

Master's Thesis

Community Gun Violence Exposure among Urban Youth:
An Overlooked Externality of Endemic Gun Violence in the United States

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Abstract

Gun violence is a daily reality for many youth in the United States (U.S). As mass shootings at concerts, schools, and places of worship have incited a national reckoning with the country's unwavering defense of gun rights over safety legislation, ensuing research has justifiably focused on the direct victims of gun homicides. Yet the public health impact of gun violence goes beyond these heavily publicized mass shootings, with chronic community violence constituting the vast majority of gun violence events. Low-income Black and brown youth are most at risk of secondhand exposure to chronic community gun violence. Despite this persistent and harmful exposure, research into the downstream effects of community gun violence on youth has lagged. This review aimed to assess the state of evidence on indirect exposure to community gun violence among low-income urban youth in the U.S. PubMed, Web of Science (core collection), ProQuest, and SCOPUS were searched for peer-reviewed articles exploring the scope, risk factors, and impacts of community gun violence exposure on this population. The primary findings suggest that exposure to community gun violence is common in certain communities and detrimental to youth development. The broad themes emerging from this review include (1) a lack of consensus regarding the range of experiences that constitute community gun violence, (2) exposure to violence involving a firearm as distinct from that with other weapons, (3) a need to conceptualize multiple dimensions of gun violence exposure, (4) differential impacts of exposure to community gun violence across developmental stages, and (5) how indirect gun violence exposure uniquely contributes to cycles of community violence. Future research should move toward a consistent typology, multidimensional conceptualization, and developmental- and context-specific examination of community gun violence exposure.

Introduction

The 1986 Surgeon General's report *The Health Consequences of Involuntary Smoking* described the health impacts of exposure to secondhand smoke, resulting in broad policy initiatives to prohibit smoking in enclosed public places and workplaces (*The Health Consequences of Involuntary Smoking*, 1986). This report revealed that the consequences of smoking went beyond smokers to those indirectly exposed, effectively framing secondhand smoke as a threat to the public's health. In the past four decades, public health has tackled smoking head-on, channeling resources and advocacy efforts toward reducing indirect exposure to smoking – especially among children – in the process. Gun violence prevention has similarly benefitted from renewed public health attention in the past decade. However, gun violence research and interventions have generally remained fixed on preventing direct victimization. In 1994, Dr. Rosenberg, then director of the National Center for Injury Prevention and Control at the Centers for Disease Control and Prevention (CDC), used cigarettes as an analogy to advocate for a public health approach to gun violence: “*We need to revolutionize the way we look at guns, like what we did with cigarettes ... It used to be that smoking was a glamour symbol—cool, sexy, macho. Now it is dirty, deadly—and banned* (Goss, 2006, pg. 87).” Indirect exposure to community gun violence poses broad threats to youth development and wellbeing. These threats warrant a shift in the paradigm of gun violence exposure to encompass indirect experiences as distinct exposures to be studied and prevented.

The public health impact resulting from gun violence has generally been conceptualized in terms of physical injuries and deaths resulting from a gun wound (Mitchell et al., 2019; Slovak, 2002; Turner et al., 2019). Less explored are the physiological and psychosocial consequences of chronic, indirect exposure to community gun violence among the populations who are disproportionately impacted – low-income urban communities of color. Although there is no standardized definition, for the purposes of this review, indirect exposure to community gun violence will refer to witnessing gunfire or hearing gunshots in public places such as streets, parks, and schools, or knowing a friend or family member who has been shot (Abt, 2019; Rajan et al., 2019; Stein, Jaycox, Kataoka, Rhodes, et al., 2003). While media attention skews toward sensationalist forms of gun violence such as mass shootings, community gun violence represents a more pervasive issue, with broad, yet understudied implications for health. Through this review, I seek to explore what is known about indirect exposure to community gun violence among low-income urban youth in the United States: its scope, risk factors, and health implications. I aim to elucidate gaps in the scientific literature, point toward evidence-based interventions, and ultimately, call attention to community gun violence as a pressing public health issue.

Background

Gun violence in the United States

The United States stands apart in its gun violence epidemic, with U.S. youth ages 5 to 14 years accounting for 92% of firearm victims in Organization for Economic Co-operation and Development

(OECD) countries. In the U.S., 15 to 24-year-olds are 49 times more likely to die by firearm homicide than their counterparts in other high-income countries, with non-Hispanic Black youth accounting for 66% of all firearm homicide victims in this age group (Centers for Disease Control and Prevention, 2018; Grinshteyn & Hemenway, 2016). While these current statistics are alarming, gun violence has persisted as a problem unique to the U.S. for decades (Crebs et al., 2016). Firearm homicide rates in the U.S. have remained largely stagnant in the 21st century after rising and then falling from the mid-1980s until the turn of the century (Wintemute, 2015). Yet, recent CDC data shows that in 2017, firearm deaths peaked higher than in 40 years, with rates of gun violence consistently rising since 2014 (CDC, 2018). Although gun violence remains a leading cause of death among youth in the U.S., hyper-politicization and inaccurate media representation have stalled efforts to effectively address it (CDC, 2018; Crebs et al., 2016). In response to a 1993 Kellermann et al. study associating firearm possession with homicide, the National Rifle Association (NRA) lobbied Congress to ban the use of federal funds to conduct research that “[advocated] or [promoted] gun control” (Kellermann et al., 1993; Omnibus Consolidated Appropriations Act, 1997, pg. 245). This legislation, known as the Dickey Amendment, effectively blocked the CDC from studying gun violence as a public health issue (Rostron, 2018). In the last decade, heavily broadcasted mass shootings have renewed nationwide conversations about gun violence and reinvigorated research interest in this area (Chien et al., 2020).

