

The Comparative Impact of Different Forms of Violence Exposure in Youth on Long-Term Adult Outcomes

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Abstract

Violence exposure during childhood and adolescence is associated with a wide range of negative emotional and behavioural outcomes. Despite an extensive body of research, there are numerous problems with respect to how violence exposure has been operationalized and measured; design and methodology (i.e., cross-sectional or short-term longitudinal studies); limited outcome measures; and overall conflicting findings. Further, there is a paucity of research examining the effects of violence exposure during youth on long-term adult outcomes. Given the considerable individual variability that exists with respect to the effects of violence exposure, longitudinal research is needed to clarify the comparative impact of different types of violence exposure across locations. Using a large and racially diverse community sample ($n = 753$; male = 58%; Black = 46%), the current longitudinal study aimed to elucidate the comparative and cumulative effect of different types of violence exposure (witnessing versus victimization) across different locations (home, school, neighbourhood) occurring during youth (lifetime through grade 8) on long-term adult (age 25) outcomes of internalizing, externalizing, and attention problems; substance use; and intimate partner violence perpetration. Results indicated that victimization, but not witnessing violence, predicted all five adult outcomes. More specifically, being victimized in the home setting was associated with the widest range of negative outcomes (internalizing, externalizing, and attention problems), while school victimization was specifically associated with substance use problems in adulthood. The nature and severity of direct victimization may put youth at greater risk for developing emotional and behavioural dysregulation, and the home and school settings appear to be important contexts for adolescent development. Additionally, when youth experienced multiple types of violence across multiple locations (cumulative violence exposure), they experienced a broader and more diverse range of

negative outcomes in adulthood. This study extended existing research on the effects of violence exposure during childhood and adolescence. Taking a life-course perspective, these findings demonstrate that violence exposure has long-term negative effects evident well into adulthood, with victimization at home and school as more robust predictors of negative adult outcomes than exposure to neighbourhood violence. Based on these findings, preventing and effectively addressing youth victimization, especially at home and school, must be a top research, practice, and policy priority.

Key words: witnessing violence; victimization; cumulative violence exposure; adult psychopathology

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Chapter 1.

Introduction

Violence exposure during child and adolescence is a significant public health problem, associated with a wide range of negative effects on mental health and psychosocial adjustment (Hooven, Nurius, Logan-Greene, & Thompson, 2012). Since the late 1980s, researchers have contributed to a significant and growing body of research examining the harmful effects of violence exposure (Fowler, Tompsett, Braciszewski, Jacques-Tiura, & Baltes, 2009). Although the negative outcomes associated with violence exposure during child and adolescence have received significant attention, numerous problems exist.

Studies often use different terms to describe violence exposure or they do not effectively articulate what is meant by violence exposure (Davies, Evans, & DiLillo, 2008). Further, our understanding of the impact of violence exposure has been limited by the compartmentalization of research into separate literatures (Margolin et al., 2009). For example, studies have investigated community violence exposure, exposure to domestic violence or marital aggression, peer victimization, and general violence exposure that lump together both witnessing and victimization. Violence exposure is often subsumed under the broader child abuse literature, and identifying distinct impacts is challenging. Further, many studies do not report information about the type or extent of violence to which youth are exposed. Because the construct has been operationalized in different ways, it is difficult to compare and generalize the findings.

For the purposes of this study, violence exposure will be defined as directly experiencing or witnessing physical violence in the home, school, or neighbourhood. Violence includes, but is

not limited to, threats of bodily harm; hitting, beating, and attacking with or without a weapon; gun violence; serious injury or death (Buka, Selner-O'Hagan, Kindlon, & Earls, 1996).

1.1 Limitations of Prior Research

In part because of different definitions and measures, the strength of the relationship between violence exposure and negative outcomes varies, and there are differences among individual studies, thus clouding the pattern of findings (Fowler et al., 2009). There is also a dearth of research investigating the impact of violence exposure type (witnessing versus victimization) and location (home, school, neighbourhood). Direct comparisons linking specific violence exposure types with specific outcomes are relatively rare. There is a need for additional research into the unique consequences of different types of violence exposure as a way to better understand the mechanisms of violence exposure impact (Margolin, Vickerman, Oliver, & Gordis, 2010). Wright, Fagan, and Pinchevsky (2013) also underscored this need to examine different forms of violence exposure separately (i.e., victimization at home versus witnessing parental violence in the home), given that different forms of violence exposure exert unique effects on different outcomes; "It seems important that future research attempt to better differentiate the forms of violence to which youth are exposed" (p. 11).

Another major limitation is that most studies have been retrospective or cross-sectional in nature. Longitudinal studies have typically investigated short-term effects (1-3 years) of violence exposure, and potential long-term effects are not well understood. Much of the research focuses on the impact on child and adolescent mental health and adjustment, neglecting adult outcomes. Further, even comprehensive longitudinal studies have only looked at two or three negative outcomes associated with violence exposure, whereas there is value in investigating a wide range

of outcomes within the same sample.

Research on complex trauma emphasizes interacting and potentially cascading symptoms that can lead to emotional dysregulation, guilt, distrust, and self-destructive behaviours (Cook et al., 2005). Margolin and colleagues (2010) point to cumulative exposure across types of violence as an understudied and crucial aspect of violence exposure. From a developmental risk-resilience perspective, greater risk is expected when violence interferes with multiple interpersonal domains of youths' lives (Margolin et al., 2010). There is unique value in investigating *both* independent and cumulative effects of violence exposure.

1.2 Violence Exposure Prevalence

Studies using large nationally representative samples in the United States have found that approximately 60% of children and adolescents age 17 and younger have been exposed to at least one violent act in the past year (Finkelhor, Ormord, & Hamby, 2009). Other prevalence estimates suggest that 50% to 96% of children and adolescents residing in urban areas are exposed to some form of violence (Stein, Jaycox, Kataoka, Rhodes, & Vestal, 2003). Although much of the research has focused on large urban areas, research conducted in rural settings showed that youth reported comparably high levels of violence exposure compared to youth in urban areas (Singer, Anglin, Song, & Lunghofer, 1995). Furthermore, Sullivan and colleagues (2004) found that 61% of adolescents in rural areas reported witnessing at least one violent act during their lifetime, and 45% witnessed multiple violent acts. In terms of different locations, approximately 24% of youth have been exposed to violence in the *home* at some point in their lives (Dong et al., 2004). The rates of witnessing violence in *school* range from 56% to 87%; victimization in school is lower, with 44% of youth reporting that they were threatened by a peer

at school (Flannery, 2004). Studies examining *community/neighbourhood* violence exposure have found that 70.3% of youth reported witnessing violence and 49.1% reported violence victimization (Itani, Fischer, & Chu, 2017).

1.3 Theory

Childhood and adolescence are times of significant change and transition; home, school, and neighbourhood environments have substantial impacts on developmental trajectories. According to stress and coping theories (Laumakis, Margolin, & John, 1998), violence exposure occurring at these times can have a significant impact on brain development, as well as the interpretation of the self, others, and the surrounding world. Research has focused on identifying biological correlates of psychosocial stress, such as violence exposure; these experiences are associated with maladaptive endocrine and metabolic changes resulting from the release of hormones such as cortisol and norepinephrine due to alterations in the hypothalamic-pituitary-adrenal axis (e.g., McCoy, 2013; Peckins, Dockray, Eckenrode, Heaton, & Susman, 2012). With increased levels of these hormones, especially over time, violence exposure has important effects on children's and adolescents' brain development in terms of structure, connectivity, and functioning (Gould, McEwen, Tanapat, Galea, & Fuchs, 1997). These effects are even seen on the cellular level, through changes in genetic transcription (Ganzel, Morris, & Wethington, 2010; McGowan et al., 2009).

These structural and functional changes in biology can manifest behaviourally in youth, including difficulties with self-regulation, memory and higher-order functioning; increased attention to threat cues; hyperarousal; and increases in reactivity and automaticity (Blair, 2010; Evans & Schamberg, 2009; Goldsmith, Pollack, & Davidson, 2008; Valentino & Van

Bockstaele, 2008). These changes directly impact the ways that youth exposed to violence react to and process environmental stimuli (De Bellis, 2005). That said, there are still considerable individual differences in psychosocial stress responses; how these underlying biological changes manifest is the consequence of numerous different but interrelated factors.

Other relevant theories include social learning (Bandura, 1976) and social cognitive (Bandura, 1986) theories. Violence may be learned through role models provided by family, peers, or other adults, either directly or indirectly, and is reinforced in childhood. This may continue into adulthood as a coping response to stress or as a method of conflict resolution or problem solving. Additionally, continued violence exposure may lead children to view violence as normative or as an acceptable way of interacting (Huesmann, 1988). These explicit beliefs may develop overtime and contribute to aggression and violence perpetration (Jouriles, McDonald, Mueller, & Grych, 2012). The cognitive contextual framework (Grych & Fincham, 1990) also emphasizes children's appraisals of the violence to which they witness or directly experience. A child's understanding and interpretation of violence is associated with later negative outcomes later. For example, the more that children perceive interparental conflict to threaten themselves, other family members, or the stability of the family, the more likely they are to experience internalizing problems (Grych, Jouriles, McDonald, & Fincham, 2000). Self-blame appraisals are also associated with negative outcomes and psychopathology (Grych et al., 2000).

Attachment theory (Bowlby, 1982) posits that the primary impact of violence exposure is relational. One of the core developmental tasks of infancy and early childhood is forming trusting, secure relationships with attachment figures (Van Horn & Lieberman, 2010). Children rely on their attachment figures to protect them from danger and make the world a safer and more predictable place. Violence exposure, especially in the home setting, can undermine

children's ability to form secure representations of their primary caregivers. By disrupting the developing trust that children have in their caregivers, resulting insecurities in both their attachments and other important relationships (e.g., peers) may arise. Furthermore, dimensions of parenting (e.g., parental monitoring, positive regard, warmth, harsh discipline) are associated with attachment security and stressors in the home, such as violence exposure (Braungart-Rieker, Garwood, Powers, & Wang, 2001), thus compounding the negative outcomes associated with violence exposure.

Other important considerations come from ecological models, emphasizing the importance of neighbourhood characteristics (Jackson, Posick, & Vaughn, 2019), youth gang affiliation (Forster, Grigsby, Unger, & Sussman, 2015), and individual factors (e.g., fetal alcohol spectrum disorders, psychopathic traits) (Denny, Coles, & Blitz, 2017).

Lastly, limited research has evaluated timing effects of violence exposure across different developmental periods (e.g., infancy, early childhood, middle childhood, adolescence, adulthood) (Dunn et al., 2020; Narayan, 2017). A developmental perspective involves viewing exposure to violence in the context of typical developmental processes and identifying the links between disrupted and typical development.

1.4 Effects of Violence Exposure

Violence exposure is often persistent across childhood and adolescence, and it can be diverse and unpredictable (Gorman-Smith, Henry, & Tolan, 2004; Lambert, Ialongo, Boyd, & Cooley, 2005). Violence exposure is a risk factor for a wide range of emotional and behavioural problems (Kliewer et al., 2004). It has been associated with significant levels of distress and psychopathology such as depression, anxiety, and posttraumatic stress disorder (PTSD) (see

Reijntjes et al., 2010, for a review). Other outcomes include aggression and future violent and sexual delinquency (Caputo et al., 1999; Chen et al., 2013). Furthermore, drug initiation and dependence, poor academic performance, and low self-esteem have been associated with violence exposure (Kliewer et al., 2004).

1.5 Violence Exposure and Internalizing Problems

A large number of studies have found a significant effect of violence exposure on internalizing problems, including depressive and anxious symptomatology, in children and adolescents (see Wilson & Rosenthal, 2003, for a review). A longitudinal study by Mrug and Windle (2008) investigated the effects of violence exposure using a sample of 603 children in grade 5, and found that violence exposure (i.e., any exposure to six types of violent acts in the past 12 months) was associated with internalizing problems 17 months later. Fowler and colleagues (2009) conducted a meta-analysis of 114 studies investigating the mental health outcomes of community violence exposure among youth. They found a moderate positive effect between community violence exposure and internalizing symptoms ($d = .45$). Another meta-analysis looking at 60 studies of domestic violence exposure found a moderate positive effect between domestic violence exposure and internalizing problems among youth ($d = .48$) (Evans, Davies, & DiLillo, 2008).

Some researchers have hypothesized that youth exposed to violence may come to learn that their world is dangerous and that they are unworthy of being kept safe (Margolin & Gordis, 2004), thus increasing negative self-perceptions and a sense of hopelessness. Similarly, while anxiety is an adaptive reaction to a threat, youth exposed to violence may continue to exhibit fear years later, as well as develop more generalized fears, such as fear for their personal safety and

the safety of loved ones (Burgers & Drabick, 2016). Overall, violence exposure is associated with self-regulation difficulties (i.e., ability to control, modulate, inhibit, and initiate thoughts, behaviours or emotions with the purpose of achieving a particular goal) (McCoy, 2003). Specifically, emotion-regulation difficulties may increase the likelihood of experiencing internalizing symptoms over time.

There is some inconsistency in the research, however, with numerous studies failing to find a relationship between violence exposure and internalizing symptoms (Cooley-Quille, Turner, & Beidel, 1995; Fitzpatrick, 1993; Singer et al., 1995). Researchers have argued that this reflects an adaptation whereby youth become desensitized to the emotional effects of the violence around them (Fowler et al., 2009). Such cognitive and emotional habituation to violence could result in decreases in depression and anxiety.

1.6 Violence Exposure and Externalizing Problems

Youth exposed to violence may also exhibit externalizing problems, including rule-breaking behaviour, aggression, and violence perpetration (McCabe et al., 2005). Mrug and Windle (2008) found that violence exposure also predicted externalizing symptoms 17 months later. Among 114 studies, Fowler and colleagues (2009) also found a moderate effect size ($d = .63$) between community violence exposure and externalizing problems among youth. In fact, they found that community violence exposure impacted externalizing problems more than internalizing problems. Similarly, Evans and colleagues (2008) found a moderate effect size ($d = .47$) between domestic violence exposure and externalizing problems in children/adolescents.

It has been hypothesized that rule-breaking and aggressive behaviours may arise through observation, modeling, and reinforcement, as youth come to learn that violence is a legitimate

and acceptable way of behaving and interacting. Violence exposure can also reinforce aggression and weaken disinhibition toward acting aggressively (McCabe et al., 2005). Further, violence exposure may normalize the use of aggressive behaviour, and may be viewed as an effective method of problem solving (Guerra, Huesman, & Spindler, 2003). Because Fowler and colleagues (2009) found greater effect sizes for community violence exposure and externalizing problems compared to internalizing problems, they suggested that violence exposure may disrupt behavioural control more than emotion regulation. That said, Lynch and Cicchetti (1998) point out that youth exhibiting externalizing behaviours may be more likely to be in environments that increase their exposure to violence, especially community violence.

1.7 Violence Exposure and Attention Problems

Other research has found a link between violence exposure and attention problems and attention-deficit/hyperactivity disorder (ADHD). Children who experience community violence victimization exhibit significantly greater difficulties in regulating attention compared to their peers (Gorman-Smith & Tolan, 1998; Osofsky, 1995). Children who are exposed to violence display both immediate and long-term disruptions in a wide range of functions related to memory, learning, and attention (Becker-Blease, Freyd, & Pears, 2004; Beers & De Bellis, 2002). Lewis et al. (2015) conducted a study using a large sample of 4,745 grade 5 students, and found that youth who reported both witnessing violence and victimization (measured as exposure to four types of violent events in the past 12 months) had more parent-reported ADHD symptoms and were more likely to meet predictive criteria for ADHD. Furthermore, girls exhibited a steeper increase in ADHD symptoms and higher probability of meeting criteria for a diagnosis of ADHD than did boys. Another study found that family violence exposure was associated with attention problems, but only for girls and not boys (Becker & McCloskey, 2002).

DePrince, Weinzierl, and Combs (2009) have hypothesized that chronic stress in the context of witnessing violence or being a victim of violence could impact brain regions responsible for attention, focus, and executive functioning. Youth may also engage in various cognitive strategies to avoid threat-related cues, which could contribute to changes in attention and information processing (DePrince et al., 2009). Overall, research supports the hypothesis that a trauma experience such as violence exposure is associated with neurobiological changes in response to the activation of stress response systems; this affects structures responsible for regulating attention and other meta-cognitions (Lewis et al., 2015).

1.8 Violence Exposure and Substance Use

There is significant research emphasizing the link between violence exposure and later alcohol and drug use (Finkelhor et al., 2009). A longitudinal study (Wright et al., 2013) examined the effects of violence exposure in the school, community, and home (defined as child abuse and intimate partner violence) at age 12 on youths' subsequent alcohol and marijuana use at age 15. The authors found that violence exposure increased the frequency of substance use 3 years later. Although the type of violence exposure was differentially associated with later substance use, the overall accumulation of violence exposure was associated with both alcohol and marijuana use. Using a cross-sectional design, Vermeiren, Schwab-Stone, Deboutte, Leckman, and Ruchkin (2005) investigated the relationship between community violence (witnessing and victimization) and substance use in a sample of 3,380 adolescents (14-17 years) living in the United States, Belgium, and Russia. Adolescents exposed to community violence reported higher levels of cigarette smoking, as well as alcohol, marijuana, and illicit drug use; these results did not vary significantly among the three countries (Vermeiren et al., 2005).

Although not directly investigated, researchers have hypothesized that substance use may be a means to relieve or cope with trauma-related symptoms associated with violence exposure (i.e., self-medication hypothesis; Khantzian 1997; Stewart 1996). It may be an avoidant coping strategy as a means of counteracting the stress and negative emotions produced by traumatic events (Kaufman, 2009). Further, substance use has also been conceptualized as a more deviant coping mechanism associated with other antisocial behaviours and negative emotions following violence exposure (Agnew, 2006; Foster & Brooks-Gunn, 2009).

1.9 Violence Exposure and Intimate Partner Violence

Researchers have found that violence occurring in family relationships predicts teen dating violence and later intimate partner violence (Jouriles, Wolfe, Garrido, & McCarthy 2006; Wolfe et al., 2005). The intergenerational transmission of violence explains that youth who witness interparental aggression in the family are more likely to experience and engage in intimate partner violence in subsequent intimate relationships (Black, Sussman, & Unger, 2009). Using a retrospective design, Roberts, Gilman, Fitzmaurice, Decker, and Koenen (2010) looked at data from 14,564 men aged 20 years or older, and found a strong association between witnessing intimate partner violence in childhood with later adult perpetration. Specifically, observing intimate partner violence in childhood increased the risk of later perpetration of intimate partner violence by 56% to 63%, depending on the severity of the intimate partner violence that was observed during childhood (Roberts et al., 2010).

