



Published in final edited form as:

J Youth Adolesc. 2014 September ; 43(9): 1513–1526. doi:10.1007/s10964-013-0068-5.

Testing Pathways Linking Exposure to Community Violence and Sexual Behaviors Among African American Youth

Dexter R. Voisin,

School of Social Service Administration, University of Chicago, 969 East 60th Street, Chicago, IL 60637, USA; STI/HIV Intervention Network, Chicago, IL, USA

Anna L. Hotton, and

Division of Infectious Diseases, John H. Stroger Hospital, Chicago, IL, USA

Torsten B. Neilands

Center for AIDS Prevention Studies, San Francisco, CA, USA

Dexter R. Voisin: d-voisin@uchicago.edu

Abstract

Exposure to community violence and HIV sexual risks are two major public health concerns among youth. This study tests various pathways linking exposure to community violence and sexual behaviors among African American adolescents. Using a sample of 563 (61 % females) African American youth attending high school we examined whether problematic psychological symptoms, low school engagement, and/or negative perceptions of peer norms about safer sex functioned as pathways linking exposure to community violence and sexual behaviors. Major findings indicated that, for boys, the relationship between exposure to community violence and sexual debut and sexual risk behaviors were linked by aggression. In addition, the relationship between exposure to community violence and sexual risk behaviors were linked by negative perceptions of peer attitudes about safer sex. For girls, the relationship between exposure to community violence and sexual debut was linked by aggression and negative perceptions of peer attitudes about safer sex. These findings provide support for pathways linking exposure to community violence to sexual behaviors.

Keywords

Youth; Exposure to community violence; Sexual behaviors; HIV risk; Pathways

Introduction

In the United States (US), human immunodeficiency virus (HIV) is a major public health concern, and youth, particularly those who are African American, are disproportionately

© Springer Science+Business Media New York 2013

Correspondence to: Dexter R. Voisin, d-voisin@uchicago.edu.

Author contributions: D.V. conceived and designed the study, collected the data and wrote the first manuscript draft; A.H. participated in the data analyses and interpretation and contributed to drafting the manuscript; T.N. participated in the data interpretation and drafting the manuscript. All authors read and approved the final manuscript.

affected. In 2011, African Americans, while comprising approximately 15 percent of the adolescent population, account for 67 percent of diagnosed cases of HIV infection among persons between 13 and 19 years old (Centers for Disease Control 2011). Epidemiologic data suggests that, among adolescents, the high frequency of risky behaviors, such as early sexual debut, incorrect and inconsistent condom use, multiple sexual partners, and using alcohol and drugs during sex are among the factors that may account for this age disparity in transmission (Centers for Disease Control 2010). One factor contributing to such disparities might be sexual networks. For instance, sexual partner homophily is the tendency of individuals to choose partners similar to themselves. Given the higher incidence of HIV within African American communities, coupled with dense sexual networks (Schneider et al. 2011), the probability of contracting HIV becomes significantly higher for African American youth compared with peers from other racial/ethnic groups even in the absence of racial/ethnic differences in individual-level risk behaviors. Understanding structural and contextual factors that may increase sexual risk behaviors and HIV risk is critically important given the striking disparities in HIV rates among African American youth.

Exposure to community violence is another significant public health concern that disproportionately impacts youth. Such exposures consist of witnessing or experiencing violent incidents (e.g., robberies, muggings, gang-related deaths, or homicides) taking place outside the home between individuals who are unrelated and may or may not know each other (Krug et al. 2002). Once more, African American youth bear a disproportionate burden of such exposures (Centers for Disease Control 2010). In the US, exposure to community violence is highest among African American adolescent males. For instance, in 2006, the incidence of homicides per 100,000 among African American male youth was 66.4, compared to 28.4 among Hispanic/Latino males, 16.9 among Asian and Pacific Islander males, and for 3.4 among white males (Centers for Disease Control 2010). Although homicides reflect only one narrow aspect of exposure to community violence, these racial and ethnic disparities are striking.

Exposure to Community Violence and Sexual Behaviors

While a plethora of studies exists on the relationships between sexual or physical violence and sexual risk behaviors (Jones et al. 2010), researchers only recently have begun to explore the relationship between exposure to community violence and sexual risk behaviors. The evidence linking this exposure to HIV sexual risk behaviors is supported by both cross-sectional (Albus et al. 2004; Brady and Donenberg 2006; Sullivan et al. 2004; Voisin 2003, 2005; Voisin et al. 2007; Wilson et al. 2012) and longitudinal research (Brady et al. 2008; Stiffman et al. 1995) across a variety of youth populations. For instance, with regards to direct victimization, a study of African American high school males, controlling for income, family composition, and network norms, found that exposure to community violence was associated with higher rates of sexual risk behaviors (i.e., having sex without condoms, multiple sexual partners, and drug use during sex) (Voisin 2003). Longitudinal research among white and Latino youth has also provided evidence that independent of age, gender, ethnicity, socioeconomic status, and previous levels of health risk behaviors, adolescents who had been victimized by violence were more likely to report a higher number of sexual partners (Brady et al. 2008).

Researchers have attempted to determine whether there is a differential impact between witnessing violence and experiencing victimization on HIV-related drug and sexual risk behaviors. While results suggest that direct victimization has a stronger relationship to these risk behaviors than only witnessing someone else being victimized, both witnessing and experiencing violence are associated with increased risk-taking. For instance, in a study of 517 racially-diverse adolescent girls seeking contraceptive care, results controlling for age, school enrollment, and having repeated a grade indicated that participants who had witnessed violence were two to three times more likely to report drinking alcohol or using other drugs before sex, as well as to have intercourse with a risky sexual partner. Those who experienced violence, however, were two to four times more likely than those who had only witnessed violence to report early sexual debut, sex with strangers, multiple sexual partners, and testing positive for sexually transmitted diseases (Berenson et al. 2001). Longitudinal findings also substantiate results from cross-sectional research, documenting that exposure to community violence and HIV-related factors co-vary (Stiffman et al. 1995).

Research has also begun to consider polyvictimization and to determine whether, in this context, specific forms of victimization have a differential impact on sexual behaviors. For instance, findings among African American girls have indicated that witnessing and experiencing community victimization is related to unsafe sex, while the contribution of sexual violence was not significant (Wilson et al. 2012). These findings suggest that exposure to community violence might have significant effects on sexual risk behaviors regardless of the existence of sexual violence. Given these various empirical associations between exposure to community violence and HIV-related sexual risk behaviors among youth, understanding the mechanisms by which exposure to violence increases sexual risk behaviors is important for developing effective interventions for African American youth.

