ARTICLE

PATHWAYS TO AGGRESSION IN URBAN ELEMENTARY SCHOOL YOUTH

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This study examined the pathways from violence exposure to aggressive behaviors in urban, elementary school youth. We utilized structural equation modeling to examine putative causal pathways between children's exposure to violence, development of posttraumatic stress symptoms, permissive attitudes towards violence, and engagement in aggressive behaviors. Self-report measures were administered to 259 4th-grade students from urban schools. Almost 100% of participants reported exposure to at least one experience with violence. Results demonstrated that both posttraumatic stress symptoms and attitudes toward violence mediated the relation between exposure to violence and aggression. This model suggests that the relation between violence exposure and youth violence and aggression is multidetermined, suggesting the need for both the developmental adaptation of tertiary prevention and intervention strategies so as to be suitable for younger children, as well as the need for multiple or multifaceted interventions. © 2011 Wiley Periodicals, Inc.

One of the biggest problems in contemporary society is violence, and violence perpetrated by and against youth is startlingly common. Between 1993 and 2003, juveniles were identified as either victims or offenders in 38% of all violent crimes in which offender age could be estimated (Baum, 2005). In 2006, homicide was the second leading cause of death for 15- to 24-year-olds and the third leading cause for 10- to 14-year-olds (National Center for Injury Prevention and Control, 2006). Youth violence is a critical public health issue impacting individuals, families, and

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communities. The purpose of this study was to explore the pathways from violence exposure to aggressive behaviors in urban, elementary school youth. Better understanding of these trajectories will facilitate development of more targeted, effective prevention and intervention strategies for youth.

Numerous studies have documented the high prevalence of violence exposure among youth (e.g., O'Keefe, 1997; Seedat, van Nood, Vythilingum, Stein, & Kaminer, 2000; Weist, Acosta, & Youngstrom, 2001). In a national telephone sample of youth aged 10 to 16 years, 35.1% reported experiencing a completed victimization in their lifetime (Boney-McCoy & Finkelhor, 1995). Although research has found that violence exposure is higher among adolescent males (Buka, Stichick, Birdthistle, & Earls, 2001; Cooley-Quille, Boyd, Frantz, & Walsh, 2001; Jaycox et al., 2002; Slovak & Singer, 2002), the difference in exposure rates between males and females appears minimal (Schwartz & Proctor, 2000).

The range of negative consequences of violence exposure for youth has been a subject of considerable study. Within this domain of inquiry, a solid body of research has served to highlight prominent associations with aggressive behavior, posttraumatic stress symptoms, and negative attitudes toward violence.

Aggressive Behavior

The association between violence exposure and aggression among adolescents has been extensively demonstrated in the empirical literature (e.g., Benhorin & McMahon, 2008; Malik, 2008; Thompson & Massat, 2005). Social learning theories of aggression (Bandura, 1973) can account for the link between violence exposure and subsequent engagement in violence. Children may learn to adopt aggressive behaviors by observing aggressive models, and by appraising the at-time personally advantageous outcomes that can be achieved via expressions of aggression or infliction of violence.

In one study that assessed community violence exposure, child maltreatment, and witnessing intimate partner violence, the link between exposure and aggressive behavior held even when each category of exposure was assessed independently (McCabe, Lucchini, Hough, Yeh, & Hazen, 2005). Studies of adolescents have shown that higher exposure is associated with greater violent behavior, (Flannery, Singer, & Wester, 2001; Gellman & Delucia-Waack, 2006; Shahinfar, Fox, & Leavitt, 2000) and violence exposure predicts aggressive behavior over 1-year (Gorman-Smith & Tolan, 1998) and 2-year periods (McCabe et al.; Schwab-Stone et al., 1999).

Understanding more fully the factors that may lead from violence exposure to commission of violence by youth is essential for developing effective prevention and intervention strategies. Posttraumatic stress symptoms and attitudes toward violence are prevalent outcomes associated with youth exposure to violence that have been found to be significant risk factors for subsequent manifestation of aggression in this population.

Posttraumatic Stress Symptoms. Posttraumatic stress symptoms and posttraumatic stress disorder (PTSD) are important consequences of exposure to violence that may also impair social and behavioral functioning (Margolin & Gordis, 2004). Significant evidence links violence exposure to the development of trauma symptoms in youth (e.g., Cooley-Quille et al., 2001; Kilpatrick et al., 2003; Paxton, Robinson, Shah, & Schoeny, 2004; Singer, Flannery, Guo, Miller, & Leibbrandt, 2004).

