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Exposure to Violence, Social Cognitive Processing, and Sleep Problems in Urban Adolescents

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Abstract

Exposure to violence is associated with elevated levels of sleep problems in adolescence, which contributes to poor mental and physical health and impaired academic performance. However, reasons underlying the associations between exposure to violence and sleep difficulty have not been examined. This study tested a social cognitive processing path model linking experiences of witnessing and directly experiencing community violence and sleep problems. Participants were 362 early adolescents (*M* age = 12.45 yrs, *SD* = 0.59; Range 11 to 14 yrs; 48.9% male; 51% Latino/a; 34% black) from urban communities enrolled in a middle-school-based intervention study on the east coast of the United States that was designed to reduce the negative effects of exposure to violence. All youth in the current study reported witnessing or directly experiencing community violence. Adolescents completed four school-based assessments over an 18-month period, reporting on their exposure to community violence, sleep problems, intrusive thoughts about and social constraints in talking about violence, and life events. A path model that included both victimization and witnessing violence revealed that wave 1 witnessing violence, but not victimization, was associated with elevated social constraints in talking about violence at wave 2, which was associated with elevated intrusive thoughts at wave 3, which was associated with poor sleep quality at wave 4. Prior levels of all constructs were controlled in the analysis, in addition to life events, single parent household status, children's age and sex, intervention condition, and school. Youth exposed to violence may benefit from help in processing their experiences, thus reducing social constraints in talking about their experiences and associated intrusive thoughts. This is turn may improve sleep outcomes.

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Author contributions: WK and SL jointly conceived and designed the study, WK ran the analyses, WK and SL jointly interpreted the data and drafted the manuscript. All authors approved the final manuscript.

Keywords

sleep problems; community violence; intrusive thoughts; social constraints; adolescence

Introduction

Sleep problems, defined as short duration of sleep, poor sleep efficiency, and sleep-wake difficulties, are common in adolescence, with an estimated 25-40% of children reporting sleep disturbance (Singh & Kenney, 2013). Youth living in disadvantaged neighborhoods characterized by high levels of violence have a particularly high risk for sleep difficulties. Nationally, an estimated one out of six youth living in neighborhoods characterized by violence, poor housing, litter, and vandalism report sleep problems compared with one in ten youth living in more favorable social environments (Singh & Kenney, 2013).

Adolescent sleep problems are linked to a range of mental and physical health problems, as well as to poor academic and cognitive performance. For example, in a study of 1,760 high school students, Danielsson, Harvey, MacDonald, Jansson-Fröjmark, and Linton (2013) found that sleep disturbances predicted depressive symptoms the following year. Kelly and El-Sheikh (2014), using 3 waves of data with a sample of 176 children, demonstrated that problematic sleep was associated with more emotional and behavioral adjustment difficulties over time, and to a lesser extent, adjustment difficulties predicted greater sleep problems over the 5-year period. In a study that followed a large group of youth from birth to age 15, Meldrum, Barnes, and Hay (2013) illustrated that sleep deprivation was associated with low self-control, which in turn was related to delinquency. Finally, in a comprehensive study with over 64,000 child and adolescent participants, Smaldone, Honig, and Byrne (2007) reported that inadequate sleep was associated with a variety of mental and physical health symptoms, including frequent or severe headaches and depressive symptoms. Collectively, these studies illustrate robust associations between sleep difficulties and mental and physical health.

The consequences of sleep difficulties are not restricted to mental and physical health; rather, they extend to deficits in cognitive and academic performance. Building on prior reviews of the literature (Wolfson & Carskadon, 2003), Curcio et al. (2006) conducted a comprehensive review of the correlational and experimental research on sleep and concluded that sleep quality and quantity are associated with multiple facets of learning in students, neurocognitive functioning, and academic performance. Subsequent work has confirmed these conclusions, but has highlighted the role of environmental factors such as parental education and socioeconomic status (Buckhalt et al., 2009; Buckhalt & Staton, 2011) as well as exposure to community and peer violence (Lepore & Kliewer, 2013). For example, in a 2-year longitudinal study with 166 school-age children, Buckhalt et al. (2009) found that sleep difficulties at time 1 predicted changes in cognitive ability and school achievement at time. For many of the analyses, the association between sleep problems and cognitive and academic functioning was stronger when paternal education was low. Lepore and Kliewer (2013) demonstrated in a short-term longitudinal study with 498 seventh-grade students that exposure to community violence and victimization by peers was associated

with school achievement, even after accounting for depressive symptoms, intrusive thoughts, and absences. Sleep problems partially or fully accounted for these associations.

The body of research on the consequences of sleep difficulties highlight the importance of investigating who is at greatest risk for sleep problems and why. The present study extends recent work linking exposure to violence and sleep problems (Lepore & Kliewer, 2013) by examining social and cognitive factors that help to account for the positive association between exposure to community violence and sleep problems in adolescents. In the present study, we consider victimization experiences (e.g., being chased; asked to use or sell drugs; threatened with physical harm; slapped, punched, or hit; beaten up or mugged; stabbed; exposed to gunfire) as well as witnessing violence, as many more youth witness than directly experience violence in their community (Fowler, Tompsett, Braciszewski, Jacques-Tiura, & Baltes, 2009).

Kliewer, Lepore, Oskin, and Johnson (1998) describe a social cognitive processing model of exposure to community violence. This model hypothesizes that youth exposed to community violence develop intrusive thoughts in response to witnessing or directly experiencing community violence, which in turn leads to elevated levels of internalizing symptoms such as depression and anxiety. Youth who do not have adequate support and who feel constrained in talking about their experiences with violence are more likely both to develop intrusive thoughts as a consequence of exposure and, if intrusive thoughts do develop, are more likely to experience depressive and anxious symptoms. Based on this model, in the current study we hypothesized that adolescents exposed to community violence would suffer from sleep problems, in part due to negative social reactions from others when they attempt to talk about their experiences, as well as from distressing, unbidden violence-related intrusive thoughts.