Pathways Linking Exposure to Community Violence and Sexual Behaviors

From an HIV-prevention perspective, identifying pathways that may explain the relationships between exposure to violence and sexual risk behaviors can be used in developing intervention content to disrupt these relationships. In this study, we posit that the relationship between exposure to community violence and HIV sexual risk behaviors may be linked by problematic psychological symptoms, low school engagement, and/or negative peer influences (Voisin et al. 2011). Prior studies have documented that linking or connecting pathways often link major youth problems. For instance, in prior analyses, we documented that exposure to community violence was related to low school engagement [i.e., student–teacher connectedness and grade point average (GPA)] by way of psychological distress (Voisin et al. 2011). In additional analyses, we documented that the association between low school engagement and HIV-risk behaviors was linked by peer influences (gang involvement for boys and association with peers who endorsed risky sexual norms for girls) (Voisin and Neilands 2010). Though the above observations are useful, it remains unknown whether psychological problems, school engagement constructs [i.e., student–teacher connectedness and grade point average (GPA)] or negative peer influences might function as pathways linking exposure to community violence and sexual behaviors. In addition, these exposures often co-occur, and understanding which linking pathways might prove to be the strongest pathways between exposure to community violence and

sexual risk behaviors is important for developing and effectively targeting intervention content. Moreover, we do not know whether hypothesized pathways linking exposure to community violence and sexual risk behaviors vary by gender.

Empirical support shows that exposure to community violence is related to a heightened risk for experiencing psychological distress (Margolin and Gordis 2000), and that such symptoms are associated with sexual activity (Starr et al. 2012). Longitudinal findings indicate that, among African American adolescent girls in psychiatric care, internalizing and externalizing behaviors predicted increased sexual activity over time, including HIV-risk behaviors (Starr et al. 2012). However, it remains unknown whether psychological distress might also account for a pathway linking exposure to community violence and sexual risks, or whether this relationship might exist for a nonclinical sample.

Additionally, we posit that the relationship between exposure to community violence and sexual risk may be linked by school engagement. Community violence is related to a higher number of absences at school, often connected to safety concerns following violence eruptions within the community (Bowen and Bowen 1999). In addition, research documents that youth who are more highly engaged with teachers (Voisin 2005) as well as those with strong aspirations for attending college are less likely to report unsafe sexual behaviors (Vesely et al. 2004). This might be explained by human capital perspectives suggesting that these youth are less likely to engage in risky behaviors because they have increased prospects for a brighter future and are more likely to resist behaviors that may threaten such prospects (Ssewamala et al. 2010).

Finally, we posit that exposure to community violence and sexual risk may be linked by negative perceptions of peer attitudes. Some youth in the presence of repeated exposure to community violence may join delinquent peer networks (e.g., gangs) as a response to the threat of future violence, even as those peer associations in turn might tend to increase exposure to community violence (Schwab-Stone et al. 1995; Salzinger et al. 2001). While a plethora of research documents that negative peer norms are a consistent predictor of youth risk behaviors including early sexual debut and sexual risk behaviors (DiClemente 1991; Kinsman et al. 1998), it remains unknown in the extant literature whether perceived negative peer norms account for one pathway linking exposure to community violence and sexual risk behaviors (Fig. 1).

Despite the increasing evidence that exposure to community violence and HIV-related sexual risk behaviors are interrelated, our understanding of the pathways linking these two major problems is limited. Increasing our understanding of mechanisms through which exposure to community violence is associated with unsafe sex can inform public health intervention and prevention programs for youth and can help to move youth prevention science outside of traditional and bifurcated silos (e.g., public health, education, or mental health domains). This is also particularly important given the disproportionate rates of exposure to community violence that adolescents face, in addition to elevated rates of sexual risk behavior and HIV infection when compared to adults (Berenson et al. 2001; Sullivan et al. 2004; Voisin et al. 2007).

Gender is an important consideration with regards to several of the factors we examine that may influence exposure to community violence and sexual risk behaviors. For instance, boys and girls often respond to trauma in gender normative ways, such that males may express more externalizing symptoms and females more internalizing symptoms in response to traumatic stressors (Margolin and Gordis 2000); however, findings in this area have been often mixed (for reviews, see McDonald and Richmond 2008). Additionally, research indicates that African American girls tend to outperform boys in certain academic outcomes, including positive orientation towards high school completion as well as GPA (Saunders et al. 2004), which is one dimension of school engagement (Furlong and Christenson 2008). Moreover, adolescent boys and girls are often socialized differently and gender differences often tend to be more pronounced during adolescence than prior to or after this period. Such dynamics may contribute to gendered differences in pathways to risk outcomes (DiClemente et al. 2001; Voisin and Neilands 2010). Consequently, gender warrants special consideration when evaluating pathways linking exposure to community violence and sexual behaviors. To address this important gap in the extant literature, this study was conducted to empirically test multiple linking pathways between exposure to community violence and sexual risk behaviors in a sample of urban African American adolescents.

Study Aims and Hypotheses

The primary aim of this study was to test intermediary pathways through which exposure to violence is linked to sexual risk behaviors. Specifically, we hypothesized that, the relationship between exposure to community violence and sexual risk behaviors would be linked by psychological problem symptoms, low school engagement, and/or negative peer influences. We tested these linking pathways using a multiple pathway framework to examine the relative contribution of each variable to the total and indirect effects. In addition, we hypothesized that, although both boys and girls exposed to community violence may engage in sexual risk behaviors, the pathways to such risks would be different for boys and girls, given the differential rates of exposure to community violence as well as differences in gender socialization previously discussed.

Methods

Participants and Procedure

In April 2006, 20 trained research assistants (masters and doctoral-level students) recruited prospective participants from a single high school in a large Midwestern city. The overwhelming majority of students attending this school (80 %) were African American. Research assistants administered parental permission forms to approximately 673 students who identified themselves as African American (ages 13–19) in 25 home room classes. Students were eligible for participation in the study if they self-identified as African American, were between the ages of 13–19 years, and were attending regular high school classes (i.e., non-special education classes). Data collection occurred within a 2-week period.

Parents or guardians signed permission forms for their adolescents to participate in the study. Students who brought signed parental forms were required to provide assent prior to

completing the self-administered survey. The questionnaire was developed to be understood at a fifth-grade reading level. Participants were provided \$10.00 for completing the survey, which took no more than 40 min to complete and was administered in a small school auditorium.

The final sample was composed of 563 urban youths (219 boys and 344 girls) who either identified solely as African American ($n = 540$) or African American with mixed heritage ($n = 23$). The study achieved an 83 % participation rate. The majority of boys and girls (55 and 54 % respectively) lived in single-female-headed households, and 61 % of boys and 59 % of girls reported receiving “free school lunch.” No students reported any adverse reactions in relationship to answering study questions. Institutional Review Board approval was obtained from the university and the local school council and regional office.

Measures

Gender—Boys and girls were given similar questionnaires that were framed in gender-specific language. Consequently, psychometric properties for all scales were calculated separately for boys and girls.

Exposure to Community Violence—Lifetime exposure to community violence was assessed by the Exposure to Violence Probe (Stein et al. 1997). This measure is comprised of eight items that measure the frequency of witnessing or personally experiencing violent acts. All items were measured on a 7-point scale from 0 (“never”) to 6 (“six or more times”). For example, “Have you ever been a victim of a robbery or hold-up?” A combined score was calculated which included both witnessing and victimization. The alpha coefficients were .72 for both boys and girls.

Psychological Problem Behaviors—Four measures assessed psychological problem behaviors [internalizing behaviors (anxiety), externalizing behaviors (aggression), withdrawal, and PTSD symptoms] in this study.