Various theoretical perspectives have been used to explain the association between exposure to family violence and later intimate partner violence perpetration. Perhaps through social learning processes such as observational learning, violence is used as a “habitual

response” to conflict with romantic partners through mechanisms of learned behavior (Bandura, 1986). Further, youth who witness violence, especially family violence, may fail to develop prosocial attitudes and interpersonal boundaries, thereby putting them at risk for later intimate partner violence or sexual offending (Spaccarelli, Coatsworth, & Bowden, 1995). In many cases, youth may learn that violence is an effective means to resolve conflict with romantic partners or as a way to gain control (Ehrensaft et al., 2003). Repeatedly viewing violent behaviour between parents can lead children to view violence as acceptable or normative in romantic relationships (Riggs & O’Leary, 1989), and beliefs about the acceptability of intimate partner violence are also associated with intimate partner violence perpetration among adolescents (Reyes, Foshee, Niolon, Reidy, & Hall, 2016). That said, a recent study looked at whether these beliefs persist from adolescence to adulthood, and whether they continue to predict intimate partner violence perpetration. The authors found that acceptability of violence and intimate partner violence were not robust predictors of one’s own intimate partner violence perpetration (Shorey, Torres, Fite, Stuart, & Temple, 2018). These findings call into question the stability of acceptability beliefs, suggesting that they may not be a robust predictor of later intimate partner violence perpetration in adulthood.

Researchers have hypothesized that compared to boys who are not exposed to intimate partner violence, boys exposed to intimate partner violence are more likely to approve of violence, to believe that violence bolsters one’s reputation, and to justify the use of violence (e.g., Edleson, 1999; Roberts et al., 2010). Although sex differences are sometimes found, questions remain around the causes of dating violence between men and women (Jouriles et al., 2012). A recent longitudinal study, using a sample of 35,900 adolescents, found that although physical dating violence had decreased among youth, boys reported significantly higher rates of

physical dating violence victimization compared to girls (Shaffer, Adjei, Viljoen, Douglas, & Saewyc, 2018). Potential sex differences in teen dating violence and adult intimate partner violence need to be clarified, and additional research is needed to understand which theoretical models best explain male and female intimate partner violence perpetration (Jouriles et al., 2012).

1.10 Sex Differences

Although research has found sex differences in terms of both frequency and effects of violence exposure (Breslau & Anthony, 2007; Kessler, 1995), findings have been inconsistent and conflicting. Boys are exposed to violence more frequently than girls, and they are also more likely to be polyvictims (i.e., experiencing multiple forms of violence exposure) (Finkelhor et al., 2007b). Despite this, regardless of level of violence exposure, it has been shown that girls experience greater distress after experiencing violence compared to boys (Horowitz, Weine, & Jekel, 1995). Further, some studies have found that girls exposed to violence are more likely to report internalizing symptoms (e.g., depression, anxiety, hyperarousal) and boys more often report externalizing symptoms (e.g., aggression and conduct problems) (Buckner, Beardslee, & Bassuk, 2004; Sternberg, Lamb, Guterman, & Abbott, 2006). Kilpatrick et al. (2003) found that girls were 2.5 times more likely than boys to be diagnosed with co-occurring PTSD and a major depression episode, while boys were twice as likely as girls to be diagnosed with substance use problems.

One explanation for potential sex differences lies in sex-specific coping responses. After traumatic experiences, such as violence exposure, boys may have a higher probability of expressing anger and acting out aggressively. In contrast, girls are more likely to cope by

internalizing their responses and may exhibit fears/anxieties and mood disturbances (Hoffman & Su, 1997; Eschenbeck et al., 2007). That said, there is increasing evidence that girls may be vulnerable to *both* internalizing and externalizing behaviours following exposure to violence (Cooley-Strickland et al., 2009).

There are also distinct findings between boys and girls with respect to violence exposure type and location. Foster, Kuperminc, and Price (2004) reported that boys reported more distress from violence victimization compared to witnessing violence, whereas girls did not differ in their response to victimization or witnessing violence. In terms of violence exposure location, males generally report more community violence exposure than females (Selner-O'Hagan, Kindlon, Buka, Raudenbush, & Earls, 1998; Stein et al., 2003).

Despite some evidence of sex differences in the prevalence and effects of violence exposure, other studies have found no differences (e.g., Kaufman, 2009; McDonald & Richmond, 2008). Although there are conflicting reports of whether there are sex differences in children's emotional and behavioural reactions to violence exposure, it is still an important area to explore. From an ecological model, environmental influences and their interactions with individual factors (i.e., sex) may impact the likelihood of violence exposure and associated vulnerability and outcomes (Cooley-Strickland et al., 2009).

1.11 Effects of Violence Exposure on Adult Outcomes

Although many studies have investigated the negative effects of violence exposure during child and adolescence, few have considered a life-course perspective and examined long-term adult outcomes (i.e., age 21 or older). Oloffson, Lindqvist, Shaw, and Danielsson (2012)

conducted a 26-year prospective study looking at specific health consequences of violence exposure in adolescence. The researchers examined three cohorts (sample sizes were 396, 478, and 231, respectively) of Swedish individuals between 1974 and 2000. Violence exposure was measured using three questions and then combined and dichotomized such that any positive response was considered violence exposure (physical violence or threats). They found that women, but not men, who had been exposed to violence reported a heavy illness burden (i.e., symptoms and diseases including coughing, vomiting, chest pain, gall bladder problems, nervous troubles, high blood pressure, diabetes, cancer) and poor self-rated health. The authors acknowledged that the violence exposure measure was limited; it failed to capture different types of violence exposure and was likely an underestimate of the prevalence of exposure.

Hooven and colleagues (2012) examined the long-term effects of violence exposure on adult mental health in a sample of 123 individuals. The sample was a subset of a larger sample ($N = 849$) drawn from a longitudinal study that followed individuals from high school (mean age of 16 years) into young adulthood (ages 21-24 years). The researchers only measured “juvenile victimization” and created a total score (ranging from 0-5) that included property victimization, witnessing violence, physical assault, emotional maltreatment, and sexual victimization. They found that adolescent victimization was positively associated with emotional distress (a measure capturing depression, anger, and anxiety); only sexual victimization predicted suicide risk (suicidal thoughts, direct/indirect threats, prior attempts). Although the sample was drawn from a larger longitudinal sample, violence exposure was measured retrospectively. Furthermore, the authors included witnessing violence in the overall victimization measure without providing a rationale or reporting specific findings related to witnessing violence.

Similarly, Kulkarni, Graham-Bermann, Rauch, and Seng (2011) used retrospective data

to examine the relationship between childhood violence exposure and adulthood PTSD. Using a sample of pregnant women from a larger study, the authors used various measures assessing domestic violence, life stressors (e.g., sexual assaults, muggings, miscarriages), and child abuse. They found that women who witnessed violence and experienced child abuse suffered more current and lifetime PTSD. The study had numerous limitations, including a sample that may not be generalizable; measures that did not specify the exact nature or severity of the violence exposure; violence exposure that included a wide range of childhood trauma experiences; and reliance on retrospective data.

Using a longitudinal design, Stoddard, Heinze, Choe, and Zimmerman (2016) examined the predictive role of witnessing community violence exposure in adolescence on future educational aspirations. The authors found that witnessing community violence was associated with lower educational aspirations (i.e., “How likely is it that you will graduate from high school?”; “How likely is it that you will go to trade school or college?”). For boys, attitudes about violence predicted violent behaviour at age 22, and future educational aspirations indirectly predicted less violent behaviour at age 22. Although this study examined long-term effects of violence exposure in youth, it only examined witnessing community violence, and did not measure psychopathology outcomes.

A recent study by Turanovic (2019) investigated how the effects of adolescent violent victimization on negative outcomes in early adulthood vary by youths’ differential risk of being victimized. Participants came from the National Longitudinal Study of Adolescent to Adult Health ($N = 8,323$). The adolescent violent victimization measure was a dichotomous variable, reflecting whether respondents were victims of violence in the past year. Participants were enrolled in grades 7-12 at the time of completing this measure. Examples included “you were

jumped,” “someone stabbed you,” and “someone shot you.” 15% of participants experience violent victimization. Information was also gathered to determine “risk for violent victimization” including household income, neighbourhood characteristics, school characteristics, race, and sex. Outcomes were measured when participants were between 18 and 26 years of age, and included violent and property offending, subsequent violent victimization, depressive symptoms, hard drug use, and low educational attainment. The relationships between violent victimization and negative outcomes were found among individuals with the lowest risks for victimization. Low-risk youth appeared to have been “diverted onto a negative life pathway that they were unlikely to have experienced prior to being violently victimized” (p. 125). For high-risk youth, victimization may be redundant with other types of life stressors and adversity experienced in adolescence. As noted above, the goal of this study was to understand for whom violent victimization is most harmful. Although Turanovic used a wide range of outcomes in early adulthood, she focused narrowly on violent victimization; other forms of violence exposure (i.e., witnessing violence) were not considered, nor was the location of the violent victimization. Furthermore, the violent victimization measure was scored dichotomously, thus potentially obscuring valuable information.

1.12 Child Abuse

Although there is a dearth of research examining the long-term effects of violence exposure during youth, it is important to note the extensive body of research examining the effects of child abuse, including longitudinal studies spanning many years. Child abuse includes physical, emotional, and/or sexual maltreatment as well as neglect of children, and is not restricted to family-related violence exposure or that which occurs in the home setting. Research in this area has found associations among child abuse and neglect and later negative adult

outcomes including aggressive and violent behaviour, nonviolent criminal behaviour, substance use, self-injurious and suicidal behaviour, emotional problems, interpersonal problems, and academic and vocational difficulties (Lansford et al., 2002, 2007; Malinosky-Rummell & Hansen, 1993; Widom, 1999, 2014, 2017). Three commonly used research strategies include: (a) comparison of rates of abuse history in two or more samples that differ on a behaviour(s), (b) comparison of the behaviour(s) of a group with a history of abuse with the behavior(s) of a non-abused group(s), and (c) prospective designs that assess behaviors of an at-risk or community sample at two or more different points in time (Malinosky-Rummell & Hansen, 1993). Widom (1989) used a prospective cohorts design including 908 children, and found that 29% of those who were physically or sexually abused and/or neglected (between 1967-1971) were arrested for a criminal offense as an adult (about 20 years later), compared to 21% of the control subjects. Lansford et al. (2002) also carried out a prospective longitudinal study of 463 children (53 maltreated and 410 non-maltreated) between 1987 and 1999. They found that physical maltreatment in the first 5 years of life was associated with psychological and behavioural problems (i.e., aggression, delinquency, anxiety/depression, PTSD, social problems, thought problems, social withdrawal) during adolescence, above and beyond the various other risk factors related to maltreatment. More extensive longitudinal studies of this kind are required to examine the range of violence exposure experienced by children and adolescents, and the associations with negative emotional and behavioural outcomes in adulthood.

1.13 Remaining Considerations

Although violence exposure is a unique type of trauma impacting the psychological well-being of youth, more research is needed to better understand when and how violence exposure contributes to the development of psychopathology (Fowler, 2009). Violence exposure is a

complex form of trauma, and it is important to have large samples and longitudinal designs to effectively investigate the many variables of interest (Evans et al., 2008). It is also important for future research to investigate a wider range of long-term outcomes, as well as specifically looking at aggression and violence in future romantic relationships (Wolfe et al., 2003). Furthermore, it has been suggested that the effects of violence exposure may function, in part, through the presence of other potentiating or mediating factors, but that there is insufficient research to address this issue (Cicchetti & Lynch, 1993; Fowler et al., 2009). Lastly, there is also an identified need to examine different forms of violence exposure; namely, domestic violence and community violence, as a way to “highlight the unique and shared characteristics of these related forms of trauma” (Wolfe et al., 2003, p. 185).

Given the considerable individual variability that exists in manifestations of posttraumatic distress, it is essential to better understand factors about violence exposure that contribute to differences among internalizing, externalizing, and attention problems; substance use; and intimate partner violence over longer periods of time. More specifically, how do different forms of violence exposure impact emotional and behavioural problems over time, as adolescents transition to adulthood? The following sections review four domains that are relevant to furthering the research base: (a) witnessing violence versus direct victimization; (b) location of violence exposure; (c) cumulative violence exposure; and (d) the potential indirect effect of delinquency on the association between violence exposure during childhood and adolescence and long-term adult outcomes.

1.14 Witnessing versus Victimization

Different subtypes of violence exposure may contribute differentially to negative developmental outcomes (Howard, Feigelman, Li, Cross, & Rachuba, 2002). Witnessing violence and direct victimization are often considered collectively as “violence exposure.” However, given that each of these constructs represents unique aspects of violence exposure, it is important to separate them to understand their relative contributions to negative outcomes. Some research has shown that direct victimization is more strongly associated with internalizing problems than is witnessing violence (e.g., Fitzpatrick & Boldizar 1993; Martinez & Richters 1993), whereas witnessing violence is more strongly associated with externalizing problems than is direct victimization (Boxer et al. 2008). Further, Farrell and colleagues (2014) examined the influence of witnessing violence and direct victimization in the development of physical aggression in a sample of 1,156 high-risk sixth graders. They found that witnessing violence, but not direct victimization, predicted increases in physical aggression and delinquency. In contrast, interpersonal and peer victimization during childhood have been shown to predict internalizing problems, such as anxiety and depression, in late adolescence (Reijntjes et al., 2010; Schwartz et al. 2005). A study using 753 participants from the Fast Track Project, the same sample as the current study, found that only witnessing violence, and not direct victimization, mediated the link between callous-unemotional traits and delinquency, indicating that indirect and direct forms of violence exposure may be associated with different developmental effects (Oberth, Zheng, & McMahon, 2017).

The nature and severity of direct victimization may put youth at greater risk for developing trauma-related symptoms and associated disorders, compared to indirect violence exposure like witnessing, which may be more associated with later externalizing symptoms.

Additionally, unlike witnessing violence, victims have experienced the negative consequences of violence first-hand, and may be less likely to engage in these behaviours in the future. That said, two meta-analyses did not find significant differences between victimization and witnessing domestic violence on adolescent adjustment (Kitzmann et al., 2003; Wolfe et al., 2003).

Mrug and colleagues (2008) examined the relationships between violence exposure and adolescent adjustment across multiple contexts. The authors noted that they did not separate the effects of witnessing violence from the effects of direct victimization, and there is the possibility that witnessing and victimization may have differential impacts on adjustment. In a subsequent study with the same sample, Mrug and Windle (2010) did separate these different types of violence exposure, and concluded that they made independent contributions in predicting internalizing and externalizing symptoms in adolescents.

1.15 Location of Violence Exposure

Negative emotional and behavioural outcomes also vary depending on the location of violence exposure: home, school, or neighbourhood. Witnessing or experiencing violence in a particular context can interrupt a child's sense of security and safety in that specific setting, thereby disrupting secure relationships and developmentally appropriate behaviours (Cummings & Davies, 1996). *Home violence* may be associated with conflicted marital or parent-child relationships, ineffective discipline and parental monitoring, and more absent and disengaged parents, which may ultimately deprive youth of an important safe environment (Mrug et al., 2008). *School violence* may impact a youth's ability to develop positive bonds with teachers and peers, and it may also interrupt effective learning through attentional biases towards threat (Mrug et al., 2008). Lastly, *neighbourhood violence* may produce a more widespread sense of threat and

interrupt the possibility for positive neighbourhood or community engagement (Mrug et al., 2008). Given the importance of different environmental contexts on child and adolescent development, it is essential that studies examining the effects of violence exposure consider *where* such exposure takes place.

Some researchers have taken this into account. For example, Haynie, Petts, Maimon, and Piquero (2009) examined whether violence exposure in adolescence was associated with “precocious role exits” in later adolescence. Using a U.S. sample of 11,949 adolescents, the authors measured violence exposure (*indirect forms*: witnessing street, peer, and school violence, as well as family/friend suicide; *direct forms*: victimization by intimate partner, family victimization, victimization on the street) and precocious role exits (running away from home, dropping out of high school, having a child, attempting suicide, and coming into contact with the criminal justice system) 5-6 years later. They found that direct exposure to intimate partner victimization had the greatest effect on the likelihood of a precocious role exit; direct exposure to street victimization was only associated with high school dropout; and witnessing violence on the street was not associated with any of the outcomes. Although the researchers only focused on these behavioural outcomes, and neglected emotional or mental health outcomes, their findings emphasize the importance of context/location for understanding the developmental implications of violence exposure. They also noted that their study was limited to adolescence and “it is unclear and currently unknown whether early exposure to violence continues to shape behavioral outcomes throughout the life course” (p. 283).

Further, Mrug and colleagues (2008) examined different locations of violence exposure (home, school, neighbourhood) in childhood (grade 5) and associated negative outcomes 17

months later (mean age was 13.2 years). They found that violence exposure at home was associated with the broadest range of outcomes, including anxiety and depression symptoms, delinquency, and overt aggression. Violence exposure at school was strongly related to anxiety, depression, and aggressive fantasies. Violence exposure in the neighbourhood made unique contributions only to aggressive fantasies. The researchers indicated that, because violence exposure at home was uniquely related to both internalizing and externalizing outcomes, a safe home environment is an important component of youth adjustment. In terms of violence exposure at school, Mrug and colleagues identified the importance of trust and safety within the context of peer relationships; when this is compromised, youth are more likely to experience internalizing symptoms such as anxiety and depression. Lastly, because neighbourhood violence exposure was not significantly associated with internalizing problems, the authors suggested that youth may be less familiar with the violent perpetrators in their communities; close and frequent contact with known perpetrators is likely to cause feelings of anxiety and depression (Kolko, Brown, & Berliner, 2002). The neighbourhood or community may also contribute to more pervasive effects, whereby adolescents learn that violence is an acceptable and effective way to interact.

In a subsequent study, Mrug and Windle (2010) found that home violence was related to anxiety, depression, and aggression; school violence predicted anxiety and depression; and neighbourhood violence predicted delinquency. More specifically, witnessing violence at school and victimization at home were related to depression; witnessing violence in the neighbourhood only predicted delinquency; and, interestingly, victimization in the neighbourhood was not independently predictive of internalizing or externalizing outcomes. Although these studies addressed context-specific violence exposure, the effects were only measured 17 months later.

Due to the compartmentalization of violence exposure research into separate literatures, many studies have separately investigated community violence exposure, exposure to domestic violence or marital aggression, and peer victimization or school violence. Because youth are often exposed to violence in more than one location, it is essential to investigate the comparative impact of violence exposure occurring in different locations.

