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## Childhood Trauma Exposure and Gun Violence Risk Factors among Victims of Gun Violence

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### Abstract

**Objective:** Gun violence is a serious public health concern, yet, risk factors for gun violence involvement remain understudied. Childhood trauma exposure, such as domestic violence (DV) and community violence (CV), may increase the risk for aggression, although this relationship has not been examined in the context of gun violence. The aim of the current study was to investigate whether different childhood trauma ecologies are related to increased gun violence involvement and gun violence risk factors among individuals hospitalized for a gun injury.

**Method:** Seventy-two gun violence victims reported on their gun violence involvement and gun violence risk factors (e.g., gun ownership, gun carrying, gun arrests, impulsivity, perceptions regarding violence) at hospital bedside.

**Results:** Childhood domestic violence (DV) and community violence (CV) exposure were both associated with increased gun violence involvement as well as numerous gun violence risk factors. Effect sizes were generally medium to large ( $Md = .53$ ).

**Conclusion:** Childhood traumatic events, such as DV and CV, may be important antecedent risk factors for gun violence.

### Keywords

Childhood traumatic experiences; gun violence; aggression; victimization

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Guns kill an average of 83 Americans per day (CDC, 2013). Among developed countries, the United States has the highest rate of gun violence (Grinshteyn & Hemenway, 2016), driven by a gun homicide rate 25.2X higher than other nations. Further, while the global rates of gun violence have decreased since 2003, the prevalence of gun violence in the U.S. remains unchanged (Grinshteyn & Hemenway, 2016). The annual cost of firearm injuries is estimated to be \$229 billion including costs for healthcare, criminal justice, loss of income, pain, and quality of life (Follman, 2016). The importance of gun violence as a research priority was emphasized at the presidential level under President Barack Obama's "Now is the Time" plan (White House, 2013), which included a call for research identifying gun violence risk factors. Nonetheless, gun violence research remains woefully limited. Gun violence research has been stymied due to legal restrictions, political pressure not to fund gun-related research, and, as a result of this political pressure, a lack of funding (APA, 2013a).

Although gun violence research remains nascent, much research has been devoted to identifying risk factors for violence in general, which have demonstrated that exposure to traumatic events during childhood is a key distal risk factor for both victimization and perpetration of violence (Widom, 1989a, Widom, 1989b). To date, however, it is unknown if witnessing violence during childhood is specifically tied to gun violence, which is unfortunate as childhood trauma exposure likely precedes gun violence involvement and could thus be an important target for prevention efforts. While the larger aggression literature is likely informative, it is imperative to distinguish gun violence from other forms of aggression. Gun violence represents a less common, but more lethal, event on the spectrum of violent behavior and is most likely associated with unique risk factors, thus meriting specific research attention. At this time it is not clear how much the larger aggression literature can be extrapolated to the topic of gun violence; however, this literature is an important starting place for beginning to understand gun violence. Given the low base rate of gun violence, research efforts should be focused on those who are most vulnerable such as victims of gunshot injury, as these individuals are at markedly higher risk for future involvement in gun violence (Cooper, Eslinger, Nash, Al Zawahri, & Stolley, 2000; Nanney, Conrad, McCloskey, & Constans, 2015; Rich & Grey, 2005). The aim of the current study was to determine whether two types of childhood trauma, domestic violence (DV) and community violence (CV), are related to gun violence and several gun violence risk factors among hospitalized victims of a gun injury.

## Gun Violence

Gun violence, like other forms of violence, is perpetrated by a small portion of the population. Although gun violence is present across races and ages, urban Black men ages 18 to 34 are at the highest risk for being both a victim and a perpetrator of gun violence (CDC, 2013). It is critical to contextualize the racial disparities in gun violence in terms of structural inequities as opposed to racial differences. Frameworks such as the "cradle-to-prison" pipeline explain the structural disadvantages present for many African-American youths residing in disadvantaged urban areas and how these inequalities may lead to violent behavior (Children's Defense Fund, 2009). Beyond demographic variables, risk factors specific to gun violence remain somewhat elusive. This lack of clarity is likely largely due to

the absence of research in this area. Serious mental illness (SMI) is often considered a risk factor for gun violence; however, the link between SMI and gun violence is actually quite weak (Metzl, & MacLeish, 2015; Swanson, 2013). SMI is often operationalized to include schizophrenia, bipolar disorder, and major depressive disorder, which may miss other relevant conditions, such as antisocial personality disorder (ASPD), conduct disorder, and posttraumatic stress disorder (PTSD). Individuals who perpetrate gun violence may also manifest psychological difficulties that may not warrant a diagnosis, or may not fully disclose their symptoms.