Internalizing behaviors, externalizing behaviors, and withdrawal were measured using the Youth Self Report (YSR) survey. This 113-item measure is the self-administered version of the widely used Child Behavior Checklist (CBCL) (Achenbach 1991). Respondents described current or recent behaviors on a 3-point scale ranging from “not true” to “very true.” Internalizing behaviors are measured in two ways, including 13 items summed for anxiety and depression, and seven items summed for withdrawal and depression. Seventeen items are summed for externalizing aggressive behaviors. Each dimension is scored on a continuous scale. The following items “I cry a lot,” “I would rather be alone than with others,” and “I get in many fights” are examples of anxiety, withdrawal, and aggression, respectively. The alpha coefficients for anxiety were .78 for boys and .76 for girls. The alpha coefficients for withdrawal were .62 for boys and .69 for girls. The alpha coefficients for externalizing behaviors were .80 for both boys and girls.

PTSD symptoms within the past 6 months were assessed using the University of California at Los Angeles' PTSD Reaction Index (UCLARI) Adolescent Version (Rodriguez et al. 1999; Saltzman et al. 2001). These self-report items measure the frequency of PTSD

symptoms rated on a 5-point Likert scale ranging from “none of the time” to “most of the time.” For example, “I watch out for danger or things that I am afraid of.” Items were summed to form a continuous PTSD score. The alpha coefficients were .82 for both boys and girls.

School Engagement—Information on markers for school engagement was assessed by current GPAs obtained from school records and a standardized measure assessing student–teacher connectedness. Students' combined GPAs were obtained in their core courses such as math, English, social science, and science. Student–teacher connectedness was assessed by the Student Assessment of Teachers Scale (Klem and Connell 2004; McNeely and Falci 2004). Adolescents responded to seven items measured on a 5-point Likert type scale, ranging from 1 (“strongly disagree”) to 5 (“strongly agree”). Example: “Teachers at my school care about me.” Higher scores on the scale indicated higher student–teacher connectedness. The alpha coefficients were .86 and .87 for boys and girls, respectively.

Negative Perceptions of Peer Attitudes About Safer Sex—Information on peer influences was assessed by the Peer Network Scale (Voisin 2003). Negative perceptions of peer attitudes about safer sex were measured by three items to assess perceptions of peer attitudes promoting unsafe sex and drug use. For example, “How many of your friends believe that condoms reduce pleasure?” Responses were measured on a seven point scale from 0 (“none”) to 6 (“more than 6”). The alpha coefficients were .72 and .65 for boys and girls, respectively.

Gang Membership—Information on gang membership was assessed by one item. “Have you ever been a member of a gang?”

Sexual Behaviors—This study assessed sexual début and sexual risk behaviors. A single survey item “Have you ever had sex?” assessed sexual début which was defined as having had vaginal or oral sex with the opposite sex. Sexual risk behaviors were defined as having one or more of the following experiences in the prior 12 months: sex without condoms, sex with multiple partners, or sex while using drugs. Nationally representative data shows that the above behaviors are implicated in the acquisition of STIs among adolescents (Crosby et al. 2003; Kelley et al. 2003; Strunin and Hingson 1992).

Statistical Analysis

Descriptive analyses characterized the sample via one-way frequency tables and measures of central tendency. In exploratory analyses, we computed correlations among all study variables using Spearman rank-order correlation coefficients. We compared exposure to community violence, problematic psychological symptoms, student–teacher connectedness, history of gang involvement, negative perceptions of peer attitudes about safer sex, and sexual risk behaviors by gender using t-tests for continuous variables and Chi square tests for categorical variables. Since there were several gender differences in psychological symptoms and risk behavior, and because we were interested in whether the association between exposure to community violence, intermediary variables, and sexual risk behaviors differed for males and females, we conducted the analyses in the sample overall and

stratified by gender. Multivariable models included age as a covariate given the wide age range of study participants and to account for the fact that sexual debut and sexual risk behaviors tend to increase as youth become older (DiClemente et al. 2009).

We used a multiple pathway framework (MacKinnon et al. 2002, 2007; Preacher and Hayes 2008) to examine whether exposure to community violence was associated with sexual debut and sexual risk behaviors, either directly, or indirectly, through the proposed pathways, which were hypothesized to lie in the pathway between exposure to violence and sexual behaviors. We used STATA's *binary mediation* macro, which allows for binary dependent variables and mediators and adjustment for covariates, to estimate the indirect effect of exposure to community violence on sexual risk behaviors via the proposed pathways based on the product of coefficients approach (MacKinnon et al. 2004, 2007). OLS regression for continuous outcomes and logit regression for binary outcomes were used to calculate the effects of exposure to community violence (independent variable) on the proposed pathway variables (psychological problem behaviors, low school engagement, and negative perceptions of peer attitudes about safer sex), and the effects of the proposed pathways on sexual debut and sexual risk behaviors (outcome variables) controlling for exposure to community violence. The observed unstandardized regression coefficients were standardized prior to calculating the indirect effect due to the presence of binary independent variables (MacKinnon and Dwyer 1993). Statistical significance of the point estimates for the indirect effects was assessed using bias corrected bootstrap confidence intervals using 5,000 replicates. Confidence intervals around indirect effect estimates that exclude zero indicate statistical significance at $p < 0.05$. Analyses were conducted using STATA version 10.0 (StataCorp, College Station, TX).

Results

Sample Description and Gender Differences

The overall sample was composed of 563 African American youth (219 boys and 344 girls). Mean age was 16.1 (SD = 1.2) and the majority of boys and girls (61 and 59 %, respectively) reported receiving “free school lunch.” In bivariate analysis, compared with females, males reported higher levels of exposure to community violence, history of gang involvement, and negative perceptions of peer norms, but lower levels of withdrawal, anxiety, aggression, PTSD, and lower core GPA. With regard to sexual behaviors, males were more likely than females to have ever had sex (see Table 1).

Estimated Correlations

Correlations among study variables for males and females are shown in Table 2. Major findings indicated that correlations were significant between exposure to community violence and sexual debut for boys ($r = 0.14$; $p < 0.05$), and between exposure to community violence and sexual debut ($r = 0.19$; $p < 0.01$) and sexual risk behaviors ($r = 0.14$; $p < 0.05$) for girls.

Direct and Indirect Effects of Exposure to Community Violence on Sexual Behavior for Males

In multivariable analysis, the age-adjusted direct effect of exposure to community violence on sexual debut ($B = 0.03$; 95 % CI $-0.02, 0.07$) and sexual risk behaviors ($B = 0.02$; 95 % CI $-0.02, 0.06$) was not statistically significant for males. However, findings indicated that higher levels of exposure to community violence were significantly associated with externalizing behaviors ($B = 0.21$; 95 % CI $0.13, 0.29$), internalizing behaviors ($B = 0.12$; 95 % CI $0.03, 0.21$), PTSD ($B = 0.18$; 95 % CI $0.05, 0.31$), and negative perceptions of peer norms ($B = 0.19$; 95 % CI $0.09, 0.29$). In addition, aggression was positively associated with sexual debut ($B = 0.13$; 95 % CI $0.001, 0.26$) and sexual risk behaviors ($B = 0.12$, 95 % CI $0.01, 0.23$). Moreover, negative perceptions of peer attitudes about safer sex were positively associated with sexual risk behaviors ($B = 0.09$; 95 % CI $0.02, 0.17$). Higher levels of PTSD ($B = -0.10$; 95 % CI $-0.18, -0.02$) and higher GPA ($B = -0.67$; 95 % CI $-1.12, -0.21$) were negatively associated with sexual debut.