Scope of Indirect Exposure to Community Gun Violence

Although there is extensive research describing the psychological and social consequences of community violence exposure on youth, there are few studies on the impacts of indirect exposure to violence involving a gun. Direct gun violence exposure means being threatened, injured, or killed with a firearm. Although indirect gun violence exposure is sometimes defined as simply witnessing violence involving a firearm, some research studies have adopted a broader definition encompassing hearing gunshots, learning of gun violence, knowing someone who has been victimized, or seeing violence in the media (Stein, Jaycox, Kataoka, Rhodes, et al., 2003).

Although estimates vary, indirect exposure to gun violence is consistently more common than direct gun victimization (Stein, Jaycox, Kataoka, Rhodes, et al., 2003). Data from the National Survey of Children’s Exposure to Violence (NatSCEV) estimates that 17% of 14-17-year-old youth have heard gunshots or seen someone shot (Finkelhor et al., 2015). Among urban African American 6-7-year-olds in Detroit, 84% had witnessed gunfire, 26% had witnessed a shooting, and 14% had seen a dead body. Seven percent of this sample had witnessed a shooting 3 times or more (Bailey et al., 2005). A nationally representative survey reveals that about 8% of youth ages 2 to 17 years have at least one friend or relative who had been shot with a firearm in the year prior to the survey (Turner et al., 2018). Among a sample of youth ages 2 to 17 in Boston, Philadelphia, and rural Tennessee, 41% reported hearing or seeing gun

violence (Mitchell et al., 2019). Most studies have not collected data on location of exposure, meaning these rates may include gun violence that occurs in homes. Rates of exposure to community gun violence vary considerably between populations and regions, with certain populations being at higher risk of exposure and subsequent sequelae.

At-Risk Populations

The effects of gun violence exposure follow gendered and age-moderated patterns, although these remain poorly understood (Cooley-Strickland et al., 2009). Indirect exposure to gun violence is highest among Black, urban, male, and low-income adolescent youth (Mitchell et al., 2019; Stein, Jaycox, Kataoka, Rhodes, et al., 2003; Turner et al., 2019). Latinx and Native American youth are also more likely to witness community violence than their white counterparts (Foster & Brooks-Gunn, 2009; Mitchell et al., 2019; Turner et al., 2019). While gun violence does occur in rural areas, prevalence studies show that urban-dwelling youth experience higher rates of exposure to firearm-related violence, with about ten times as many inner-city youth from Baltimore witnessing a shooting than middle/upper-class youth from a Maryland suburb (Bell & Jenkins, 1993; Campbell & Schwarz, 1996; Mitchell et al., 2019; Slovak, 2002). Males are more likely than females to have been exposed to community violence, including gun violence, across populations (Finkelhor et al., 2015). Exposed females report experiencing more internalizing symptoms such as anxiety and depressive symptoms, while, in contrast, males tend to experience externalizing problems such as aggression after exposure to community violence, consistent with psychopathological trends overall (Cooley-Quille et al., 2001; Cooley-Strickland et al., 2009).

A large body of evidence to date has demonstrated that gun homicides are often concentrated within small geographical “hot spots” and networks of people (Braga et al., 2010; Papachristos et al., 2012; Weisburd et al., 2014). Racial disparities in gun violence exposure are echoed by rates of firearm victimization, with Black youth 0-19 years old being 9 times as likely to die by gun homicide than their white counterparts (CDC, 2018). Neighborhood poverty, often rooted in structural racism, is a strong predictor of crime as chronic disinvestment, blight, and community disorder perpetuate crime in certain areas, thus increasing residents’ vulnerability to gun violence exposure (Luthar & Goldstein, 2004). In fact, a recent study found an association between disinvestment and gun violence, with higher inequality, mistrust in institutions, less economic opportunity, and reduced public welfare spending predicting higher rates of firearm-related homicide (Kim, 2019).

Psychosocial Impacts of Exposure to Community Gun Violence

The distinct predictors of and sequelae resulting from indirect exposure to gun violence qualify it as a unique developmental risk factor among youth. The high lethality of firearms has been shown to increase perceived threat and thus exacerbate subsequent traumatic symptoms among exposed youth (Mitchell et al., 2015). Evidence to date suggests that indirect exposure to community violence results in

symptomology that is distinct from that resulting from direct exposure (Foster & Brooks-Gunn, 2009). For example, a study of preschool children found that witnessing violence was associated with internalizing symptoms (e.g., depression, anxiety, post-traumatic stress), while direct victimization led to externalizing problems (e.g., aggression, conduct disorder, impulsivity) (Stein et al., 2001). Exposure to community gun violence has been linked to distress, anxiety, depression, anger, withdrawal, post-traumatic stress, substance use, desensitization to violence, and academic difficulties, yet the particular risk factors and pathways underlying these associations are not well-explained (Cooley-Strickland et al., 2009; Garbarino et al., 2002; Luthar & Goldstein, 2004; Mitchell et al., 2019; Stein, Jaycox, Kataoka, Rhodes, et al., 2003). A longitudinal study of adolescents in Chicago found that exposure to gun violence doubles one's risk of serious crime perpetration in the next two years (Bingenheimer, 2005). This is in line with Social Contagion Theory, which posits that gun violence spreads through social networks in an epidemic-like way, such that being exposed to gun violence increases one's risk of becoming both a gun violence perpetrator and victim (Green et al., 2017).

