that youth would have similar community violence exposure at adjacent time points. We expected that this stability in community violence exposure would be more prevalent than changing exposure over time. In addition, we examined individual and family predictors of adolescent patterns of community violence exposure to understand whether these malleable factors may distinguish youth with chronic community violence exposure during adolescence from youth with low or fewer exposures, or youth who transition from low exposure to high exposure from youth with comparatively lower exposure over time. It was hypothesized that males, youth with high depressive symptoms, impulsivity, and deviant peer affiliations, and youth with low parental monitoring would have more community violence exposure and be more likely to experience increases in community violence exposure over time.

Prior research examining victimization experiences often has classified youth based on cutoff scores. Despite its utility, this method can impose differences between youth that may not be meaningful or may result in classification errors including false positives and false negatives. In addition, inaccurate cut points have important practical implications for estimation of the prevalence of victimization and for successfully designing and implementing interventions (Solberg and Olweus 2003). Thus, the present study uses Latent Transition Analysis (LTA; see Collins 2006 and Collins and Sayer 2001), a person-centered longitudinal modeling approach that can be used to study change in group membership over time, to study community violence exposure. LTA allows us to empirically derive the groups, rather than relying on predetermined cut scores. A benefit of using LTA to study community violence exposure is that it is possible to examine the two types of repeat victimization; the measurement model addresses *multiple* victimization, while the structural component allows us to explore *chronic* victimization.

The most common measurement model used at each time point in LTA is Latent Class Analysis (LCA). LCA is conceptually similar to cluster analysis where the goal is to identify groups (latent classes) based on observed response patterns (Clogg 1988; Lazarsfeld and Henry 1968;

McCutcheon 1987). Rather than relying on predetermined cut points, LCA assumes that there is an underlying categorical latent variable that determines an individual's class membership. Unlike cluster analysis, LCA is model-based or probabilistic, which implies that the model can be replicated with an independent sample (Muthén and Muthén 2000). Further, LCA allows the inclusion of predictor variables simultaneously in the model, (i.e. covariates and distal outcomes). Also, unlike traditional cluster analysis, LCA models provide statistical fit indices that can be used to assess model fit and help decide on the number of classes. LTA builds on the results of the LCA to examine change in individual group membership across time. The parameters of the LTA model describe change, or transitions, among the groups of the LCA; thus, the dependent variable is lagged, with each year predicting the subsequent year. External variables can be included into the model to describe what types of individuals are in each group at each time point and who transitions in and out of the classes.

Method

Participants

Participants were 543 African American middle school students initially assessed in the fall of first grade as part of an evaluation of two school-based preventive interventions whose immediate targets were early learning and aggressive behavior in first grade (Ialongo et al. 1999b). The original sample consisted of 678 children and families, representative of students entering first grade in nine Baltimore City public elementary schools, who were recruited for participation in the intervention trials. Three first grade classrooms in each of nine elementary schools were randomly assigned to one of the intervention conditions or to a control condition. The interventions were provided over the first grade year. Of the 678 children who participated in the intervention trial in first grade (i.e., in an intervention or control group), 585 were African American. Of these 585 youth, 92.8% ($N = 543$) had parental consent, provided assent, and reported about their community violence exposure in grades 6, 7, or 8. These 543 youth comprised the sample of interest for this study. The majority of the sample (i.e., 88.8%) had complete data in grades 6, 7, and 8. Approximately eight percent of the sample had data for two of the three assessments, and three percent had data for only one assessment. Nearly half of the sample was female ($N = 246$; 45.3%). Participants with data in grades 6, 7, and 8 did not differ from those missing data at one or more assessments in terms of gender, percentage receiving free or reduced lunch, intervention status (χ^2 s $ps > .05$), age at entry into the study, first grade

self-reports of anxiety or depressive symptoms, or teacher ratings of first grade externalizing problems ($ps > .05$). As an indicator of the socioeconomic status of the sample, 72% of the sample received free lunch or reduced lunches according to parent report at the 1st grade assessment. At the 6th grade assessment, the majority of youth resided in urban settings in an Eastern metropolitan area with violent crime rates that exceed national averages (Federal Bureau of Investigation 2008). In grade 6, youth ranged in age from 10.38 to 13.12 ($M = 11.76$, $SD = .35$).