While the direct effects of exposure to community violence on sexual risk behaviors and sexual debut were not significant, increased levels of exposure to community violence were significantly and positively associated with aggression and negative perceptions of peer norms, which were in turn associated with sexual debut and sexual risk behaviors. A formal test of the statistical significance of the indirect effects yielded statistically significant positive indirect effects of exposure to community violence on sexual debut ($\beta 0.11$; 95 % CI $0.02, 0.24$) and sexual risk behaviors ($\beta 0.10$; 95 % CI $0.02, 0.24$) via aggression, and on sexual risk behaviors via negative perceptions of peer attitudes about safer sex ($\beta 0.07$; 95 % CI $0.02, 0.15$). This suggests that increased aggression may be one of the pathways through which exposure to community violence impacts sexual behavior. The findings also suggested that participants exposed to higher levels of exposure to community violence were more likely to subscribe to perceptions of peer attitudes that endorsed unsafe sex, which was associated with sexual risk behaviors (Table 3).

Direct and Indirect Effects of Exposure to Community Violence on Sexual Behavior for Females

For females, there was a significant age-adjusted direct effect of exposure to community violence on sexual debut ($B = 0.06$; 95 % CI $0.02, 0.10$), though the direct effect of exposure to community violence on sexual risk behaviors was not statistically significant ($B = 0.02$; 95 % CI $-0.02, 0.06$). Multiple regression analysis indicated that higher levels of exposure to community violence were associated with higher levels of PTSD ($B = 0.19$; 95 % CI $0.08, 0.31$), externalizing behaviors ($B = 0.13$; 95 % CI $0.05, 0.21$), internalizing behaviors ($B = 0.12$; 95 % CI $0.03, 0.22$), and negative perceptions of peer attitudes about safer sex ($B = 0.09$; 95 % CI $0.02, 0.17$), and lower levels of student–teacher connectedness ($B = -0.23$; 95 % CI $-0.33, -0.13$). In addition, aggression was positively associated with sexual debut ($B = 0.09$; 95 % CI $0.01, 0.17$), and negative perceptions of peer attitudes about safer sex were positively associated with sexual debut ($B = 0.12$; 95 % CI $0.04, 0.20$), and with sexual risk behaviors ($B = 0.13$; 95 % CI $0.05, 0.21$).

There were significant positive indirect effects of exposure to community violence on sexual debut via aggression ($\beta = 0.04$; 95 % CI 0.01, 0.10) and perceptions of peer norms ($\beta = 0.04$; 95 % CI 0.01, 0.11), and sexual risk behaviors via negative perceptions of peer attitudes about safer sex ($\beta = 0.05$, 95 % CI 0.01, 0.12). Similarly to the associations observed for males, these results suggest that higher levels of exposure to community violence were associated with increased levels of aggression, which is in turn associated with an increased likelihood of engaging in sexual debut. In other words, increased levels of aggression may partially account for, or explain, the association between exposure to community violence and sexual debut among females. In addition, exposure to community violence is associated with an increased likelihood of having negative perceptions of peer attitudes about safer sex, which in turn leads to an increased likelihood of sexual debut and sexual risk behaviors (Table 4).

Discussion

Exposure to community violence is a serious public health concern in urban areas and especially among African American youth who bear a significant burden. Several studies have documented associations between exposure to community violence and sexual risk behaviors among youth (Berenson et al. 2001; Brady et al. 2008; Sullivan et al. 2004; Voisin et al. 2007; Wilson et al. 2012). However, few studies have explored the pathways that may account for such relationships. This study empirically tested multiple pathways linking exposure to community violence to HIV sexual risk behaviors among African American adolescents. We hypothesized that problematic psychological symptoms, low school engagement, and/or negative perceptions of peer norms would provide pathways linking the relationship between exposure to community violence and HIV sexual risks behaviors, with potential differences by gender. Our findings provided empirical support for several pathways linking exposure to community violence and sexual behaviors. For boys, there were significant positive indirect effects of exposure to community violence on sexual debut and sexual risk behaviors through aggression, and on sexual risk behaviors via negative perceptions of peer attitudes about safer sex. For girls, there were significant positive indirect effects of exposure to community violence on sexual debut via aggression and negative perceptions of peer attitudes about safer sex. Unique pathways linking exposure to community violence and sexual debut were PTSD for boys and negative perceptions of peer attitudes about safer sex for girls.

Consistent with other research, we speculate that youth exposed to community violence may be more inclined to display aggression versus depressive symptoms given that internalizing coping strategies may render them more defenseless and vulnerable, especially in high violence communities (Horowitz et al. 2005). Our findings suggest that externalizing reactions to exposure to community violence are related to increased sexual risk behaviors, and that the ways in which adolescents cope with exposure to violence has an impact on sexual risk behaviors. These findings might also be explained by different psychological sequelae related to how individuals react to and cope with violence and how those reactions affect sexual risk behaviors. For example, aggressive behaviors, as opposed to internalizing ones, are more closely aligned with impulsivity, which is a significant correlate of sexual debut (DiClemente et al. 2005). Another plausible explanation is that youth who experience

internalizing symptoms such as depression and withdrawal may have less positive self-images, which may hinder sexual possibilities (Voisin et al. 2013).

For boys, there was a significant negative indirect effect of exposure to community violence on sexual debut via PTSD; i.e., exposure to community violence was associated with increased levels of PTSD, but PTSD was negatively associated with sexual debut. As anticipated, males in this study were exposed to significantly higher levels of community violence compared to their female counterparts and it is well documented that such exposure is highly correlated with PTSD symptoms (Moretti et al. 2006). Another unique gender finding was that negative perceptions of peer attitudes about safer sex were a pathway linking exposure to community violence and sexual debut for girls but not for boys. This finding highlights gender differences that may complicate extant research on the influence of peer norms on sexual debut (Kinsman et al. 1998) for male and female adolescents. Research has indicated gender differences in African American adolescents' social networks, with girls often reporting smaller but more intimacy-intense friend groups (Coates 1987), which may elucidate the unique effects of perceived peer attitudes for girls but not for boys. Some research has begun to examine the gender-specific contextual factors that may predict the timing of sexual debut among urban, African American youth (Ramirez-Valles et al. 2002) and our findings indicate that this should continue to be an area of further study.

Major findings also indicated that the relationship between exposure to community violence and sexual risk behaviors were linked by negative perceptions of peer norms for both boys and girls. Multiple studies provide evidence that negative perceptions of peer norms are a significant contributing factor to sexual risk behaviors among youth (DiClemente et al. 2005; DiClemente 1991). These results corroborate earlier findings and also extend them by identifying negative perceptions of peer norms as a pathway through which exposure to community violence may impact sexual risk behaviors.