Despite the lack of a significant link between SMI and gun violence, psychological factors almost certainly play an important role in gun violence risk, as factors such as aggressive tendencies, impulsivity, and beliefs regarding violence have been tied to generalized aggressive behavior (Allen, Anderson, & Bushman, 2018; Anderson & Bushman, 2002; Gilbert, Daffern, Talevski, & Ogloff, 2013). As most of the prior aggression literature has not isolated gun violence from other forms of aggression, it is unclear if these factors also specifically correspond with gun violence, which is a distinct form of violence. Nonetheless, the presence of established risk factors for violent behavior likely increase one's risk for involvement in gun violence and therefore should be examined in the context of understanding gun violence.

### **Risk Factors for Violent Behavior**

Prior aggressive behavior is the strongest and most consistent risk factor for future involvement in general acts of violence, particularly when it begins early in life (Dubow, Huesmann, Boxer, & Smith, 2016; Moffitt, Caspi, Harrington, & Milne, 2002). Weapon carrying, including gun carrying, also elevates one's risk for being both a victim and a perpetrator of violence (Siegel et al., 2014; Wintemute, 2015). Levels of behavioral impulsivity have also been linked with aggression (Jolliffe & Farrington, 2009). The underlying cognitive processes, and resulting beliefs, that may drive violent behavior are also relevant to gun violence. Violent individuals may have misperceptions of hostile intent by others (Allen et al., 2018; Anderson & Bushman, 2002; Gilbert, Daffern, Talevski, & Ogloff, 2013). Individuals involved in gun violence may believe that the use of violence is needed to prevent victimization and is acceptable to use when threatened or to retaliate, a phenomenon labeled the Code of the Street (COS; Anderson, 2000). The COS regulates the use of violence and normalizes the use of aggression to maintain others' respect through a violent identity and values exacting retribution if one feels disrespected. Although there has been limited research regarding COS and aggression, a few studies have documented that endorsement of COS is tied to violent behavior (Mears, Stewart, Siennick, & Simons, 2013; Stewart & Simons, 2010). Attempts to understand gun violence risk factors should include the assessment of aggression-related beliefs as a way to understand the cognitive framework that may be present in the context of gun violence.

### **Childhood Trauma as an Antecedent for Violent Behavior**

The previously described aggression risk factors are crucial to understanding gun violence. Nonetheless, the critical question remains—where do these risk factors come from? What

leads an individual to begin to see others as more aggressive than they are? Although there are likely several etiologies for aggression including genetic and other biological vulnerabilities (Anderson & Bushman, 2002; Huesmann, 2018), childhood experiences may be a critical precursor for the development of gun violence risk factors, and then ultimately to later engagement in gun violence. Indeed, childhood trauma has been a consistent theme in the aggression literature (Anderson & Bushman, 2002; Huesmann, 2018). As articulated by the “cycle of violence” theory (Widom, 1989a, 1989b), individuals who experience victimization, may be more vulnerable to engage in violence. Much of the aggression literature has centered on how childhood trauma, generally physical abuse, may serve as a critical gateway to later violent behavior (Dodge, Bates, & Pettit, 1990; Fagan, 2005; Reckdenwald, Mancini, & Beauregard, 2013). Cross-sectional and longitudinal studies have demonstrated that childhood trauma is a risk factor for aggression throughout the lifespan (Duke, Pettingell, McMorris, & Borowsky, 2010; Fagan, 2005; Felson & Lane, 2009; Mersky, & Topitzes, 2010; Smith & Thornberry, 1995; Thornberry, Henry, Ireland, & Smith, 2010). For instance, one longitudinal study reported that youth who experienced chronic violence were 31.5X more likely to engage in violent behavior (Spano, Rivera, & Bolland, 2010). Thus, there appears to be a compelling relationship between early trauma exposure and violent behavior across samples and study designs.