Assessment Design

Adolescents reported about their community violence exposure, depressive symptoms, deviant peer affiliation, and parental monitoring in each of grades 6, 7, and 8. Teacher reports of adolescent impulsivity also were obtained in each of grades 6, 7, and 8. A face-to-face interview was used to gather data from the teachers and youth at each assessment point. Written informed consent was obtained from parents and verbal assent from the youth. Individual face-to-face interviews with adolescents were conducted primarily (~95%) at school; the remaining interviews were conducted in adolescents' homes, at libraries, or other public places that allowed for privacy.

Measures

Community violence exposure was assessed using items from the Children's Report of Exposure to Violence (CREV; Cooley et al. 1995), a self-report instrument used to assess the frequency of exposure to community violence through witnessing, victimization, hearsay, and media. The violent events assessed were being beaten up, robbed, stabbed, or shot, or witnessing someone experiencing one or more of those events or witnessing a killing. In each of grades 6, 7, and 8, a dichotomous variable was created to indicate whether or not the respondent had experienced each of the seven violent events (3 victimization by violence; 4 witnessing violence). The CREV has proven to be highly reliable in African-American youth and to be related to psychological well-being (Cooley et al. 1995).

Depressive symptoms were assessed using the depression subscale of the Baltimore How I Feel (BHIF; Ialongo et al. 1999a), a 45-item, youth self-report measure of depressive and anxious symptoms. Children report the frequency of depressive and anxious symptoms over the last 2 weeks on a 4-point scale (1 = *never*, 4 = *most times*). The BHIF was designed as a first-stage measure in a two-stage epidemiologic investigation of the prevalence of child and adolescent mental disorders as defined in the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed., rev.; *DSM-IV*; American Psychiatric Association,

1994). Items for the depression subscale were generated directly from *DSM-IV* criteria or drawn from existing child self-report measures, including the Children's Depression Inventory (Kovacs 1983), the Depression Self-Rating Scale (Asarnow and Carlson 1985), and the Hopelessness Scale for Children (Kazdin et al. 1986). Summary depression scores were created by summing across the 21 depression items to yield a depression subscale score. Chronbach's alpha for the depression items in Grades 6, 7 and 8 ranged from .82 to .85. In middle school, the BHIF Depression subscale was significantly associated with a diagnosis of major depressive disorder on the Diagnostic Interview Schedule for Children IV (Shaffer et al. 2000).

Impulsive behavior was assessed using the impulsive behavior subscale of the Teacher Report of Classroom Behavior Checklist (TRCBC), an adaptation of the Teacher Observation of Classroom Adaptation-Revised (TOCA-R; Werthamer-Larsson et al. 1991). Like the TOCA-R, the TRCBC measures each child's adequacy of performance on the core tasks in the classroom as defined by the teacher. Each child's performance is rated on a 6-point scale (*never true to always true*) in the following domains: accepting authority (aggressive behavior); social participation (shy or withdrawn behavior); self-regulation (impulsivity); motor control (hyperactivity); concentration (inattention); and peer likeability (rejection). A summary impulsivity score was created by taking the mean of the 3-item impulsive behavior subscale. Coefficient alpha for the impulsive behavior subscale ranged from .78 to .81 in grades 6 through 8. The impulsivity subscale was significantly associated with the teacher's perception of the child's need for medication for emotional and behavioral problems.

Parental monitoring was assessed using the Structured Interview of Parent Management Skills and Practices-Youth Version (SIPMSP; Patterson et al. 1992). The SIPMSP Youth Version was designed to assess the major constructs included in Patterson et al.'s (1992) model of the development of antisocial behavior and substance use in children and adolescents. The constructs assessed are (1) parental monitoring/supervision, (2) inconsistent discipline, (3) reinforcement/involvement, and (4) rejection of the child. For the parental monitoring subscale, youth are asked to respond to questions regarding their parents' monitoring practices in forced choice response formats. Higher numbers indicate less monitoring.

Deviant Peer Affiliation was assessed using items developed by Capaldi and Patterson (1989). Using a forced choice format, youth indicate how many of their peers have engaged in delinquent and/or antisocial behavior. Items are rated on a 5-point scale (1 = *none of them*; 5 = *all of them*), and higher scores indicate more deviant peer affiliation. In the present sample, coefficient alphas ranged from .76 to .85 in grades 6, 7 and 8.

Analytic Strategy

The LTA model used in this study was originally described by Graham et al. (1991; for a technical description see Humphreys and Janson 2000; Reboussin et al. 1998). As noted above, a significant benefit of the LTA model that makes it well suited to model change in community violence exposure is that it uses a measurement model to capture the experience or types of community violence exposure, and it is a longitudinal model that allows for the examination of chronic violence exposure. The LTA model used in this study is specified using a recommended step-by-step model building process that helps to ensure correct specification (Nylund et al. 2008), while also capitalizing on the flexibility of the latent variable framework which allows for the integration of substantive information (e.g., concurrent behavioral information) directly into the model specification. The results are presented for the measurement model for each grade first, and then the full longitudinal model that includes covariates.