We hypothesized that school engagement markers would be a significant pathway linking exposure to community violence and sexual risk behaviors. However, our findings provided no empirical support for this assumption. Although bivariate analyses indicated a moderate negative correlation between exposure to community violence and student–teacher connectedness for boys and girls, the association between student–teacher connectedness and sexual debut and sexual risk behaviors did not reach statistical significance, and the indirect effects of student–teacher connectedness on unsafe sex were not significant. Prior studies have documented that school engagement markers are significant predictors of sexual risk behaviors. For instance, low versus high student–teacher connectedness has been associated with sexual risk behaviors among youth (Voisin 2005) and no versus active school enrollment has been associated with sexual risk behaviors and confirmed cases of sexually transmitted infections among African American females (Crosby et al. 2007). Additionally, we know that exposure to community violence is a threat to positive school engagement (Margolin et al. 2010; Shonk and Cicchetti 2001). However, no studies to date have empirically examined whether school engagement might link exposure to community violence and sexual risk behaviors when assessed collectively in the presence of other pathways such as psychological problem behaviors and negative perceptions of peer norms. Our results do not necessarily suggest that school engagement does not matter; however,

they may imply that, given the low levels of school engagement markers noted in these findings relative to other findings (Voisin 2005), linking pathways such as negative perceptions of peer norms and psychological symptoms might be more salient. However, further research would be needed to clarify this finding.

While there were significant bivariate correlations between exposure to community violence and sexual debut and sexual risk behaviors for boys and girls, in multivariable analysis the direct effects linking exposure to community violence to sexual debut and sexual risk behaviors were not statistically significant for boys, though findings did indicate a significant direct relationship between exposure to community violence and sexual debut for girls. However, there were significant indirect associations between exposure to community violence and sexual risk behaviors via aggression and negative perceptions of peer norms for both boys and girls despite the absence of statistically significant direct effects. The lack of direct effect may be explained by limited power due to the moderate sample size, especially given that the analysis was stratified by gender, or because of competing influences of intermediary variables, such as PTSD and aggression, that impact the outcome in opposite directions, thus cancelling out the direct effect. We are also unable to rule out the potential for confounding by unmeasured extraneous variables, which may exert influence on the direct and indirect pathways between exposure to community violence and sexual risk behaviors. Also, the cross-sectional nature of the study precludes making causal inferences that rely on temporal ordering among variables. The presence of indirect effects of exposure to community violence on sexual risk behaviors via aggression and negative perceptions of peer norms are theoretically plausible but warrant replication in larger and more diverse samples using prospective designs.

The above findings expand on the existing literature by further elucidating the pathways linking exposure to community violence and sexual risk behaviors, though they should be interpreted within the context of important study. Non-probability sampling limits the generalizability of findings to larger groups of African Americans. Although we used temporal stems with study variables, all results must be interpreted within the confines of cross-sectional data, which limits any temporal or causal inferences. In addition, although we assessed customary behavioral factors that are associated with STI risk, there are other behavioral factors such as unprotected anal intercourse, having sex with a partner who was using drugs, and having sex with older partners. Such behaviors would need to be also assessed in future studies. However, we do believe that these findings may provide the basis for longitudinal studies that can clarify the temporal relationship among these variables and determine whether such associations persist across time. Finally, future research with larger samples of multiethnic youth are needed to document whether these or alternative relationships may vary by race/ethnicity.

The findings from this study are significant in several ways. Given that psychological symptoms such as aggression and PTSD may link exposure to community violence to sexual risk behaviors, there is an even greater need to provide mental health services within schools and other prosocial systems of care for African American youth. Researchers and practitioners may not recognize the importance of exposure to community violence as a correlate of HIV-related risk behaviors among youth. Our findings suggest that youth

workers across juvenile justice, mental health, education, and public health domains should be trained to better understand these intersecting issues among youth and be given resources to intervene within domains that are amenable to change, such as providing mental health treatment and using peer models to intervene on changing friendship norms.

Conclusion

Epidemiological data has shown that exposure to community violence and sexual risk behaviors among youth are associated, but few studies have explored the pathway variables through which exposure to community violence is thought to impact sexual risk behaviors. We found significant positive indirect effects of exposure to community violence on sexual debut and sexual risk behaviors through aggression, and on sexual risk behaviors via negative perceptions of peer norms for boys. For girls, there were significant positive indirect effects of exposure to community violence on sexual debut via aggression and negative perceptions of peer attitudes about safer sex. Our findings have important implications for targeting interventions. In addition to structural interventions aimed at reducing violence, providing positive outlets for youth who display aggressive behaviors and changing social norms around risk may help to reduce risk for HIV transmission among at-risk youth. Future research using larger samples and prospective study designs is needed to improve understanding of the mechanisms through which violence may contribute to HIV transmission among African American youth.

Acknowledgments

This research was supported by funding from the National Institutes of Health, 1RO3 HD049283-01 awarded to Dexter Voisin.

References

- Achenbach, TM. Child behavior checklist/4-18. Burlington: University of Vermont; 1991.
- Albus K, Weist M, Perez-Smith A. Associations between youth risk behavior and exposure to violence: Implications for the provision of mental health services in urban schools. *Behavior Modification*. 2004; 28:548. [PubMed: 15186515]
- Berenson A, Wiemann C, McCombs S. Exposure to violence and associated health-risk behaviors among adolescent girls. *Archives of Pediatric and Adolescent Medicine*. 2001; 15:1238–1242.
- Bowen N, Bowen G. Effects of crime and violence in neighborhoods and schools on the school behavior and performance of adolescents. *Journal of Adolescent Research*. 1999; 14:319–342.
- Brady S, Donenberg GR. Mechanisms linking violence exposure to health risk behavior in adolescence: Motivation to cope and sensation seeking. *Journal of the American Academy of Child and Adolescent Psychiatry*. 2006; 45(6):673–680. [PubMed: 16721317]
- Brady SS, Tschann JM, Pasch LA, Flores E, Ozer EJ. Violence involvement, substance use, and sexual activity among Mexican-American and European-American adolescents. *Journal of Adolescent Health*. 2008; 43(3):285–295. [PubMed: 18710684]
- Center for Disease Control and Prevention (CDC). Youth risk behavior surveillance—United States, 2009. *MMWR Surveillance Summaries*. 2010; 59:6.
- Center for Disease Control and Prevention (CDC). HIV surveillance in adolescents and young adults. 2011. Retrieved from http://www.cdc.gov/hiv/pdf/statistics_surveillance_Adolescents.pdf
- Coates DL. Gender differences in the structure and support characteristics of black adolescents' social networks. *Sex Roles*. 1987; 17(11/12):667–687.