Childhood trauma exposure may contribute to gun violence due to the development of altered views regarding violence, which, combined with situational variables, may result in violent behavior. As an understandable adaptation to their life experiences, childhood trauma survivors may develop inaccurate perceptions regarding the likelihood of being a victim as well as aggression-related cognitive biases (Anderson & Bushman, 2002; DeWall & Anderson, 2011; Dodge et al., 1990; Pine et al., 2005; Teisl & Cicchetti, 2008). Modeling of aggression in the home and/or in the community may shape beliefs regarding the normalcy and appropriateness of aggressive behavior (i.e., COS). Further, witnessing violence in the home or in the community allows for observational learning of aggression to occur, which is a key mechanism for the development of aggressive behavior (Huesmann, 2018).

Likely as a result of these altered perceptions regarding violence, childhood trauma exposure has been linked with several violence risk factors including weapon ownership and carrying, criminal justice involvement, impulsivity, and aggression (Duke, et al., 2010; Leeb, Barker, & Strine, 2007; Smith & Thornberry, 1995). A few studies have observed that victimization precedes gun carrying (Leeb et al., 2007; Spano et al., 2010). Survivors of childhood trauma have been found to have higher rates of delinquency, criminal behavior, and arrests compared to their non-trauma-exposed counterparts (Dodge, Pettit, Bates, & Valente, 1995; Smith & Thornberry, 1995; Lansford et al., 2007; Maxfield & Widom, 1996; Widom, 1989b). Exposure to childhood trauma may place individuals at increased risk for gun violence; however, no research has specifically examined this relationship. Further, in the APA report summarizing the risk factors for gun violence, childhood trauma exposure was not explicitly discussed (APA, 2013a), although harsh and coercive parenting practices and exposure to violence were briefly noted. This is unfortunate as childhood trauma may then be an overlooked intervention foci. Work is needed to explicitly test whether childhood trauma exposure is tied to gun violence and indicators of gun violence risk. If a link is observed, this research would highlight the importance of childhood trauma in the context of

gun violence. Yet, as gun violence involvement is restricted to a very small subsample of the population (APA, 2013a), it is likely more informative to concentrate research efforts on those at highest risk, such as individuals who have already been victimized by gun violence (Cooper et al., 2000; Nanney et al., 2015; Rich & Grey, 2005).

Posttraumatic stress disorder (PTSD), a relatively common outcome of childhood trauma exposure, has received scant attention in the previous research, which is noteworthy given the prominent focus on child trauma. It seems likely that individuals who exhibit adverse trauma-related outcomes, such as PTSD, would be at particularly increased risk for violent outcomes. By the nature of the disorder, PTSD is likely an important risk factor for violence. PTSD includes symptoms of arousal or reactivity (e.g., “being on alert” or an exaggerated startle response), reckless behavior, irritability or aggression, and altered beliefs regarding safety and others (APA, 2013b). A few studies have reported that PTSD is related to aggressive behavior (Marshall, Panuzio, & Taft, 2005; Orcutt, King, & King, 2003). Among violently injured youth, PTSD was present in 65% of the sample, and due to the timeframe of this assessment, these PTSD diagnoses were the result of prior traumatic experiences (Rich & Grey, 2005).