Linkages between exposure to violence and social constraints in talking about violence

Youth who are victimized or who witness violence in their communities may feel constrained in disclosing their experiences to their parents and others. In a recent study with urban African American children exposed to violence, Dinizulu, Grant, and McIntosh (2014) examined reasons youth did not disclose information to adults about their experiences with violence. One key reason for non disclosure concerned threats to autonomy – that is, restriction of activity and decision-making. A second key reason concerned fears that the adult receiving the information would not believe or would blame the adolescent. Concern about making listeners uncomfortable or upset is consistent with research by Ozer and Weinstein (2004). Approximately half Ozer and Weinstein's sample of early adolescents reported withholding information about exposure to violence for that reason.

Ozer and Weinstein's (2004) findings converge with those from a recent study of the ways in which living in a violent community affects parents and parenting. Because parents reside in the same communities as their children, parents also may experience victimization or may witness significant amounts of violence (Borre & Kliewer, 2014; Kliewer & Zaharakis, 2013). This exposure, in turn, may heighten parents' mental health problems, affect coping, and reduce parents' sensitivity and responsiveness to their children. For example, in a sample of families residing in low-income communities, Borre and Kliewer (2014) found

that parents' experiences of victimization and life stress were associated with negative changes in their mental health. The negative changes in parents' mental health, in turn, were associated with less awareness of their children's activities and the extent to which their children disclosed information to them the subsequent year.

In addition to the reasons above, literature indicates that negative social reactions to victims are quite common, including rude or insensitive remarks, negative evaluations, victim blame and derogation, avoidance and rejection, and discrimination (Bennett & Dunkel-Schetter, 1992). These and other negative or unsupportive social reactions can generate in victims a feeling of being socially constrained. Social constraints have been defined as "both objective social conditions and individuals' construal of those conditions that lead individuals to refrain from or modify their disclosure of stress- and trauma-related thoughts, feelings, or concerns" (Lepore & Revenson, 2007, p. 315). Prior research has shown that adolescents who perceive social constraints in talking about community violence tend to have elevated intrusive thoughts about violence and psychological distress symptoms (Kliewer et al., 1998; Ozer & Weinstein, 2004). In the present study, we predicted that exposure to community violence in adolescents would be positively associated with social constraints on disclosure about their experiences with violence, and might account for some of the association between violence and sleep problems in adolescents.

Linkages between social constraints in talking about violence and intrusive thoughts about violence

To the extent that social constraints on disclosure can decrease how much one talks with others about stressful experiences (Lepore, 2001; Pasipapanodya et al., 2012), it can impede adaptive cognitive processing. That is, social constraints can interfere with some of the potential cognitive benefits associated with talking with others about stress-related thoughts and concerns, including the benefit of gaining a different perspective on the stressor, learning how to reframe one's thoughts about the stressor, and finding a way to make sense of or create a coherent narrative about the stressor (Clark, 1993; Lepore, Fernandez-Berrocal, Ragan, & Ramos, 2004). Failure to cognitively process a stressor, in turn, can increase symptoms of unbidden and distressing stress-related intrusive thoughts. According to Horowitz (1993), intrusive thoughts emerge from an individual's need to integrate stress-related information into his or her mental model of the world. Stressors such as exposure to violence can challenge mental models such as positive expectations and beliefs about being safe and in control of important outcomes in one's life. Intrusive thoughts may be a symptom of cognitive efforts to integrate information inherent in a stressor that is discrepant with the information in one's mind. Thus, in the present study, we predicted that youth who experienced social constraints on disclosure about violence would also experience elevated violence-related intrusive thoughts. Prior research has shown a positive correlation between constraints on disclosure and intrusive thoughts related to a range of stressors, including chronic illness (Mosher et al., 2012; You & Lu, 2014), racial discrimination (Henson, Derlega, Pearson, Ferrer & Holmes, 2013), and exposure to community violence (Kliewer et al., 1998; Ozer & Weinstein, 2004).

Linkages between intrusive thoughts and sleep disturbance

Intrusive thoughts about a stressor can prolong the psychologically and physically aversive effects of the stressor even in the physical absence of the stressor (Baum, Cohen, & Hall, 1993). Following extreme, life-threatening stressors, intrusive thoughts can be particularly intense and disturbing, and have been identified as a hallmark of posttraumatic stress syndrome, or PTSD (American Psychiatric Association, 2013). Several lines of research have documented associations between intrusive thoughts and sleep disturbance, primarily in adults suffering from various life stressors. For example, Hall and colleagues (1997) found that intrusive thoughts regarding the loss of a loved one was associated with longer sleep latency and less deep sleep as measured by actigraph, controlling for time since loss, age, and depressive symptoms. In a study of African American women with breast cancer, Taylor and colleagues (2012) demonstrated that intrusive thoughts about cancer predicted insomnia symptom severity. Berset and colleagues (2010) found evidence that intrusive thoughts mediated the positive relation between work stress and impaired sleep. There is a dearth of research, however, linking intrusive thoughts about violence to sleep difficulties in adolescents. We expect that adolescents' responses to intrusive thoughts about violence will parallel adults' responses based on evidence that children and adolescents exposed to stressors such as war, emotional abuse, and physical abuse manifest the classical symptoms of PTSD, including intrusive re-experiencing, avoidance of stimuli associated with the stressor and hyper-arousal (Shaw, 2000).