In addition to the mental health symptoms, physiological effects have been documented as a result of exposure to violence involving firearms. Two studies including children from San Juan, Puerto Rico and Hartford, Connecticut showed that exposure to gun violence, defined as hearing gunshots more than once, significantly increased odds of asthma, after controlling for socioeconomic status, prematurity, air pollution, and exposure to tobacco smoke (Ramratnam et al., 2015; Rosas-Salazar et al., 2016). While still incompletely understood, hypothalamic-pituitary-adrenocortical (HPA) axis and immune response dysregulation resulting from psychosocial distress have been proposed as the biological mechanisms underpinning this association (Rosenberg et al., 2014; Yonas et al., 2012). Witnessing gun violence during adolescence has also been linked to hypertension in adulthood, in line with extensive research on ACEs demonstrating the harmful effects of early trauma on health across the life course (Ford & Browning, 2014).

While adolescents experience the greatest cumulative exposure to gun violence, youth exposed during sensitive periods, particularly early childhood (usually defined as birth to age 8), may be at risk for the most severe developmental consequences. The child brain is characterized by high neural plasticity and malleability to environmental exposures. Early childhood trauma is known to disrupt neurodevelopment via physiological dysregulation and learned maladaptive coping (Cooley-Strickland et al., 2009). A biopsychosocial model points toward four mechanisms of risk and resilience underpinning the relationship between childhood trauma exposure and psychopathology: information processing biases that heighten threat perception, maladaptive learning mechanisms, heightened emotional reactivity, and emotional dysregulation (McLaughlin & Lambert, 2017). Moreover, early trauma has been associated with a host of adverse health outcomes later in life, many of which are the leading causes of morbidity

and mortality in the U.S. (Petruccelli et al., 2019). The concept of allostatic load, or the strain resulting from the body's effort to maintain homeostasis, is useful in understanding how chronic stress leads to physiological 'wear-and-tear' via repeated activation of the neural, neuroendocrine, and immune systems during threatening situations (McEwen, 1998). Children and adolescents living in neighborhoods with high rates of gun violence likely also face a multitude of social adversities in addition to violence exposure such as structural poverty and neglect (Cooley-Strickland et al., 2009). These may compound the effects of community gun violence exposure by limiting access to coping resources. On the other hand, contextual factors such as familial or school support and the presence of a stable caregiver can serve as protective factors, buffering the negative impacts of gun violence exposure on developmental outcomes (Foster & Brooks-Gunn, 2009; Luthar & Goldstein, 2004).

Indirect Gun Violence Exposure as an Adverse Childhood Experience

Since the landmark 1996 Adverse Childhood Experiences (ACEs) study revealing the numerous lifelong health impacts of exposure to traumatic experiences (emotional, physical, or sexual abuse, and household dysfunction) during childhood, a burgeoning body of research has further illuminated the broad scope and public health implications of early childhood adversity (Felitti et al., 1998). Events categorized as ACEs have since evolved to include physical and emotional neglect, and parental separation as a form of household dysfunction (Petruccelli et al., 2019). Numerous health outcomes, from psychopathologies to ischemic heart disease, have been consistently linked to ACEs via neurobiological mechanisms, such as the stress-response system, and poor health behaviors, impaired attachment, and maladaptive coping (Finkelhor, 2018). A recent systematic review offers evidence for the classification of indirect gun violence exposure as an adverse childhood experience. The authors argue that expansion of the definition of gun violence exposure as an ACE is warranted given its known effects on youth wellbeing and persistent research gaps (Rajan et al., 2019).

Theoretical Frameworks

Stress Process Model

The Stress Process Model has been used extensively to understand the effects of community violence on children and adolescents. This model integrates a life course perspective to elucidate how violence exposures accumulate with age, with older youth suffering the most adverse consequences of multiple exposures (Figure 1) (Finkelhor et al., 2015). This model is based on the following tenets: (1) violence exposure is tied to social inequality and disadvantage, (2) proximal and distal stressors are interconnected and cumulative, where the nature of violence exposure is self-perpetuating, (3) stress-related outcomes are conceptualized generally, and (4) personal and social coping resources should be considered (Foster & Brooks-Gunn, 2009).