All models were estimated with the latent variable software *Mplus*, Version 5 (Muthén and Muthén 1998–2007) using full information maximum likelihood estimation. This approach allows for missing data under missing at random (MAR, see Little and Rubin 1990; Rubin 1987) assumptions, where students who have data on at least one variable are included in the analysis, unless they are missing data on the covariates. The LTA models are considered longitudinal mixture models, and as with all mixture models are known to converge on local, rather than global solutions (McLachlan and Peel 2000). The use of random start values ensures that the results are global ones.

With LCA and LTA models, as with many latent variable models, there is not one single statistical indicator that is recommended to assess model fit; rather a combination of statistical indicators and substantive theory are used to decide on the best fitting model. The Bayesian Information Criterion (BIC; Schwartz 1978) is commonly used and trusted for model comparison, and lower values of the BIC indicate a better fitting model. At each grade, LCA measurement models that differed in the number of classes were compared using a bootstrap likelihood ratio test (BLRT) to determine the number of latent classes (Nylund et al. 2007a) along with the BIC. For nested LTA models that differed in the specification of change (not the number of classes), the traditional likelihood ratio test was used to compare models. The frequency table chi-square statistics (either Pearson or likelihood ratio-based) are not recommended for the LTA model since the chi-square distribution is not well approximated when there are large numbers of sparse cells. Other model diagnostic information was used to compare model fit, such as a count of the significant bivariate residuals for each model (e.g., "TECH10" in *Mplus*).

Results

Descriptive Statistics

Means and standard deviations for community violence witnessing and victimization are presented in Table 1. In each of grades 6, 7, and 8, participants were more likely to report that they had witnessed someone being beaten up than the other community violence exposure items. Participants reported that they had witnessed community violence significantly more than they had been victimized by community violence ($\chi^2 = 16.21, 31.49, \text{ and } 31.66$ for grades 6, 7, and 8, respectively).

Patterns of Community Violence Exposure

Our discussion of patterns of community violence exposure is divided into two parts which reflect the model building strategy used in this study. We first present the results of the cross-sectional measurement model exploration which was performed independently for each of the three grades in the analysis. The second part of the results is from the longitudinal LTA model, which built on the results of the cross-sectional results.

Measurement Model: Latent Class Analysis

For each grade, independent LCA’s were run, beginning with a 1-class independence model, and fitting up to a 4-class model. Table 2 presents the model fit information (i.e., log likelihood ratio, BIC, ABIC, and p-value for the BLRT) for the models presented by grade. Column one of Table 2 contains the fit indices for a one-class model, column two for a two-class model, up to the four-class model. The values with asterisks indicate the best-fitting model (i.e., the lowest value) according to the particular index.

Table 1 Means and standard deviations for binary community violence exposure items in grades 6, 7, and 8

Item	Grade 6 <i>M</i> (SD)	Grade 7 <i>M</i> (SD)	Grade 8 <i>M</i> (SD)
Witness someone beaten up	0.33 (0.47)	0.31 (0.46)	0.39 (0.49)
Witness robbing or mugging	0.07 (0.26)	0.07 (0.25)	0.10 (0.30)
Witness shooting or stabbing	0.07 (0.26)	0.05 (0.22)	0.10 (0.30)
Witness killing	0.04 (0.19)	0.02 (0.13)	0.05 (0.22)
Victim of a beating	0.02 (0.15)	0.03 (0.18)	0.02 (0.15)
Victim of robbing or mugging	0.01 (0.12)	0.01 (0.12)	0.03 (0.17)
Victim of shooting or stabbing	0.02 (0.15)	0.01 (0.11)	0.01 (0.10)

Means indicate proportion of sample endorsing item
 N = 500 for Grade 6. N = 523 for Grade 7. N = 527 for Grade 8