The present study extends the literature in this area by focusing on the relationship between intrusive thoughts and sleep problems among adolescents living in urban communities characterized by poverty and violence. We hypothesized that youth experiencing elevated intrusive thoughts about violence also would report more sleep difficulties than youth experiencing relatively few intrusive thoughts. It is possible, however, that associations between intrusive thoughts and sleep disturbance might be stronger in youth than in adults given that their coping strategies are less well developed and youth typically have less control over their environments than do adults. For example, researchers have shown that adolescents use fewer cognitive coping strategies than do adults (Garnefski, Legerstee, Kraaij, van den Kommer, & Teerds, 2002). Cognitive coping strategies are particularly important when environments are less amenable to change (Lazarus & Folkman, 1984).

The current study

The current study extends prior literature linking exposure to violence and sleep problems in adolescents in several ways. First, we test a social cognitive processing model that potentially illuminates the processes by which violence exposure affects sleep problems. We hypothesize that adolescents who witness or directly experience violence in their community will report higher levels of social constraints in talking about violence. These constraints, in turn, affect the extent to which adolescents experience intrusive thoughts about violence, which in turn affect sleep difficulties. If supported, this model can provide a direction for reducing sleep difficulties among youth exposed to violence. Second, we test this model using a 4-wave longitudinal design to establish causal ordering of the variables. Thus, the model includes exposure to community violence at wave 1, social constraints in talking

about violence at wave 2, intrusive thoughts about violence at wave 3, and sleep problems at wave 4. The statistical analysis controls for previous levels of sleep problems, social constraints, and intrusive thoughts, as well as child sex, age, family structure, other non-violent life events, intervention condition, and school. Thus, we test how exposure to violence affects changes in social and cognitive processing variables, which in turn affect changes in sleep problems, while accounting for potential confounds.

Methods

Overview

Data for this study were collected as part of a multisite, multi-wave two-group randomized controlled trial. The trial tested the efficacy of a behavioral intervention designed to promote adjustment among youth exposed to violence using expressive writing (Lepore & Smyth, 2002). In the experimental arm of the trial, youth wrote for 20 minutes once a week for six sessions about their thoughts and feelings related to violence. In the attention control arm of the trial, youth wrote for the same amount of time and number of sessions as the intervention group, but focused on non-emotional topics that were unrelated to violence (e.g., daily routines, eating and physical activities). Preliminary analyses indicate no intervention effects on any of the variables reported in this study, but to be conservative we accounted for intervention condition and school in the statistical models.

Participants

Participants were 362 7th grade students from two urban public middle schools, one in Philadelphia, PA and one from the greater Richmond, VA area who reported witnessing or directly experiencing some violence in the community. The schools had a high percentage of students from low-income families with between 61% (Richmond) and 81% (Philadelphia) meeting the eligibility requirement for the federal free or reduced-price lunch program. During 2008-09 44.6% of students nationwide were eligible for a free or reduced price lunch (http://nces.ed.gov/programs/digest/d10/tables/dt10_044.asp). The larger study had a 77% recruitment rate. The mean age of the sample was 12.45 yrs (*SD* = 0.59 yrs) and slightly less than half (48.9%) of the sample was male. More than half of the sample (51%) identified as Latino/a. In terms of race, 34% of the sample identified as black / African American, 8% identified as white, 5% as American Indian, and 6% identified as Asian. The remainder of the sample endorsed multiple ethnicities or chose not to respond. Over a third of the sample (37.6%) resided in a single-parent household.

Procedures

The Institutional Review Board at the study institutions approved study procedures. The measures were administered using a computer-assisted survey interview (CASI, Sawtooth Software, Inc.). Each respondent was provided with a headset-equipped laptop and completed the CASI during a class period. Via CASI, the respondent can hear and read each question on the laptop before selecting an answer. Data were collected from two cohorts of youth beginning in fall, 2008 and continuing to spring, 2011. Data were collected in October during the fall semester of the 7thgrade (Wave 1 = W1); at the end of the spring semester (May) of the 7th grade (Wave 2 = W2); during the middle of fall semester (October) of the

8th grade (Wave 3 = W3); and at the end of the spring semester (May) of the 8th grade (Wave 4 = W4).

Measures

Community violence—Exposure to community violence was assessed at W1 using a modified version of the Survey of Children's Exposure to Community Violence (Richters & Saltzman, 1990). This self-report index assesses the frequency with which a child has directly experienced (10 items) (e.g., "hit, slapped, or punched" "chased by gangs or older kids") or witnessed (13 items) (e.g., "seen someone threatened with serious physical harm") violence. Although this is called a measure of community violence, some of the items could refer to violence experienced in the home, possibly by parents or other relatives, or at school. Thus, it is a broad measure of violence exposure. Respondents indicated how often (1 = never to 6 = 20 or more times) they had been directly victimized or witnessed violence during the past year. Items were summed to create victimization and witnessing scores. This measure has been used in dozens of studies of violence exposure and has strong validity (Fowler et al., 2009).

Social constraints in talking about violence—Level of social constraints for discussing violence was assessed with an adapted version of the *Social Constraints Scale* (Lepore & Revenson, 2007; Lepore, Silver, Wortman, & Wayment, 1996). This 5-item scale was adapted by making items specific to children's perceive constraints in talking about violence with a parent or other significant adult (e.g., "When you talk with a parent or guardian about violence or aggression you have seen or that has happened to you, how often do they give you the idea that they don't want to hear about it?"). Response options range from 1 (never) to 4 (often). Items were summed to create a total constraint score. Cronbach alphas in the present study were acceptable (α=0.80 at both W1 and W2).