## The Current Study

Taken together, the prior literature points to the utility of incorporating childhood trauma into the conceptualization of gun violence. As previous studies have focused on aggressive behavior more broadly, the role of childhood trauma as a risk factor for gun violence is unclear. Evidence of a link between childhood trauma and gun violence and related risk factors may indicate that childhood trauma is an important antecedent to gun violence and signal the relevance of childhood trauma in prevention programs. Still, childhood trauma is an umbrella term that consists of different trauma types, which may have disparate relationships to violence (Egeland, Yates, Appleyard, & Van Dulmen, 2002; Maxfield & Widom, 1996). Physical abuse has been routinely examined in relation to aggression, but other trauma types such as DV and CV have received less attention. DV and CV may also be relevant trauma types as they are forms of interpersonal violence versus abusive parenting practices. DV and CV exposure provide opportunities for observational learning of aggression, a central channel by which aggressive tendencies are developed (Huesmann, 2018). Consequently, the aim of the current study was to examine DV and CV in relation to gun violence and indicators of gun violence risk in a high-risk sample of individuals hospitalized due to gunshot injury. In accordance with the general aggression literature, the gun violence risk factors examined in this study were prior involvement in gun violence, gun ownership and carrying, gun-related arrests, impulsivity, aggression, COS, probability of being a victim or perpetrator of violence, and posttraumatic stress symptoms (PTSS). The study hypotheses are as follows: 1) witnessing DV will be related to more prior involvement in gun violence and higher levels of gun violence risk factors and 2) Childhood CV exposure will correspond with more prior involvement in gun violence and higher levels of gun violence risk factors. Due to the emerging state of the literature, differences between DV and CV were not anticipated.

## Method

### Participants

Seventy-two patients who were admitted to a Level I trauma center due to gunshot injury resulting from CV were included in the study. Prospective participants were referred from the Trauma Center Psychiatry Consult Liaison Service. This sample of participants were recruited for either a pilot study ( $n = 21$ ) or a randomized clinical trial (RCT) ( $n = 51$ ) to assess the efficacy of a novel gun violence intervention [edited out for blind review] (Author citation). Inclusion criteria for both intervention trials were: 1) age 18–55, 2) hospitalization due to gun violence due to CV, not DV, as the intervention was developed specifically for CV-related gun violence, 3) admission to the Trauma Surgery service, 4) capacity to provide voluntary informed consent. Exclusion criteria were: 1) non-English speaking, 2) too physically compromised to participate as deemed by the Trauma Surgery service, 3) suspected intellectual disability/inability to understand consent process, 4) psychosis, and 5) legal detention. Only the pretreatment data was used for this study. The vast majority of the participants were Black men (91.8% Black, 8.2% White; 90.4% male, 9.6% female) with a mean age of 27.98 ( $SD = 9.18$ , Range 18–54). Nearly all (98.6%) identified as non-Hispanic/Latino (1.4% Hispanic/Latino). A little less than half (46.6%) of participants did not have a high school diploma/GED and 38.4% were unemployed. Income was reported in increments of \$10,000. Median income was \$10,000 and 80.9% of participants reported an annual income of under \$20,000 ( $M = 1.31$ ,  $SD = 1.35$  which corresponds to \$10,000–\$20,000). Most participants were never married (83.6%, 8.2% married, 8.2% divorced). A history of prior arrests was very common as 91.7% of participants reported being arrested at least once and 47.9% reported prior incarceration.

### Procedures

All participants were patients hospitalized due to gunshot injury at the [edited out for blind review]. Prospective participants were referred by the Trauma Center Psychiatry Consult Liaison Service who assess and treat all violently injured patients. Two licensed psychologists approached eligible participants in their hospital room to solicit participation (Median = 3 days post gunshot injury). Of the 93 eligible patients who were offered treatment, 82.8% enrolled. At bedside, participants completed a brief (approximately 20–30 minutes) pre-treatment assessment. Childhood trauma, and other relevant constructs, were not more explicitly assessed as the study was conducted with a sample of acutely injured patients who were admitted to a busy Level I trauma center at hospital bedside. Items from relevant measures were therefore selected to maximize efficiency and minimize burden. No participant incentives were utilized. The present study was approved by the Institutional Review Board of the [edited out for blind review]. Due to the sensitive and incriminating nature of the data collected, a certificate of confidentiality was obtained from the U. S. Department of Health and Human Services as this certificate allows researchers to decline to respond to court requests for information.

### Measures

**Demographics and Trauma Exposure.**—Participants were asked questions regarding their age, marital status, educational attainment, and employment (i.e., number of days they

worked in the past month). Participants were asked single-item yes/no questions to assess childhood DV (i.e., “Growing up, did you see violence between family members?”) and CV (i.e., “Did you ever witness someone die suddenly or be badly injured and, if so, at what age?”).