1.16 Cumulative Violence Exposure

Finkelhor and colleagues (2007a) have highlighted the occurrence of multiple forms of violence and adverse events (e.g., physical assault, child maltreatment, sexual abuse, bullying) among children and adolescents, known as polyvictimization. Children and adolescents who experience multiple forms of violence are at an increased risk for physical, psychological, and emotional harm. The term *cumulative violence exposure* has been used to address different types of co-occurring violence exposure (witnessing and victimization) across multiple locations (home, school, neighbourhood). In addition to examining the *comparative* effects of different forms of violence exposure, as a way to better understand its effects on developmental trajectories, it is also important to consider the *cumulative* effects of such violence exposure. Researchers have noted the cumulative effects of violence exposure, whereby combinations of exposure (both direct and indirect and across multiple locations) result in more frequent or severe negative outcomes (i.e., comorbidity of adverse outcomes) (e.g., Margolin et al., 2010; Mrug et al., 2008). For example, a youth who witnesses violence at school may be at a lower risk for negative outcomes compared to a youth who both witnesses and is a victim of violence in the home, school, and neighbourhood. There is a need for integrated approaches to examining violence exposure because youth exposed to violence in one domain are at an increased risk of experiencing violence in other domains (Finkelhor et al., 2007a).

Mrug and colleagues (2008) noted a dearth of research on outcomes associated with cross-contextual or cumulative violence exposure. In their study, they found that cumulative violence exposure showed weak but significant linear effects for externalizing symptoms; for internalizing behaviours, there was a steep linear effect at low-to-moderate exposure but a tapering off at high cumulative exposure. They speculated that violence exposure may be related to internalizing problems up to a point of “saturation” when desensitization begins to take place. Wright and colleagues (2013) also identified cumulative violence exposure as an important area of research, and examined different forms of violence exposure in different locations, as well as the accumulation of this violence, on substance use in adolescence over a 3-year period. They found that cumulative violence exposure was related to increased frequency of both alcohol and marijuana use, and resulted in more deleterious effects compared to exposure to a single type of violence or to no violence.

Cumulative violence exposure may be especially detrimental because it means that youth have fewer “safe havens” and may be more likely to engage in maladaptive or negative coping mechanisms (Wright et al., 2013). The cumulative risk hypothesis suggests that the total number of adverse events may be a more important factor associated with negative outcomes than for each specific adverse event (Morales & Guerra, 2006; Sameroff, 2000). Additional research is required to address longer-term impacts of the accumulation of different types of violence exposure across a wider range of negative adult outcomes. Do youth exposed to different types of violence exposure (witnessing and victimization) across multiple locations (home, school, neighbourhood) at a greater frequency, experience a greater number of, and more severe, negative outcomes in adulthood? Overall, it is important to examine both the *independent* (e.g., witnessing versus victimization across multiple locations) and *cumulative* effects of violence

exposure on later adult outcomes. Both may provide unique information about the effects of violence exposure occurring during youth.

1.17 Indirect Effect of Delinquency

Another important limitation of previous research is that many researchers have not controlled for cross-sectional relationships while linking violence exposure with psychopathology outcomes. For example, associations exist among depression, delinquency, and substance use (Fergusson, Lynskey, & Horwood, 1996; Marmorstein, Iacono, & Malone, 2010), and these significant relationships may act as mediators between violence exposure and other outcomes. Although there may be numerous child, parent, and environment-based mediators, there is reason to investigate the potential mediating role of delinquency on the association between violence exposure and negative adult outcomes. Overall, delinquency is one of the most strongly documented outcomes of violence exposure; numerous studies have shown that violence exposure significantly predicts delinquency in adolescence (Chen et al., 2013; Shukla & Wiesner, 2016). For example, using the Fast Track Project sample, Oberth et al. (2017) found that total violence exposure (witnessing and victimization) in adolescence was significantly associated with property, drug, violent, and sexual delinquency in grade 12.

Delinquency has also been associated with a range of other negative outcomes. Researchers have consistently identified the co-occurrence of delinquency and alcohol use (D'Amico, Edelen, Miles, & Morral, 2008) and illicit drug use (Murphy, Brecht, Huang, & Herbeck, 2012), with most studies indicating that delinquency is initiated before substance use. A study with 193 adolescents between the ages of 14 and 18 attempted to tease out the temporal relationship between delinquency and substance use (Hunter, Miles, Pedersen, Ewing, &

D'Amico, 2014). Those youth who engaged in delinquent behaviours were at risk for substance use 6 months later. Delinquency has also been associated with both externalizing and internalizing problems (Vermeiren, 2003). The author hypothesized that the high comorbidity between delinquent behaviour and externalizing problems and depressive and anxious symptomatology may be accounted for by the presence of common risk factors. Some researchers have highlighted a link between delinquency and ADHD through mechanisms of self-control and impulsivity (Pratt et al., 2002), while others indicate that stress responses impact attention, focus, and behavioural control (Vermeiren, 2003). Lastly, delinquency is associated with emotional and physical dating violence (Sweeten, Larson, & Piquero, 2016). Using a sample of 1,354 juvenile offenders, Sweeten and colleagues (2016) found significant associations between delinquent behaviours and dating violence in young adulthood.

When considering directions for future research, Cisler and colleagues (2012) noted that given the link between violence exposure and delinquency (McCart et al., 2007), and the link between delinquency and substance use (Nation & Heflinger, 2006), it is possible that delinquency mediates the relationship between violence exposure and substance use; however, the authors did not directly examine this in their study. Further, Vermeiren and colleagues (2005) emphasized the importance of a prospective research design to demonstrate whether antisocial behaviour or delinquency acts as an intervening variable between violence exposure and substance use. Unfortunately, many prior studies are cross-sectional; therefore, they are unable to address temporal ordering. Thus, it is impossible to determine whether violence exposure uniquely and independently contributes to various negative outcomes. Given the demonstrated associations between violence exposure and delinquency, and delinquency with other emotional

and behavioural problems, future research should investigate whether delinquency functions as a mediator or mechanism by which violence exposure predicts negative outcomes.

It is important to note that, according to General Strain Theory (Agnew, 2006), psychological distress (e.g., anger, anxiety, depression) is viewed as a pathway to delinquency and other behavioural problems, rather than the other way around. Although adolescent delinquency has been conceptualized primarily as a dependent variable, some researchers suggest that it is also important to understand the negative impact that adolescent delinquency can have on outcomes in emerging adulthood (see Arnett, 2000; Krohn, Lizotte, & Perez, 1997; Lopes et al., 2012; Odgers et al., 2008; Piquero, Farrington, Nagin, & Moffitt, 2010). Generally, criminal involvement can have an adverse impact on other life domains, thus interfering with youths' emotional and social development (Makarios, Cullent, & Piquero, 2017). Delinquency may be one of the mechanisms by which violence exposure exerts its effects. For example, Skerer et al. (2009) found that familial conflict (i.e., anger, yelling, hitting among family members) predicted substance use disorders, at least partially, through aggression and delinquency. The same was not true when internalizing problems was used as the mediator.

Thus, it is important to consider whether violence exposure predicts delinquency, and if engagement in delinquent behaviours during adolescence, in part, is associated with long-term emotional and behavioural problems.

1.18 The Current Study

The current study aimed to address many of the numerous limitations and empirical gaps in the existing research examining the effects of violence exposure during child and adolescence. The study included three distinct investigations. First, I attempted to elucidate the *comparative*

effects of violence exposure subtypes (witnessing versus victimization) and location (home, school, neighbourhood) in youth (lifetime through grade 8) on long-term adult outcomes (at age 25) of internalizing, externalizing, and attention problems; substance use; and intimate partner violence. Second, the study investigated the *cumulative effect* of violence exposure across a composite indicator of these adult outcomes, reflecting comorbidity of adverse outcomes. Cumulative violence exposure was also used as a single predictor for all five of the adult outcomes. The purpose of this second aim was to examine whether cumulative violence exposure (witnessing and victimization across multiple locations) is associated with a broader array of negative adult outcomes. Third, I examined the potential *indirect effect of delinquency* (measured at grade 12) on the association between violence exposure and the five adult outcomes. Most previous research is cross-sectional in nature, and comprehensive longitudinal studies have typically looked at outcomes 1-3 years later. Investigating long-term outcomes is essential in understanding the developmental models of violence exposure in youth. This study was also unique in that it examined different forms of violence exposure separately, including different combinations of violence exposure (i.e., witnessing violence at school vs. being a victim of violence at school) on a wide range of negative adult outcomes within the same sample. Baseline levels of internalizing, externalizing, and attention problems (all measured in grade 4), and substance use (measured in grade 7) served as covariates. Sex, race, severity-of-risk score, and family socioeconomic status (SES) measured in the summer following kindergarten also served as covariates. Models were run separately for males and females to examine possible sex differences with respect to the effects of violence exposure.

1.19 Hypotheses

Independent Effects of Violence Exposure

(1) *Victimization* will be more strongly associated with internalizing than externalizing problems.

(2) *Witnessing* violence will be more strongly associated with externalizing problems than internalizing problems.

(3) *Victimization* will be associated with a broader range of negative outcomes compared to witnessing violence.

(4) Both victimization and witnessing violence in the *home* will be more strongly related to internalizing problems and intimate partner violence, compared to violence exposure in the *school* and *neighbourhood*.

(5) Victimization in the *school* will be more strongly related to internalizing problems compared to violence exposure in the neighbourhood.

(6) Witnessing violence exposure in the *neighbourhood* will be more strongly related to externalizing problems and substance use, compared to violence exposure in the *home* and *school*.

(7) Due to a paucity of research, no specific hypothesis was made regarding type and location of violence exposure with respect to attention problems in adulthood.

Cumulative Effects of Violence Exposure

(1) *Cumulative violence exposure* will predict internalizing, externalizing, and attention problems; substance use; and intimate partner violence.

(2) *Cumulative violence exposure* will predict a greater number of negative adult outcomes (i.e., comorbidity of adverse outcomes).

Potential Indirect Effect of Delinquency

(1) Delinquency will *mediate* (indirect effect) the relation between violence exposure and the adult outcomes of externalizing, substance use, and intimate partner violence.

Chapter 2.

Method

2.1 Participants and Procedures. Participants came from a community-based sample of children from the Fast Track project, a longitudinal multisite investigation of the development and prevention of child conduct problems (Conduct Problems Prevention Research Group [CPPRG], 2019). Participants were identified in schools within four sites (Durham, NC; Nashville, TN; Seattle, WA; and rural Pennsylvania), and classified as high-risk based on crime and poverty statistics of the neighbourhoods that they served. In 1991–1993, 9,594 kindergarteners across three cohorts were screened for classroom conduct problems by teachers using the Authority Acceptance (AA) score of the Teacher Observation of Classroom Adjustment-Revised (TOCA-R; Werthamer-Larsson, Kellam, & Wheeler, 1991), and a subset of these participants were then screened for home behaviour problems by parents using a 22-item instrument based on the Child Behavior Checklist (CBCL; Achenbach, 1991). After the multiple-gating screening procedure, children were selected for inclusion into the high-risk sample (control = 446 and intervention = 445) on the basis of this screen score. In addition to the high-risk sample of 891 children, a stratified normative sample ($n = 387$) was identified to represent the population-normative range of risk scores, selected from the control schools. This normative sample were stratified to represent the population according to race, sex, and level of teacher-reported behaviour problems. The study used data from the high-risk control group (65% male; 49% Black, 48% White, 3% other race) and normative sample (51% male; 43% Black, 52% White, 5% other race).

Probability weights were constructed to adjust for the over-sampling of high-risk

children (Jones, Dodge, Foster, Nix, & CPPRG, 2002), and were used in the current study. These weights are calculated based on the distributions of within-site stratification of the TOCA-R (Werthamer-Larsson et al., 1991; teacher report) and the distribution of *T*-scores of behaviour problems on the CBCL (Achenbach, 1991; parent report). These probability weights correct for the disproportionate number of high-risk control youth presented when the high-risk control and normative samples are combined, such that the weighted sample approximates a normative distribution, within the population sampled, across the screening variables. As 79 of those recruited for the high-risk control group were also included as part of the normative sample and 1 participant was missing a weighting variable value, the final sample size for the current analyses included 753 participants (58% male; 46% Black; 50% White; 4% other race). Informed consent was obtained from all participants and/or legal guardian(s). Parent(s) were compensated with \$75 for completing each of the summer interviews, while teachers were compensated \$10/child each year for completing all classroom measures. The age range of the current sample was based on the time data collection took place for the relevant measures of this particular study. See Measures section below.

2.2 Measures

2.21 Covariates. The covariates include sex, race, severity-of-risk score summed from standardized teacher and parent screening scores during kindergarten, and SES (Hollingshead, 1975) measured in the summer following kindergarten. Further, internalizing, externalizing, and attention problems (measured in grade 4), and substance use (measured in grade 7) were also included as covariates.

Internalizing, externalizing, and attention problems all came from the caregiver-report

Child Behavior Checklist (CBCL; Achenbach, 1991). The CBCL is composed of 112 items. The internalizing problems broad-band scale includes 33 items from the anxious/depressed, withdrawn, and somatic complaints narrow-band scales. The externalizing broad-band scale includes 33 items from the delinquent behavior and aggressive behavior narrow-band scales. Lastly, the attention problems narrow-band scale includes 11 items.

Substance use was measured using the Tobacco, Alcohol, and Drugs (TAD) survey, which is a 57-item open-ended and forced-choice instrument based on measures from the National Longitudinal Study of Adolescent Health (Bureau of Labor Statistics, 2002) to assess frequency and problem level for tobacco, alcohol, and marijuana use. For *cigarette use*, participants reported the number of days they had smoked cigarettes in the past month. Responses were scored as 1 if participants reported any days of past month cigarette use, and 0 if participants reported 0 days of use. *Alcohol misuse* included two items: self-report of number of days being drunk and number of days consuming five or more drinks in a row in the past year. A binary outcome was constructed to operationalize alcohol misuse; participants were assigned 1 if they answered yes to either of the two items, and 0 if they reported 0 days on both items. For *marijuana use*, participants reported the number of times they had used marijuana in the past month. If participants reported any days of using marijuana in the past 30 days, they were assigned a score of 1; if they reported 0 days of use, they were assigned a score of 0. Use of other illicit drugs was not included due to extremely low endorsement of these substances in the sample. For all analyses, a *substance use composite* was used, calculated by summing the dichotomous scores for cigarette use, alcohol misuse, and marijuana use (range 0–3).

Given that the violence exposure measure assessed *lifetime* violence exposure, it was not possible to accurately control for symptoms *before* violence exposure occurred, as there was no

way of knowing when this took place over the course of participants' lives. Despite this, internalizing, externalizing, and attention problems in grade 4, and substance use in grade 7 were included as covariates; however, this limitation is important to note.

2.22 Violence Exposure. Following grades 7, 8, 10, and 11, My Exposure to Violence (Buka et al., 1996) was used to collect information about the participants' exposure to five types of violent events: beating, attack with a weapon, gun shot, accident or other event resulting in death or serious injury, and threat by another person with serious injury. For each type of event, the individual was asked five questions: whether it happened; whether the event occurred more than once; and whether the event occurred at home, at school, or in the neighbourhood. Responses for occurrence and setting (home, school, neighbourhood) questions (four questions for each type of event) were *yes* = 1 or *no* = 0. For the question about frequency, responses were *once* = 1 or *more than once* = 2. The measure has three scales including witnessing violence, victimization, and cumulative violence exposure. For the witnessing and victimization subscales, the content of the questions was the same (e.g., "Have you seen others be beaten?" versus "Have you been beaten?"). The potential score range for witnessing and victimization subscales (each with five occurrence questions and five frequency questions) was 0–15. For violence exposure in the home, school, and neighbourhood, the scores ranged from 0-5, indicating the number of types of violent incidents that had been encountered in the given location. The cumulative violence exposure scale sums the number of violent events and the location(s) of such events. This scale range was 0–60 (10 occurrence questions, 10 frequency questions, and 30 location occurrence questions). A second cumulative violence measure was created, whereby each type of violence (witnessing or victimization) and each location (home, school, location) was dichotomized (*yes* = 1; *no* = 0). The range was 0-6. If a participant witnessed violence in all three locations and was a

victim in all three locations then they would receive a score of 6. See Appendix A for additional information. The Cronbach's alphas for the witnessing and victimization subscales, and cumulative violence exposure were .87, .85, and .90, respectively.

The measure administered in grades 7 and 8 asked about lifetime violence exposure, with questions phrased as "Have you ever...". In grades 10 and 11, the measure was revised and asked questions phrased as "In the past 2 years, have you...". Because the questions and time-frames are different, it was not possible to create a score accurately reflecting violence exposure across the years that the measure was given. For this reason, I used the data collected in grade 8, reflecting lifetime exposure through grade 8.

2.23 Delinquency. In grade 12, the Self-Reported Delinquency (SRD; Elliott et al., 1985) measure asked youth about the number and types of criminal offenses committed within the past year. There were 34 questions tapping into different offenses including property damage, theft, assault, etc. Offenses ranged from lying about one's age to attacking someone. Response options were "yes" (1) or "no" (0). The current study created a total delinquency score from four different subscales including: (1) property delinquency (13 items; e.g., "In the past year, have you damaged/destroyed someone's property?"), (2) violent delinquency (5 items; e.g., "In the past year, have you attacked someone with the intent to hurt/kill him/her?"), (3) drug delinquency (3 items; e.g., "In the past year, have you sold heroin, cocaine, and/or LSD?"), and (4) sexual delinquency (2 items; e.g., "In the past year, have you had sex with someone against his/her will?"). The Cronbach's alpha for the total delinquency scale was .77.

2.24 Internalizing Problems. The Young Adult Self-Report (Achenbach, 1997) was

used to collect information about multiple behaviours, with 10 scales in total. It is a 132-item self-report instrument of emotional and behavioural symptoms with response options of “not true,” “sometimes true” and “often true.” A different variation was used for 10 items, namely “never,” “sometimes” and “often.” The dichotomy “yes/no” is used in a single item. The internalizing problems broad-band scale (39 items) is comprised of responses from three narrow-band scales: (1) withdrawn/depressed (18 items), (2) anxious/depressed (9 items), and (3) somatic complaints (12 items). The anxious/depressed narrow-band scale asks questions about loneliness, worries/fears, feelings of worthlessness, guilt, and sadness. The withdrawn narrow-band scale asks questions about enjoying little, lack of friendships, being secretive, and not getting along with others. The somatic complaints narrow-band scale taps into physical symptoms often associated with distress, including body aches, nausea, eye and skin problems, numbness, and sleep problems. Raw scores were used for the analyses. However, when investigating the cumulative effect of violence exposure, the critical cut-off point was the *T*-score that denotes the *borderline range* ($T = \geq 60$) for the internalizing broad-band scale. Responses were scored as 1 if scores reached or exceeded this cut-off point, and 0 if scores fell below this point. The Cronbach’s alpha for the internalizing problems scale was .91.