Intrusive thoughts—Intrusive thoughts were measured with the 4-item Intrusions subscale of the *Children's Revised Impact of Events Scale* (CRIES; Giannopoulou et al., 2006). Respondents are asked to think about the violence they experienced and rate the extent to which they experienced symptoms (e.g., Did you think about it, the violence or aggression you've seen or experienced, even when you didn't mean to?) in the past two weeks. Responses were scored 0 (not at all), 1 (rarely), 3 (sometimes) or 5 (often). Higher scores reflected more intrusive thinking. The CRIES had good reliability and validity (Giannopoulou et al., 2006).Cronbach alphas in the present study were acceptable (α = 0.85 at W2; α = 0.79 at W3).

Sleep problems—Sleep problems were measured with the Sleep/Wake Behavior Problems scale (Wolfson & Carskadon, 1998). This validated, 10-item self-report measure assesses the frequency (1 = never to 5=everyday/night) with which a child experiences erratic sleep-wakebehaviors (e.g., "extremely hard time falling asleep,""felt tired, dragged out or sleepy during the day") over theprior two weeks. Cronbach's alpha was acceptable (α = 0.77 at W1; α = 0.81 at W2; α = 0.79 at W3; α = 0.82at W4). Data from Waves 1 to 3 was summed to create an index of prior sleep problems. Students also reported on their usual bedtime and wake time on school days, the number of hours they typically slept per night on

school days, sleep latency (the length of time it took to fall asleep), and number of times waking up per night.

Control variables—Life events, child age, child sex, family structure (whether or not the child lived in a single parent household), intervention condition (experimental vs. control), and school were controlled in the models. Life events were assessed using nine items that reflected potential stressors in the child's family and home life other than violence exposure over the past year. Sample items included moving, family members marrying, new babies coming into the family, serious illness of family members, death of family members or close friends, property damage, and changing schools. Respondents indicate the presence or absence of the event; items were summed to create a total score.

Results

Attrition analyses

Overall, 79.8% of the participants were retained across the 4 waves of the study. Extensive mobility in these urban communities contributed to the attrition rate. Participants missing data on Wave 4 were compared with participants who completed the other waves of data on demographics and sleep problems, Wave 1 social constraints, Wave 2 intrusive thoughts, and life events. There were no sex, X^2 (1) = 0.11, $p > .10$ or family structure, X^2 (1) = 3.11, $p > .05$ differences in attrition, but older youth, $t(360) = 2.28$, $p < .05$ were more likely than younger youth to drop out of the study. Youth who remained in the study versus youth who dropped out had a similar level of social constraints, $t(353) = 0.01$, $p > .10$, intrusive thoughts, $t(335) = 0.93$, $p > .10$, and life events, $t(360) = 1.26$, $p > .10$, but had a lower level of sleep problems, $t(359) = 3.48$, $p < .001$. Overall these analyses indicate a slight tendency for youth who were more vulnerable to attrit.

Descriptive statistics and correlations among study variables

Means, standard deviations and Pearson correlations among the study variables are presented in Table 1. There was moderate cross-time stability in social constraints, intrusive thoughts, and sleep-wake problems. Both victimization and witnessing violence were positively associated with social constraints, intrusive thoughts, and sleep problems, as well as with life events. Sleep problems were positively associated with social constraints and intrusive thoughts, as well as with life events.

Regarding exposure to violence, hearing gunfire when in or near the home was the most frequent type of exposure, with over two-thirds (70.6%) of youth reporting this in the previous year. Seeing people using or selling drugs (61.1%), seeing someone beaten up or mugged (60.5%), being slapped, hit, or punched (50.8%), seeing others threatened with serious harm (45.3%), and seeing people shot (21.3%) were very common.

In terms of sleep behavior, usual bedtime on school days varied from 7:00 pm to after midnight, with a median of 10:30 pm. Usual waking time on school days varied from before 5 am up to 8 am, with a median of 7:00 am. Students slept an average of 7.48 hrs (SD = 1.68 hrs; range 2-12 hours) on school nights. Sleep latency ranged from 5 min to over 1 hour,

with two-thirds of the sample reporting falling asleep within 15 min or less. Most students (73.6%) reported waking up at least once per night.

Overview of path analyses

A path analysis was run in Mplus version 7.2 (Muthen & Muthen, 2014) to test the hypotheses that exposure to community violence, assessed at baseline, would be positively associated with changes in constraints in talking about violence, which in turn would be positively associated with intrusive thoughts about violence, which would affect sleep difficulties. The model controlled for prior levels of sleep problems, social constraints, and intrusive thoughts, as well as child sex, age, family structure, other non-violent life events, intervention condition, and school. Several goodness-of-fit indices were used to evaluate model fit, including the comparative fit index (CFI; Bentler, 1992) and the root mean square error of approximation (RMSEA; Browne & Cudeck, 1993). Models with a RMSEA value below 0.08 and/or a CFI value of 0.95 (Hu & Bentler, 1999, Yu, 2002) or greater were considered to have good fit.

Figure 1 displays the results of the path model. The data fit of the model adequately (N = 327; $\chi^2(23) = 40.05$, $p < .05$; RMSEA = .048; CFI = .943). As shown in figure 1, when both forms of exposure to violence are included in the model, witnessing violence, but not direct victimization at Wave 1 was positively associated with constraints in talking about violence at Wave 2, controlling for Wave 1 constraints, which in turn were associated with intrusive thoughts about violence at Wave 3, controlling for Wave 2 intrusive thoughts, which were associated with sleep problems at Wave 4, controlling for prior sleep problems, life events, demographic variables, intervention condition, and school. When models only included victimization or only included witnessing violence, model fit also was adequate and both forms of exposure to violence were significantly associated with changes in social constraints.