In addition to the direct link identified between violence exposure and aggressive behavior, emerging research suggests that posttraumatic stress symptoms may serve as an important mediator of this pathway. This finding is consistent with predominant

clinical conceptualizations and extant research on PTSD. Limbic hyperarousal and associated emotional dysregulation have been well-identified as hallmark features of PTSD (van der Kolk, 2003). Van der Kolk suggests that PTSD in children affects the development of specific brain structures and psychophysiological responses that, in turn, undermine the child's capacity to coordinate cognition, emotion regulation, and behavior. This disruption, in turn, leads to difficulties in modulating affect and impulse control, including aggression against self and others. According to Schore (2003), PTSD can lead to dysregulation of aggression since people with PTSD symptoms exhibit frequent limbic hyperarousal, including activation of sympathetic nervous system "fight-flight" stress response states triggered by over-determined and often quite subtle perceptions of danger or threat.

Attitudes Toward Violence

Another important consequence of violence exposure in children and adolescents is its impact on the development of permissive attitudes toward violence. For example, witnessing violence has also been found to be associated with attitudes toward violence (Farrell & Sullivan, 2004), which, in turn, has been found to be associated with aggressive behavior (Bellmore, Witkow, Graham, & Juvonen, 2005; Gellman & Delucia-Waack, 2006). Guerra, Huesmann, and Spindler (2003) found that violence exposure predicted aggressive behavior in elementary school-aged children, but was associated with aggressive social cognition during only later elementary school grades. In two studies (Schwartz & Proctor, 2000; Shahinfar, Kupersmidt, & Matza, 2001), youths who witnessed violence were more likely to believe that aggression would lead to the desired outcome and that aggression was an appropriate response to situations involving ambiguous peer provocation. In one of these studies (Shahinfar et al., 2001), youths who had been the victims of severe violence were more likely to endorse approval of aggression as a social response.

A sizeable body of research has lent empirical support to the conceptualization that violence exposure can lead to both emotional constriction and a desensitization to violence in a subset of exposed youth, increasing risk of subsequent perpetration of aggressive behaviors as a problem-solving, self-protective, or retaliatory strategy (Farrell & Bruce, 1997; Fitzpatrick, 1993; Ng-Mak, Salzinger, Feldman, & Stueve, 2002; Ng-Mak, Salzinger, Feldman, & Stueve, 2004; Schwab-Stone et al., 1995). Youth who exhibit such behavioral profiles are often understood clinically within a conduct disorder framework. There are various explanations for the mediator role of attitude towards violence. Children exposed to danger may adopt a worldview that is maladaptive in normal situations (Garbarino & Kostelny, 1993). Alternately, youth exposed to high levels of violence may become desensitized and normalize the violence (Farrell & Bruce; Fitzpatrick; Schwab-Stone et al., 1995).

Developmental Onset of Violence Trajectories

Identifying pathways to youth-perpetrated violence is crucial to develop successful prevention and intervention strategies. Gellman and Delucia-Waack (2006) compared 45 adolescent male perpetrators of school violence with 45 nonviolent participants from inner-city schools to examine the relations among use of violence and violence exposure, attitudes, and PTSD. They found that use of violence had significant independent associations with exposure to violence, attitudes toward violence, and PTSD in the perpetrator sample. However, this study was conducted with only a male

sample and did not examine PTSD and attitudes toward violence as potential mediators of the relation between violence exposure and violent behavior.

Although the direct connection between violence exposure and perpetration in youth is well-documented, few studies have examined potential mediators of this relationship. In a longitudinal study with a sample of 1,358 urban adolescents, Ruchkin, Henrich, Jones, Vermeiren, and Schwab-Stone (2007) examined the mediating effects of posttraumatic stress between violence exposure and psychopathology. They found that posttraumatic stress fully mediated the relations between violence exposure and depression and anxiety in girls and partially in boys. Further, posttraumatic stress partially mediated the relation between violence exposure and commission of violence in boys. Guerra and colleagues (2003) examined the mediating role of social cognition between violence exposure and aggression in an ethnically diverse sample of 4,458 children living in urban neighborhoods and found that the relation between violence exposure and aggression in high school students (Grades 9–12) was partially mediated by social cognition. Allwood and Bell (2008), in a sample of 123 adolescents, found that PTSD symptoms and acceptance of violence cognitions fully mediated the relation between violence exposure and aggressive behavior and the relation differed for boys and girls.