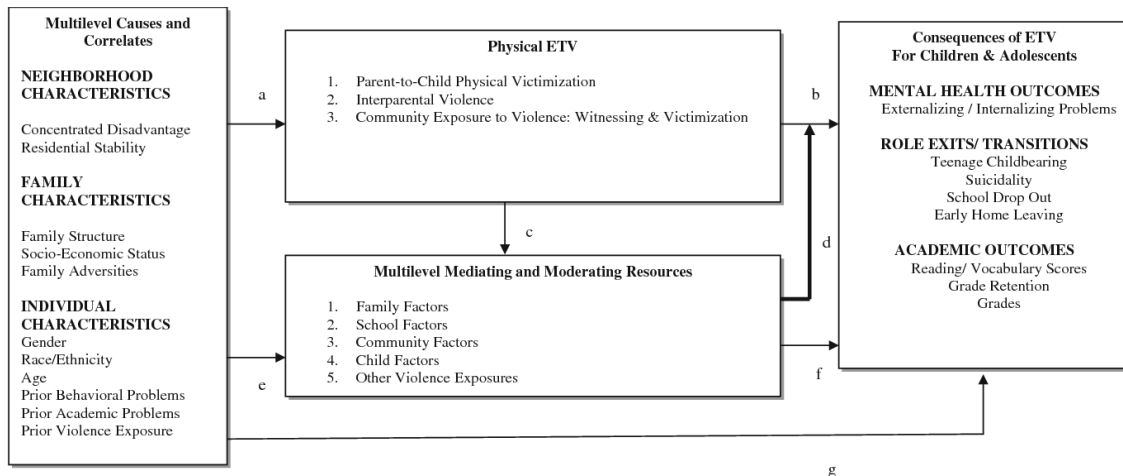


Figure 1. Conceptual stress process model of exposure to violence (ETV) among children and adolescents.

Retrieved from Foster, H., & Brooks-Gunn, J. (2009). Toward a Stress Process Model of Children’s Exposure to Physical Family and Community Violence. *Clinical Child and Family Psychology Review*, 12(2), 71–94.

<https://doi.org/10.1007/s10567-009-0049-0>.

Research points toward a multidimensional conceptualization of community violence exposure, whereby the type, severity, physical and relational proximity, and chronicity of exposure moderate its effects on youth (Kennedy & Ceballo, 2014). For example, acute community violence exposure seems to be more related to internalizing problems such as anxiety and depression, whereas chronic exposure has a stronger relationship to externalizing problems such as aggression (Cooley-Quille et al., 2001). These symptom profiles interact with gendered and age-specific patterns of psychopathology, with girls and younger children being more likely to experience internalizing problems (Cooley-Strickland et al., 2009; McLaughlin & Sheridan, 2016; Quimby et al., 2018). The myriad of contextual factors surrounding indirect exposure to community gun violence must be taken into account when examining its public health implications among youth.

Ecological-Transactional Perspective

A second theoretical model that will be used to understand the dynamics and impacts of community violence on youth is the ecological-transactional model. This theoretical framework applies the social-ecological model to frame the ways in which multiple contexts interact to influence child development. From most distal to most proximal, these ecologies span the macrosystem (cultural values and beliefs), exosystem (community context), microsystem (family, school, and peer environments), and the ontogenic level (intrapersonal factors) (Figure 2). These levels are interactional and transactional in nature, meaning that factors in one context affect factors in another, and contexts have mutual impacts on each other over time. Further, each context may contain both protective and vulnerability factors which moderate the impacts of community violence on youth.

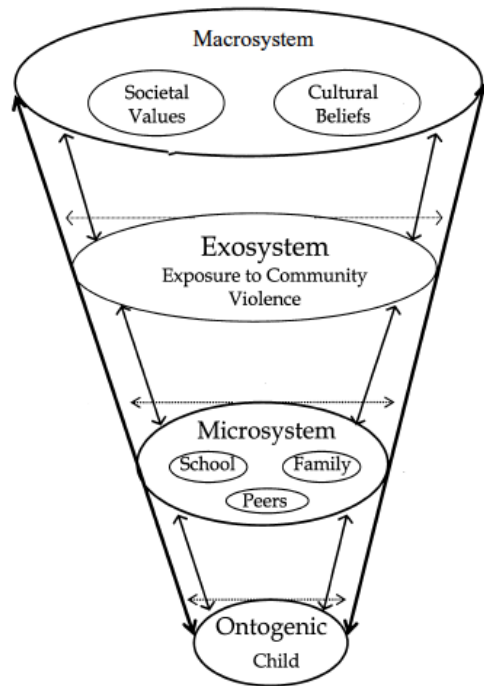


Figure 2. A visual representation of the impacts of community violence on children and adolescents based on the ecological-transactional model. Retrieved from Overstreet, S., & Mazza, J. (2003). An ecological-transactional understanding of community violence: Theoretical perspectives. *School Psychology Quarterly, 18*(1), 66.

Community gun violence occurs at the exosystem of the ecological-transactional model but is driven by and influences factors at both distal and proximal levels. For example, macrosystem factors such as poverty, racial segregation, housing discrimination, and concentrated poverty contribute to the prevalence of community gun violence. At the microsystem, community violence can stress familial relationships, straining parent-child relationships and increasing the likelihood of violence within the home. There is also evidence to support the bidirectionality of this relationship, with children from maltreating families experiencing more externalizing behavior problems as a result of community violence exposure when compared to children from non-maltreating families (Overstreet & Mazza, 2003). An alternate response to the presence of community violence at the microsystem is parental restrictiveness, whereby parents/caregivers adopt controlling behaviors or extreme safety precautions to protect their children. This parenting style may promote healthy adaptation and improve youth's internal locus of control, or alternatively, reinforce youth's beliefs about their neighborhood being dangerous and unpredictable, causing emotional distress, or interfere with adolescents' need for autonomy. At the intrapersonal level, exposure to community violence alters youth's organizing principle from one of safety and predictability to imminent danger in the environment around them. This may lead to feelings of helplessness, intrusive thoughts, emotional numbing, desensitization, or aggression as adaptations (Overstreet & Mazza, 2003).