Discussion

Millions of adolescents are exposed to community violence each year, and this exposure is associated with elevated levels of sleep problems in adolescence, which contributes to poor mental and physical health and impaired academic performance. However, there is a dearth of literature examining the underlying reasons for associations between exposure to violence and sleep difficulty. The purpose of this study was to test a social cognitive processing model linking exposure to community violence and the significant public health problem of sleep difficulties among early adolescents. Our longitudinal data supported a model whereby witnessing violence in the community was associated with higher constraints in talking about violence, which in turn was associated with greater intrusive thoughts about violence, which then contributed to greater sleep difficulties. The influences of life events and living in a single parent household, as well as intervention condition, school, and previous levels of constraints, intrusive thoughts, and sleep difficulties, were statistically controlled in the analysis. Notably, when both directly experiencing and witnessing community violence were included in the same model, only witnessing violence was significantly associated with social constraints in talking about violence.

These findings contribute to the literature on the consequences of exposure to violence in youth and on the growing body of research examining correlates of sleep difficulties in adolescents. Previous research has linked exposure to violence with intrusive thoughts, and intrusive thoughts about violence with internalizing difficulties (Kliewer et al., 1998). This is the first report to demonstrate how both social and cognitive processing of experiences of violence might unfold over time among urban early adolescents and affect sleep. These findings indicate the importance of indirect exposure to violence in explaining adolescents' sleep difficulties, and the necessity of assisting youth in processing these experiences socially and psychically.

Importantly, our data indicate that witnessing community violence contributed to sleep difficulties even after accounting for victimization experiences and non-violent events in the adolescent's life. Our data suggest that witnessing violence in urban communities is quite common; indeed, over two-third of the adolescents in our sample reported hearing gunfire in or near their home, and rates of other types of violence were also alarmingly high. Adolescents who witnessed more violence felt more constraints in talking about it with their parents. Although we did not assess the reasons for these constraints, several factors likely contribute to this observed association. As noted by Dinizulu et al. (2014) concerns about threats to autonomy may be one reason adolescents do not talk with parents about the violence they witness. Research has shown that in dangerous neighborhoods parents restrict the activities of their children (Weir, Etelson, & Brown, 2006). Given the push for autonomy in adolescence (Baumrind, 2005), the desire for freedom and fear of restriction may "win out" over wanting to share experiences with parents. A second reason for non disclosure involves concerns about the reactions of the adult (Dinizulu et al., 2014; Ozer & Weinstein, 2004). Future research might build on our work and that of Dinizulu et al. (2014) by examining factors that increase or decrease the likelihood that youth who witness violence disclose these experiences to significant adults. This would help identify youth at greater or lesser risk for cognitively processing their experiences.

Although peer relationships are quite important to adolescents (Furman & Buhrmester, 1992), encouraging adolescents to talk with their peers about violence they have witnessed or experienced may not be a good idea. Literature on the benefits of peer support during adolescence is equivocal (Cauce et al., 1996), perhaps because adolescents are not as competent as adults at helping youth cognitively process thoughts and feelings, and are not as able to take a broad perspective given their level of development.

The present results also suggest that constraints in talking about violence may inhibit cognitive processing, leading to elevations in intrusive thoughts about the victimization experience. Our data builds on research documenting elevated depressive and anxious symptoms among youth with intrusive thoughts about violence (Kliewer et al., 1998), extending this work to include sleep difficulties. The importance of sleep to the health and well-being of individuals across the lifespan has gained national attention (Kelly & El-Sheikh, 2014; http://www.cdc.gov/features/dssleep/). Our data highlight the ways in which exposure to violence might affect sleep difficulties via intrusive thoughts about violence.

Although we used a longitudinal design and controlled for plausible alternative explanations for our findings, our study was based on self-report data. Although self-report data is the most reliable source of information for exposure to violence, social constraints, and intrusive thoughts, the study could have benefitted from additional data on sleep problems from other reporters or experimental methods. Further, our constraints measure only included questions on the adolescent's parent and not other adults, and did not ask about the extent to which adolescents talked with their parents in general.

In the absence of eliminating community violence, which would be the most effective intervention, our data suggest that helping youth who witness or experience violence to process their experiences and thus reduce intrusive thoughts may partially assist in reducing sleep difficulties. Interventions might focus on individual adolescents exposed to violence to help them "work through" their experiences without unduly raising their anxiety. Along these lines, educating school counselors or others working directly with youth in community-settings about how to assist youth in processing responses to witnessing or directly experiencing violence might be an important step. Interventions might also focus on groups of adolescents witness violence or who are victimized. In particular, cognitive-behavioral therapy (CBT) approaches may be effective. A substantial body of evidence suggests that CBT approaches are effective for addressing intrusive thoughts and anxiety in adolescents (Kendall et al., 2006), and emerging evidence suggest it may be effective for addressing sleep-related problems (de Bruin et al., 2014). Another strategy might be to intervene with families. Family-focused interventions might take two forms. One type of approach might be to work to improve communication between parents and adolescents by educating parents in how to listen to and respond to their children's concerns about violence they see and experience, and using experiential approaches to practice active listening skills. A second approach might be to assist parents in processing their own response to trauma. Recent data suggests that parents' mental health and parenting behavior are affected by their own victimization and stressful life experiences (Borre & Kliewer, 2014). Thus, assisting parents with their own cognitive processing and coping skills might help children by making parents more sensitive and responsive to their children's needs. However, because youth in violence-ridden neighborhoods may have to cope with unsupportive and negative parental responses to their disclosures about violence (Dinizulu, 2014; Kaynak et al, 2011), interventions that can enhance cognitive control may be more effective than interventions addressing social conditions.