**Prior Assaults, Arrests, and Gun Carrying.**—Participants reported their lifetime number of unarmed assault victimizations and times he/she was assaulted with a gun, number of arrests, including number of violent arrests (i.e., assault, rape, homicide) and gun crimes, and whether or not they owned a gun, and if so, the number of days they carried a gun in the past 30 days. As the data was bimodally distributed, participants who endorsed carrying a gun greater than 50% of the time were classified as routine gun carriers.

**Impulsivity.**—Impulsivity was assessed using 3 items from the 12-item negative urgency subscale of the UPPS Impulsive Behavior Scale (Whiteside & Lynam, 2001). The negative urgency subscale was selected as this aspect is most characteristic of reactive violence (Allen et al., 2018). Selected items were rated on a 4-point Likert scale: “When I am upset, I often act without thinking,” “When I feel bad, I will often do things I later regret in order to make myself feel better now,” and “Sometimes when I feel bad, I can’t seem to stop what I am doing even though it is making me feel worse.” Adequate internal consistency and validity data has been described (Whiteside & Lynam, 2001). Cronbach’s alpha for the current sample was .71.

**Aggression.**—Aggression was assessed using items from the Reactive-Proactive Aggression Questionnaire (RPQ; Raine et al., 2006), which assesses both reactive and proactive aggression. Participants are asked to rate the frequency of their behavior on a 3-point Likert scale from 0 “*Never*” to 2 “*Often*.” Three items were selected from each subscale. Reactive items assessed the frequency of damaging things when mad, feeling better after hitting or yelling at someone, hitting others to defend oneself. Proactive items measured the frequency of using physical force to get what one wants, having fights to earn or keep respect, and yelling at others so they would do things for him/her. Adequate psychometrics have been reported. In the current study, reactive aggression Cronbach’s alpha = .66; proactive aggression = .57.

**COS.**—COS was assessed using 3-items from a 7-item COS measure that asks participants to indicate the extent to which they believed that it is justifiable to use violence on a 4-point Likert scale, (1 = “*Strongly Disagree*” to 4 = “*Strongly Agree*”) (Stewart & Simons, 2010). Indices of internal consistency have been reported. The COS items selected were: “When someone disrespects you, your family, or your associates it is important that you use physical force or aggression to teach him or her not to disrespect you,” “If someone uses violence against you, your family, or your associates, it is important that you use violence against him or her to get even,” and “Sometimes you need to threaten people in order to get them to treat you fairly.” For the present study, Cronbach’s alpha was .73.

**Probability of Victimization/Perpetration.**—Individual’s perceived probability of being victimized and perpetrating violence were assessed using 2 items modeled on the Probability and Cost Questionnaire (PCQ; McManus & Ehlers, unpublished) that have been

used previously (White, McManus, & Ehlers, 2008). Participants rated the likelihood that they will be violently victimized or be a perpetrator of violence on a scale from 0 “*Not at all likely to happen*” to 100 “*Almost sure to happen*.” Satisfactory Cronbach’s alphas have been reported (White, McManus, & Ehlers, 2008). For the present study, Cronbach’s alpha was .71.

**PTSS.**—As the *DSM-5* was published during the course of the study, PTSS was assessed using the PTSD-Checklist- Civilian Version (PCL-C; Weathers, Litz, Herman, Huska, & Keane, 1993;  $n = 21$ ) and the PCL-5 (Weathers et al., 2013;  $n = 51$ ). The PCL directly corresponds to DSM PTSD criteria. Respondents report the extent to which they experienced each of the PTSD symptoms in the past month on a 5-point Likert scale. Psychometrics properties for the PCL have been established (Weathers et al., 1993, 2013). As scores across versions are not interchangeable and due to the small  $n$  for the PCL-C, only the PCL-5 scores were used for the PTSS severity measure; however, clinical cutoffs for each version were used to create a composite probable PTSD variable. Cronbach’s alpha in the current study was .90.