Table 2 Fit indices for LCA models with 1–4 Classes for 6th, 7th and 8th Grades

# Classes	1	2	3	4
# Free parameters	7	15	23	31
<i>6th grade (N = 500)</i>				
Log likelihood	−803.12	−741.34	−732.41	−724.63
BIC	1649.75	1575.90 ^b	1607.76	1641.90
ABIC	1627.53	1528.28 ^b	1534.75	1543.51
BLRT	N/A ^a	0.00 ^b	0.12	0.31
<i>7th grade (N = 523)</i>				
Log likelihood	−742.43	−678.80	−670.02	−665.46
BIC	1528.69	1451.49 ^b	1484.01	1524.96
ABIC	1506.47	1403.87 ^b	1411.00	1426.56
BLRT	N/A ^a	0.00 ^b	0.07	0.60
<i>8th grade (N = 527)</i>				
Log likelihood	−947.05	−869.32	−852.81	−852.81
BIC	1937.97	1832.64 ^b	1849.77	1849.77
ABIC	1915.75	1785.03	1776.76 ^b	1776.76
BLRT	N/A ^a	0.00	0.00	0.00

^a BLRT not available for the 1-class model

^b Best-fitting model according to that index

Examining the results for sixth grade in Table 2, the BIC (1575.90) and ABIC (1528.28) indicate that the two-class model fits best (see the starred values in column 3). Despite the BLRT ($p < .001$) indicating the three-class model would fit best, the two other indices point towards a two-class model. The results for the two other grades were consistent with sixth grade, indicating that the two-class solution fit the data the best.

Interpretation of the classes is aided by the item profile of plots of the resulting two-class models, presented in Fig. 1. Along the *x*-axis of the item profile plots are the seven exposure items and along the *y*-axis is the probability of endorsing the given item. Examination of the top plot of Fig. 1 for Grade 6 reveals that the two profiles are different primarily by their probability of endorsing the witnessing items since both profiles have a very low (lower than 0.15) probability of endorsing the victimization items. One class (designated with filled diamonds) had a relatively low probability of endorsing all seven items, which comprises of 84% of the sample at grade 6. Because of the low profiles across all the items, we called this class the “Low Exposure” class. The other profile (designated with filled boxes), which was the remaining 16% of the sample at grade 6, had a slightly higher probability of endorsing the victimization items, but had a markedly higher probability of endorsing the witnessing items. Because of this difference, we called this class the “High Exposure” class. The profile plots across the other grades revealed a very similar profile pattern. The shape of the pattern was remarkably

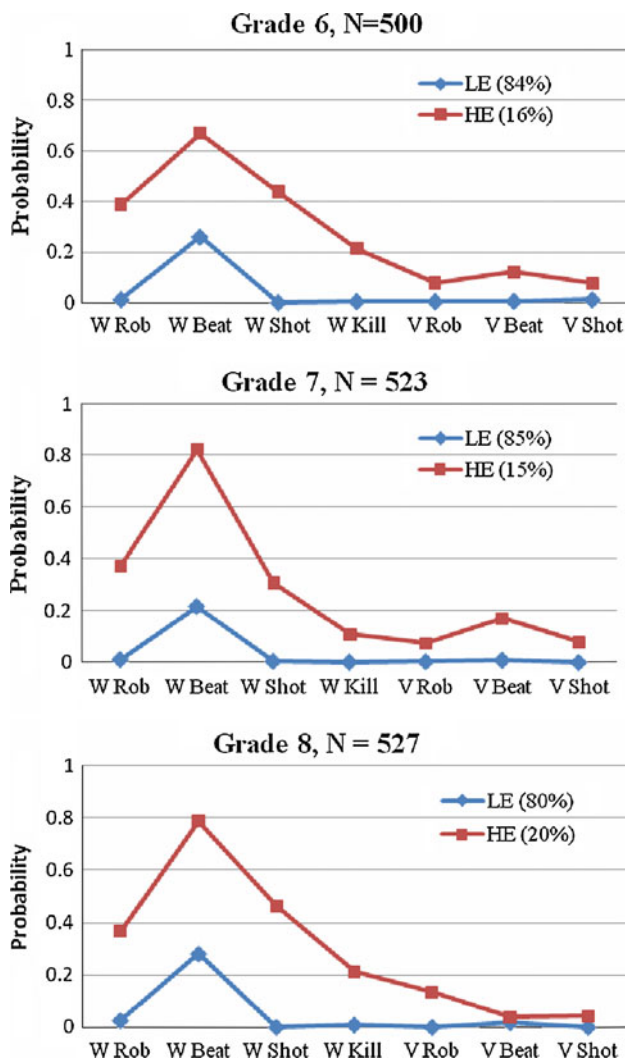


Fig. 1 Conditional item probability profile plots for the 2-class models for 6th through 8th grade. Class size information is presented in the legend. *LE* low exposure class and *HE* high exposure class

similar, resulting in the naming of the classes in the same way across middle school. In sum, the two class LCA model emerged as the best fitting measurement model across all three grades, where the resulting classes were differentiated by low and high exposure.