Conclusion

The present study contributes to our understanding of how exposure to community violence – a reality affecting millions of adolescents in the United States and around the world – is linked to sleep difficulties (Singh & Kenney, 2013), which also is a growing issue related to mental health, physical well-being, and cognitive functioning. Unfortunately, exposure to violence and the associated difficulties with sleep disproportionately affect youth who are poor and thus have the fewest resources to combat these issues. We demonstrated, using longitudinal data with controls for prior levels of constructs and competing hypotheses, that witnessing violence in the community was related to constraints in talking about violence with parents, which in turn was associated with intrusive thoughts about violence, which

was associated with sleep difficulties. Thus, our work contributes to an understanding of the social and cognitive processes linking exposure to violence and sleep difficulties during early adolescence. Building on prior theory (Kliewer et al., 1998; Lepore et al., 1996) and empirical research on social constraints, intrusive thoughts and/or adjustment in adolescents exposed to violence (Dinizulu et al., 2014; Kaynak et al., 2011; Ozer & Weinstein, 2004), our work suggests several avenues for possible intervention to improve the sleep outcomes in youth who are exposed to violence. These include youth-focused, family-focused, or school-counselor focused approaches to reduce social constraints in talking about violence and reduce intrusive thoughts about violence without unduly raising anxiety.

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References

American Psychiatric Association. Diagnostic and statistical manual of mental disorders, fifth edition. American Psychiatric Association; Arlington, VA: 2013.

Baum A, Cohen L, Hall M. Control and intrusive memories as possible determinants of chronic stress. Psychosomatic Medicine. 1993; 55:274–286. [PubMed: 8346335]

Baumrind D. Patterns of parental authority and adolescent autonomy. New Directions for Child and Adolescent Development. 2005; 108:61–69. DOI: 10.1002/cd.128. [PubMed: 16121897]

Bennett, TH.; Dunkel-Schetter, C. Negative social reactions to victims: An overview of responses and their determinants. In: Montada, L.; Filipp, SH.; Lerner, MJ., editors. Life crises and experiences of loss in adulthood. Lawrence Erlbaum Associates; Hillsdale, NJ: 1992. p. 497-518.

Bentler PM. On the fit of models to covariances and methodology to the Bulletin. Psychological Bulletin. 1992; 112:400–404. [PubMed: 1438635]

Berset M, Elfering A, Luthy S, Luthi S, Semmer NK. Work stressors and impaired sleep: rumination as a mediator. Stress and Health. 2010; 27:e71–e82. DOI: 10.1002/smi.1337.

Borre A, Kliewer W. Parental Strain, Mental Health Problems, and Parenting Practices: A Longitudinal Study. Personality and Individual Differences. 2014; 68:93–97. http://dx.doi.org/10.1016/j.paid.2014.04.014. [PubMed: 24976666]

Browne, MW.; Cudeck, R. Alternative ways of assessing model fit. In: Bollen, KA.; Long, JS., editors. Testing Structural Models. American Book; Newbury Park, CA: 1993.

Buckhalt JA, El-Sheikh M, Keller PS, Kelly RJ. Concurrent and longitudinal relations between children's sleep and cognitive functioning: The moderating role of parent education. Child Development. 2009; 80:875–892. doi: 10.1111/j.1467-8624.2009.01303.x. [PubMed: 19489909]

Buckhalt, JA.; Staton, LE. Children's sleep, cognition, and academic performance in the context of socioeconomic status and ethnicity. In: El-Sheikh, M., editor. Sleep and development: Familial and socio-cultural considerations. Oxford University Press; New York, NY: 2011. p. 245-264.doi: 10.1093/acprof:oso/9780195395754.003.0011

Cauce, AM.; Mason, C.; Gonzales, N.; Hiraga, Y. Social support during adolescence: Methodological and theoretical considerations. In: Hurrelmann, K.; Hamilton, SF., editors. Social problems and social contexts in adolescence. Perspectives across boundaries. de Gruyter; Hawthorne, NY: 1996. p. 131-151.

Clark LF. Stress and the cognitive-conversational benefits of social interaction. Journal of Social and Clinical Psychology. 1993; 12:25–55. doi: 10.1521/jscp.1993.12.1.25.

Curcio G, Ferrara M, DeGennaro L. Sleep loss, learning capacity and academic performance. Sleep Medicine Review. 2006; 10:323–337. DOI: 10.1016/j.smrv.2005.11.001.

Danielsson NS, Harvey AG, MacDonald S, Jansson-Frojmark M, Linton SJ. Sleep disturbance and depressive symptoms in adolescence: The role of catastrophic worry. Journal of Youth and Adolescence. 2013; 42:1223–1233. doi: 10.1007/s10964-012-9811-6. [PubMed: 22968332]

de Bruin EJ, Oort FJ, Bögels SM, Meijer AM. Efficacy of Internet and Group-Administered Cognitive Behavioral Therapy for Insomnia in Adolescents: A Pilot Study. Behavioral sleep medicine. 2014; 12:235–254. [PubMed: 23767888]

Dinizulu SM, Grant KE, McIntosh JM. The Influence of Nondisclosure on the Mental Health of Urban African-American Adolescents Exposed to Community Violence. Journal of prevention & intervention in the community. 2014; 42:208–220. [PubMed: 25050605]

Fowler PJ, Tompsett CJ, Braciszewski JM, Jacques-Tiura JJ, Baltes BB. Community violence: A meta-analysis on the effect of exposure and mental health outcomes of children andadolescents. Development and Psychopathology. 2009; 21:227–259. doi: 10.1017/S0954579409000145. [PubMed: 19144232]

Furman W, Buhrmester D. Age and sex differences in perceptions of networks of personal relationships. Child Development. 1992; 63:103–115. doi: 10.2307/1130905. [PubMed: 1551320]

Garnefski N, Legerstee J, Kraaij V, van den Kommer T, Teerds J. Cognitive coping strategies and symptoms of depression and anxiety: a comparison between adolescents and adults. Journal of Adolescence. 2002; 25:603–611. doi:10.1006/jado.2002.0507. [PubMed: 12490178]

Giannopoulou I, Smith P, Ecker C, Strouthos M, Dikaiakou A, Yule W. Factor structure of the Children's Revised Impact of Event Scale (CRIES) with children exposed to earthquake. Personality and Individual Differences. 2006; 40:1027–1037. doi: 10.1016/j.paid.2005.11.002.