2.25 Externalizing Problems. The externalizing problems broad-band scale is drawn from the Young Adult Self-Report (Achenbach, 1997). The externalizing broad-band scale (35 items) is comprised of responses from the aggressive behavior (15 items), rule-breaking behavior (14 items), and intrusive (6 items) narrow-band scales. The aggressive behavior narrow-band scale asks questions about temper, arguing, screaming, fighting/attacking, and threatening behaviour. The rule-breaking behavior narrow-band scale asks questions about breaking rules, lack of guilt, lying/cheating, irresponsibility, and stealing. Lastly, the intrusive narrow-band scale

asks questions about being loud, showing off, talking too much, and bragging. Note that the rule-breaking behavior subscale included two questions tapping into substance use (“I use drugs (other than alcohol and nicotine) for non-medical purposes” and “I drink too much alcohol or get drunk too frequently”). To assess the impact of these two items, analyses were conducted twice: once with these two items as part of the externalizing scale and again with these two items removed from the scale. Raw scores were used for the analyses. However, when investigating the cumulative effect of violence exposure, the critical cut-off point was the *T*-score that denoted the *borderline range* ($T = \geq 60$) for the externalizing broad-band scale. Responses were scored as 1 if scores reached or exceeded this cut-off point, and 0 if scores fell below this point. The Cronbach’s alpha for the externalizing problems scale was .89.

2.26 Attention Problems. The attention problems narrow-band scale is drawn from the Young Adult Self-Report (Achenbach, 1997). It includes 15 items with questions tapping into forgetfulness, concentration, daydreaming, disorganization, poor attention to detail, etc. Raw scores were used for the analyses. However, when investigating the cumulative effect of violence exposure, the critical cut-off point was the *T*-score that denoted the *borderline range* ($T = \geq 65$). Responses were scored as 1 if scores reached or exceeded this cut-off point, and 0 if scores fell below this point. The Cronbach’s alpha for the attention problems scale was .81.

2.27 Substance Use. The Tobacco, Alcohol, and Drugs (TAD) survey is a 57-item open-ended and forced-choice instrument based on measures from the National Longitudinal Study of Adolescent Health (Bureau of Labor Statistics, 2002) to assess frequency and problem level for tobacco, alcohol, and illegal drug use. I created three dichotomous indicators, including (1) *binge drinking problem*, defined as five or more drinks on one or more occasion in the last month; (2)

heavy marijuana use, defined as 27 or more days of use in the past month; and (3) *serious substance use*, defined as use of cocaine, crack, inhalants, heroin, LSD, phencyclidine, ecstasy, mushrooms, speed, or other pills not prescribed by a physician in the past month. Additionally, an alcohol and drug module, adapted from the National Institute of Mental Health Diagnostic Interview Schedule (Robins, Helzer, Croughan, & Ratcliff, 1981), was administered. Based on the DSM-IV, diagnostic criteria for alcohol abuse were applied to create a diagnostic indicator. An overall *substance use problems* indicator was created, scored 1 if any of the four substance use problems were met, or 0 otherwise.

2.28 Intimate Partner Violence. The 47-item General Violence Questionnaire (Holtzworth-Monroe, Rehman, & Herron, 2000) measured violence between the respondent and any of his/her romantic partners over the past 12 months. The frequency values are: never (1), once (2), twice (3), 3-5 times (4), and more than 5 times (5). The violent acts *against* romantic partners scale (i.e., intimate partner violence) summed the number of times (1-5) the respondent did the following to any romantic partner: (a) yelled or screamed; (b) pushed, shoved, grabbed, slapped, or threw something; (c) punched, hit, kicked, bit, or slammed them against a wall; (d) beat them up or choked, strangled, burned, or scolded them; (e) threatened them with a knife or gun; and (f) used a knife or gun on them. Possible range of scores was 6-30. The Cronbach's alpha for the IPV scale was .72.

Analytic Plan

Descriptive statistics were conducted using SPSS version 24 (IBM, 2016); all other analyses were conducted using Mplus 8 (Muthén & Muthén, 2017) through structural equation modelling (SEM). All models were estimated using full information maximum likelihood

(FIML) with robust standard errors, which provides estimates of the variance-covariance matrix for all available data, including those individuals who have incomplete data on some measures (Ruben & Little, 2002). Model fit criteria included chi-square (χ^2) value, Root Mean Square Error of Approximation (RMSEA), and Comparative Fit Index (CFI). Models with nonsignificant χ^2 value, RMSEA less than .06, and CFI greater than .90 indicate adequate fit; however, with larger sample sizes as per the present study a non-significant χ^2 value is not necessary (Hu & Bentler, 1999). A maximum likelihood estimator with robust standard error (MLR) was used in conjunction with Monte Carlo integration and logit link function (Atkins et al., 2013). The former is a maximum likelihood parameter that estimates with standard errors and a chi-square test statistic (when applicable) that are robust to non-normality and non-independence of observations (Muthén & Muthén, 1998-2015). Effect sizes (ES) were reported using Pearson r values (.1 = small; .3 = medium; .5 = large) (Cohen, 1988). For primary analyses, standardized betas reflect ES values (Cohen, 1988). Covariates (i.e., sex, race, severity-of-risk score, SES) were included in all analyses. Internalizing, externalizing, and attention problems assessed in grade 4 and substance use assessed in grade 7 were also included as covariates. To account for the oversampling of high-risk participants and to increase generalizability to the population, a probability weight was used. This was based on group (normative versus high-risk control) and was previously calculated for all normative and high-risk control group participants (Jones, Dodge, Foster, Nix, & CPPRG, 2002).

Independent effects of violence exposure. Using SEM, a series of linear regression analyses was conducted to test the prediction of the five adult outcomes from violence exposure type and location. The first model included witnessing and victimization as predictors for the five outcome measures. It was important to include both in the model, to account for the fact that

a number of participants may have been exposed to both forms of violence exposure. The second model included violence exposure in the home, school, and neighbourhood as separate predictors for the five outcome measures. The third model included witnessing violence exposure in the three locations as separate predictors. Lastly, the fourth model used direct victimization in the three locations as separate predictors.

Cumulative effect of violence exposure. A fifth model included cumulative violence exposure as the predictor for the five individual adult outcome measures. A sixth model used cumulative violence exposure as the predictor for a composite score of the five adult outcomes. This composite score was created using critical cut-off scores (i.e., *T*-scores denoting the *borderline range*) for internalizing, externalizing, and attention problems. Responses were coded as 1 if the score reached or exceeded this cut-off point, and 0 if scores fell below this point. For substance use, the measure was dichotomous, with 1 indicating that any substance use problem indicator was endorsed and 0 meaning no substance use indicators were reported. For intimate partner violence, median split (+ 1 *SD*) was used, such that scores ≥ 1 *SD* above the median were coded as 1 and scores equivalent to or below the median were coded as 0. These scores were summed, with the overall composite score ranging from 0-5, with 5 indicating that a participant met the threshold for the five adult outcomes, which indicates comorbidity of adverse outcomes.

Indirect effect of delinquency. A seventh model was created to test for the potential indirect effect of self-reported delinquency on the five adult outcomes. Direct and indirect associations of delinquency measured in grade 12 were examined between cumulative violence exposure and the five adult outcome measures; this was done using the product of coefficients method with bootstrapping 1000 times to obtain 95% confidence intervals of the mediated effect (MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002). Bootstrapping is a nonparametric

approach to statistical inference that does not make a priori assumptions about a sampling distribution (i.e., it does not necessitate a normal distribution of scores for a given variable), and empirically derives its sampling distribution from the study's data (Davison & Hinkley, 1997). The product of coefficients method provides an estimate of the indirect effect by multiplying regression coefficients for the regression of the intervening variable (i.e., delinquency) on the independent variable (i.e., cumulative violence exposure) and for the regression of the outcome (i.e., the five adult outcomes) on the intervening variable with the independent variable and baseline measure included in the model. The product of coefficients approach with bootstrapped confidence intervals is recommended for testing indirect effects, and in contrast to traditional mediation analysis (Baron & Kenny, 1986), a significant association between the independent and outcome variable is not required for establishing an indirect effect (Fairchild & MacKinnon, 2014; MacKinnon et al., 2002). Indirect effects were considered significant if the confidence intervals did not include a 0 value. Bootstrapping avoids problems associated with calculating standard errors for product of coefficients, because it relies on confidence intervals for testing indirect effects as opposed to point estimates of the indirect effects (Hayes, 2009).

Chapter 3.

Results

3.1 Descriptive Statistics

The percentages of participants reporting different types of violence exposure are shown in *Table 1*; 89% of participants reported any exposure to violence; 87% witnessed violence; and 51% were victimized. Of those who reported witnessing violence, 56% also experienced direct victimization. Examining different locations, 22% reported violence exposure in the home; 75% reported violence exposure at school; and 58% reported violence exposure in the neighbourhood. More specifically, 14% reported witnessing violence in the home; 72% reported witnessing violence at school; and 54% reported witnessing violence in the neighbourhood. Further, 14% reported victimization at home; 30% reported victimization at school; and 28% reported victimization in the neighbourhood.

Violence exposure across multiple locations was reported by 52% of youth. More specifically, witnessing violence across multiple locations was reported by 46% of youth, with 11% of the sample reporting witnessing violence in all three locations. Victimization across multiple locations was reported by 20% of youth, with 6% of the sample reporting being victimized in all three locations.

Regarding sex differences in violence exposure, 91% of males and 86% of females reported any violence exposure. For boys, 89% reported witnessing violence and 59% reported being victimized; for girls 84% reported witnessing violence and 40% reported being victimized. Further, for boys, 22% reported violence exposure at home; 75% at school; and 65% in the

neighbourhood. For girls, 21% reported violence exposure at home; 75% at school; and 48% in the neighbourhood.

Means, standard deviations, skewness, and kurtosis are reported in *Tables 2a* and *2b*. Although the prevalence rates were quite high, the overall levels of violence exposure were generally low: witnessing violence ($M = 4.95$, ranging from 0-15 out of a potential 0-15 range); direct victimization ($M = 1.88$, ranging from 0-14 out of a potential 0-15 range; cumulative violence exposure ($M = 10.24$, ranging from 0-46 out of a potential 0-60 range; the second cumulative violence exposure scale ($M = 3.51$, ranging from 0-6 out of a potential 0-6 range). The mean scores for violence exposure type and location (e.g., witnessing at home, victimization at school, etc.) were very low; this was expected and consistent with previous studies noting very low endorsement rates. Mean scores for witnessing violence in the home, school, and neighbourhood were .20, 1.05, and 1.18, respectively. Mean scores for victimization in the home, school, and neighbourhood were .17, .37, and .43, respectively.

In terms of delinquency, scores range from 0-23 out of a potential range of 0-23 ($M = .80$, skewness = 5.90). The data are positively skewed because of low endorsement.

The age 25 outcome measures were normally distributed (skewness between .03 and 2.2). Intimate partner violence was the most positively skewed outcome measure (skewness = 2.2). For internalizing problems, the mean score was 18.40, with scores ranging from 0-61 out of a potential 0-78, with 41% of participants falling in the borderline range or higher (T score ≥ 60). For externalizing problems, the mean score was 15.27, with scores ranging from 0-58 out of a potential 0-70, with 36% of participants falling in the borderline range or higher (T score ≥ 60). Note that when the two substance use items were removed from the externalizing scale, with this

altered scale, the mean was 14.12 (ranging from 0-54 out of a potential 0-66). All analyses were run twice, once with the original externalizing scale and again with the new scale without the two substance use items. Results did not differ. For this reason, all primary analyses will be reported with the original externalizing scale. For attention problems, the mean score was 7.90, with scores ranging from 0-29 out of a potential 0-30, with 15% of participants falling in the borderline range or higher (T score ≥ 60). For intimate partner violence, the mean score was 14.20, with scores ranging from 12-30 out of a potential 6-30, with 14% of participants meeting the critical cut-off (median split + 1 SD : ≥ 16.48). Substance use was a dichotomous score, with 49% of participants having a score of 1 (indicating substance use problem). For the composite measure, which was calculated by summing the dichotomous scores indicating severity of the outcome measure, 30% had a score of 0; 27% had a score of 1; 19% had a score of 2; 13% had a score of 3; 9% had a score of 4; and only 2% had a score of 5 (meaning they met the cut-off criteria for all five outcomes).

3.2 Bivariate Associations

Correlations are shown in *Table 2a* and *Table 2b*. Cumulative violence exposure was significantly positively correlated with delinquency (grade 12) and age 25 outcomes of internalizing problems, externalizing problems, attention problems, substance use, IPV, and the composite score (r 's = .13–.25, p 's < .05; ES = small to medium). Witnessing violence was significantly positively correlated with delinquency and all age 25 outcome measures except for substance use (r 's = .10–.20, p 's < .05; ES = small); victimization was significantly positively correlated with delinquency and all age 25 outcome measures (r 's = .14–.25, p 's < .01; ES = small to medium). However, after controlling for the other violence exposure type (i.e., conducting partial correlations), only IPV was significantly positively correlated with witnessing

violence ($r = .11, p < .05$; ES = small). In contrast, when controlling for witnessing, victimization was still significantly positively correlated with internalizing problems, externalizing problems, attention problems, and substance use (r 's = .09-.21, p 's < .05; ES = small), but not IPV.

In terms of location, violence exposure at home was significantly positively correlated with delinquency; internalizing, externalizing, and attention problems; IPV; and the composite score (r 's = .11-.19, p 's < .05; ES = small), but not substance use. School violence exposure was significantly positively correlated with externalizing problems, substance use, and the composite score (r 's = .12-.13, p 's < .05; ES = small). Neighbourhood violence exposure was significantly positively correlated with delinquency; internalizing, externalizing, and attention problems; IPV; and the composite score (r 's = .10-.22, p 's < .05; ES = small), but not substance use.

Witnessing violence at home was significantly positively correlated with internalizing problems, externalizing problems, attention problems, and IPV (r 's = .13-.19, p 's < .01; ES = small); witnessing violence at school was significantly positively correlated with externalizing problems ($r = .09, p < .05$; ES = small); and witnessing violence in the neighbourhood was significantly positively correlated with delinquency, internalizing problems, externalizing problems, and IPV (r 's = .09-.20, p 's < .05; ES = small). Victimization occurring at home was significantly positively correlated with delinquency, internalizing problems, externalizing problems, attention problems, and IPV (r 's = .11-.20, p 's < .05; ES = small); victimization occurring at school was significantly positively correlated with externalizing problems, attention problems, and substance use (r 's = .09-.15, p 's < .05; ES = small); and victimization occurring in the neighbourhood was significantly positively correlated with all outcomes (r 's = .13-.22, p 's <

.01; ES = small). Overall, based solely on correlational analyses, externalizing problems is the outcome most consistently associated with different types of violence exposure. Further, cumulative violence exposure, and victimization specifically, were correlated with the most outcome measures.

Correlations among the outcome measures were as follows: Delinquency was significantly positively correlated with externalizing problems, attention problems, and substance use (r 's = .09-.16, p 's < .05; ES = small), but not internalizing problems or IPV. Internalizing problems were significantly positively correlated with externalizing problems, attention problems, substance use, and IPV (r 's = .18-.76, p 's < .01; ES = small to large). Externalizing problems were significantly positively correlated with attention problems, substance use, and IPV (r 's = .29-.72, p 's < .01; ES = medium to large). Attention problems were significantly positively correlated with substance use ($r = .20, p < .01$; ES = small) and IPV ($r = .24, p < .01$; ES = small). Lastly, IPV and substance were not significantly correlated.

In terms of covariates, male sex was significantly positively correlated with cumulative violence exposure; witnessing and victimization; neighbourhood violence exposure; witnessing neighbourhood violence; victimization in the school and neighbourhood; delinquency; externalizing problems; and substance use (r 's = .10-.20, p 's < .05; ES = small). Male sex was significantly negatively related to IPV ($r = -.21, p < .01$; ES = small) (i.e., female sex was significantly positively correlated with IPV perpetration). SES was significantly negatively related to cumulative violence exposure; witnessing and victimization; home violence exposure and neighbourhood violence exposure; witnessing violence at home and in the neighbourhood; victimization in the neighbourhood; internalizing problems; externalizing problems; attention

problems; and the composite score (r 's = .10-.26, p 's < .05; ES = small to medium) (i.e., lower SES was associated with the above-mentioned variables). Black race was significantly positively correlated with cumulative violence exposure; witnessing violence; home violence exposure and neighbourhood violence exposure; witnessing violence at the home, school, and neighbourhood; victimization at home and in the neighbourhood; externalizing problems; and IPV (r 's = .09-.32, p 's < .05; ES = small to medium). Black race was significantly inversely related to substance use ($r = -.14$, $p < .01$; ES = small). Lastly, the severity-of-risk score was significantly positively correlated with cumulative violence exposure, witnessing and victimization, neighbourhood violence exposure, witnessing and victimization in the neighbourhood, internalizing problems, externalizing problems, attention problems, and the composite score (r 's = .09-.25, p 's < .05; ES = small to medium).

3.3 Primary Analyses

The current study included seven different models, which will be outlined in detail below. Additional models were run to examine potential sex differences. All path analyses were first fit without any covariates (unconditional) and then with all covariates included (conditional). All models were “just identified” (meaning the number of observed parameters was equal to the number of estimated parameters with degrees of freedom = 0) and thus model fit could not be assessed; this has previously been encountered in other reports, and it did not interfere with the models or the ability to interpret results (see Pasalich et al., 2016).

Witnessing versus Victimization. *Figure 1* shows the path model with witnessing and victimization predicting internalizing, externalizing, and attention problems; substance use; and IPV. Because both types of violence exposure were included in the same model, this accounted

for the fact that of those participants who reported witnessing violence, 56% also experienced direct victimization. Higher levels of victimization were associated with greater internalizing problems ($\beta = .13$; $B(SE) = .66(.28)$, $p = .019$; ES = small); externalizing problems ($\beta = .14$; $B(SE) = .59(.21)$, $p = .005$; ES = small); attention problems ($\beta = .15$; $B(SE) = .32(.12)$, $p = .008$; ; ES = small); substance use ($\beta = .18$; $B(SE) = .04(.01)$, $p = .001$; ES = small); and IPV ($\beta = .14$; $B(SE) = .15(.06)$, $p = .020$; ES = small). Witnessing violence did not independently predict any of the adult outcomes.