### Data Analytic Plan

Data was analyzed using SPSS 23.0. Potential covariates such as age, race/ethnicity, and sex were considered prior to conducting the analyses. Independent t-tests and chi-square analyses were conducted for the continuous and dichotomous variables, respectively. Due to the small sample size and limited literature in this area, Type I error was not controlled. Effect sizes are presented to aid in interpretation and the analyses are presented as preliminary findings.

## Results

### Descriptive information.

Variables such as sex, race/ethnicity, employment, and income were not related to the dependent variables ( $ps > .05$ ), therefore, no covariates were used in the analyses. Acknowledged gun ownership was relatively low, with 21.9% of the sample reporting owning a gun and 19.2% reporting routine gun carrying. A little under one-quarter of the sample reported a prior violent arrest (24.2%) and 23.8% reported a prior gun arrest. Approximately one-third (32.3%) of the sample had likely PTSD. Trauma exposure was common in this sample: 43.1% acknowledged DV exposure and 47.9% reported experiencing childhood CV and 12.3% witnessed CV after the age of 18. As this sub-sample was too small to make meaningful comparisons, participants who reported only adult-onset CV exposure were excluded from the CV analyses. DV was related to childhood CV, with 62.9% of individuals who experienced DV also reporting CV,  $\chi^2(62) = 11.45, p < .001$ .

### Involvement in violence and gun violence risk factors.

DV and CV were not significantly tied to number of prior unarmed victimizations, although small effect sizes were observed (see Table 1). DV and childhood CV were, however, significantly related to a higher number of gun assaults, with large effect sizes noted for both. DV was associated with an increased risk for violent crime arrests and gun arrests.



Childhood CV was marginally tied to violent crime arrests and unrelated to gun arrests. Statistical trends for gun ownership were observed for DV and CV, both being linked with slightly increased likelihood of gun ownership (see Table 2). Both CV and DV were marginally related to routine gun carrying. Those who reported DV exposure were nearly 3X more likely to routinely carry a gun and those who experienced CV were approximately 3.5X more likely to do so.

Witnessing DV was associated with higher levels of impulsivity and childhood CV was marginally tied to higher levels of impulsivity, although an effect size of .46 was observed. DV was also related to higher levels of reactive aggression, with a large effect size of  $d = .93$ , but was only marginally to higher levels of proactive aggression. Childhood CV was statistically related to reactive or proactive aggression, although results revealed small effect sizes. COS differed by DV status and a statistical trend was noted for childhood CV. DV was also linked with higher perceived probability of being a victim, and marginally to beliefs about being a perpetrator. However, perceptions of being either a victim or a perpetrator did not differ depending on childhood CV status. DV was associated with higher levels of PTSS and probable PTSD. Statistical trends were noted for childhood CV and PTSS and probable PTSD.

## Discussion

The present study is the first examination of the relationships between specific childhood trauma ecologies, DV and CV, and gun violence involvement, and several indicators of gun violence risk. In contrast to the majority of the prior aggression literature that has focused on large community samples or samples of at-risk youth, the present study utilized a novel sample hospitalized gunshot victims, who are likely at a markedly elevated risk for future gun violence (Cooper et al., 2000; Nanney et al., 2015; Rich & Grey, 2005). DV and CV exposure have been somewhat overlooked trauma ecologies in the prior aggression literature, and their relation to gun violence specifically has not been previously investigated. As anticipated, DV and CV were both related to a higher number of prior gun assaults, with large effect sizes. However, both trauma types were not significantly related to unarmed assaults, even though small effect sizes were observed. This pattern of findings may indicate that childhood trauma has a stronger relationship with gun violence than unarmed violence, which highlights the importance of childhood trauma in gun violence. To the authors' knowledge this is the first study to disentangle how childhood trauma may be uniquely related to gun assaults versus unarmed assaults.