To date, research examining pathways from violence exposure to perpetration of aggressive behavior has focused on adult and adolescent samples. However, the prevalence of early-onset violence exposure in elementary school-aged children in urban communities has become widely established, and it has recently become a focus of youth violence prevention efforts (Kisiel et al., 2006). Therefore, it is essential to examine whether these violence exposure/engagement pathways are already in place in urban elementary school children. If so, tertiary prevention and intervention programs will need to be developed or adapted for elementary school youth.

The present study is intended to advance the knowledge base regarding early pathways to aggression for violence-exposed elementary school children. Drawing upon the extant literature examining these pathways in adolescents, we hypothesized that a mediation model would best explain the relations among violence exposure, posttraumatic stress symptoms, attitudes toward violence, and aggressive behaviors in younger urban youth. This article reports the results of research designed to test this model on a fourth-grade sample of ethnically diverse, inner-city children. Implications for design of early prevention and intervention strategies are discussed.

METHOD

Participants

Participants were fourth-grade students drawn from six inner-city schools within one school district in a major metropolitan area in the Northeastern United States. All study classrooms were mainstreamed with English as the first language. Students were recruited as part of a multischool youth violence prevention initiative. Participation was voluntary and required parent consent and student assent. Consent was requested from every student in the grade. Letters were sent home to parents along with a consent form for them to sign 22 of the 298 parents refused consent.

Table 1. Demographic Breakdown of the Sample

Demographic variable	
Total *n*	256
Mean age (*SD*)	9.54 (.64)
Gender (%)	
Female	55.9
Male	44.1
Ethnicity (%)	
African American	37.1
Caucasian	4.4
Latino	35.5
Asian	0.8
Native American	2.0
Biracial/multiracial	10.8
Other	9.6

Note: SD = standard deviation.

Participants were 276 students across 15 classrooms; however, 17 of the 276 cases were later excluded because of missing data, providing a sample of 259. Gender was closely distributed (55.2% female, 44.8% male). Ethnic/racial distribution was predominantly ethnic minority: African American (36.3%), Hispanic/Latino (35.1%), Biracial/multiracial (10.4%), Caucasian (4.2%), Native American (1.9%), Asian (.8%), and Other (8.5%). Demographic variables are reported in Table 1. Measures were administered in classrooms during regular school hours. The data for this study served as the baseline data for an outcome evaluation of a youth violence prevention program that was offered in some of the participating schools. Institutional Review Board (IRB) approval was obtained from Justice Resource Institute's IRB.

Measures

Children's Report of Exposure to Violence (CREV). The CREV is a 29-item self-report questionnaire assessing children's lifetime exposure to community violence through four modes: media (television or film), reported/hearsay, direct witnessing, and direct experience. The CREV also includes three categories of victims: strangers, self, and familiar people. Violent situations include being chased or threatened, beaten up, robbed, shot, stabbed, or killed. Responses are made on a 5-point Likert scale assessing the frequency of victimization. Therefore, scores on the CREV may range from 0 to 116. The CREV has demonstrated adequate 2-week test-retest reliability ($r = .75$), internal consistency (Cronbach's alpha = .78), and construct validity (Cooley, Turner, & Beidel, 1995).

Children's Report of Post-Traumatic Symptoms (CROPS). The CROPS is a 26-item self-report questionnaire covering the broad spectrum of posttraumatic symptoms found in traumatized and violence-exposed children. Responses are made on a 3-point Likert scale. Good test-retest reliability ($r = .80$), internal consistency (Cronbach's alpha = .91), and criterion validity has been demonstrated for this measure (Greenwald & Rubin, 1999).

Normative Beliefs About Aggression (NBA). The NBA a 20-item, self-report measure designed to measure youth attitudes and beliefs towards violence and aggression under varying conditions of provocation. Responses load onto two subscales: General

Approval of Aggression and Approval of Retaliation Aggression. Internal consistency of the two scales ranges from .65 to .85 (Huesmann, Guerra, Miller, & Zelli, 1992a; Huesmann & Guerra, 1997; Huesmann, Guerra, Zelli, & Miller, 1992b).