Structural Model: Latent Transition Analysis

Based on the results of the independent LCA, the 2-class LCA model is the measurement model used at each time point in a longitudinal LTA model. The profiles of the two-class solution appeared stable over time, suggesting that it may be plausible to fix the measurement parameters to be the same in the longitudinal model (i.e. measurement invariance). To test if measurement invariance is plausible, two LTA models were fit without covariates, one where all the measurement parameters were freely estimated across time

and another where the measurement parameters for each class was held invariant across time. The results indicated that there is no significant decrease in fit by assuming measurement invariance across time ($\chi^2_{(diff)} = 31.49$, $df = 28$, $p = 0.29$), implying that the two exposure classes can be considered the same across middle school.

Several LTA models were fit to explore different model specifications, but for sake of space and clarity only the final LTA model results are presented. Other LTA models considered allowed for more advanced covariate relationships, including models exploring interactions between class membership and transition probabilities, which allow for differential transition probabilities based on covariate values. Specifically, these interactions tested whether any of the covariates (i.e., gender, depressive symptoms, impulsivity, parental monitoring) were associated with transitioning from the low exposure class to the high exposure class, or the high exposure class to the low exposure class during grades 6 through 8. There was no evidence supporting differential transition probabilities for any of the covariates, so these interactions were not included in the final model. The final LTA model included time-varying covariates related to the exposure latent class variable at each grade and controlled for intervention effects. Table 3 includes the size of the two exposure classes based on the final LTA model. Consistent with the cross-sectional LTA, the low exposure class is the largest class and remains largest over time. Table 4 presents the percentage of the sample (or the relative size) of each of the transitional patterns possible based on the final LTA model. The largest pattern observed, comprising of 62% of the sample, was the pattern where students remain in the low exposure class throughout middle school. The second largest transitional pattern, comprising of 16% of the sample, was the pattern where students start out in 6th grade in the high exposure class and remain there through middle school. The next largest transitional pattern (9%) observed was a pattern that exhibited a transition from low exposure in 6th and 7th grades and then transitioned into high exposure for 8th grade. The next largest pattern (6%) was one where students in the high exposure class transitioned into the low exposure class in 7th grade and remain there in 8th grade.

Table 5 presents the logistic regression coefficient (or logit), standard error, *t*-value, *p*-value, and odds ratio for the time-varying covariates and intervention status that are

Table 3 Size of exposure classes based on the final LTA model with time-varying covariates, controlling for intervention effects

Class	Grade 6 (%)	Grade 7 (%)	Grade 8 (%)
High exposure	25	21	30
Low exposure	75	79	70

Table 4 Percentage of the sample in each of every possible transitional pattern based on the final two-class, measurement invariant LTA model that included time-varying covariates, controlling for intervention effects

Grade 6	Grade 7	Grade 8	Percentage (%)
High	High	High	16
High	High	Low	1
High	Low	High	2
High	Low	Low	6
Low	High	High	3
Low	High	Low	0
Low	Low	High	9
Low	Low	Low	62

Low low exposure class. High high exposure class

included in the LTA model and related to class membership at 6th, 7th, and 8th grades. Across middle school, there does not seem to be an effect of intervention. That is, across all three grades, students in the control, classroom, and family intervention groups were equally likely to be in either the low or high exposure class. Regarding 6th grade covariate results, there were no significant differences in gender, deviant peer affiliation, or parent monitoring for students across the two exposure classes, controlling for intervention effects. However, there were significant differences in impulsive behavior and depressive symptoms. Specifically, the impulsive behavior coefficient for the high exposure class (0.58, $p < .00$) indicated that compared to the low class, students in the high exposure class exhibited significantly more impulsive behavior, controlling for intervention effects. Further, the coefficient for depressive symptoms for the low exposure class (0.84, $p = 0.03$) indicated that, compared to students in the low exposure class, students in the high exposure class had significantly more depressive symptoms, controlling for intervention effects. The effect of depressive symptoms does not persist through 7th or 8th grade. In 8th grade, the impulsive behavior effect emerges again. The coefficient for the low exposure class (0.86, $p = 0.03$) indicated that, similar to 6th grade, students in the high exposure class exhibited significantly more impulsive behavior.