Witnessing was significantly associated with victimization ($\beta = .46$; $B(SE) = 3.37(.40)$, $p = .000$). All age 25 adult outcome measures were significantly associated with one another (β 's = .17-.75; B 's = .10-71.18, p 's < .05). With regard to covariates, male sex was associated with higher levels of witnessing violence ($\beta = .08$; $B(SE) = .59(.29)$, $p = .046$) and being victimized ($\beta = .16$; $B(SE) = .81(.21)$, $p = .000$). Lower SES and Black race were associated with higher levels of witnessing violence ($\beta = -.12$; $B(SE) = -.03(.01)$, $p = .007$; $\beta = .33$; $B(SE) = 2.41(.29)$, $p = .000$). Greater externalizing symptoms and substance use measured in grades 4 and 7, respectively, were associated with higher levels of both witnessing violence and victimization (β 's = .17-.22; B 's = .05-.80, p 's < .01). Male sex was associated with substance use ($\beta = .13$; $B(SE) = .13(.05)$, $p = .007$). Female sex was associated with internalizing problems ($\beta = -.26$; $B(SE) = -3.1(1.1)$, $p = .003$) and IPV ($\beta = -.26$; $B(SE) = -1.3(.21)$, $p = .000$). Lower SES was associated with greater internalizing problems ($\beta = -.11$; $B(SE) = -.10(.05)$, $p = .030$). Internalizing problems in grade 4 were associated with internalizing problems at age 25 ($\beta = .18$; $B(SE) = .33(.11)$, $p = .004$); attention problems in grade 4 were associated with attention problems at age 25 ($\beta = .17$; $B(SE) = .24(.10)$, $p = .013$); and substance use in grade 7 was associated with IPV at age 25 ($\beta = .11$; $B(SE) = .47(.21)$, $p = .022$). The severity-of-risk score

was associated with externalizing problems ($\beta = .17$; $B(SE) = 1.0(.29)$, $p = .000$); attention problems ($\beta = .16$; $B(SE) = .53(.18)$, $p = .003$); and IPV ($\beta = .13$; $B(SE) = .20(.09)$, $p = .032$). Black race was associated with IPV ($\beta = .15$; $B(SE) = .78(.26)$, $p = .003$). Non-Black race (i.e., identifying as a race other than Black) was associated with substance use ($\beta = -.10$; $B(SE) = -.10(.05)$, $p = .047$).

Home, School, Neighbourhood. *Figure 2* shows the path model with violence exposure occurring in the home, school, and neighbourhood predicting internalizing, externalizing, and attention problems; substance use; and IPV. Higher levels of home violence exposure were associated with greater internalizing problems ($\beta = .10$; $B(SE) = 1.3(.54)$, $p = .019$; ES = small); externalizing problems ($\beta = .11$; $B(SE) = 1.2(.52)$, $p = .020$; ES = small); and attention problems ($\beta = .16$; $B(SE) = .93(.26)$, $p = .000$; ES = small). Higher levels of school violence exposure were associated with greater substance use ($\beta = .12$; $B(SE) = .05(.02)$, $p = .018$; ES = small).

Violence exposure in the home, school, and neighbourhood were all significantly associated with one another (β 's = .35-.44; B 's = .37-.93, p 's < .01). With regard to covariates, lower SES ($\beta = -.18$; $B(SE) = -.03(.17)$, $p = .000$); male sex ($\beta = .13$; $B(SE) = .54(.16)$, $p = .001$); Black race ($\beta = .24$; $B(SE) = .94(.17)$, $p = .000$); externalizing symptoms in grade 4 ($\beta = .23$; $B(SE) = .05(.01)$, $p = .001$); and substance use in grade 7 ($\beta = .20$; $B(SE) = .67(.20)$, $p = .001$) were all associated with higher levels of violence exposure in the neighbourhood. Black race was also associated with greater home violence exposure ($\beta = .15$; $B(SE) = .27(.09)$, $p = .002$).

Witnessing Violence across Locations. *Figure 3* shows the path model with witnessing violence in the home, school, and neighbourhood predicting internalizing, externalizing, and attention problems; substance use; and IPV. Higher levels of witnessing violence at home were

associated with greater attention problems ($\beta = .11$; $B(SE) = .96 .40$), $p = .017$; ES = small), and this association approached significance for IPV ($\beta = .10$; $B(SE) = .42(.22)$, $p = .056$). Witnessing violence in the school or neighbourhood did not independently predict any adult outcomes.

Witnessing violence in the home, school, and neighbourhood were all significantly associated with one another (β 's = .25-.33; B's = .13-.35, p 's < .01). With regard to covariates, lower SES ($\beta = -.18$; $B(SE) = -.02(.004)$, $p = .000$); male sex ($\beta = .11$; $B(SE) = .30(.12)$, $p = .009$); Black race ($\beta = .29$; $B(SE) = .83(.12)$, $p = .000$); externalizing symptoms in grade 4 ($\beta = .23$; $B(SE) = .04(.01)$, $p = .000$); and substance use in grade 7 ($\beta = .19$; $B(SE) = .44(.12)$, $p = .000$) were all associated with higher levels of witnessing violence in the neighbourhood. Black race and substance use in grade 7 were both associated with witnessing greater levels of violence in the home and school (β 's = .10-.16; B's = .14-.22, p 's < .05).

Victimization across Locations . *Figure 4* shows the path model with victimization in the home, school, and neighbourhood predicting internalizing, externalizing, and attention problems; substance use; and IPV. Higher levels of victimization at home were associated with greater internalizing problems ($\beta = .10$; $B(SE) = 2.4(1.3)$, $p = .05$; ES = small); externalizing problems ($\beta = .13$; $B(SE) = 2.7(.96)$, $p = .005$; ES = small); and attention problems ($\beta = .17$; $B(SE) = 1.9(.59)$, $p = .001$; ES = small). Further, higher levels of victimization at school were associated with substance use ($\beta = .10$; $B(SE) = .08(.04)$, $p = .034$; ES = small). Victimization in the neighbourhood did not independently predict any adult outcomes.

Direct victimization in the home, school, and neighbourhood were all significantly associated with one another (β 's = .30-.48; B's = .09-.23, p 's < .01). With regard to covariates,

lower SES ($\beta = -.12$; $B(SE) = -.008 (.003)$, $p = .005$); male sex ($\beta = .14$; $B(SE) = .24(.07)$, $p = .001$); externalizing symptoms in grade 4 ($\beta = .16$; $B(SE) = .014(.007)$, $p = .031$); and substance use in grade 7 ($\beta = .17$; $B(SE) = .23(.10)$, $p = .020$) were all associated with higher levels of being victimized in the neighbourhood. Male sex was associated with being victimized at school ($\beta = .14$; $B(SE) = .17(.06)$, $p = .002$). Externalizing symptoms in grade 4 were associated with being victimized at home ($\beta = .17$; $B(SE) = .009(.004)$, $p = .013$).

3.4 Cumulative Violence Exposure

Figure 5 shows the path model with cumulative violence exposure predicting internalizing, externalizing, and attention problems; substance use; and IPV. Higher levels of cumulative violence exposure were associated with greater internalizing problems ($\beta = .10$; $B(SE) = .14(.07)$, $p = .046$; ES = small); externalizing problems ($\beta = .17$; $B(SE) = .20(.06)$, $p = .001$; ES = small); attention problems ($\beta = .13$; $B(SE) = .08(.03)$, $p = .008$; ES = small); substance use ($\beta = .13$; $B(SE) = .007(.003)$, $p = .013$; ES = small); and IPV ($\beta = .16$; $B(SE) = .05(.016)$, $p = .003$; ES = small). The model was run again using the alternative cumulative violence exposure measure that dichotomized and summed the different types and locations of possible violence exposure (range: 0-6). Results did not differ.

An additional model was run (see *Figure 6*) to test whether cumulative violence exposure predicted a composite score of adult outcomes (i.e., comorbidity of adverse outcomes). Greater levels of cumulative violence exposure were associated with comorbidity of adverse outcomes ($\beta = .13$; $B(SE) = .02(.01)$, $p = .026$; ES = small). This model was run again using the alternative cumulative violence exposure measure. Results did not differ.

With regard to covariates, lower SES ($\beta = -.04$; $B(SE) = -.07(.03)$, $p = .008$); male sex (β

= .13; $B(SE) = 2.1(.69)$, $p = .002$); Black race ($\beta = .24$; $B(SE) = 4.0(.71)$, $p = .000$); externalizing symptoms in grade 4 ($\beta = .20$; $B(SE) = .18(.06)$, $p = .001$); and substance use in grade 7 ($\beta = .24$; $B(SE) = 3.2(.76)$, $p = .000$) were all associated with higher levels of violence exposure. Only the severity-of-risk score was associated with the composite score ($\beta = .12$; $B(SE) = .10(.05)$, $p = .030$).

See *Table 3* and *Table 4* for additional information.

3.5 Sex Differences

As noted above, because the path models were all “just identified” and model fit could not be assessed, it was not possible to test gender invariance. Instead, all models were run separately for males ($n=437$) and females ($n=316$).

For males, greater levels of victimization were associated with externalizing problems ($\beta = .18$; $B(SE) = .54(.23)$, $p = .017$; ES = small); attention problems ($\beta = .15$; $B(SE) = .33(.15)$, $p = .030$; ES = small); and substance use ($\beta = .19$; $B(SE) = .04(.01)$, $p = .004$; ES = small). For females, victimization predicted internalizing problems ($\beta = .24$; $B(SE) = .15(.06)$, $p = .008$; ES = small); externalizing problems ($\beta = .20$; $B(SE) = .89(.04)$, $p = .013$; ES = small); attention problems ($\beta = .17$; $B(SE) = .44(.22)$, $p = .045$; ES = small); and substance use ($\beta = .19$; $B(SE) = .05(.02)$, $p = .005$; ES = small). This association approached significance for IPV ($\beta = .15$; $B(SE) = .19(.10)$, $p = .052$).

With respect to location, males appear to be most affected by neighbourhood violence exposure (see *Figure 7*), which predicted externalizing problems ($\beta = .19$; $B(SE) = .96(.40)$, $p = .017$; ES = small) and IPV ($\beta = .19$; $B(SE) = .19(.08)$, $p = .016$; ES = small). Specifically, both

witnessing violence and direct victimization in the neighbourhood predicted these two outcomes (β 's = .18-.19; B's = .28-1.3, p 's < .05; ES = small). In contrast, for females (see *Figure 8*), violence exposure at home was associated with internalizing problems ($\beta = .19$; B(SE) = 2.5(.85), $p = .004$; ES = small); externalizing problems ($\beta = .24$; B(SE) = 2.3(.80), $p = .004$; ES = small); attention problems ($\beta = .26$; B(SE) = 1.44(.35), $p = .000$; ES = small); and IPV ($\beta = .17$; B(SE) = .47(.22), $p = .039$; ES = small). This was the case for both witnessing violence and direct victimization (β 's = .17-.26; B's = .47-2.5, p 's < .05; ES = small). Although overall neighbourhood violence exposure predicted negative adult outcomes in males, victimization at home also independently predicted externalizing problems ($\beta = .16$; B(SE) = 1.9(.90), $p = .029$; ES = small) and attention problems ($\beta = .17$; B(SE) = 1.9(.83), $p = .016$; ES = small). A notable difference was that internalizing problems was a significant outcome for females but not males.

3.6 Indirect Effect of Delinquency

Figure 9 shows the path model examining whether cumulative violence exposure in youth was associated with the five adult outcomes (internalizing, externalizing, and attention problems; substance use; and IPV) indirectly through delinquency measured in grade 12. Cumulative violence exposure was associated with delinquency ($\beta = .17$; B(SE) = .04(.02), $p = .008$; ES = small). Cumulative violence exposure was also associated with internalizing problems ($\beta = .10$; B(SE) = .16(.07), $p = .049$; ES = small); externalizing problems ($\beta = .16$; B(SE) = .19(.07), $p = .003$; ES = small); attention problems ($\beta = .13$; B(SE) = .08(.03), $p = .011$; ES = small); substance use ($\beta = .12$; B(SE) = .01(.03), $p = .019$; ES = small); and IPV ($\beta = .16$; B(SE) = .05(.02), $p = .003$; ES = small). Delinquency in grade 12 was only associated with one adult outcome, substance use ($\beta = .08$; B(SE) = .02(.01), $p = .041$; ES = small). Indirect effects testing indicated that delinquency did not significantly account for indirect effects of cumulative

violence exposure in youth on substance use at age 25 ($B(SE) = -.02(.01)$, 95% CI[0.000, 0.001]). *Table 5* and *Table 6* show the relevant coefficients and confidence intervals.

Chapter 4.

Discussion

4.1 Summary of Major Findings

The prevalence of violence exposure during childhood and adolescence is staggering, with roughly 60% of youth experiencing at least one violent act in the past year (Finkelhor et al., 2009). Violence exposure is heterogeneous, in etiology, quality, quantity, and impact (Perry, 1997). It is essential to better understand the ways in which violence exposure contributes to these significant and varied outcomes. One explanation is that the type of exposure (witnessing versus victimization) and where it takes place (home, school, neighbourhood) differentially impact youth. It is also important to examine how different types of violence exposure occurring during youth continue to exert their effects as youth transition into adulthood.

This study examined the comparative and cumulative effects of violence exposure across multiple locations occurring during youth on long-term adult outcomes at age 25. Consistent with previous studies, there were high rates of violence exposure during youth: 89% of participants reported experiencing violence exposure before the end of grade 8. 14% of participants reported witnessing violence in the home; 72% reported witnessing violence at school; and 54% reported witnessing violence in the neighbourhood. By comparison, in a similar study, Mrug and Windle (2010) found that 12% reported witnessing violence in the home; 70% at school; and 32% in the neighbourhood. Further, in the current study, 52% of youth reported experiencing violence exposure across multiple locations; this overlap is consistent with prior research, indicating that youth exposed to violence in one domain are at an increased risk of

experiencing violence in other domains (Finkelhor et al., 2007a). The violence exposure measure in the current study was comparable to other studies, and the mean scores obtained for both witnessing violence and direct victimization across locations (home, school, neighbourhood) were very similar to prior research.

Witnessing versus Victimization. Violence exposure was associated with child and neighbourhood demographics (e.g., SES, race, initial severity-of-risk score). After controlling for these associations, as well as prior symptom level, violence exposure made independent contributions in predicting negative adult outcomes. When comparing witnessing violence and direct victimization, only victimization during youth predicted all five adult outcomes: internalizing, externalizing, and attention problems; substance use; and IPV. Witnessing violence did not independently predict any of the five adult outcomes. This finding was somewhat surprising, as I expected to find differential impacts of both witnessing and victimization. However, there are a number of potential mechanisms and/or developmental pathways that may account for these findings. Meta-analytic findings indicate greater impact of victimization than witnessing violence on adolescent adjustment (Fowler et al., 2009; Wilson, Stover, & Berkowitz, 2009). The nature and severity of direct victimization may put youth at greater risk for developing emotional and behavioural dysregulation and associated problems. Further, because other studies were short-term, perhaps the effects of witnessing violence become attenuated over time. This finding should not downplay the significant negative effects of witnessing violence; rather, it highlights the especially detrimental impact of being victimized during childhood and adolescence, and how this continues to be associated with a broad array of emotional and behavioural problems well into adulthood.

Violence Exposure Type and Location. Consistent with Mrug and Windle (2010),

violence exposure at home and school were more robust predictors of negative adult outcomes than exposure to neighbourhood violence. Violence exposure at home predicted internalizing, externalizing, and attention problems. Violence exposure at school only predicted substance use problems. Violence exposure in the neighbourhood did not independently predict any adult outcomes. This finding does not rule out the significant impact of neighbourhood or community violence exposure. Rather, because the violence exposure measure was lifetime through grade 8, it may be that youth are not spending as much time outside in the neighbourhood during childhood and early adolescence, but are instead spending the majority of their time at school and in the home. The stronger effects of violence exposure in more proximal contexts (home and school) is consistent with previous research (Mrug et al., 2008). Lastly, no location independently predicted IPV. Although victimization predicted IPV, *where* this victimization occurs does not appear to make independent contributions to IPV in adulthood. This finding was surprising, given existing research demonstrating a link between exposure to severe intimate partner violence and teen dating violence (Jouriles, Mueller, Rosenfield, McDonald, & Dodson, 2012). Perhaps this effect is attenuated over time, as youth transition to adulthood; the association between witnessing violence at home and IPV perpetration at age 25 approached significance ($p = .056$). That said, the current study was investigating violence exposure (five types of violent events) across three different locations. Violence exposure occurring at home is distinct from more specific operationalizations such as children witnessing intimate partner violence between parents. For example, Jouriles et al. (2012) collected data from mothers reporting their own and their partners' perpetration of severe physical IPV, and found associations with teen dating violence perpetration. The current findings highlight that being victimized during childhood and adolescence predicts later IPV perpetration; however, where

this occurs does not seem to provide additional predictive information.

When examining the interaction of violence exposure type (witnessing versus victimization) and location (home, school, neighbourhood), victimization at home and school were again the most robust predictors of negative adult outcomes. This is not surprising, given victimization, but not witnessing violence, predicted all five adult outcomes. Specifically, victimization in the home setting appears to have the most detrimental effects on later adult adjustment, predicting internalizing, externalizing, and attention problems. This is consistent with the larger body of research on the effects of domestic violence and child maltreatment more generally (Evans et al., 2008; Wolfe et al., 2003). As such, these findings emphasize the importance of a safe home environment for the emotional and behavioural development of youth. This study extended this finding, in showing that earlier experiences in the home environment continue to impact youth as they transition into adulthood. As noted above, given that victimization is a more direct and severe form of violence exposure *and* the home setting functions as a developmentally important “safe haven,” it is not surprising that being victimized at home is associated with the widest range of negative outcomes in adulthood. The three adult outcomes of internalizing, externalizing, and attention problems all reflect common trauma symptoms caused by emotional, behavioural, and attentional dysregulation.

Interestingly, *witnessing* violence at home predicted attention problems in adulthood. This was the only outcome associated with witnessing violence. Both witnessing violence and direct victimization at home predicted attention problems in adulthood, which is conceptualized as attentional dysregulation (i.e., stress-related symptoms associated with trauma). This finding is consistent with previous research showing that youth who report both witnessing and direct victimization experiences have elevated risk for ADHD symptoms (Lewis et al., 2015). The

current study expanded upon this finding, showing that violence exposure occurring at home predicts attention problems and that this persists into adulthood.

Victimization in the school setting predicted substance use. Previous studies have linked victimization due to school violence (i.e., physical and relational bullying) to substance use in later adolescence (Earnshaw et al., 2017; Sullivan et al., 2006; Tharp-Taylor, Haviland, & D'Amico, 2009). These studies have specifically investigated school victimization; there is a surprising dearth of research examining witnessing violence at school, despite its prevalence. Some studies have identified deviant peer affiliation as a potential factor explaining the relationship between school victimization and substance use problems (Jiang et al., 2016). Youth who are rejected or victimized by peers may develop deviant peer affiliations (Dishion et al., 2012). These deviant peers then play a significant role in predicting initiation of alcohol, cigarette, and illicit drug use by way of social modeling, peer pressure, and reinforcement (Van Ryzin & Dishion, 2014). This study extended these findings, indicating that earlier school victimization is associated with alcohol, marijuana, and illicit drug use in adulthood.