Aggression Questionnaire (AQ). The AQ is a 34-item, student self-report measure of anger and aggression. A Total AQ score can also be computed, and the 34 items are scored on five subscales: Physical Aggression, Verbal Aggression, Anger, Hostility, and Indirect Aggression. Each item is rated on a 5-point Likert scale, from 1 (*not at all like me*) to 5 (*completely like me*). Within the normative sample of youth aged 11 to 12 years, the internal consistency of the total scale was .92. Test-retest reliability was also adequate ($r = .80$). Studies have demonstrated the scale's criterion and construct validity as well (Buss & Warren, 2000).

Statistical Analyses

Means, standard deviations and correlations among measures were calculated. The sample was stratified by age, gender, and ethnicity. Bivariate statistics were used to compare boys and girls on exposure to violence. The data were analyzed using the Statistical Package for Social Sciences (SPSS-13.0), with Lisrel 8.51 for the Structural Equation Modeling. The model chi-square statistic was used to determine the fit of the model to the observed data. A nonsignificant ($p > .05$) chi-square indicates a good fit. In addition, model fit is considered to be good if the χ^2 is not too large relative to the degrees of freedom. It indicates a good fit when χ^2: degree freedom (*df*) ratios are 2:1 to 5:1 (Marsh & Hocevar, 1988). Four indices, the comparative fit index (CFI), root-mean-square error of approximation (RMSEA), goodness of fit index (GFI), and non-normed fit index (NNFI), were used to assess the goodness of fit of the model. RMSEA smaller than .10 represents reasonable model fit and as a rule of thumb, a well-fitting model has CFI, GFI, and NNFI values close to 1.

RESULTS

Preliminary Analyses

Means, standard deviations, and partial correlations among observed variables are presented in Table 2. The correlations between the indicators of the same construct were higher than the correlations between the measures of different constructs (indicated with bolded correlations). Notably, exposure to violence, posttraumatic stress symptoms, and attitudes toward violence were all significantly correlated with aggressive behavior.

Factor Analysis

Principle components analysis was used on the factor structure of the CROPS. The Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) and Bartlett Test of Sphericity both indicated that factor analysis is appropriate. The KMO was .89 and the Bartlett test was highly significant ($p < .001$). The factor analysis indicated a two-factor solution for CROPS. Table 3 includes the rotated factor structure of the scale. The initial eigen values showed that the first factor explained 29.74% of the variance, the second factor 6.75% of the variance. Two factors explained 36.49% of the variance.

Table 2. Means, Standard Deviations, and Partial Correlations Among Variables

	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*
1. Media exposure	–	–	–	–									
2. Hearsay	.58**	–	–	–									
3. Direct witnessing	.44**	.77**	–	–									
4. Direct experience	.28**	.34**	.38**	–									
5. Self-damaged & somatic	.02	.07	.02	.26**	–								
6. Intrusion & avoidance	.10	.13*	.06	.20**	.70**	–							
7. General approval of aggression	.20**	.19**	.15*	.09	.09	.10	–						
8. Approval of retaliation aggression	.17**	.15*	.10	.05	.03	.04	.69**	–					
9. Physical aggression	.32**	.34**	.36**	.26**	.20**	.24**	.38**	.43**	–				
10. Verbal aggression	.37**	.34**	.27**	.25**	.32**	.40**	.25**	.24**	.64**	–			
11. Anger	.30**	.31**	.33**	.32**	.36**	.42**	.23**	.23**	.72**	.66**	–		
12. Hostility	.31**	.25**	.17**	.35**	.40**	.42**	.14*	.14*	.52**	.64**	.60**	–	
13. Indirect aggression	.32**	.29**	.26**	.19**	.24**	.35**	.25**	.28**	.67**	.60**	.66**	.56**	–
Means	10.15	8.51	5.73	1.31	.71	.93	12.27	22.73	20.17	12.64	18.09	21.86	15.40
Standard deviations	4.74	6.84	6.39	1.81	.48	.41	5.20	8.60	8.67	4.13	6.29	6.68	5.61

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Table 3. Rotated Factor Loadings From Principal Components Analysis of Items in CROPS