- Crosby RA, DiClemente RJ, Wingood GM, Lang D, Harrington KF. Value of consistent condom use: A study of sexually transmitted disease prevention among African American adolescent females. *American Journal of Public Health*. 2003; 93(6):901–902. [PubMed: 12773349]
- Crosby RA, DiClemente RJ, Wingood GM, Salazar LF, Rose E, Sales JM. The protective value of school enrolment against sexually transmitted disease: A study of high risk African American adolescent females. *Sexually Transmitted Infections*. 2007; 83(3):223–227. [PubMed: 17569721]
- DiClemente RJ. Predictors of HIV-preventive sexual behavior in a high-risk adolescent population: The influence of perceived peer norms and sexual communication on incarcerated adolescents' consistent use of condoms. *Journal of Adolescent Health*. 1991; 12(5):385–390. [PubMed: 1751507]
- DiClemente R, Salazar L, Crosby R, Rosenthal SL. Prevention and control of sexually transmitted infections among adolescents: The importance of a socio-ecological perspective— A commentary. *Public Health*. 2005; 119(9):835–836.
- DiClemente R, Wingood G, Crosby R, Sionean C, Brown L, Zimand E, et al. A prospective study of psychological distress and sexual risk behaviors among black adolescent females. *Pediatrics*. 2001; 108(5):e5. [PubMed: 11433084]
- Furlong MJ, Christenson SL. Engaging students at school and with learning: A relevant construct for all students. *Psychology in the Schools*. 2008; 45(5):365–368.10.1002/pits.20302
- Horowitz K, McKay M, Marshall R. Community violence and urban families: Experiences, effects, and directions for intervention. *American Journal of Orthopsychiatry*. 2005; 75(3):356–368. [PubMed: 16060732]
- Jones DJ, Runyan DK, Lewis T, Litrownik AJ, Black MM, Wiley T, et al. Trajectories of childhood sexual abuse and early adolescent HIV/AIDS risk behaviors: The role of other maltreatment, witnessed violence, and child gender. *Journal of Clinical Child and Adolescent Psychology*. 2010; 39(5):667–680. [PubMed: 20706919]
- Kelley SS, Borawski EA, Flocke SA, Keen KJ. The role of sequential and concurrent sexual relationships in the risk of sexually transmitted diseases among adolescents. *Journal of Adolescent Health*. 2003; 32(4):296–305. [PubMed: 12667734]
- Kinsman SB, Romer D, Furstenberg FF, Schwarz DF. Early sexual initiation: The role of peer norms. *Pediatrics*. 1998; 102(5):1185–1192. [PubMed: 9794952]
- Klem AM, Connell JP. Relationships matter: Linking teacher support to student engagement and achievement. *Journal of School Health*. 2004; 74(7):262–273. [PubMed: 15493703]
- Krug, E.; Dahlberg, LL.; Mercy, JA.; Zwi, AB.; Lozano, R., editors. *World report on violence and health*. Geneva: World Health Organization; 2002.
- MacKinnon DP, Dwyer JH. Estimating mediated effects in prevention studies. *Evaluation Review*. 1993; 17:144–158.
- MacKinnon DP, Fairchild AJ, Fritz MS. Mediation analysis. *Annual Review of Psychology*. 2007a; 58:593–614.
- MacKinnon DP, Fritz MS, Williams J, Lockwood CM. Distribution of the product confidence limits for the indirect effect: Program PRODCLIN. *Behavior Research Methods*. 2007b; 39(3):384–389. [PubMed: 17958149]
- MacKinnon DP, Lockwood CM, Hoffman JM, West SG, Sheets V. A comparison of methods to test mediation and other intervening variable effects. *Psychological Methods*. 2002; 7(1):83–104. [PubMed: 11928892]
- MacKinnon DP, Lockwood CM, Williams J. Confidence limits for the indirect effect: Distribution of the product and resampling methods. *Multivariate Behavior Research*. 2004; 39(1):99.
- Margolin G, Gordis EB. The effects of family and community violence on children. *Annual Review of Psychology*. 2000; 51(1):445–479.
- Margolin G, Vickerman KA, Oliver PH, Gordis EB. Violence exposure in multiple interpersonal domains: Cumulative and differential effects. *Journal of Adolescent Health*. 2010; 47(2):198–205. [PubMed: 20638013]
- McDonald CC, Richmond TR. The relationship between community violence exposure and mental health symptoms in urban adolescents. *Journal of Psychiatric and Mental Health Nursing*. 2008; 15(10):833–849. [PubMed: 19012675]

- McNeely C, Falci C. School connectedness and the transition into and out of health-risk behavior among adolescents: A comparison of social belonging and teacher support. *Journal of School Health*. 2004; 74(7):284–292. [PubMed: 15493705]
- Moretti MM, Obsuth I, Odgers CL, Reebye P. Exposure to maternal vs. paternal partner violence, PTSD, and aggression in adolescent girls and boys. *Aggressive Behavior*. 2006; 32(4):385–395.
- Preacher KJ, Hayes AF. Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods*. 2008; 40(3):879–891. [PubMed: 18697684]
- Ramirez-Valles J, Zimmerman MA, Juarez L. Gender differences of neighborhood and social control processes: A study of timing of first intercourse among low-achieving, urban, African American youth. *Youth & Society*. 2002; 33(3):418–441.
- Rodriguez, N.; Steinberg, A.; Pynoos, RS. UCLA PTSD index for DSM IV instrument information: Child version, parent version, adolescent version. Los Angeles: UCLA Trauma Psychiatry Services; 1999.
- Saltzman WR, Pynoos RS, Layne CM, Steinberg AM, Aisenberg E. Trauma-and grief-focused intervention for adolescents exposed to community violence: Results of a school-based screening and group treatment protocol. *Group Dynamics: Theory, Research, and Practice*. 2001; 5(4):291.
- Salzinger S, Feldman RS, Stockhammer T, Hood J. An ecological framework for understanding risk for exposure to community violence and the effects of exposure on children and adolescents. *Aggression and Violent Behavior*. 2001; 7:423–451.
- Saunders J, Davis L, Williams T, Williams JH. Gender differences in self-perceptions and academic outcomes: A study of African American high school students. *Journal of Youth and Adolescence*. 2004; 33(1):81–90.
- Schneider J, Voisin D, Michaels S, Ostrow D, Laumann E. Evaluation of sexual networks as a cause for disparate HIV prevalence between blacks and whites: More questions than answers. *AIDS*. 2011; 25(15):1933–1934. [PubMed: 21914982]
- Schwab-Stone M, Ayers T, Kaprow W, Voyce C, Barone C. No safe haven: A study of violence exposure in an urban community. *Journal of the American Academy of Child Adolescent Psychiatry*. 1995; 10:1343–1352. [PubMed: 7592272]
- Shonk SM, Cicchetti D. Maltreatment, competency deficits, and risk for academic and behavioral maladjustment. *Developmental Psychology*. 2001; 37(1):3. [PubMed: 11206431]
- Ssewamala FM, Ismaylova L, McKay M, Sperber E, Bannon W, Allcea S. Gender and the effects of an economic empowerment program on attitudes toward sexual risk-taking among AIDS-orphaned adolescent youth in Uganda. *Journal of Adolescent Health*. 2010; 46(4):372–378. [PubMed: 20307827]
- Starr LR, Donenberg GR, Emerson E. Bidirectional linkages between psychological symptoms and sexual activities among African American adolescent girls in psychiatric care. *Journal of Clinical Child & Adolescent Psychology*. 2012; 41(6):811–821. [PubMed: 22742458]
- Stein MB, Walker JR, Hazen AL, Forde DR. Full and partial posttraumatic stress disorder: Findings from a community survey. *American Journal of Psychiatry*. 1997; 154(8):1114–1119. [PubMed: 9247398]
- Stiffman AR, Dore P, Cunningham RM, Earls E. Person and environment in HIV risk behavior change between adolescence and young adulthood. *Health Education Quarterly*. 1995; 22:211–226. [PubMed: 7622389]
- Strunin L, Hingson R. Alcohol, drugs, and adolescent sexual behavior. *Substance Use and Misuse*. 1992; 27(2):129–146.
- Sullivan T, Kung E, Farrell A. Relation between witnessing violence and drug use initiation among rural adolescents: Parental monitoring and family support as protective factors. *Journal of Clinical and Child Adolescent Psychology*. 2004; 33(3):488–498.
- Vesely SK, Wyatt VH, Oman RF, Aspy CB, Kegler MC, Rodine S, et al. The potential protective effects of youth assets from adolescent sexual risk behaviors. *Journal of Adolescent Health*. 2004; 34(5):356–365. [PubMed: 15093789]