4.2 Cumulative Violence Exposure

This study also considered that youth often experience multiple forms of violence exposure across multiple domains, and that exposure to multiple forms of violence can have more serious effects than exposure to one type alone. As expected, cumulative violence exposure predicted all five adult outcomes. Further, we also found that cumulative violence exposure predicted a composite score (ranging from 0-5) of the five adult outcomes, which reflects comorbidity of adverse outcomes. This shows that when youth experienced multiple types of violence across multiple locations, they experienced a broader and more diverse range of

negative symptoms in adulthood. This comorbidity of symptoms may be an indication of functional impairment. These findings extend previous research (Margolin et al., 2010; Wright et al., 2013), and indicate that the accumulation of violence exposure continues to contribute to a wide range of emotional and behavioural problems in adulthood.

4.3 Sex Differences

Although there are mixed findings regarding sex differences among youths' emotional and behavioural reactions to violence exposure, this study identified important sex differences. Females generally experienced more negative outcomes associated with violence exposure than did males. This is consistent with prior research indicating that girls experience greater distress after experiencing violence compared to boys (Horowitz, Weine, & Jekel, 1995). Females also experienced internalizing problems following violence exposure, while males did not. Again, this is consistent with research demonstrating that girls are more likely to report internalizing symptoms (e.g., depression, anxiety, hyperarousal) following violence exposure (Sternberg, Lamb, Guterman, & Abbott, 2006). Females may cope by internalizing the trauma, thereby experiencing anxiety, fear, and mood disturbances (Eschenbeck et al., 2007). Further, violence exposure predicted both internalizing *and* externalizing outcomes in females. Although earlier research reported that girls experienced internalizing problems whereas boys experienced externalizing problems following violence exposure, our findings are consistent with more recent research demonstrating that girls are at risk for *both* internalizing and externalizing symptoms (Cooley-Strickland et al., 2009).

In terms of location, for males, neighbourhood violence predicted externalizing problems and IPV; for females, home violence predicted internalizing, externalizing, and attention

problems; and IPV. These results may be explained by differential proximity to settings, whereby boys spend more time in the neighbourhood and girls spend more time at home. Further, boys generally report more neighbourhood violence exposure than girls (Selner-O'Hagan et al., 1998). Although this indicates that home violence predicts negative outcomes for females only, when looking more specifically at victimization in the home setting, results suggest that home victimization predicts externalizing and attention problems in males. This is further evidence of the strong association between being victimized at home during child and adolescence and later negative adult outcomes, with this finding existing for both males and females.

4.4 Indirect Effect of Delinquency

Lastly, I examined whether delinquency measured in grade 12 acted as a mediator between violence exposure during youth and the five adult outcomes. Although cumulative violence exposure predicted delinquency in grade 12 and substance use at age 25, and delinquency also predicted substance use, delinquency did not act as a mediator. Delinquency predicting substance use is consistent with prior research identifying delinquency as a precursor to alcohol use (D'Amico, Edelen, Miles, & Morral, 2008) and drug use (Murphy, Brecht, Huang, & Herbeck, 2012). Based on the findings of the current study, engaging in delinquent behaviour (property, violent, drug, and sexual delinquency) in grade 12 does not help to explain the association between violence exposure in youth and adult substance use 11 years later. That said, important questions remain regarding other potential mediators that may explain how violence exposure exerts its effects and contributes to negative adult adjustment.

4.5 Strengths and Limitations

The current study has numerous strengths. Using a large and racially diverse community sample, longitudinal design, and SEM, the study was able to compare how different types of violence exposure (witnessing versus victimization) across different locations (home, school, neighbourhood) in youth independently predict five outcomes 11 years later (age 25). Understanding the diverse impact of violence exposure has been limited by the compartmentalization of different bodies of research (e.g., community violence, domestic violence, peer victimization), whereas the current study had the advantage of including different forms of violence exposure in one model to ascertain the comparative effects on long-term adult outcomes. Further, by including five outcome measures, the current study emphasized the wide range of negative effects of violence exposure during child and adolescence. The current study also demonstrated that cumulative violence continues to exert deleterious effects (i.e., comorbidity of adverse outcomes) well into adulthood.

Despite its strengths, a few limitations of the study must be addressed. The most notable limitation is the violence exposure measure. While *My Exposure to Violence* (Buka et al., 1996) is a reliable and valid measure, previously used in other studies, questions remain whether it accurately reflects an individual's exposure to violence. It asks about only five types of violent events, all of which are scored the same despite a wide range in severity (i.e., witnessing someone being slapped versus witnessing someone being killed). Further, it does not accurately take into account frequency; an individual will have the same score after exposure to violence on 2 occasions or 15 occasions. It would also be important to have information about the relationship to the perpetrator(s) or the victim(s) of witnessed violence. Especially when investigating violence exposure across locations, information about the perpetrator would

provide important information about interpersonal violence exposure. For example, if a respondent reported being victimized at home, was this by a parent (and which parent?), sibling, or family friend? Lastly, the measure did not ask about other forms of violence exposure (e.g., sexual violence).

Similar to the violence exposure measure, the IPV measure (*General Violence Questionnaire*; Holtzworth-Monroe, Rehman, & Herron, 2000) only included six types of violent acts perpetrated against romantic partners, and they were scored the same despite ranging significantly in severity (e.g., yelling versus using a weapon).

Despite significant *p*-values, all of the primary analyses (Figures 1 through 9) yielded small ES; thus, present findings should be replicated with additional measures and samples. That said, although the proportion of variance explained is small, it is comparable to previous research. For example, Mrug and Windle (2010) yielded standardized beta coefficients (β) ranging from .08 to .14. In the current study, β 's = .10 to .19. Furthermore, a meta-analysis examining outcomes associated with community violence exposure during youth noted that, "all tested models left significant amounts of variance in outcomes unexplained" (Fowler et al., 2009, p. 251). The effects of violence exposure may function, in part, through the presence of other potentiating or compensatory factors. This emphasizes the need for more complex explanatory models of individual and contextual factors that either buffer against or exacerbate the effects of violence exposure during youth.

4.6 Implications

Although violence exposure has negative effects on mental health and adjustment, the most significant effect is seen when youth are victimized at home or in the school. Home

victimization is associated with the widest range of negative outcomes (internalizing, externalizing, and attention problems), whereas school victimization is specifically associated with substance use problems later in life. Using a longitudinal design with a large and diverse sample, this study extended existing research on the effects of violence exposure during child and adolescence. Taking a life-course perspective, these findings demonstrate that violence exposure has long-term negative effects evident well into adulthood. The study also provides further evidence of the heterogeneous nature of violence exposure, and the varied impact of different types of violence across different locations. Additionally, with the accumulation of violence exposure across contexts, youth are more likely to experience comorbid symptoms and diverse negative outcomes in adulthood. Lastly, there are important differences with respect to violence exposure in males and females, especially with respect to where such violence takes place (i.e., neighbourhood versus home). Based on these findings, preventing youth victimization, especially at home and the school, must be a top research, practice, and policy priority. Future research efforts are outlined below.

In terms of practice efforts, the heterogeneity of violence exposure dictates heterogeneity of intervention (Perry, 1997). For youth or adults already exposed to violence, assessment and treatment efforts must consider the location in which this exposure took place, and employ a trauma-informed treatment that considers the relevant developmental disruption specific to each context. For example, for youth exposed to violence in the home, components including re-exposure interventions, education about violence and cognitive restructuring, processing of emotional cues, social problem-solving skills, and parenting interventions have all been empirically evaluated (Vickerman & Margolin, 2007). Child-Parent Psychotherapy (CPP) for preschoolers exposed to marital violence (Lieberman & Van Horn, 2005) is associated with

significant reductions in children's traumatic stress (Lieberman, Van Horn, & Ippen, 2005). The Youth Relationship Project (Wolfe et al., 1996) was developed for adolescents with histories of violence exposure and risk factors for abuse; a randomized control trial found that youth receiving the intervention showed a greater decline in aspects of posttraumatic stress compared to a control group (Wolfe et al., 2003). For school victimization, Cognitive-Behavioural Intervention for Trauma in School (CBITS) is an evidence-based intervention for youth exposed to school violence (Stein et al., 2003). CBITS is aimed at relieving symptoms of PTSD, depression, and general anxiety. Based on the findings from the current study, it would also be important to include an adjunct treatment for substance use or a preventive intervention for substance use problems among youth. Overall, treatment must not solely focus on alleviating symptoms, but instead must consider how violence exposure functions as a precipitating factor, as well as how the accumulation of violence exposure across multiple locations continues to impact emotional and behavioural functioning in adulthood.

In terms of policy, the U.S. Department of Health and Human Services and the Centers for Disease Control and Prevention (CDC) call for creating safe, stable, nurturing relationships and environments for all children and families, as fundamental to the prevention of adverse childhood experiences. Such policies and strategies include: (a) strengthening economic supports for families (e.g., earned income tax credits, family-friendly work policies); (b) promoting social norms aimed at decreasing violence and adversity (e.g., public education campaigns, bystander approaches to support healthy relationship behaviours); (c) ensuring a strong start for children (e.g., early childhood home visitations, high-quality child care); and (d) connecting youth to caring adults and activities (e.g., mentoring and after-school programs) (Merrick et al., 2019). Such policy initiatives aimed at preventing adverse childhood experiences, such as witnessing

violence and direct victimization, may improve the mental, physical, and social well-being of youth over the lifespan (CDC, 2019).

4.7 Future Directions

Future research should be longitudinal and examine longer-term (i.e., middle age) outcomes. More detailed measures should be employed to present a more complete record of the violence to which youth are exposed, including severity and information about the perpetrator(s) and victim(s) of witnessed violence. It would also be important to examine online victimization, which is an increasingly common experience for youth (White & Carmody, 2016). Lastly, more research is needed to identify the mechanisms by which violence exposure exerts its effects, as well as relevant risk and protective factors for both youth and adults. This would be especially important when looking at violence exposure across locations and contexts. For example, potential explanatory models for home violence exposure could look at parent-child attachment, parental monitoring, or parental mental health (Voison, Tan, Tack, Wade, & DiClemente, 2012). Regarding school violence exposure, deviant peer affiliation, peer relationship quality, school engagement, and academic functioning would be important potential mediators (Bender & Roberts, 2008; Borofsky, Kellerman, Baucom, Oliver, & Margolin, 2013). Lastly, examining the mediating role of social stability or social cohesion may further elucidate the link between neighbourhood violence exposure and negative adult outcomes (Antunes & Ahlin, 2016).

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Table 1. *Descriptive Statistics for Violence Exposure*

	Percentage of participants (<i>N</i> =753)
Any Violence Exposure	89
Type	
Witnessing	87
Victimization	51
Location	
Home	22
School	75
Neighbourhood	58
Violence Exposure in Multiple Locations	52
Witnessing Across Locations	
Witnessing in the Home	14
Witnessing in the School	72
Witnessing in the Neighbourhood	54
Victimization Across Locations	
Victimization in the Home	14
Victimization in the School	30
Victimization in the Neighbourhood	28

Table 2a. Descriptive Statistics and Correlations among Main Study Variables

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.
1. CVE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2. Witnessing	.89**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3. Victimization	.81**	.51**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4. Home	.52**	.30**	.44**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5. School	.69**	.53**	.56**	.34**	-	-	-	-	-	-	-	-	-	-	-	-	-
6. Neighbourhood	.86**	.78**	.65**	.41**	.44**	-	-	-	-	-	-	-	-	-	-	-	-
7. Delinquency	.17**	.14**	.15**	.11*	.06	.19**	-	-	-	-	-	-	-	-	-	-	-
8. Internalizing	.15**	.12**	.15**	.16**	.07	.11**	.05	-	-	-	-	-	-	-	-	-	-
9. Externalizing	.25**	.20**	.25**	.19**	.12**	.22**	.16**	.71**	-	-	-	-	-	-	-	-	-
10. Attention	.15**	.10*	.18**	.18**	.07	.10*	.09*	.76**	.72**	-	-	-	-	-	-	-	-
11. Substance use	.13*	.06	.20**	.03	.13**	.09	.14**	.18**	.29**	.20**	-	-	-	-	-	-	-
12. IPV	.19**	.16**	.14**	.18**	.09	.19**	.08	.32**	.36**	.24**	.07	-	-	-	-	-	-
13. Composite	.20**	.13**	.22**	.19**	.12*	.18**	.16**	.76**	.80**	.71**	.54**	.48**	-	-	-	-	-
14. Sex (1=male)	.15**	.10*	.20**	-.01	.06	.17**	.18**	-.07	.15**	.03	.17**	-.21**	.04	-	-	-	-
15. Race (1=Black)	.24**	.32**	.06	.15**	.07	.25**	.28	.07	.10*	-.03	-.14**	.19**	.08	.02	-	-	-
16. SES	-.19**	-.19**	-.10*	-.14**	-.01	-.26**	-.01	-.18**	-.16**	-.08	.07	-.15**	-.11*	.03	-.19**	-	-
17. Risk score	.13**	.09*	.15**	.04	.03	.14**	.08	.13**	.25**	.17**	.06	.09	.17**	.29**	.03	-.13**	-
<i>M</i>	10.24	4.95	1.88	.37	1.42	1.62	.79	18.4	15.3	7.9	.49	14.2	1.5	.58	.46	25.7	1.01
<i>SD</i>	8.33	3.64	2.45	.92	1.24	2.02	2.1	12.42	10.3	5.6	.5	2.5	1.4	.49	.50	12.9	1.64
Range	46	15	14	7	7	10	23	61	58	29	1	18	5	1	1	62	9
Skewness	1.2	.78	1.62	3.71	1	1.4	5.89	.91	1	.81	.03	2.2	.66	-.33	.16	.54	-.20
Kurtosis	1.5	.13	2.9	17.9	1.2	1.3	49.5	.45	1.1	.54	-2	7.8	-.54	-.36	-.19	-.30	-.36

* $p < .05$. ** $p < .01$.

Note. CVE = cumulative violence exposure; IPV = intimate partner violence; SES = socioeconomic status

Table 2b. *Descriptive Statistics and Correlations among Main Study Variables*

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.
1. Wit. Home	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2. Wit. School	.27**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3. Wit. Neighbourhood	.30**	.33**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4. Vic. Home	.47**	.19**	.22**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5. Vic. School	.23**	.36**	.27**	.29**	-	-	-	-	-	-	-	-	-	-	-	-	-
6. Vic. Neighbourhood	.32**	.26**	.55**	.48**	.50**	-	-	-	-	-	-	-	-	-	-	-	-
7. Delinquency	.08	.05	.17**	.11*	.04	.18**	-	-	-	-	-	-	-	-	-	-	-
8. Internalizing	.14**	.06	.09*	.14**	.06	.13**	.05	-	-	-	-	-	-	-	-	-	-
9. Externalizing	.14**	.09*	.18**	.20**	.12**	.22**	.16**	.71**	-	-	-	-	-	-	-	-	-
10. Attention	.13**	.04	.06	.18**	.09*	.14**	.09*	.76**	.72**	-	-	-	-	-	-	-	-
11. Substance use	.02	.07	.03	.03	.15**	.15**	.14**	.18**	.29**	.20**	-	-	-	-	-	-	-
12. IPV	.19**	.09	.20**	.12*	.04	.13**	.08	.32**	.36**	.24**	.07	-	-	-	-	-	-
13. Composite	.18**	.09	.13**	.15**	.10*	.22**	.16**	.76**	.80**	.71**	.54**	.48**	-	-	-	-	-
14. Sex (1=male)	-.02	-.02	.14**	.02	.15**	.17**	.18**	-.07	.15**	.03	.17**	-.21**	.04	-	-	-	-
15. Race (1=Black)	.15**	.10*	.30**	.09*	-.01	.09*	.28	.07	.10*	-.03	-.14**	.19**	.08	.02	.-	-	-
16. SES	-.11**	.02	-.26**	-.12**	-.06	-.18**	-.01	-.18**	-.16**	-.08	.07	-.15**	-.11*	.03	-.19**	-	-
17. Risk score	.05	-.01	.13**	.01	.07	.12**	.07	.138**	.25**	.17**	.06	.09	.17**	.29**	.03	.13**	-
<i>M</i>	.2	1.1	1.2	.17	.37	.43	.79	18.4	15.3	7.9	.49	14.2	1.5	.58	.46	25.7	1.01
<i>SD</i>	.60	.87	1.44	.47	.63	.84	2.1	12.42	10.3	5.6	.5	2.5	1.4	.49	.50	12.9	1.64
Range	4	4	5	3	3	5	23	61	58	29	1	18	5	1	1	62	9
Skewness	3.9	.59	1.13	3.2	1.7	2.4	5.89	.91	1	.81	.03	2.2	.66	-.33	.16	.54	-.20
Kurtosis	17.8	.06	.29	2.4	2.4	6	49.5	.45	1.1	.54	-2	7.8	-.54	-.36	-.19	-.30	-.36

* $p < .05$. ** $p < .01$.

Note. IPV = intimate partner violence; SES = socioeconomic status; Wit. = witnessing; Vic. = victimization

Table 3. Estimates from Multiple Linear Regression of Covariates Predicting Internalizing, Externalizing, and Attention Problems; Substance Use; and Intimate Partner Violence

	Internalizing Problems		Externalizing Problems		Attention Problems		Substance Use		IPV	
	B (SE)	β	B (SE)	β	B (SE)	β	B (SE)	β	B (SE)	β
Sex (1=male)	-3.12(.35)	-.13**	.97(.87)	.05	-.49(.50)	-.05	.13(.05)	.13**	-1.35(.24)	-.26**
Race (1=Black)	1.81(1.1)	.08	1.23(.94)	.06	-.38(.51)	-.04	-.10(.05)	-.09*	.78(.26)	.15**
SES	-.10(.05)	-.11*	-.06(.03)	-.08	-.01(.02)	-.02	.003(.002)	.08	-.01(.008)	-.05
Risk score	.56(.35)	.08	1.0(.29)	.17**	.53(.18)	.16**	-.01(.02)	-.04	.19(.09)	.13*
Internalizing problems (gr. 4)	.33(.11)	.18**	.01(.09)	.01	.05(.05)	.06	.006(.004)	.08	-.01(.02)	-.03
Externalizing problems (gr. 4)	.01(.10)	.01	.09(.08)	.09	-.07(.04)	-.12	.004(.004)	.07	.004(.02)	.01
Attention problems (gr. 4)	.11(.20)	.04	.14(.17)	.05	.24(.09)	.17*	-.001(.009)	-.01	-.02(.05)	-.03
Substance use (gr. 7)	.57(.95)	.03	-.06(.67)	-.004	.18(.40)	.02	.04(.04)	.04	.47(.21)	.11*

* $p < .05$; ** $p < 0.01$.