	Rotated factor structure	
Item	*Factor 1*	*Factor 2*
I daydream		.579
I "space out" when people are talking to me		.612
I find it hard to concentrate	.299	.432
I think about bad things that have happened	.381	.353
I try to forget about bad things that have happened		.506
I avoid reminders of bad things that have happened		.510
I worry that bad things will happen	.452	.389
I do special things to make sure nothing bad happens		.463
I do some things that I am probably too old for		.364
It is hard for me to go to sleep at night	.296	.535
I have bad dreams or nightmares	.454	.360
I get headaches	.511	.251
I get stomach aches	.453	.425
I feel sick or have pains	.408	.413
I feel tired or low energy	.558	.301
I feel all alone	.348	.492
I feel strange or different than other kids	.717	
I feel like there is something wrong with me	.678	.215
I feel like it is my fault when bad things happen	.749	
I am a jinx or bad-luck charm	.671	
I feel sad or depressed	.660	
I do not feel like doing much	.615	.274
My future looks bad	.404	.439
I am on the lookout for bad things that might happen	.691	
I am nervous or jumpy	.419	.286

According to Greenwald and Rubin's (1999) factor analysis of CROPS, items loading on the first factor included the sense of self as damaged, self-alienation, guilt, and dysphoria; items loading on the second factor included somatic symptoms; and items loading on the third factor covered avoidance and intrusive thoughts. However, according to our factor analysis, items loading on the first factor covered the sense of self as damaged, self-alienation, guilt, dysphoria, and somatic symptoms, whereas items loading on the second factor included avoidance and intrusive thoughts. Therefore, the latent variable posttraumatic stress symptoms was represented by two indicators: damaged self-guilt/somatic and avoidance/intrusive thoughts.

Exposure to Community Violence

The mean score on the scale was 26.10, with a standard deviation of 17.64. Almost all (98.8%) of the participants reported experiencing at least one lifetime violent event. Violence exposure via the media was most common, and hearsay was the second most common. Although direct experience was least common, which would be expected, the rates are remarkable given that each item represents a serious violence exposure, such that even single incident exposure is significant. Strikingly, half the sample (52.1%) reported at least one experience of direct victimization. For example, 40.5% reported having been beaten up at least once, 27% reported having been chased or seriously threatened with physical harm, 13.5% reported having been robbed or

mugged, and 6.9% reported having been shot or stabbed. Direct witnessing rates were also quite high. For example, a large percentage of students reported seeing someone they knew get beaten up (60.6%), chased or seriously threatened (35.5%), robbed or mugged (23.1%), shot or stabbed (22.4%), or killed (14.3%).

Boys reported experiencing significantly more total violence (31.47 ± 20.93) than girls (22.04 ± 13.09), $t\ (256) = -4.43$, $p < .001$. The frequency of categories of violence exposure was similar across genders.

Structural Equation Modeling

Anderson and Gerbing's (1992) suggestion on two-step model was followed. According to two-step model, the measurement model was conducted first. In the measurement model (Fig. 1), four latent constructs were modeled. Media exposure, hearsay, direct witnessing, and direct experience were used as indicators of exposure to violence. For the latent variable posttraumatic stress symptoms, two indicators were used as a result of factor analysis: damaged self-guilt/somatic factor and avoidance/intrusive thoughts.