Discussion

The deleterious effects of community violence exposure have been well documented (see Lynch 2003 for a review), resulting in an increased interest in understanding predictors of community violence exposure to inform interventions to prevent this exposure (e.g., Lambert et al. 2005). However, rates and predictors of *chronic* community violence exposure are less understood given limited longitudinal

Table 5 Log odds coefficients for the final two-class LTA model with gender (Boys = 0, Girls = 1), depression, parent monitoring, and impulsive behavior as covariates and the low exposure class as the comparison group

Effect	Logit	SE	<i>t</i>	<i>p</i> value	Odds ratio
Grade 6					
Gender	-0.20	0.43	0.46	0.65	0.82
Depression	0.84*	0.39	-2.16	0.03	2.31
Parent monitoring	0.39	0.30	-1.28	0.20	1.48
Impulsive behavior	0.58*	0.22	-2.66	0.01	1.79
Deviant peers	0.46	0.37	-1.23	0.22	1.58
Class intervention group	0.51	0.37	-1.38	0.17	1.66
Family intervention group	0.00	0.00	-0.23	0.82	1.00
Grade 7					
Gender	0.25	0.94	-0.27	0.79	1.28
Depression	-0.46	0.83	0.55	0.58	0.63
Parent monitoring	0.03	0.57	-0.05	0.96	1.03
Impulsive behavior	0.72	0.31	-2.32	0.02	2.04
Deviant peers	0.74	0.98	-0.75	0.45	2.09
Class intervention group	0.47	0.73	-0.64	0.52	1.60
Family intervention group	0.00	0.00	0.06	0.95	1.00
Grade 8					
Gender	0.10	0.82	-0.12	0.90	1.11
Depression	0.56	0.64	-0.87	0.39	1.75
Parent monitoring	0.65	0.55	-1.18	0.24	1.91
Impulsive behavior	0.86*	0.33	-2.62	0.01	2.37
Deviant peers	0.66	0.94	-0.70	0.48	1.93
Class intervention group	-0.30	0.76	0.40	0.69	0.74
Family intervention group	0.00	0.00	0.65	0.51	1.00

examination of community violence exposure. Therefore, this study examined repeated assessments of community violence exposure among urban adolescents to identify longitudinal patterns of community violence exposure, and factors that distinguish youth with chronic high exposure from youth with low exposure. The majority of participants reported similar types of community violence exposure over time, with a smaller percentage reporting chronic high community violence exposure. Individual characteristics distinguished adolescents with high and low exposure to community violence.

Patterns of Community Violence Exposure

Latent class analysis was used to determine whether adolescents could be classified according to their experiences with community violence. At each assessment point, two classes of community violence exposure emerged based on frequency of exposure. The groups were similar in each grade with the majority (~80%) of adolescents in a “low

exposure class” and significantly fewer in a “high exposure class.” Consistent with Nylund and colleagues’ (2007b) examination of types of peer victimization, classifications of community violence exposure were based on frequency. There are two possible reasons that we did not also find classifications based on type of violence exposure as in some other research examining patterns of victimization (Felix and McMahon 2006; Holt and Espelage 2003). The types of community violence exposure examined in this study, witnessing and victimization by community violence, often co-occur and youth who are victims of violence have more opportunities to witness violent events. Thus, it may not be likely for youth to report only witnessing or only victimization, and thus not likely for there to exist empirical classes distinguished by witnessing or victimization. An alternative explanation may be related to measurement. Assessment of a wider range of violent events may have been more likely to reveal patterns based on type. This possibility will be important to assess in future research as the type of community violence exposure may have important implications for intervention.

Examination of repeated measures of community violence exposure permitted identification of youth with chronic exposure to community violence. As noted above, the majority of youth had similar community violence exposure at each assessment. This finding is consistent with research indicating that prior community violence is a strong predictor of subsequent exposure (e.g., Lambert et al. 2005). Among those with consistent reports of community violence exposure at multiple assessments, one-fifth of the sample reported consistently high exposure to community violence. A similar finding has been documented in the criminology literature which finds that among youth who have been victimized, the most victimization experiences are concentrated in a small proportion of youth (Lauritsen and Davis Quinet 1995; Menard and Huizinga 2001). Although that finding has been observed in high risk samples of delinquent youth, the results for this community sample of youth similarly suggest that the most severe and persistent experiences with community violence are concentrated in a minority of youth. It should be noted that the chronic high and chronic low exposure patterns observed in this study might reflect characteristics of youth’s neighborhood environments. Youth in dangerous environments may have more exposure due to a higher frequency of violence, and continue to show this exposure while they live in and participate in these types of environments. Similarly, youth in safer environments may have less exposure and continue to show this low exposure as they remain in these types of settings. Consistency between patterns of violence exposure and neighborhood characteristics will be important to examine in future research.