Current Evidence-based Interventions

Long-term strategies that address the structural inequities underlying community gun violence should undoubtedly be pursued while immediate interventions to mitigate its negative impact on youth development and wellbeing are implemented (Kaufman & Richmond, 2020). At a national level, gun legislation such as universal background checks, weapon identification, and safe storage regulations can reduce gun violence by restricting firearm access (Kalesan et al., 2016). However, policy solutions remain at a standstill due to the socio-cultural context of firearm ownership in the U.S. (Crebs et al., 2016). A more practical approach may be to focus on apolitical, programmatic solutions that sidestep governmental action to find ways of safely coexisting in the presence of firearms. Community-based interventions, especially those which adopt a “focused deterrence” approach – targeting individuals at high risk of gun violence victimization or perpetration – have shown promise in urban settings across the U.S. (Braga & Weisburd, 2015). These programs identify gang-involved youth and present them with an ultimatum, holding them accountable for their actions while also offering wrap-around services, such as employment, stable housing, mentoring, and mental health treatment (Braga & Weisburd, 2015). Altering the built environment in gun violence “hot spots,” also known as blighted area restoration, has also proved effective in curbing gun violence. Simply renovating or greening dilapidated lots and installing public lighting has drastically reduced gun violence in crime-ridden areas (Branas et al., 2018). These interventions target the small people, places, and behaviors that drive gun violence, combining enforcement with prevention and working around existing legal structures, which ultimately reduce youth’s risk of community exposure (Abt, 2019). Interpersonal interventions such as strengthening familial and school support systems can also help buffer the negative impacts of gun violence exposure on youth (Foster & Brooks-Gunn, 2009; Luthar & Goldstein, 2004). Lastly, improving access to mental health treatment, particularly for youth of color, is imperative to aid exposed youth in trauma recovery and build resilience (Garbarino et al., 2002). Many tertiary prevention strategies are also inherently primary prevention in that they break cycles of community exposure to and perpetration of gun violence that contribute to its self-perpetuating nature (Abt, 2019; Hsu et al., 2020; McGee et al., 2017; Schaechter & Alvarez, 2016).

Indirect exposure to gun violence is more widespread than direct victimization – with anywhere from 8% based on nationally representative samples to 40% based on a convenience sample of rural and urban youth ages 2-17 having witnessed gun violence (hearing gunshots or seeing someone shot) – and results in lifelong adverse outcomes (Finkelhor et al., 2015; Mitchell et al., 2019). Chronic community gun violence perpetuates cycles of violence and disinvestment in disenfranchised communities, and its effects ripple across generations. The gun violence landscape has shifted in the past decades, with significant headway made in terms of understanding the predictors and consequences of gun violence.

Large research gaps persist regarding the prevalence of exposure to community violence among youth, longitudinal associations with psychosocial outcomes, and consensus on the operationalization and impacts of indirect gun violence exposure (Abt, 2019; Mitchell et al., 2019). This review aims to consolidate evidence on the range of experiences that youth in the U.S. encounter in terms of indirect exposure to community gun violence and propose future directions for public health research, practice, and policy.

Methods

The primary purpose of this review is to explore the scientific literature on the prevalence and physiological and psychosocial effects of indirect exposure to community gun violence among urban¹ low-income youth of color (Black and Latinx) ages 2-18 years old in the United States. This review identifies subsets of urban youth – by age, gender, and race – that are particularly vulnerable to the adverse impacts of community gun violence, places these populations within the broader contextual and sociopolitical environment, and explores associated risk and protective factors. Finally, gaps in research to date on indirect exposure to community gun violence are described and future research directions proposed.

Search Strategy

This review was limited to urban youth ages 2 to 18 years old in the United States, with special attention paid to at-risk populations including low-income Black and Hispanic youth. Indirect gun violence was operationalized based on existing literature (Kennedy & Ceballo, 2014; Mitchell et al., 2019; Overstreet, 2000; Rajan et al., 2019; Turner et al., 2019). The distinct implications of exposure to gun violence, as opposed to other forms of violence, and indirect exposure, as opposed to direct exposure, are discussed. The databases used included PubMed, Web of Science (core collection), ProQuest, and SCOPUS. An exploratory search using scoping keywords based on an initial scan of the literature (*indirect, community violence, exposure to violence, firearm, gun, youth, urban, mental health, trauma, childhood adversity, and adverse childhood experiences*) was conducted to harvest terminology for a comprehensive search strategy. The following combined search string was found to yield the most relevant results across databases: (“indirect” OR “exposure”) AND (“community”) AND (“gun*” OR “firearm*”) AND (“violence” OR “crime”) AND (“youth” OR “child*” OR “adolescent*”). This search string was used to identify scientific literature on indirect exposure to community gun violence among the population of interest across the four aforementioned databases.