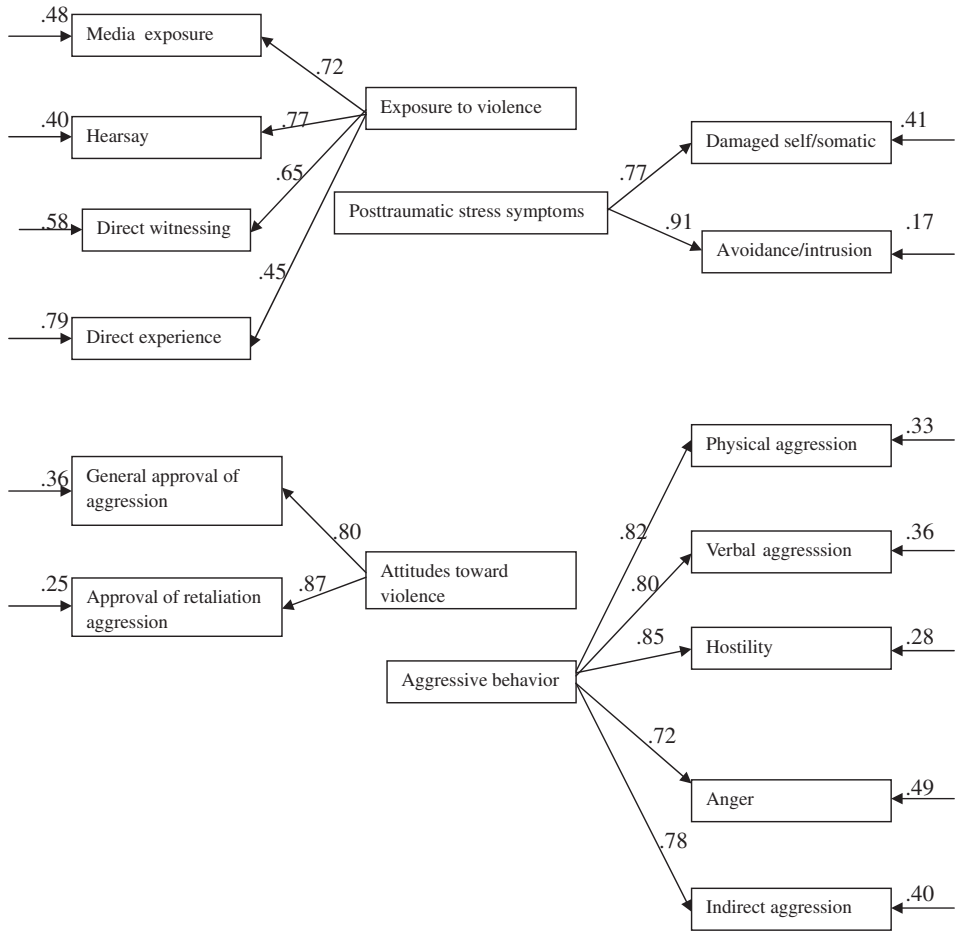

Figure 1. The measurement model.

Two indicators represented the latent variable attitudes toward violence: general approval of aggression and approval of retaliation aggression. The five subscales of the aggression—physical aggression, verbal aggression, hostility, anger, and indirect aggression—measured the aggressive behavior latent variable.

Initially, we tested a measurement model with 13 observed variables and four latent variables (Fig. 1). The first model provided reasonable fit to the data, $\chi^2(59, 256) = 175.22$, $p < .001$, CFI = .93, RMSEA = .09, GFI = .90, NNFI = .91. Modification indices suggested adding a correlated error between the two indicators of exposure to violence (direct witnessing and hearsay). The correlated error significantly reduced model chi-square, $\Delta\chi^2(1) = 12.0$, $p < .001$. The measurement model provided reasonable fit to the data, $\chi^2(58, 256) = 163.19$, $p < .001$, CFI = .94, RMSEA = .08, GFI = .91, NNFI = .92. Although the χ^2 statistic was significant, the χ^2:*df* ratio was well below the suggested 5:1 ratio, χ^2/df ratio = 2.81. The measurement model showed that the latent variables were estimated successfully from the observed variables. Factor loadings of the indicator variables on their latent factors were high (ranging from .45 to .91; mean [*M*] = .68), and all loadings were statistically significant.

The hypothesized model examined two mediated pathways through posttraumatic stress symptoms and attitudes toward violence (Fig. 2). The model demonstrated reasonable fit to the data, $\chi^2(60, 256) = 193.92$, $p < 0.001$; CFI = .92, RMSEA = .09, GFI = .90, NNFI = .89. Even though the χ^2 statistic was significant, the χ^2:*df* ratio was below the suggested 5:1 ratio, χ^2/df ratio = 3.23. Findings indicate that posttraumatic stress symptoms and attitudes toward violence independently mediated the relation between exposure to violence and aggressive behavior.