Predictors of Exposure Patterns

Prior research has identified youth characteristics that may increase risk for community violence exposure (Bingenheimer et al. 2005; Lambert et al. 2005; Salzinger et al. 2006) and it was hypothesized that stability in community violence exposure also might be related to these youth characteristics. Youth with high exposure to community violence at the initial assessment were more likely to report depressive symptoms and have impulsive behavior than youth in the low exposure group. Given the large proportion of youth whose exposure to community violence remained consistent across the three assessments (78%), this finding suggests that depressive symptoms and impulsive behavior may be characteristics that distinguish youth with chronically high exposure to violence from youth with consistently low exposure.

The finding that depressive symptoms and impulsive behavior predicted community violence exposure is consistent with prior research. Youth with depressed mood who are hopeless about the future may be more likely to engage in delinquent and high risk behaviors (Bolland 2003; Bolland et al. 2001; Leas and Mellor 2000; Pesa et al. 1997), placing them at greater risk for exposure to community violence. Relatedly, these youth may be less able or motivated to take precautions necessary to avoid community violence exposure, particularly if their depressive symptoms include suicidal ideation or intent. While depressed youth may have decreased interest or ability to avoid risky or dangerous behaviors and settings, impulsive youth may be more likely to seek out and/or engage in risky behaviors (e.g., Hoyle et al. 2000; Lynam et al. 2000), increasing their risk for community violence exposure. Thus, depressed and impulsive youth may similarly find themselves in risky, dangerous settings, but for different reasons. Impulsive youth also may be less able to carefully plan how to navigate dangerous situations, including what precautions they should take to keep themselves safe.

Contrary to expectation, deviant peer affiliation was not a predictor of community violence exposure. This was surprising because deviant peer affiliation also is a recognized predictor of aggressive and antisocial behaviors (e.g., Patterson et al. 1992), which have been identified as risks for community violence exposure (Boyd et al. 2003; Lambert et al. 2005; Weist et al. 2001). It is possible that the combination of deviant peer affiliation and aggressive behavior would better predict community violence exposure (Lambert et al. 2005). For example, the effect of deviant peers may help to maintain aggressive behavior or exacerbate it if aggression and violence are valued by the deviant crowd. Another possibility is that compared to older adolescents, the early adolescents in this sample have

less unsupervised contact with deviant peer crowds who can teach and reinforce violent behavior.

In prior research, males generally have reported more exposure to community violence (e.g., Selner O'Hagan et al. 1998; Weist et al. 2001). In this research, males were no more likely than females to transition from low community violence exposure to high community violence exposure, and male gender did not differentiate adolescents in the chronic high exposure group from the chronic low exposure group. This finding warrants replication, but may indicate that predictors of single instances of community violence exposure differ from predictors of repeated exposure to community violence. Alternatively, males and females in this sample may be similarly exposed to the neighborhood, and experience similar levels of community violence as a result.

Although routine activities theories and theories about the development of antisocial behavior highlight the importance of parental monitoring for prevention of youth involvement in violence (Miethe and Meier 1994; Patterson et al. 1992), parental monitoring did not distinguish youth with high and low exposure to violence in this study. Prior empirical research has not consistently shown a protective effect of parental monitoring against effects of community violence exposure (Gorman Smith and Tolan 1998; Miller et al. 1999). Some research indicates that parental monitoring is protective for youth with low levels of community violence exposure but the protective effects of parental monitoring are attenuated as levels of community violence exposure increase (Ceballo et al. 2003; Sullivan et al. 2004), suggesting that the effects of parental monitoring are greater under conditions of low risk. Similarly, Lambert et al. (2005) found that parental monitoring did not protect against community violence exposure for aggressive males with co-occurring depressive symptoms, a high-risk group. Esbensen et al. (1999) found that compared to the effects of prior victimization and male gender, the effects of parental monitoring on adolescent victimization were relatively weak for their high-risk sample of adolescents. Results from this study may reflect a similar phenomenon, specifically that the utility of parental monitoring for protecting youth against chronic community violence exposure may vary according to youth behavioral characteristics and the benefit of parental monitoring is greater for youth at low risk for community violence exposure.

Implications for Prevention

This study examined predictors of community violence exposure in order to identify targets for preventive interventions for youth exposed to community violence or at risk of exposure. The majority of youth (~80%) in this

sample reported consistent levels of exposure to community violence at each of the middle school assessments. This finding that most youth did not transition from low exposure to high exposure, or vice versa, highlights the importance of focusing efforts on preventing initial exposures to community violence. Youth who are exposed to community violence may find themselves in situations that increase the likelihood of repeated exposure, as suggested by routine activities theories. To inform prevention efforts, it will be important to learn how some youth in dangerous environments are able to successfully navigate these settings and avoid involvement in violence.