Inclusion criteria included peer-reviewed articles in English published in 1995 and thereafter on the scope of community gun violence, defined as firearm assaults occurring in public spaces, among low-

¹ Large central metro counties are defined by the National Center for Health Statistics (NCHS) as counties in metropolitan statistical areas (MSAs) of one million or more population that either 1) contain the entire population of the largest principal city of the MSA, 2) are completely contained within the largest principal city of the MSA, or 3) contain at least 250,000 residents of any principal city in the MSA.

income children and adolescents ages 2 to 18 years old living in urban areas of the United States. Studies regarding direct gun violence victimization, legal intervention, domestic violence, non-firearm-related violence, media or video game violence, suicides by firearm, and adult, rural, largely white non-Hispanic, high-income, or international populations were excluded from this review. For the purposes of this review, youth wellbeing will be defined as an optimal state of physical, social, cognitive, and psychological health at both the individual and environmental levels (Pollard & Lee, 2003).

Results

The search strategy yielded 224 studies, of which 81 duplicates were removed, leaving 143 studies in the abstract screening. Of those screened, 34 full-text studies were assessed for eligibility. Eighteen studies were included in the final review (Table 1). Multiple themes emerged from the review spanning (1) inconsistent operationalization of community gun violence exposure, (2) indirect exposure to gun violence as distinct from other forms of violence, (3) the need for a multidimensional conceptualization of exposure to community gun violence, (4) differential impacts of community gun violence exposure across developmental stages, and (5) how community gun violence exposure among youth contributes to future perpetration and perpetuates cycles of violence.

Table 1. Summary of relevant findings from literature review.

Title, Author(s), Year (Design)	Location (sample size), Demographics	Violence Exposure Conceptualization	Outcome(s)	Relevant Findings	Gaps in Research	Recommendations
A multivariate analysis of gun violence among urban youth: The impact of direct victimization, indirect victimization, and victimization among peers, McGee et al., 2017 (Cross-sectional survey)	Hampton Roads, VA (n = 500), Lower socioeconomic African American youth ages 12-18	Threatened with a gun, shot at with a gun, seen others attacked with a gun, seen others threatened with a gun, seen a dead body, and been to parties where guns were fired (domains: community, family, school; Level of exposure: peer victimization, direct victimization, and indirect victimization)	Gun related delinquency	Direct gun victimization predicts gun related delinquency, and this association is strong among African American adolescents.	Lack of research accounting for domains of gun violence exposure and differentiating between direct, indirect and peer victimization. Limited longitudinal data exploring these relationships.	Because gun violence exposure is an antecedent to gun violence perpetration, adolescents gun violence exposure and victimization should be prevented as a strategy to prevent future gun violence.
Childhood Trauma Exposure and Gun Violence Risk Factors among Victims of Gun Violence, Wamser-Nanney et al., 2019 (Cross-sectional survey)	St. Louis, MO* (n = 72), Patients 18-55 years old admitted to Level I trauma center due to gunshot injury from community violence (not domestic violence)	Community violence exposure was defined as witnessing someone die suddenly or be badly injured.	Gun ownership, gun carrying, gun arrests, impulsivity, perceptions regarding violence (hypothesized predictors of GV victimization).	Childhood trauma (exposure to domestic and community violence) is a risk factor for gun violence involvement.	Limited research specific to gun violence and its associated risk factors.	Research with larger sample sizes to tease apart different trauma ecologies on specific risk factors and associations with gun violence.

Community Gun Violence as a Social Determinant of Elementary School Achievement, Bergen-Cico et al 2018 (Geospatial mapping)	Syracuse, NY (n = 2127), Third grade elementary school children	Police department data for confirmed gunshots	Standardized NY state test scores for English Language Arts (ELA) and math	Higher levels of gun violence within school catchment areas were significantly associated with higher rates of ELA and math failure	Few studies have assessed the geospatial relationship between exposure to community gun violence near schools and youth academic achievement.	Indirect exposure to community gun violence may be an important social determinant of academic performance among elementary school children.
Effects of exposure to violence with a weapon during adolescence on adult hypertension, Ford and Browning, 2014 (Longitudinal)	U.S. (n = 7971), Male and females from National Study of Adolescent Health ages 11-17 years at wave 1	Saw someone stab or shoot another person.	Hypertension	Males who had witnessed violence and females who had been victimized in the past year had increased odds of hypertension, controlling for BMI, smoking, alcohol abuse and depression.	Limited research into the potential mechanisms underlying exposure to violence with a weapon and hypertension in adulthood.	Adolescents should be screened for exposure to serious violence and referred appropriately and research should target violence prevention.
Exposure to gun violence and asthma among children in Puerto Rico, Ramratnam et al., 2015 (Case-control)	San Juan, PR (n = 466), Children ages 9-14 years	Lifetime exposure to gun violence: having heard a gunshot more than once	Asthma	Gun violence exposure was associated with asthma in children after adjusting for SES, parental asthma, exposure to tobacco smoke, prematurity and residential proximity to a major road.	No studies on impact of indirect exposure to gun violence and physiological outcomes such as asthma.	Longitudinal research into exposure to violence involving firearms and asthma, as well as the potential biological mechanisms linking these.
Firearm Violence Exposure and Serious Violent Behavior, Bigenheimer, Brennan and Earls, 2005 (Propensity stratification)	Chicago, IL (n = 1517), Adolescents aged 12-15 years	Had been shot or shot at, or had seen someone shot or shot at	Serious violence perpetration	Exposure to firearm violence increased likelihood of adolescent perpetrating serious violence in subsequent 2 years.	Lack of longitudinal studies and studies accounting for personal characteristics and environmental factors that influence exposure to community violence and violence perpetration.	Identify adolescents exposed to firearm violence to prevent future violence perpetration.
Firearm Violence Exposure and Suicidal Ideation Among Young Adults Experiencing Homelessness, Hsu et al. 2020 (Cross-sectional survey)	Los Angeles, CA, Denver, CO, Houston, TX, Phoenix, AZ, New York City, NY, San Jose, CA and St. Louis, MO (n = 1426), Young adults	Being shot at and shot by, seeing someone being injured or killed with a gun, shooting a gun at another individual	Suicidal ideation	45% had experienced direct or indirect gun violence; vast majority of homeless youth who reported being perpetrators	Literature among homeless youth has overlooked potential role of violence perpetration in suicide risk.	Firearm violence perpetration is a risk factor for suicide risk and should be screened for by providers.