In the model, the relation between exposure to violence and aggressive behavior was mediated by posttraumatic stress symptoms and attitudes toward violence (path coefficient for indirect effect = .22%). The direct effects of exposure to violence on

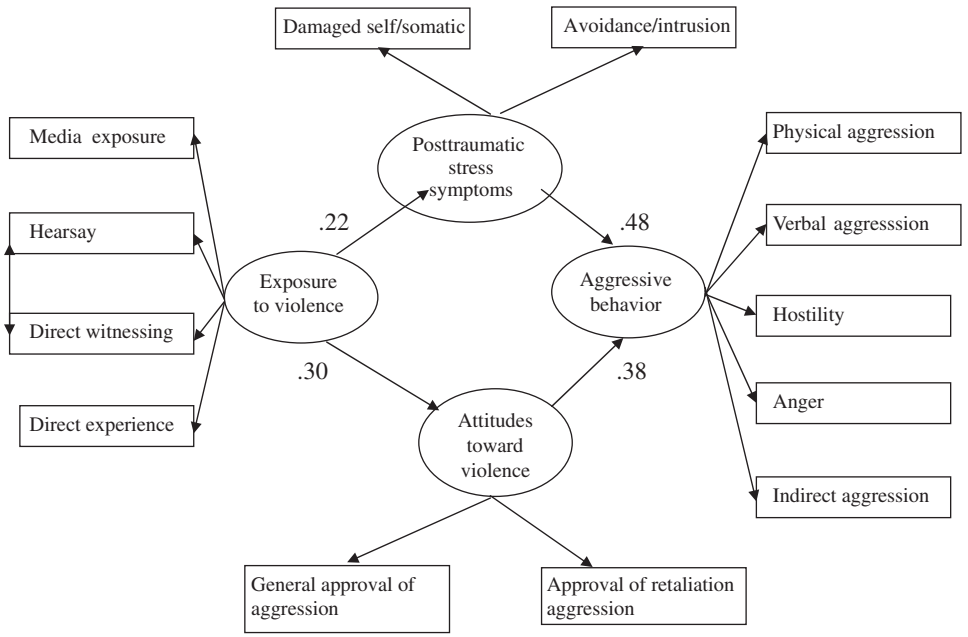

Figure 2. The structural model.

posttraumatic stress symptoms and attitudes toward violence were significant (path coefficients = 22% and 30%, respectively). Similarly, direct effects of posttraumatic stress symptoms and attitudes toward violence on aggressive behavior were significant (path coefficients = .48 and .38, respectively).

DISCUSSION

Study results revealed marked rates of violence exposure in this sample of urban elementary school youth, with virtually all participants (98.8%) reporting exposure to at least one experience with violence. Although these findings are attenuated to some extent by inclusion of exposure to violence in the media, the fact that over half the sample endorsed direct personal victimization is noteworthy.

Boys reported more exposure to violence than girls, and the difference was significant, a finding consistent with that observed in several other studies (Buka et al., 2001; Cooley-Quille et al., 2001; Jaycox et al., 2002; Slovak & Singer, 2002).

This study utilized structural equation modeling to examine putative causal pathways between children's exposure to violence, development of posttraumatic stress symptoms, permissive attitudes towards violence, and engagement in aggressive behaviors.

Aggression and hostility, like any other risk behavior or outcome, such as substance abuse, teen pregnancy or high-risk sexual behaviors, can be conceptualized as a symptom associated with trauma; however, none of these are synonymous with posttraumatic stress symptoms. In this study, aspects of youth expressions of pathology, including manifestations of anger and hostility that go beyond the PTSD diagnostic symptom criteria, are assessed. Therefore, aggression and hostility were conceptualized as part of aggressive behavior in the model.

The mediation model hypothesized to explain the dynamic relation between these variables was found to be a good fit for the data. Results demonstrated that both posttraumatic stress symptoms and attitudes toward violence mediated the relation between exposure to violence and aggression for this sample. This model suggests that the relation between violence exposure and youth violence and aggression is multi-determined. Findings support considerable research that youth exposure to violence can directly lead to subsequent expression of aggression and engagement in violent behavior (Benhorin & McMahon, 2008; Malik, 2008; Thompson & Massat, 2005). Findings further reveal that the mediating pathways of posttraumatic stress symptoms and permissive attitudes toward violence are established at an earlier age than previously identified (Allwood & Bell, 2008) and already in place by Grade 4. In essence, efforts to locate the primary pathways to violence for contemporary youth appear to suggest that perhaps "all roads [do] lead to Rome." This demonstration of multiple, distinct pathways from victimization to aggression in violence-exposed youth by the fourth grade suggests the need for both the developmental adaptation of tertiary prevention and intervention strategies for younger children, as well as for multiple or multifaceted interventions designed to target the specific physiological, attributional, affective, and behavioral processes involved in these various pathways toward aggression and violence.