Results suggest that depressive symptoms and impulsivity are important intervention targets for programs to prevent community violence exposure. Importantly, these also are risks for other serious problem behaviors, including suicide and violence perpetration (Bridge et al. 2006; Fehon et al. 2005), highlighting the need for regular assessment of depressive symptoms and impulsivity in children and adolescents and early intervention when these concerns arise.

It should be noted that even if youth report little or no direct exposure to community violence as witnesses and victims, they may be exposed to community violence through other modes not assessed in this study, such as exposure to community violence via hearsay or media. Assessments of youth experiences with community violence should therefore consider multiple forms of community violence exposure because youth exposure to community violence through indirect means such as these has been linked with youth emotional, behavioral, and physiological adjustment, including symptoms of PTSD, school avoidance, and sleep problems (Cooley Quille et al. 2001; Joshi and Kaschak 1998). In addition, research shows that perceptions of violence and safety also are significantly linked with adolescent behavioral adjustment (Aneshensel and Sucoff 1996; Ewart and Suchday 2002), and may exert effects on adjustment independent of youth witnessing or victimization by community violence exposure. Thus, these perceptions should be assessed in addition to community violence exposure in order to develop comprehensive programs for youth at risk for exposure to violence. Moreover, youth who perceive their environment negatively may be likely to behave aggressively in order to make themselves feel safe (Rasmussen et al. 2004); this aggressive behavior may lead to increased involvement in violence, including exposure to community violence as witnesses and victims.

Results highlight the need for universal interventions to be implemented in middle school, as well as throughout elementary school rather than for a single year. In addition, findings suggest the need for targeted interventions for youth at elevated risk for community violence exposure

based on particular individual characteristics (e.g., problem behaviors associated with violence involvement), and/or characteristics of their environments that increase risk for exposure to community violence exposure. Finally, interventions to reduce community violence exposure should include specific strategies youth can employ to avoid initial exposure to community violence, as well as programs to engage youth in supervised activities.

Strengths, Limitations, and Directions for Future Research

This study of longitudinal patterns of community violence exposure among urban adolescents extends our understanding of consistency and change in youth experiences with violence, and highlights variability in types of exposure over time. A primary strength of this research was the identification of patterns of community violence exposure using latent variable models. Examination of empirically-derived classes of violence exposure has several advantages over other methods of assigning individuals to groups (e.g., using cutoff scores) which may rely on arbitrary cut points and can be subject to classification errors or loss of cases who do not meet criteria for group membership. Repeated measurement of community violence exposure permitted formal examination of *chronic* community violence exposure, whereas much of the existing community violence literature has only examined frequency of exposure at single assessments. In addition, understanding predictors of community violence exposure is essential to inform preventive interventions.

These study strengths should be evaluated in the context of some limitations. This study only examined experiences with four types of community violence. Assessment of a wider range of violent experiences may have yielded different results. While examination of patterns of violence exposure in a community sample of African American youth permits greater generalizability of findings than research with high risk samples, it is important to note that the results of this study likely only generalize to youth of similar ages and from similar ethnic, socioeconomic, and geographic backgrounds. Because the racial composition of the sample may have influenced the results, perhaps given urban low income African American adolescents' high rates of community violence exposure compared to other adolescents (Buka et al. 2001), future research should examine whether these results hold for other samples of youth in similar contexts. Finally, the focus of this research was on modifiable predictors of community violence exposure that can easily be targeted in preventive interventions to the exclusion of other contextual factors (e.g., school and neighborhood characteristics) that have relevance for the nature of violent experiences adolescents

encounter. Because the present study did not account for neighborhood context variables, it was not possible to examine the relative contribution of individual and neighborhood characteristics to community violence exposure; this will be important to examine in future research.

In future research, it will be important to examine aspects of the peer and neighborhood contexts that also influence youth risk for community violence exposure. Future research should examine the effect of individual, family, peer, and neighborhood contexts on community violence exposure for youth at different ages as the relative importance of these contexts may vary with age. For example, as noted above, the effect of peers on community violence exposure may be stronger in older youth who have more unsupervised contact with peers as compared to this middle school sample. Finally, it will be important to examine variation in youth exposure among youth with similar levels of environmental risk. Understanding heterogeneity in exposure and resilience among youth in dangerous environments can be used to inform interventions to prevent exposure to community violence.

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