Note. IPV = intimate partner violence; SES = socioeconomic status

Table 4. Estimates from Multiple Linear Regression of Main Study Variables Predicting Internalizing, Externalizing, and Attention Problems; Substance Use; and Intimate Partner Violence

	Internalizing Problems		Externalizing Problems		Attention Problems		Substance Use		IPV	
	B (SE)	β	B (SE)	β	B (SE)	β	B (SE)	β	B (SE)	β
Witnessing	-.07(.19)	-.02	.13(.16)	.05	.01(.09)	.00	-.003(.008)	-.02	.02(.04)	.03
Victimization	.66(.28)	.13*	.59(.21)	.14**	.32(.12)	.15**	.036(.01)	.18**	.15(.06)	.14*
Home	1.3(.54)	.10*	1.2(.52)	.11*	.93(.26)	.16**	-.01(.03)	-.02	.21(.15)	.08
School	.72(.46)	.07	.60(.41)	.07	.233(.22)	.05	.05(.02)	.12*	.07(.10)	.04
Neighbourhood	-.24(.34)	-.04	.12(.28)	.02	-.11(.16)	-.04	.006(.01)	.03	.13(.08)	.10
Witnessing home	1.5(.83)	.08	1.24(.81)	.07	.96(.40)	.10*	.02(.04)	.02	.42(.22)	.10
Witnessing school	.89(.62)	.06	.92(.53)	.08	.34(.29)	.05	.04(.03)	.08	.08(.13)	.03
Witnessing neighbourhood	-.32(.46)	-.04	.16(.37)	.02	-.16(.21)	-.04	.00(.02)	-.00	.18(.10)	.10
Victimization home	2.4(1.3)	.10*	2.70(.96)	.13**	1.9(.59)	.17**	-.06(.05)	-.06	.18(.26)	.04
Victimization school	1.1(1.0)	.05	.61(.85)	.04	.28(.49)	.033	.08(.04)	.10*	.15(.22)	.04
Victimization neighbourhood	-.06(.89)	.06	.45(.68)	.04	-.01(.38)	-.002	.06(.03)	.09	.24(.21)	.08
CVE	.14(.07)	.10*	.20(.06)	.17**	.08(.03)	.13**	.007(.003)	.12*	.05(.02)	.16**

* $p < .05$; ** $p < 0.01$.

Note. IPV = intimate partner violence; CVE = cumulative violence exposure

Table 5. *Estimates from Multiple Linear Regression of Cumulative Violence Exposure and Covariates Predicting Delinquency*

	Delinquency	
	B (SE)	B
Sex (1=male)	.5(.14)	.12**
Race (1=Black)	.10(.21)	.02
SES	.01(.006)	.06
Risk score	.15(.021)	.04
Internalizing problems (grade 4)	-.01(.02)	-.02
Externalizing problems (grade 4)	.02(.02)	.11
Attention problems (grade 4)	.06(.05)	.11
Substance use (grade 7)	.54(.30)	1.7
CVE	.04(.02)	.17**

* $p < .05$; ** $p < 0.01$.

Note. SES = socioeconomic status; CVE = cumulative violence exposure

Table 6. *Bootstrap Tests of Delinquency as a Mediator between Cumulative Violence Exposure and Age 25 Outcomes*

	Internalizing Problems		Externalizing Problems		Attention Problems		Substance Use		IPV	
	Bootstrap Indirect effect (SE)	95% CI	Bootstrap Indirect effect (SE)	95% CI	Bootstrap Indirect effect (SE)	95% CI	Bootstrap Indirect effect (SE)	95% CI	Bootstrap Indirect effect (SE)	95% CI
CVE										
Indirect effect through delinquency	.03(.30)	-.01, .01	.32(.32)	-.004, .025	.08(.15)	-.005, .007	.02(.01)	.000, .001	.07(.06)	-.001, .005

* $p < .05$; ** $p < 0.01$

Note. IPV = intimate partner violence; CVE = cumulative violence exposure

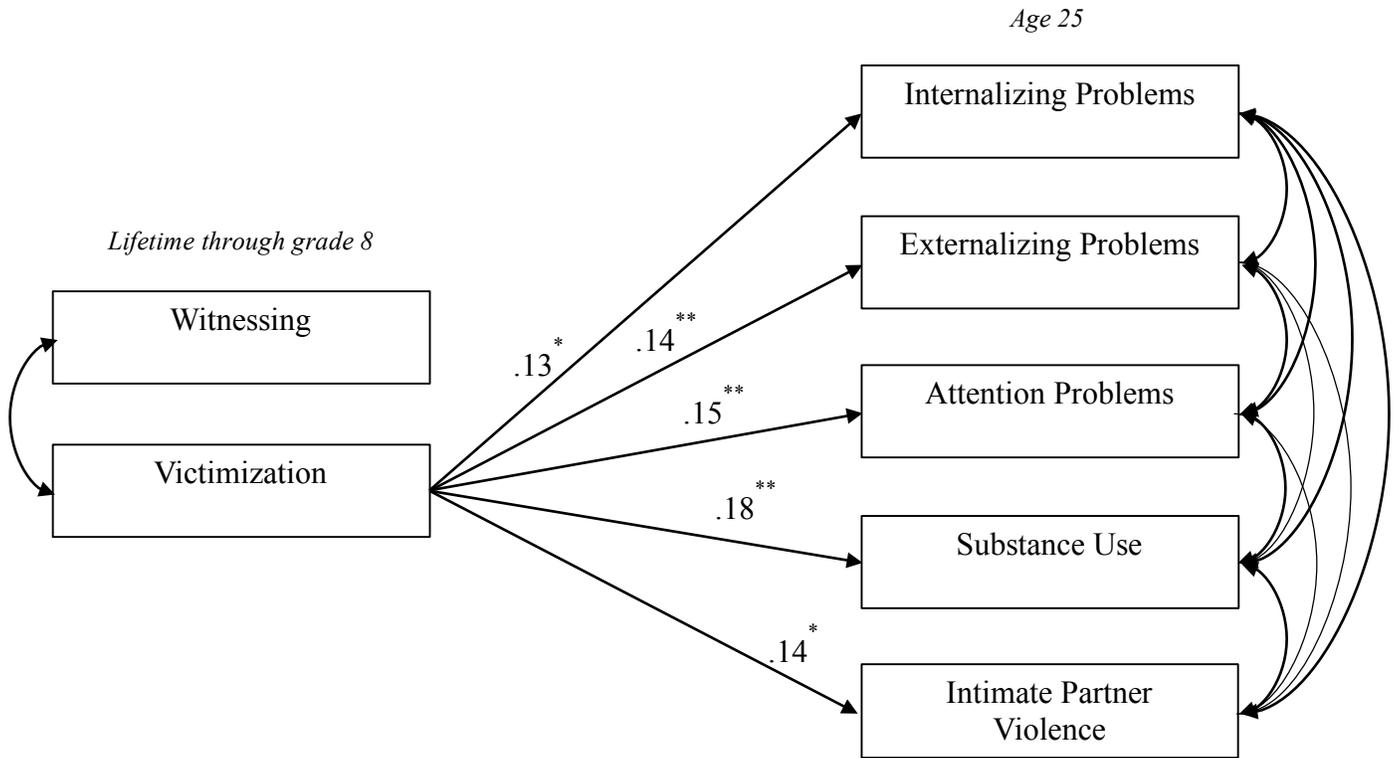


Figure 1. Path model of witnessing and victimization predicting internalizing, externalizing, and attention problems; substance use; and intimate partner violence. Covariates included in analyses but omitted from figure. * $p < .05$; ** $p < .01$.

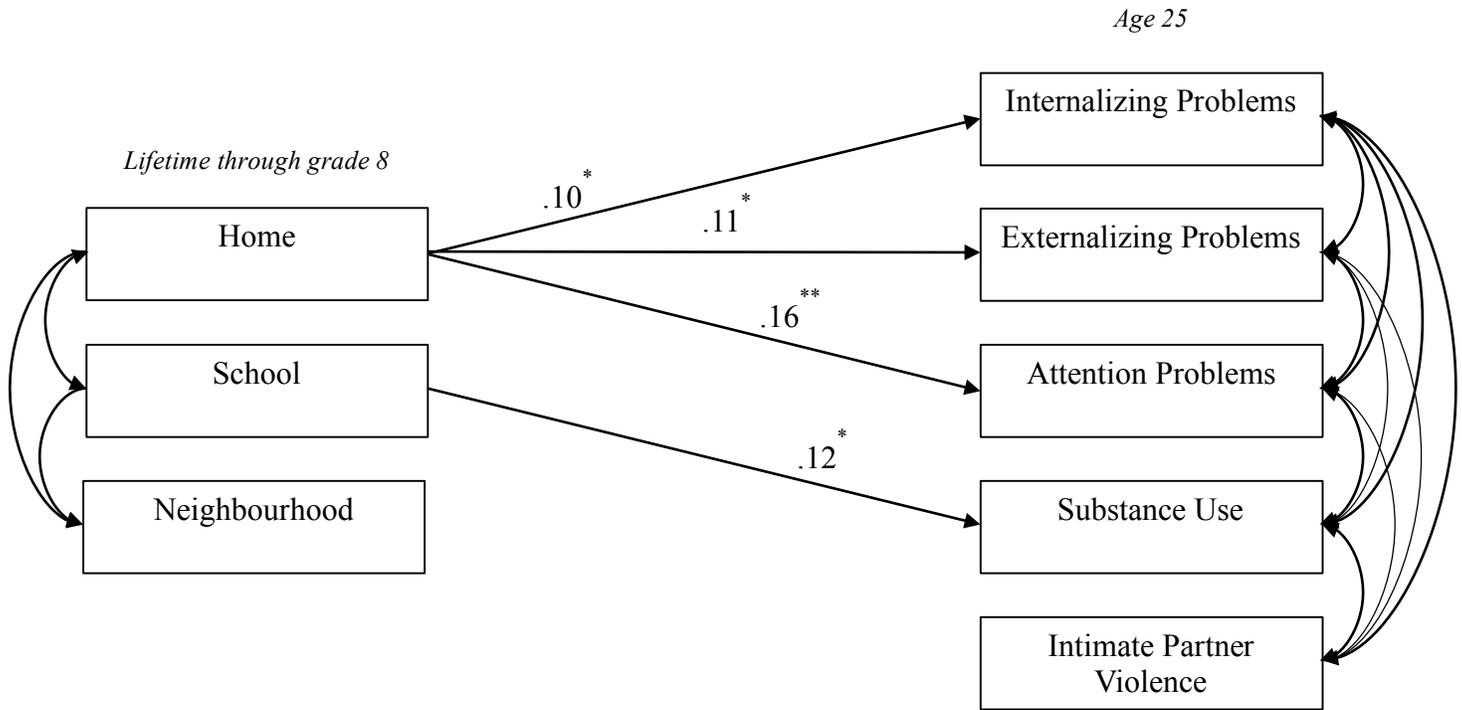


Figure 2. Path model of violence exposure in the home, school, and neighbourhood predicting internalizing, externalizing, and attention problems; substance use; and intimate partner violence. Covariates included in analyses but omitted from figure. * $p < .05$; ** $p < .01$.

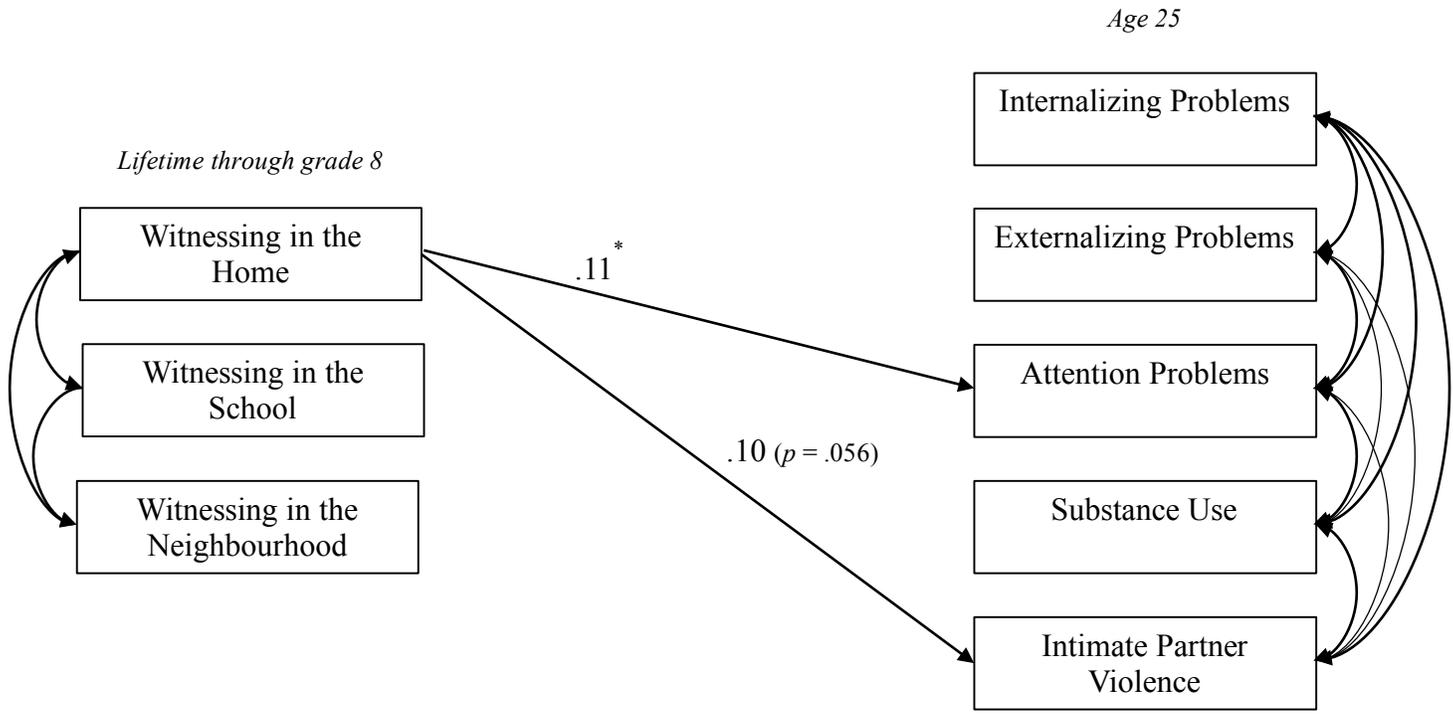


Figure 3. Path model of witnessing violence in the home, school, and neighbourhood predicting internalizing, externalizing, and attention problems; substance use; and intimate partner violence. Covariates included in analyses but omitted from figure. * $p < .05$; ** $p < .01$.

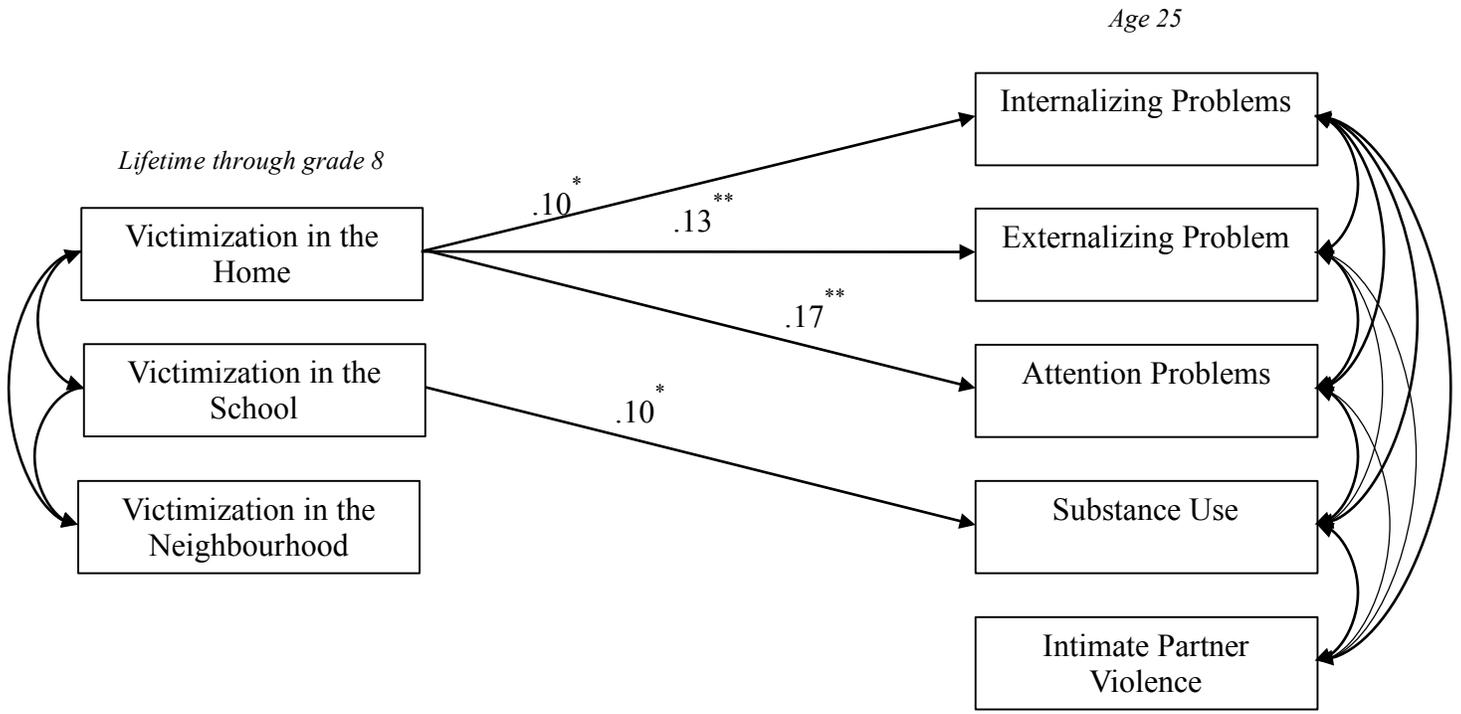


Figure 4. Path model of victimization in the home, school, and neighbourhood predicting internalizing, externalizing, and attention problems; substance use; and intimate partner violence.

Covariates included in analyses but omitted from figure. * $p < .05$; ** $p < .01$.