		experiencing homelessness			had also experienced victimization; direct and indirect gun violence victimization was not associated with suicidal ideation.	
Growing up - or not - with Gun Violence, Schaechter and Alvarez, 2016 (Commentary)	U.S. (NA), Children and adolescents	Gun-related injuries and deaths, loss of family members to firearm violence, gun violence perpetration (unintentional and intentional), chronic community violence, threat of mass shootings, and media violence.	Physical and psychological sequelae		Exposure to community violence is associated with externalizing behaviors, impaired social and behavioral functioning, high-risk behaviors, aggressive behaviors (through changes in social cognition), depression, and weapon carrying.	More research needed to understand the interactions between child development, mental health, learning, attention, and firearm access, ownership, handling, play, shooting and violence. How risk factors such as mental illness, chronic disease, learning and attention disorders and social determinants impact firearm injury risk and policy.
Gun Exposure Among Black American Youth Residing in Low-Income Urban Environments, Quimby et al., 2018 (Cross-sectional survey)	Chicago, IL (n = 185), Urban Black American adolescents from low-income public schools	Knowing someone with a gun, presence of a gun at home or relative's home, have ever held a gun	Internalizing (anxiety, depression and trauma) and externalizing (beliefs about aggression and delinquency) symptoms		Almost half of adolescents in sample were exposed to guns, most often outside of their homes. Gun exposure was associated with externalizing symptoms but knowing someone who owns a gun with both internalizing and externalizing symptoms.	Few studies have looked at impact of presence of guns in adolescents' lives on psychological and behavioral outcomes. Limited data on differential impacts of gun exposure across genders.
Gun Violence Exposure and Posttraumatic Symptoms Among Children and Youth, Turner et al., 2019 (Cross-sectional survey)	Boston, MA, Philadelphia, PA and rural areas (n = 630), Children ages 2-17 years	Witnessing gun violence: (1) Saw someone threaten another person with a gun, (2) saw someone hurt another person with a gun on purpose, and (3) saw someone shooting a gun in a public place (on the	Child victimization, polyvictimization, and posttraumatic symptoms		Direct gun violence exposure, witnessing gun violence and hearing gunshots were significantly associated with other forms of violence	Although rates of indirect exposure to gun violence are increasingly available, there is less evidence on its psychological impacts. Limited research has not distinguished exposure to gun violence from
						Limit access to firearms among youth through safe storage laws and physician counseling.
						Distinguish between gun violence victimization, gun carrying and exposure to guns in order to tease apart outcomes and appropriately tailor interventions.
						Mental health professionals and trauma-informed services should be aware that indirect gun violence exposure (hearing and seeing gun violence in their neighborhoods) can induce posttraumatic stress