- Voisin D. Victims of community violence and HIV sexual risk behaviors among African American adolescent males. *Journal of HIV/AIDS Prevention and Education in Adolescence and Children*. 2003; 5(3/4):87–110.
- Voisin D. The relationship between violence exposure and HIV sexual risk behaviors: Does gender matter? *American Journal of Orthopsychiatry*. 2005; 75(4):497–506. [PubMed: 16262509]
- Voisin D, DiClemente R, Salazar L, Crosby R, Yarber W, Staples-Horne M. Community violence exposure and health-risk outcomes among detained adolescents. *American Journal of Orthopsychiatry*. 2007; 74:506–513. [PubMed: 18194030]
- Voisin D, Hotton A, Schneider J. Witnessing verbal parental aggression and sexual activity among low income African American adolescents. *Journal of Child and Family Studies*. 2013.1007/s10826-013-9720-7
- Voisin D, Jenkins EJ, Takahashi L. Toward a conceptual model linking community violence exposure to HIV-related risk behaviors among adolescents: Directions for research. *Journal of Adolescent Health*. 2011a; 49(3):230–236. [PubMed: 21856513]
- Voisin D, Neilands T. Low school engagement and sexual behaviors among African American youth: Examining the influences of gender, peer norms, and gang involvement. *Children and Youth Services Review*. 2010; 32(1):51–57. [PubMed: 20161422]
- Voisin D, Neilands T, Hunnicut S. Mechanisms linking violence exposures and school engagement among African American adolescents: Examining the roles of psychological problem behaviors and gender. *American Journal of Orthopsychiatry*. 2011b; 81(1):61–71. [PubMed: 21219276]
- Wilson HW, Woods BA, Emerson E, Donenberg GR. Patterns of violence exposure and sexual risk in low-income, urban African American girls. *Psychology of Violence*. 2012; 2(2):194–207. [PubMed: 24563808]

Biographies

Dexter R. Voisin is a Professor at the University of Chicago. He received his doctorate in social work from Columbia University. His major research examines the impact of community violence on youth, gendered coping and factors that mediate the relationship between such exposures and youth problem behaviors.

Anna L. Hotton is an epidemiologist at the John H. Stroger Hospital, Division of Infectious Diseases. She received her doctorate in epidemiology from the University of Illinois at Chicago. Her major research interests include the role of relationship dynamics and partner selection strategies on STI and HIV risk among youth and MSM.

Torsten B. Neilands is a Professor at the University of California at San Francisco, School of Medicine. He received his doctorate in psychology from the University of Texas at Austin. His research interest examines HIV prevention and intervention among sexual and racial minority populations.

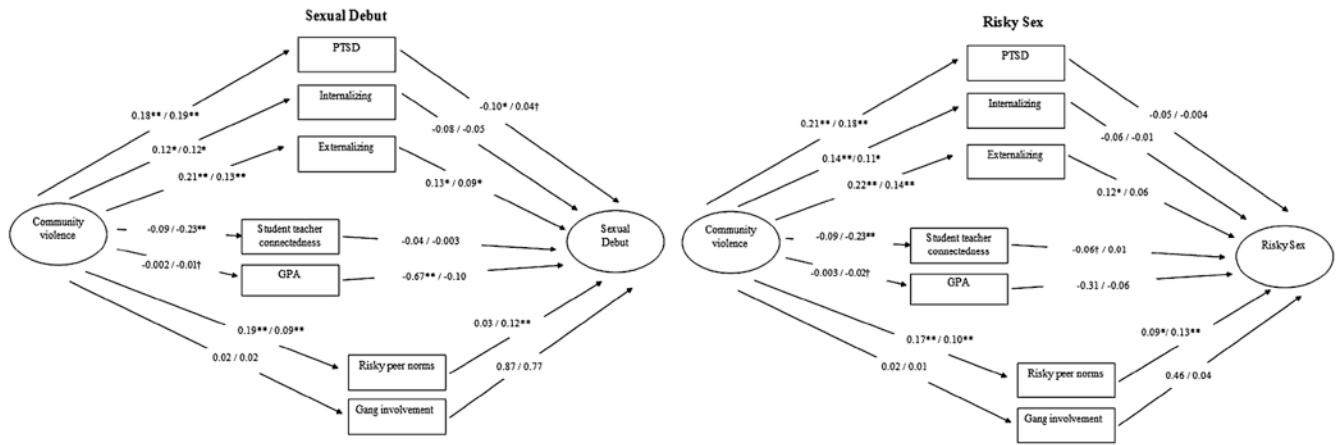


Fig. 1. Pathways linking exposure to community violence, sexual debut, and risky sex for males and females sexual debut. † $p < 0.10$; * $p < 0.05$; ** $p < 0.01$. Coefficients are shown to the *left* of the slash for males and to the *right* of the slash for females

Table 1
Participant characteristics by gender

	Total, N = 563	Males, N = 219	Females, N = 344
Community violence, <i>M</i> (SD)	11.64 (8.27)	14.97 (8.56)**	9.53 (7.35)
Student-teacher connectedness, <i>M</i> (SD)	33.90 (6.03)	34.25 (5.93)	33.67 (6.10)
Core GPA, <i>M</i> (SD)	2.02 (0.95)	1.68 (0.92)**	2.24 (0.91)
Risky peer norms, <i>M</i> (SD)	6.13 (5.11)	7.78 (5.50)**	5.08 (4.55)
History of gang involvement, n (%)	86.00 (15.84)	63.00 (30.14)**	23.00 (6.89)
PTSD, <i>M</i> (SD)	10.46 (7.30)	9.10 (6.81)**	11.35 (7.47)
Withdrawal/depression, <i>M</i> (SD)	3.00 (2.71)	2.46 (2.47)**	3.33 (2.79)
Anxiety/depression, <i>M</i> (SD)	3.94 (3.54)	2.57 (3.02)**	4.81 (3.57)
Aggression, <i>M</i> (SD)	7.16 (4.58)	6.13 (4.43)**	7.81 (4.56)
Sexual debut, n (%)	358.00 (64.50)	161.00 (74.19)**	197.00 (58.28)
Sex without condoms, n (%) ^a	172.00 (52.92)	79.00 (54.48)	93.00 (51.67)
Group sex, n (%) ^a	47.00 (14.07)	36.00 (24.66)**	11.00 (5.85)
Sex under the influence of alcohol/drugs, n (%) ^a	78.00 (23.21)	37.00 (24.83)	41.00 (21.93)
Risky sex, n (%)	215.00 (41.67)	103.00 (51.76)**	112.00 (35.33)

**
 $p < 0.01$

^a Among participants reporting sexual activity, n = 358

Table 2
Spearman rank correlation coefficients for association between study variables