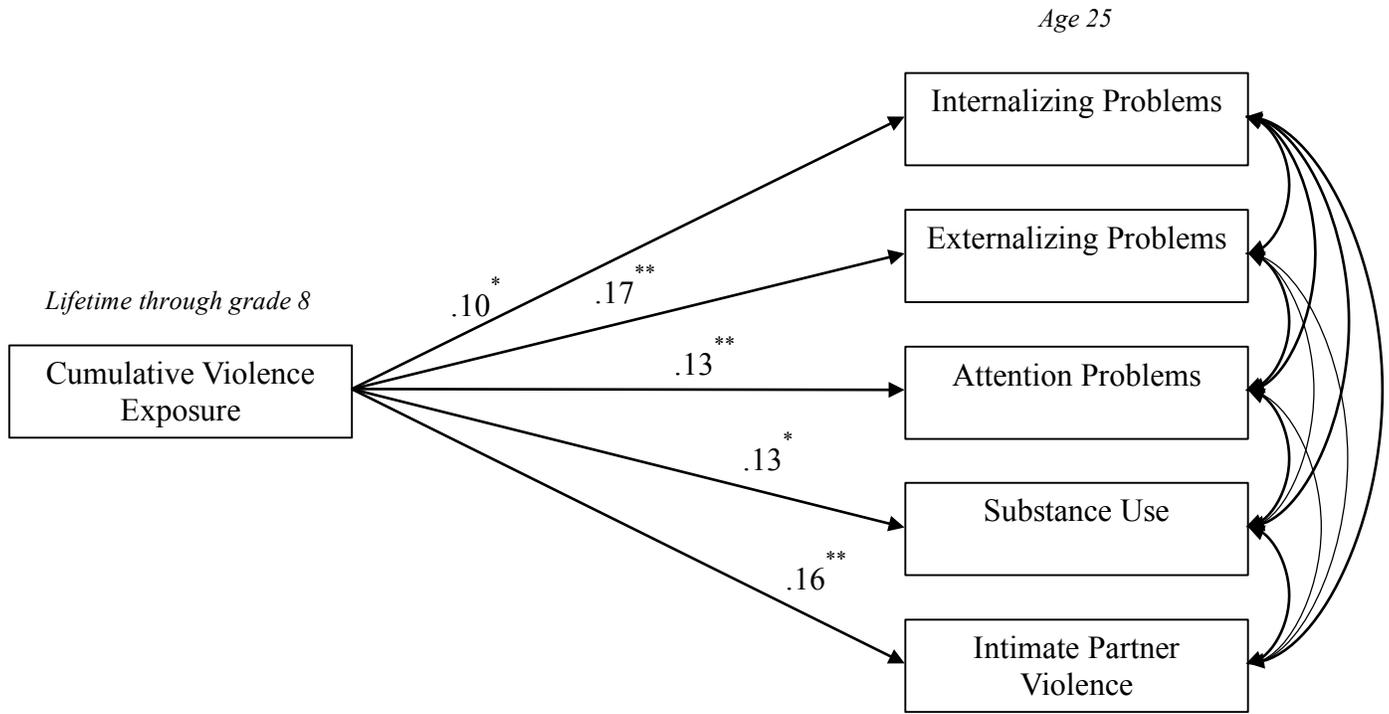


Figure 5. Path model of cumulative violence exposure predicting internalizing, externalizing, and attention problems; substance use; and intimate partner violence. Covariates included in analyses but omitted from figure. * $p < .05$; ** $p < .01$.

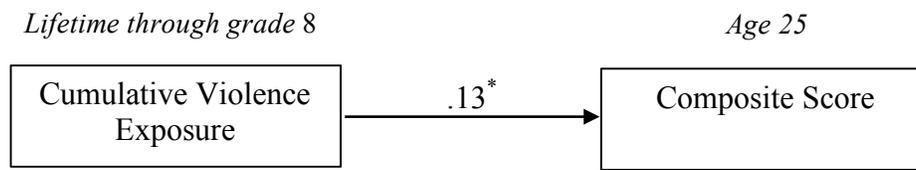


Figure 6. Model of cumulative violence exposure predicting a composite score (comorbidity of adverse outcomes). Covariates included in analyses but omitted from figure. * $p < .05$; ** $p < .01$.

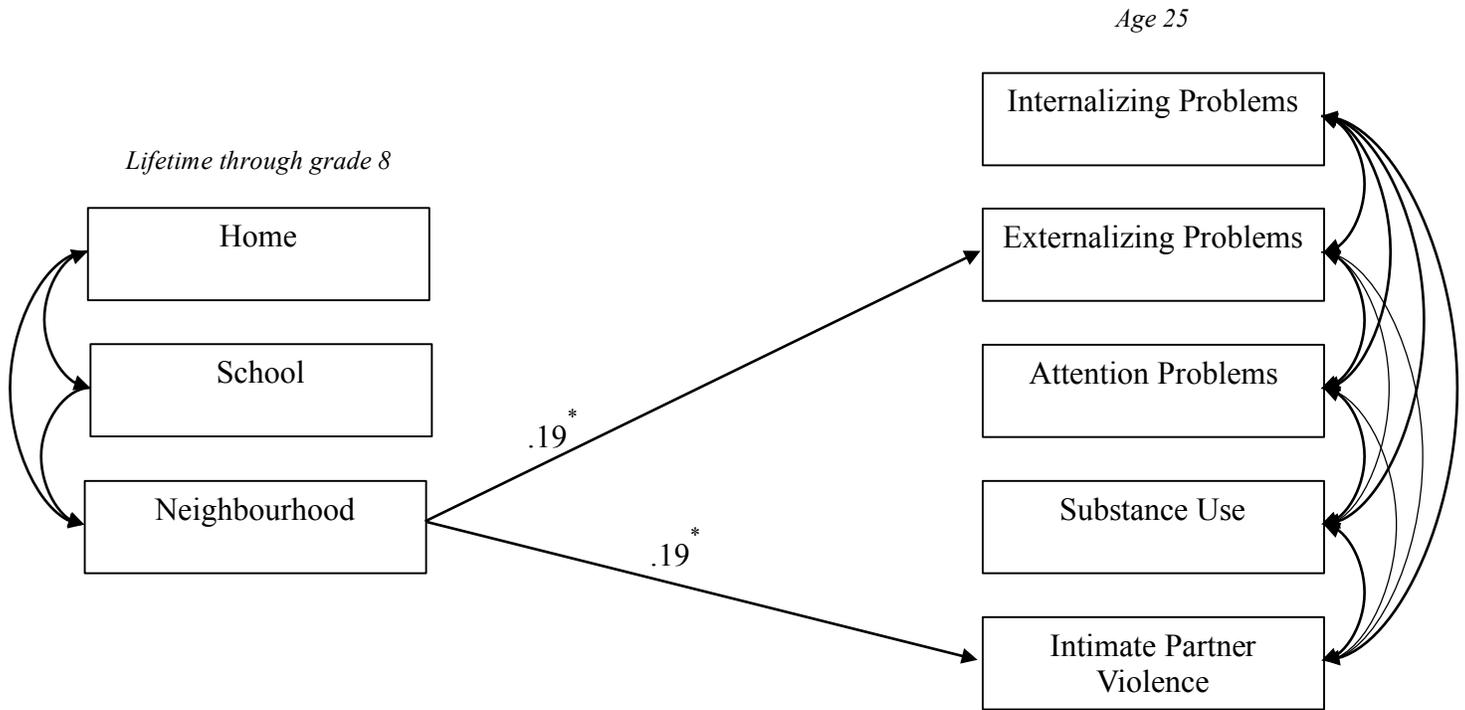


Figure 7. Path model of violence exposure in the home, school, and neighbourhood predicting internalizing, externalizing, and attention problems; substance use; and intimate partner violence in **males**. Covariates included in analyses but omitted from figure. * $p < .05$; ** $p < .01$.

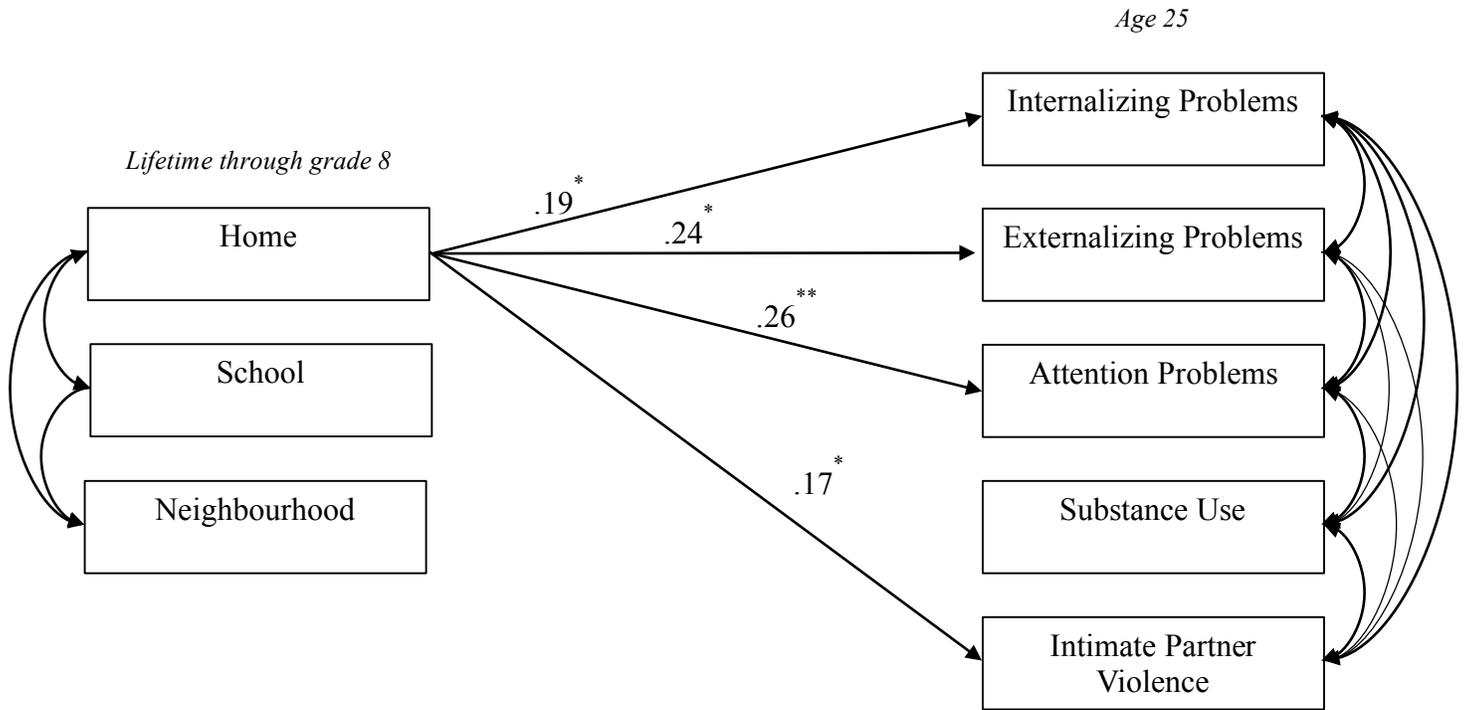


Figure 8. Path model of violence exposure in the home, school, and neighbourhood predicting internalizing, externalizing, and attention problems; substance use; and intimate partner violence in **females**. Covariates included in analyses but omitted from figure. * $p < .05$; ** $p < .01$.

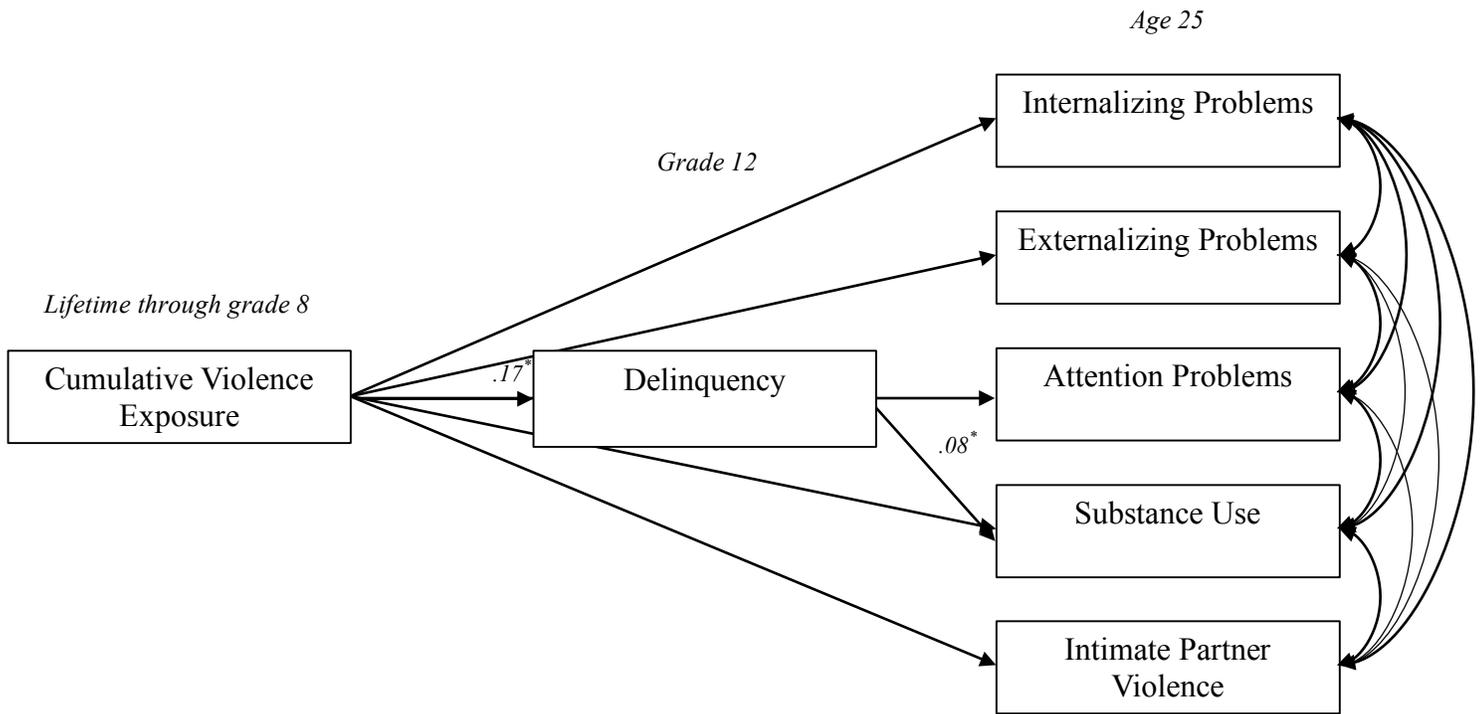


Figure 9. Path model of cumulative violence exposure predicting internalizing, externalizing, and attention problems; substance use; and intimate partner violence, with delinquency as mediator. Covariates included in analyses but omitted from figure. * $p < .05$; ** $p < .01$.

Appendix A

My Exposure to Violence (Buka et al., 1996)

Witnessing:

“Have you ever seen someone **slapped/punched/beaten**?” (0 = no, 1 = yes)

“Did this happen more than once?” (1 = no, 2 = yes)

“Did this happen at home?” (0 = no, 1 = yes)

“Did this happen at school?” (0 = no, 1 = yes)

“Did this happen in the neighborhood?” (0 = no, 1 = yes)

“Have you ever seen someone **threatened with serious bodily injury**?” (0 = no, 1 = yes)

“Did this happen more than once?” (1 = no, 2 = yes)

“Did this happen at home?” (0 = no, 1 = yes)

“Did this happen at school?” (0 = no, 1 = yes)

“Did this happen in the neighborhood?” (0 = no, 1 = yes)

“Have you ever seen someone **attacked with a knife/bat**?” (0 = no, 1 = yes)

“Did this happen more than once?” (1 = no, 2 = yes)

“Did this happen at home?” (0 = no, 1 = yes)

“Did this happen at school?” (0 = no, 1 = yes)

“Did this happen in the neighborhood?” (0 = no, 1 = yes)

“Have you ever seen someone **shot**?” (0 = no, 1 = yes)

“Did this happen more than once?” (1 = no, 2 = yes)

“Did this happen at home?” (0 = no, 1 = yes)

“Did this happen at school?” (0 = no, 1 = yes)

“Did this happen in the neighborhood?” (0 = no, 1 = yes)

“Have you ever seen someone get **killed**?” (0 = no, 1 = yes)

“Did this happen more than once?” (1 = no, 2 = yes)

“Did this happen at home?” (0 = no, 1 = yes)

“Did this happen at school?” (0 = no, 1 = yes)

“Did this happen in the neighborhood?” (0 = no, 1 = yes)

Victimization:

“Have you ever been **slapped/punched/beaten**?” (0 = no, 1 = yes)

“Did this happen more than once?” (1 = no, 2 = yes)

“Did this happen at home?” (0 = no, 1 = yes)

“Did this happen at school?” (0 = no, 1 = yes)

“Did this happen in the neighborhood?” (0 = no, 1 = yes)

“Have you ever been **threatened with serious bodily injury**?” (0 = no, 1 = yes)

“Did this happen more than once?” (1 = no, 2 = yes)

“Did this happen at home?” (0 = no, 1 = yes)

“Did this happen at school?” (0 = no, 1 = yes)
“Did this happen in the neighborhood?” (0 = no, 1 = yes)

“Have you ever been **attacked with a knife/bat?**” (0 = no, 1 = yes)
“Did this happen more than once?” (1 = no, 2 = yes)
“Did this happen at home?” (0 = no, 1 = yes)
“Did this happen at school?” (0 = no, 1 = yes)
“Did this happen in the neighborhood?” (0 = no, 1 = yes)

“Have you ever been in an **event resulting in death or serious injury?**” (0 = no, 1 = yes)
“Did this happen more than once?” (1 = no, 2 = yes)
“Did this happen at home?” (0 = no, 1 = yes)
“Did this happen at school?” (0 = no, 1 = yes)
“Did this happen in the neighborhood?” (0 = no, 1 = yes)

“Have you ever been **shot?**” (0 = no, 1 = yes)
“Did this happen more than once?” (1 = no, 2 = yes)
“Did this happen at home?” (0 = no, 1 = yes)
“Did this happen at school?” (0 = no, 1 = yes)
“Did this happen in the neighborhood?” (0 = no, 1 = yes)

Scoring:

Witnessing subscale: sum of five types of witnessed violent events (yes or no) and frequency (once, more than once). Range = 0-15.

Victimization subscale: sum of five types of directly experienced violent events (yes or no) and frequency (once, more than once). Range = 0-15.

Cumulative violence subscale: sum of ten types of violent events (yes or no) and frequency (once, more than once), and three location questions for each of the ten types of violence events (yes or no). Range = 0-60.

Other cumulative violence subscale: sum of dichotomized scores (1 = yes; 0 = no) for type of violence exposure (witnessing, victimization) across the three locations (home, school, neighborhood). Range = 0-6.

Witnessing violence in the home: sum of five types of witnessed violent events at home (yes or no). Range = 0-5.

Witnessing violence at school: sum of five types of witnessed violent events at school (yes or no). Range = 0-5.

Witnessing violence in the neighborhood: sum of five types of witnessed violent events in the community (yes or no). Range = 0-5.

Victimization in the home: sum of five types of directly experienced violent events at home (yes or no). Range = 0-5.

Victimization at school: sum of five types of directly experienced violent events at school (yes or no). Range = 0-5.

Victimization in the neighborhood: sum of five types of directly experienced violent events in the community (yes or no). Range = 0-5.