Study Limitations

Some limitations to this study should be mentioned. First, all the measures in the study were self-reports. Research has shown that elementary school-aged children (7–11 years) do have the capacity to report accurately on their own symptomatology

and distinguish between internalizing and externalizing symptoms (Norwood, 2007). Nevertheless, future studies incorporating other sources of youth exposure and outcome data (e.g., parent-report; school records) will enable researchers to assess the convergent validity of student report-data and thereby increase confidence in study findings.

A second notable limitation of this study was its reliance upon a measure of community-based forms of violence. Measurement selection was constrained by requirements of the participating school system. While this measure did not prohibit students from endorsing responses based upon exposure to instances of physical violence occurring in the home or in the context of familial relationships, other forms of familial violence and trauma exposure including exposure to sexual violence were not assessed in this study. Future research will benefit from examination of the impact of children's exposure to broader categories of violence exposure on aggressive outcomes and mediating pathways.

A final limitation that should be noted is that whereas this study was designed to examine the role of three factors (violence exposure, posttraumatic stress symptoms, and attitudes toward violence) identified in the child and adolescent literature to be of greatest relevance to aggressive outcomes, the possibility of additional direct and/or mediating pathways to violence cannot be ruled out. Future researchers may want to consider the potential contributions of variables such as scholastic achievement, social support, substance abuse, and family history of criminality in model design and testing to establish definitively precisely how many pathways, or roads, lead to youth violence.

Implications for Prevention

Findings from the present study indicate that pathways from violence exposure to aggressive behavior can be established by the fourth grade. Such findings lend strong support to the utility of staging prevention initiatives beginning in early elementary school. Primary prevention efforts designed to prevent the spread of violence and trauma are clearly needed, given the widespread exposure these urban youth have clearly faced. Such initiatives should give particular attention to culturally tailored programming designed to address specific risk factors identified in urban, high-risk communities (i.e., secondary prevention). Moreover, findings clearly indicate that youth violence prevention initiatives for elementary school-aged children should be broadened in scope to include programming specifically designed to prevent or curb symptoms of posttraumatic stress and to address negative attitudes toward aggression in violence-exposed individuals (i.e., tertiary prevention and clinical intervention).

Results of the present study provide compelling support for the need for early-onset school-based and community-based violence prevention initiatives. Reserving tertiary prevention and clinical intervention initiatives for middle and high school populations, as has until now been the prevailing paradigm, may no longer be a viable option given the increasingly earlier onset of trajectories of violence exposure and perpetration in contemporary society.

The two mediated pathways supported in this study suggest important targets for tertiary prevention/intervention efforts. First, programs need to be established that identify trauma-exposed youth who are experiencing posttraumatic stress symptoms. School personnel, including nurses, guidance counselors, and teachers, should be trained to identify posttraumatic stress symptoms in their students and provide referrals for treatment to the youth and family. All too often these youth are quickly

labeled as oppositional, attention deficit, or impulsive, but the trauma at the source of their distress is not considered or addressed. Tertiary prevention efforts need to shift schools' focus to a more trauma-informed framework in order to treat the posttraumatic stress symptoms before youth begin engaging in more serious aggression and violence. Implementing school-based screening for posttraumatic stress symptoms, stress reduction programs, and evidence-based intervention groups for youth with posttraumatic stress symptoms are just some examples of tertiary prevention programs needed in elementary schools.

Second, given the mediating role of attitudes toward violence in the link between violence exposure and perpetration among youth, tertiary prevention programs must address youths' approval of aggression. In this study, almost all youths had been exposed to violence through the media, and the messages youths receive about violence are, at best, mixed. Elementary school programs aimed at changing the culture of acceptability around violence and retaliation, empathy building, and teaching prosocial problem solving are sorely needed.

Ultimately, school systems will likely be best served by adoption of comprehensive, multifaceted approaches to youth violence prevention that begin by early elementary school, address the three tiers of prevention, extend beyond the walls of the school into all facets of the community, and are strategically designed to target and disrupt direct and mediated pathways between violence exposure and aggression. Perhaps then we will finally begin to make tangible progress in our longstanding efforts to break the cycles of violence that have plagued human beings since long before building of the first road.

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