	1	2	3	4	5	6	7	8	9	10	11
1. Community violence	1.00	-0.17**	-0.12*	0.16**	0.08	0.32**	0.13*	0.20*	0.24**	0.19**	0.14*
2. Student-teacher connectedness	-0.14*	1.00	0.17**	-0.13*	-0.02	-0.02	-0.04	-0.08	-0.24**	-0.09	-0.05
3. Core GPA	-0.04	0.17*	1.00	-0.11*	-0.01	-0.06	0.05	0.13*	-0.13*	-0.16**	-0.08
4. Negative perceptions of peer attitudes toward safer sex	0.26**	-0.16*	-0.07	1.00	0.14*	0.09	0.001	0.06	0.22**	0.32**	0.36**
5. Gang involvement	0.08	-0.18*	-0.12 [†]	0.17*	1.00	0.09	0.005	0.03	0.20**	0.08	0.002
6. PTSD	0.20**	-0.17*	-0.16*	0.20**	0.18*	1.00	0.42**	0.55**	0.36**	0.17**	0.09
7. Withdrawal/depression	0.23**	-0.26**	-0.05	0.15*	0.03	0.46**	1.00	0.57**	0.27**	0.01	0.000
8. Anxiety/depression	0.11	-0.13 [†]	0.03	0.06	0.04	0.46**	0.52**	1.00	0.36**	0.07	0.08
9. Aggression	0.37**	-0.24**	-0.03	0.24**	0.17*	0.39**	0.38**	0.40**	1.00	0.22	0.17**
10. Sexual debut	0.14*	-0.10	-0.30**	0.18*	0.15*	-0.09	-0.11	-0.13 [†]	0.16*	1.00	0.66**
11. Risky sex	0.10	-0.20**	-0.21**	0.27**	0.18*	-0.03	-0.07	-0.05	0.23**	0.65**	1.00

Boys are shown below diagonal, girls are shown above diagonal

Correlations are based on non-missing observations

[†] $p < 0.10$;

** $p < 0.05$;

* $p < 0.01$

Table 3
Direct and indirect effects of exposure to community violence on sexual debut and sexual risk behaviors among males

Dependent variable (DV)	Mediating variable (M)	Independent variable (IV)	Effect of IV on M ^a B(SE)	Effect of M on DV ^b B (SE)	Indirect effect point estimate (95 % CI)	
Sexual debut	Psychological symptoms	Community violence				
			PTSD	0.18 (0.06)**	-0.10 (0.04)*	-0.07 (-0.17, -0.01)*
	Internalizing behaviors (anxiety/withdrawal/depression)					
			Externalizing behaviors (aggression)	0.12 (0.05)*	-0.08 (0.06)	-0.04 (-0.14, 0.01)
	School engagement					
			Student-teacher connectedness	0.21 (0.04)**	0.13 (0.07)*	0.11 (0.02, 0.24)*
	Core GPA					
			Negative peer influences	-0.09 (0.06)	-0.04 (0.04)	0.01 (-0.01, 0.07)
	Negative perceptions of peer attitudes toward safer sex					
			Gang involvement	-0.002 (0.01)	-0.67 (0.23)**	0.01 (-0.04, 0.06)
Risky sex	Psychological symptoms	Community violence				
			PTSD	0.19 (0.05)**	0.03 (0.04)	0.02 (-0.04, 0.10)
	Internalizing behaviors (anxiety/withdrawal/depression)					
			Externalizing behaviors (aggression)	0.02 (0.02)	0.87 (0.59)	0.02 (-0.01, 0.09)
	School engagement					
			Student-teacher connectedness	0.21 (0.07)**	-0.05 (0.03)	-0.04 (-0.14, 0.01)
	Core GPA					
			Negative peer influences	0.14 (0.05)**	-0.06 (0.05)	-0.03 (-0.13, 0.01)
	Negative perceptions of peer attitudes toward safer sex					
			Gang involvement	0.22 (0.04)**	0.12 (0.06)*	0.10 (0.02, 0.24)*
Total						
			-0.09 (0.06)	-0.06 (0.03) [†]	0.02 (-0.004, 0.09)	
Total						
			-0.003 (0.01)	-0.31 (0.20)	0.003 (-0.02, 0.05)	

[†] $p < 0.10$;
 * $p < 0.05$;
 ** $p < 0.01$

a Effect of independent variable on mediator, controlling for age

b Effect of mediator on sexual risk variables, controlling for age

Table 4
Direct and indirect effects of exposure to community violence on sexual debut and sexual risk behaviors among females

Dependent variable (DV)	Mediating variable (M)	Independent variable (IV)	Effect of IV on M ^a B(SE)	Effect of M on DV ^b B (SE)	Indirect effect point estimate (95% CI)	
Sexual debut	Psychological symptoms	Community violence				
			PTSD	0.19 (0.06)**	0.04 (0.03) [†]	0.03 (-0.002, 0.09)
	Internalizing behaviors (anxiety/withdrawal/depression)	Community violence				
			PTSD	0.12 (0.05)*	-0.05 (0.03)	-0.02 (-0.08, 0.003)
	Externalizing behaviors (aggression)	Community violence				
			PTSD	0.13 (0.04)**	0.09 (0.04)*	0.04 (0.01, 0.10)*
	School engagement	Community violence				
			PTSD	-0.23 (0.05)**	-0.003 (0.03)	0.003 (-0.04, 0.05)
	Student-teacher connectedness	Community violence				
			PTSD	-0.01 (0.01) [†]	-0.10 (0.18)	0.005 (-0.01, 0.03)
Core GPA	Community violence					
		PTSD	0.09 (0.04)*	0.12 (0.04)**	0.04 (0.01, 0.11)*	
Negative peer influences	Community violence					
		PTSD	0.02 (0.04)	0.77 (0.69)	0.01 (-0.01, 0.07)	
Negative perceptions of peer attitudes toward safer sex	Community violence					
		PTSD	0.18 (0.06)**	-0.004 (0.03)	-0.003 (-0.05, 0.04)	
Gang involvement	Community violence					
		PTSD	0.11 (0.05)*	-0.01 (0.04)	-0.004 (-0.05, 0.03)	
Total	Community violence					
		PTSD	0.14 (0.04)**	0.06 (0.04)	0.03 (-0.01, 0.09)	
Risky sex	Psychological symptoms	Community violence				
			PTSD	-0.23 (0.05)**	0.01 (0.03)	-0.01 (-0.07, 0.04)
	Internalizing behaviors (anxiety/withdrawal/depression)	Community violence				
			PTSD	-0.02 (0.01) [†]	-0.06 (0.20)	0.003 (-0.02, 0.03)
	Externalizing behaviors (aggression)	Community violence				
			PTSD	0.10 (0.04)*	0.13 (0.04)**	0.05 (0.01, 0.12)*
	School engagement	Community violence				
			PTSD	0.01 (0.03)	0.04 (0.73)	0.00 (-0.03, 0.03)
	Student-teacher connectedness	Community violence				
			PTSD			0.006 (-0.02, 0.16)
Core GPA	Community violence					
		PTSD				
Negative peer influences	Community violence					
		PTSD				
Negative perceptions of peer attitudes toward safer sex	Community violence					
		PTSD				
Gang involvement	Community violence					
		PTSD				
Total	Community violence					
		PTSD				

[†] $p < 0.10$;
 * $p < 0.05$;
 ** $p < 0.01$

a Effect of independent variable on mediator, controlling for age

b Effect of mediator on sexual risk variables, controlling for age