Hall M, Buysse DJ, Dew MA, Prigerson HG, Kupfer D, Reynolds CF. Intrusive thoughts and avoidance behaviors are associated with sleep disturbances in bereavement-related depression. Depression and Anxiety. 1997; 6:106–112. [PubMed: 9442984]

Henson JM, Derlega VJ, Pearson MR, Ferrer R, Holmes K. African American students' responses to racial discrimination: How race-based rejection sensitivity and social constraints are related to psychological reactions. Journal of Social and Clinical Psychology. 2013; 32:504–529.

Horowitz, MJ. Stress-response syndromes: a review of post-traumatic stress and adjustment disorders. In: Wilson, JP.; Raphael, B., editors. International handbook of traumatic stress syndromes. Plenum; New York, NY: 1993. p. 49-60.B

Hu L, Bentler PM. Cutoff criteria for fit indexes in covariance structure analysis: conventional criteria versus new alternatives. Structural Equation Modeling. 1999; 6:1–55. doi: 10.1080/10705519909540118.

Kaynak OI, Lepore SJ, Kliewer W. Social support constraints moderate the relation between community violence exposure and depressive symptoms in an urban adolescent sample. Journal of Social and Clinical Psychology. 2011; 30:250–269. doi: 10.1521/jscp.2011.30.3.250.

Kelly RJ, El-Sheikh M. Reciprocal relations between children's sleep and their adjustment over time. Developmental Psychology. 2014; 50:1137–1147. doi: 10.1037/a0034501. [PubMed: 24188035]

Kendall PC, Robin JA, Hedtke KA, Suveg C, Flannery-Schroeder E, Gosch E. Considering CBT with anxious youth? Think exposures. Cognitive and Behavioral Practice. 2006; 12:136–148.

Kliewer W, Lepore SJ, Oskin D, Johnson PD. The role of social and cognitive processes in children's adjustment to community violence. Journal of Consulting and Clinical Psychology. 1998; 66:199–209. doi: 10.1037/0022-006X.66.1.199. [PubMed: 9489275]

Kliewer W, Zaharakis N. Community violence exposure, coping, and problematic alcohol and drug use among urban, female caregivers: A prospective study. Personality and Individual Differences. 2013; 55:361–66. doi: 10.1016/j.paid.2013.03.020. [PubMed: 24039324]

Lazarus, RS.; Folkman, S. Stress, appraisal, and coping. Springer; New York, NY: 1984.

Lepore SJ, Kliewer W. Violence exposure, sleep disturbance, and poor academic performance in middle school. Journal of Abnormal Child Psychology. 2013; 41:1179–1189. doi: 10.1007/s10802-013-9709-0. [PubMed: 23315234]

Lepore SJ, Revenson TA. Social constraints on disclosure and adjustment to cancer. Social and Personality Psychology Compass. 2007; 1:1–21. doi: 10.1111/j.1751-9004.2007.00013.x.

Lepore, SJ. A social-cognitive processing model of emotional adjustment to cancer. In: Baum, A.; Andersen, B., editors. Psychosocial interventions for cancer. APA; Washington, DC: 2001. p. 99-118.doi: 10.1037/10402-006

Lepore SJ, Fernandez-Berrocal P, Ragan J, Ramos N. It's not that bad: Social challenges to emotional disclosure enhance adjustment to stress. Anxiety, Stress, and Coping: An International Journal. 2004; 17:341–261. doi: 10.1080/10615800412331318625.

Lepore, SJ.; Smyth, J., editors. The Writing Cure: How Expressive Writing Influences Health and Well-Being. American Psychological Association; Washington, DC: 2002. doi: 10.1037/10451-000

Lepore SJ, Silver RC, Wortman CB, Wayment HA. Social constraints, intrusive thoughts, and depressive symptoms among bereaved mothers. Journal of Personality and Social Psychology. 1996; 70:271–282. doi: 10.1037/0022-3514.70.2.271. [PubMed: 8636882]

Meldrum RC, Barnes JC, Carter H. Sleep deprivation, low self-control, and delinquency: A test of the strength model of self-control. Journal of Youth and Adolescence. (in press). doi: 10.1007/s10964-013-0024-4.

Mosher C, Lepore SJ, Wu L, Austin J, Valdimarsdottir H, Rowley S, Rini C. Social correlates of distress following hematopoietic stem cell transplantation: Exploring the role of loneliness and cognitive processing. Journal of Health Psychology. 2012; 17:1022–32. doi: 10.1177/1359105311432490. [PubMed: 22253329]

Muthen, LK.; Muthen, BO. Mplus User's Guide. Muthen & Muthen; Los Angeles, CA: 2014.

Ozer EJ, Weinstein RS. Urban adolescents' exposure to community violence: The role of support, school safety, and social constraints in a school-based sample of boys and girls. Journal of Clinical Child and Adolescent Psychology. 2004; 33:463–476. doi: 10.1207/s15374424jccp3303_4. [PubMed: 15271604]

Pasipanodya EC, Parrish BP, Laurenceau J-P, Cohen LH, Siegel SD, Graber EC, Belcher AJ. Social constraints on disclosure predict daily well-being incouples coping with early-stage breast cancer. Journal of Family Psychology. 2012; 26:661–667. doi: 10.1037/a0028655. [PubMed: 22686265]

Richters, JE.; Saltzman, W. Survey of children's exposure to community violence: Parent report and self-report version. National Institute of Mental Health; Bethesda, MD: 1990.