DV exposure was significantly or marginally related to each risk factor for gun violence with the exception of unarmed assaults. Further, many of the effect sizes were in the medium to large range, which is important to note in light of the small sample sizes. Similar to DV, all but three risk factors were statistically or marginally related to childhood CV, which illustrates that CV exposure is linked with a host of gun violence risk factors. Our findings are consistent with prior research that has found that childhood trauma is related to increased risk for violence and related risk factors (e.g., Duke et al., 2010; Felson & Lane, 2009; Mersky, & Topitzes, 2010; Widom, 1989b). This study adds to this literature as it is the first to demonstrate that childhood trauma, particularly CV and DV, are tied to higher levels of

prior gun violence involvement and with the presence of gun-specific risk factors (i.e., gun ownership, gun carrying, and gun arrests). This study was also the first to examine the links between childhood trauma and other violence risk factors, specifically, acceptance of COS and perceptions regarding being a victim and perpetrator. While replication is needed, childhood trauma appears to be highly relevant in the context of gun violence.

Some differences were noted between trauma types. For instance, DV was related to greater risk for both violent crime arrests and gun arrests; however, childhood CV was only marginally linked with violent crime arrests and unrelated to gun arrests. Similar patterns for other risk factors were noted (i.e., impulsivity, reactive aggression, COS, perceptions regarding being a victim, PTSD), with DV being significantly related to these risk factors and childhood CV being either unrelated or only marginally related. Comparison of the effect sizes between trauma types further supports the conclusion that DV appears to have a stronger relationship to gun violence and related risk factors than childhood CV. This is not to suggest that childhood CV is not important in the context of gun violence, as childhood CV was related to a higher number of previous gun assaults, which is likely the most critical variable examined in this study for predicting future gun violence risk. Childhood CV demonstrated small to medium effect sizes for most of the risk factors, including gun ownership, routine gun carrying, aggression, COS, and PTSD. Nonetheless, all of the examined risk factors were statistically or marginally related to DV and several factors had effect sizes above .70.

Exposure to DV may therefore have a more robust relationship to gun violence involvement and related indicators of risk than childhood CV. Prior work has found that DV exposure is related to cognitive variables that are relevant for aggression, such as attention bias to threat (e.g., Pine et al., 2005). Children who witness violence within their homes not only have opportunities for modeling violent behavior, but DV is unique in that it is generally an attachment figure (i.e., father) acting violently towards another attachment figure (i.e., mother). There may also be more opportunities for observational learning regarding violence and use of a weapon in the home than in the community. Further, for individuals residing in high crime neighborhoods, DV is likely a less frequently experienced trauma type than CV (Breslau et al., 1998). Experiencing DV as a child may place individuals at increased risk for involvement in gun violence and related risk factors; however, as so few individuals exposed to DV as children go onto engage in violence, it is clear that other mediating factors (e.g., parenting variables, school functioning, peer relationships) are important to take into consideration (APA, 2013a; Huesmann, 2018). Research with a larger sample size that is powered to directly compare trauma ecologies and examine interactions between risk factors will help illuminate if there are similar or disparate effects of trauma type on specific risk factors. As almost all of the risk factors were associated with small effect sizes, it seems premature to attempt to draw conclusions regarding different trauma forms and risk factors. Results instead emphasize the widespread risk of childhood trauma on gun violence and an array of indicators for gun violence risk.

## Limitations

There are several limitations of the study that merit discussion. Most notably are the small sample size and that other forms of trauma were not assessed. It is likely that childhood abuse is a critical factor in understanding the role of childhood trauma exposure and future risk for violence. Due to the small sample size, comparisons regarding the dosage of trauma exposure were not conducted. As this sample relied on self-reports, rates of trauma exposure are likely underestimates as participants may have been unwilling to disclose traumatic experiences. Similarly, acknowledgement of risk factors such as prior involvement in violence and gun carrying may have also been under-reported due to concerns regarding legal consequences, despite being informed about the certificate of confidentiality. It was our experience that most participants were remarkably candid; however, it is still likely that some participants were not willing to fully disclose their illegal behavior. Further, the study utilized only a few items from measures with established psychometric properties to accommodate an assessment conducted at hospital bedside with patients in a Level I trauma center. The alphas for some of the scales were rather low, which was likely a function of using a small number of items from these scales. Future research should include additional items to more fully assess the constructs of interest and ensure satisfactory reliabilities. Importantly, as participants were not assessed over time, we are unable to determine if they will engage in future gun violence.