Shaw JA. Children, adolescents and trauma. Psychiatric Quarterly. 2000; 71:227–243. [PubMed: 10934747]

Singh, GK.; Kenney, MK. Rising Prevalence and Neighborhood, Social, and Behavioral Determinants of Sleep Problems in US Children and Adolescents, 2003–2012. Sleep Disorders. 2013. Article ID 394320. http://dx.doi.org/10.1155/2013/394320

Smaldone A, Honig JC, Byrne MW. Sleepless in America: inadequate sleep and relationships to health and wellbeing of our nation's children. Pediatrics. 2007; 119:S29–S37. doi: 10.1542/peds.2006-2089F. [PubMed: 17272582]

Taylor TR, Huntley ED, Makambi K, Sween J, Adams-Campbell LL, Frederick W, Mellman TA. Understanding sleep disturbances in African – American breast cancer survivors: a pilot study. Psycho-Oncology. 2012; 21:896–902. doi: 10.1002/pon.2000. [PubMed: 21648016]

Weir LA, Etelson D, Brand DA. Parents' perceptions of neighborhood safety and children's physical activity. Preventive Medicine: An International Journal Devoted to Practice and Theory. 2006; 43:212–217. doi: 10.1016/j.ypmed.2006.03.024.

Wolfson AR, Carskadon MA. Sleep schedules and daytime functioning in adolescents. Child Development. 1998; 69:875–887. doi: 10.2307/1132351. [PubMed: 9768476]

Wolfson AR, Carskadon MA. Understanding adolescents' sleep patterns and school performance: a critical appraisal. Sleep Medicine Reviews. 2003; 7:491–506. DOI: 10.1016/S1087-0792(03)90003-7. [PubMed: 15018092]

You J, Lu Q. Social constraints and quality of life among Chinese-speaking breast cancer survivors: a mediation model. Quality of Life Research. 2014 DOI 10.1007/s11136-014-0698-4.

Yu, C. Unpublished doctoral dissertation. University of California; Los Angeles: 2002. Evaluating cutoff criteria of model fit indices for latent variable models with binary and continuous outcomes.

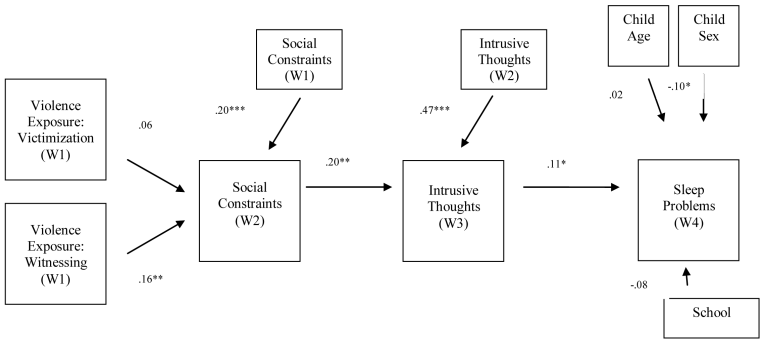

Figure 1.

Path model of longitudinal associations between exposure to community violence, social constraints in talking about violence, intrusive thoughts, and sleep problems, controlling for prior levels of constructs, life events, demographic variables, intervention condition, and school. $N = 327$; χ^2 (23) = 40.05, $p < .05$; RMSEA = .048; CFI = .943. * $p < .05$; ** $p < .01$; *** $p < .001$.

Table 1

Descriptive information on and correlations among study variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1.Victimization [a] (W1)	--	.44***	.34***	.20***	.21**	.15**	.28***	.20***	.19***	.02	.09	.09	.10	.02
2. Witnessing [a] (W1)		--	.29**	.25***	.30***	.22***	.40***	.30***	.34***	.07	−.08	.13*	.06	.27***
3.Social constraints (W1)			--	.27***	.26***	.27***	.16**	.12*	.12*	.03	.04	−.02	.07	.13*
4.Social constraints (W2)				--	.32***	.33**	.24***	.20***	.09	.01	−.02	.01	.03	.09
5.Intrusive thoughts (W2)					--	.51***	.20***	.27***	.10	−.04	−.11*	.05	.03	.01
6.Intrusvie thoughts(W3)						--	.19***	.22***	.06	−.12	−.07	.01	.02	.03
7.Sleep problems (Composite W1-W3)							--	.64***	.24***	.10*	−.21***	.09	.12*	−.06
8.Sleep problems (W4)								--	.18***	.10	−.24***	.07	.07	−.08
9.Life events (W1)									--	.18***	−.10	.06	.05	.14**
10.Age										--	.03	.03	.06	−.03
11.Sex											--	−.01	.03	.04
12. Family Structure												--	.03	.01
13.Condition													--	.02
14.School														---
M	8.79	12.99	7.20	7.44	3.63	2.75	21.45	20.85	3.56	12.45	48.9%	37.6%	50%	78.7%
SD	1.24	1.60	3.26	3.36	4.84	4.33	6.32	7.28	1.90	0.59				

Note. W1 = Wave 1, fall of 7th grade; W2 = Wave 2, spring of 7th grade; Wave 4 = Wave 4, spring of 8th grade. Family structure was coded 0 = two-parent home, 1 = single-parent home. Sex was coded 0 = female, 1 = male. Condition was coded 0 = control, 1 = experimental. School was coded 0 = Richmond, 1 = Philadelphia.

[a]Log transformed. *N*s range from 277 to 362 due to missing data.

*$p < .05$;

**$p < .01$;

***$p < .001$.

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