## Research Implications

Gun violence is an alarming, dangerous, and costly public health concern. Given the very limited amount of research specific to gun violence, there is much work to be done. These findings highlight the importance of assessing prior trauma exposure, and, more importantly, multiple forms of trauma, when conducting research regarding prediction of violence. Our findings also suggest several directions for future work, including the use of larger sample sizes to examine the relative influence of different trauma ecologies on specific risk factors. It is also important to determine the relationships among risk factors as well as the associations between risk factors and documented gun violence.

## Clinical and Policy Implications

Identification of risk factors for gun violence has clear clinical and policy implications. Our findings illustrate that childhood trauma is likely an important antecedent to engagement in gun violence. Childhood trauma exposure often precedes gun violence and the development of violence risk factors, making childhood trauma a prime prevention foci. Understanding the role of childhood trauma in relation to gun violence and risk factors for violence may help to improve early screening and prevention efforts. Work is needed to determine if trauma-related symptoms play a key role in the use of violence, and if remediating these symptoms can help to reduce violence and related risk factors.

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### Clinical Impact Statement

This article describes the needs for gun violence research and risk factors for involvement in gun violence. In the present study, individuals who had been hospitalized for a gun injury from community violence had higher levels of prior gun violence involvement and gun violence risk factors if they had witnessed childhood domestic violence and community violence. Domestic violence had a stronger relationship with gun violence risk factors than community violence. Childhood trauma may be an important intervention target for gun violence prevention efforts.

**Table 1**

Child Trauma Exposure and Involvement in Gun Violence and Risk Factors

	No DV			DV			No CV			CV		
	M	SD	d	M	SD	t	M	SD	d	M	SD	t
Unarmed assaults	1.12	.95	.27	1.38	.91	-1.18	1.13	.91	1.37	.94	-1.00	.26
Gun assaults	1.03	.82	.86	2.10	1.55	-2.80**	1.00	.74	1.92	1.49	-2.72**	.78
Reactive aggression	1.58	1.39	.93	3.03	1.70	-3.96***	2.03	1.67	2.62	1.62	-1.43	.36
Proactive aggression	1.19	1.40	.43	1.83	1.52	-1.85 <sup>†</sup>	1.24	1.29	1.85	1.61	-1.65 <sup>†</sup>	.41
Impulsivity	6.19	1.61	.74	7.41	1.66	-3.13**	6.37	1.95	7.17	1.48	-1.84 <sup>†</sup>	.46
COS	6.10	.95	.54	6.87	1.76	-2.19*	6.28	1.04	6.85	1.45	-1.74	.45
Probability of victimization	13.15	17.39	.71	29.89	28.03	-3.09**	22.20	26.35	22.02	22.94	-.02	.01
Probability of perpetration	4.86	10.69	.52	13.57	20.92	-2.07*	7.54	12.94	11.49	20.04	-.89	.23
PCL-5 <sup>a</sup>	18.26	14.90	.63	29.80	20.95	-2.27*	17.94	13.89	27.92	20.06	-1.90 <sup>†</sup>	.57

Note.

<sup>a</sup> n = 50; DV = domestic violence, CV = community violence, COS = code of the streets, PCL = Posttraumatic Stress Disorder Checklist

<sup>†</sup> p < .10

\* p < .05

\*\* p < .01

\*\*\* p < .001



Table 2

## Dichotomous Gun Violence Risk Factors By Type of Trauma Exposure

	DV				CV			
	$\chi^2$	<i>p</i>	<i>d</i>	<i>OR</i>	$\chi^2$	<i>p</i>	<i>d</i>	<i>OR</i>
Gun owner	3.17	.07	.52	2.77	2.74	.09	.48	2.86
Routine gun carrying	3.19	.07	.42	2.94	3.25	.07	.52	3.46
Violent arrest	12.65	<.001	1.20	12.80	3.46	.06	.51	3.66
Gun arrest	9.67	.002	.86	7.75	.28	.59	.14	1.40
Probable PTSD	4.98	.02	.58	3.90	5.58	.01	.66	4.41

Note. *OR* = odds ratio; *DV* = domestic violence, *CV* = community violence, *PTSD* = Posttraumatic Stress Disorder