		streets, parking lots, or stores); Hearing gun violence: (1) heard (but not seen) a gun being shot in a public place like the streets, parking lots, or stores			victimization. Polyvictimization was strongly associated with posttraumatic symptoms in older youth (10-17 years old) and hearing and witnessing gun violence were related to both posttraumatic symptoms among younger children (2-9 years old).	other forms of violence and types of gun violence exposure.	symptoms in children.
Gun Violence, African Ancestry, and Asthma: A Case-Control Study in Puerto Rican Children, Rosas-Salazar et al., 2016 (Case-control)	San Juan, PR and Hartford, CT (n = 472), Racially & ethnically diverse male juvenile offenders 14-19 years old at baseline	Hearing gunshots more than once	Asthma and total IgE		Gun violence exposure moderates the relationship between African ancestry and atopy in Puerto Rican children.	Mechanisms underpinning the association between exposure to violence and asthma are poorly understood.	Further longitudinal research into the impact of African ancestry and frequent gun violence exposure and asthma among children from racial and ethnic minorities.
Gun- and Non-Gun-Related Violence Exposure and Risk for Subsequent Gun Carrying Among Male Juvenile Offenders, Beardslee et al., 2018 (Longitudinal)	Maricopa, AZ and Philadelphia, PA (n = 1170), 1-15 Year old children and youth	Being shot or shot at, or seen others being shot or shot at.	Gun carrying		Adolescent offenders were more likely to carry a gun after exposure to gun violence but not after exposure to non-gun violence.	Longitudinal analyses have not isolated within-individual changes in violence exposure and gun carrying across multiple assessments and few studies have focused specifically on male adolescents with a history of serious criminal offense or controlled for pre-existing and time-stable factors that account for associations between violence exposure and gun carrying.	Gun violence prevention interventions should target adolescent boys who experience or witness gun violence and those in communities with high rates of gun violence.
Invisible wounds: Community exposure to gun homicides and adolescents' mental health and behavioral outcomes, Leibbrand et al.,	20 large cities across U.S. (n = 2823), 9-12 Grade students	Physical distance from adolescents' home or school addresses to gun homicide	Externalizing behavior problems, anxiety, and depression		Proximity to gun homicide was associated with significantly worse depression and anxiety symptoms among girls	Lack of studies on the impact of gun violence on community member who witness or hear about it, and whether effects vary by individual	There is a need to consider the ways in which local gun violence impacts adolescents' short- and long-term mental health beyond those physically impacted.

2020 (Geospatial analysis)				and anxiety symptoms among boys.	characteristics such as gender or proximity to event.
Longitudinal pathway from violence exposure to firearm carriage among adolescents: The role of future expectation, Lee et al., 2020 (Longitudinal)	Flint, MI (n = 850), Children and youth	Frequency of violent victimization (had threaten to hurt me, had something taken from me by physical force, and experienced being physically assaulted or hurt by someone) and violence observation (seen someone commit a violence crime where a person was hurt and seen someone get shot, stabbed or beaten up)	Future expectations about education outcomes and firearm carriage	Rate of change in violence exposure and firearm carriage were positively associated; violence exposure increased risk of firearm carriage via decreased future expectation.	Lack of longitudinal evidence on exposure to violence and firearm carriage among youth.
Mitigating the Effects of Gun Violence on Children and Youth, Garbarino, Bradshaw and Vorrasi, 2002 (Review)	U.S. (NA), Youth 2-17 years old	Community violence, violence in schools and violent content in the media	Anger, withdrawal, posttraumatic stress, and desensitization to violence	Direct and indirect exposure to violence has long-lasting developmental and psychological impacts on youth, and perpetuates cycles of community violence.	The psychological impacts of gun violence were understudied and poorly understood until very recently.
Understanding the Impact of Seeing Gun Violence and Hearing Gunshots in Public Places: Findings From the Youth Firearm Risk and Safety Study, Mitchell et al., 2019 (Cross-sectional Survey)	Boston, MA, Philadelphia, PA and rural areas of eastern TN (n = 630), Children	Directly seeing gun violence and hearing gunshots in public places such as streets, parking lots, or stores	Protective action, level of fear, sadness and upset resulting from indirect gun violence exposure.	Forty-one percent of youth reported indirect exposure to gun violence, with 32% reporting exposure in the last year. Older and urban youth had higher levels of exposure than younger and non-urban youth. Most were exposed from hearing gunshots, whereas fewer saw gun violence in public places. Almost 60% of youth reported being very or	Included only English-speaking participants and indirect gun violence exposure survey questions measure different experiences and are thus, not meant to be read as a scale.
					Longitudinal studies on newer datasets and future research on how childhood violence exposure impacts longitudinal associations between violence exposure and firearm carriage in adolescence. Future research should also use dynamic longitudinal data such as diary entries, and explore gendered patterns of violence exposure and youth firearm carriage.
					Parents should monitor children to prevent gun violence exposure and limit exposure to violence in the media. School staff should refer violence-exposed youth to mental health services and make children feel safe in schools and increase social-connectedness.
					High rates of indirect exposure to gun violence point toward need for community-level programs to promote youth safety and well-being, such as educational programs for youth who have seen gun violence or heard gunshots. Bolstering children's sense of safety and reducing community disorder may buffer the impacts of gun violence exposure.

				extremely distressed (fear, anger, sadness, and generalized upset) due to indirect gun violence, with youth living in urban areas, females and younger children being more likely to experience high fear.		
Who, What, When, and Where? Toward a Dimensional Conceptualization of Community Violence Exposure, Kennedy and Ceballo, 2014 (Theoretical)	U.S., NA, youth	Community violence (interpersonal harm or threats of harm within one's neighborhood or community); excluding domestic violence, physical maltreatment, sexual abuse, peer bullying and media violence	Youth wellbeing; psychological sequelae	Community violence exposure should be conceptualized in terms of multiple dimensions: type, severity, physical proximity, relational proximity, and chronicity. PTSD is most common consequence of community violence exposure.	No standard definition of CVE. CVE conceptualized as a homogenous stressor. Reliance on retrospective surveys and inconsistent frequency counts (continuous vs ordinal). Lacking integration of individual and community-level factors with dimensions of CVE.	More nuanced theories and methodological approaches to CVE and its impact on psychological and socioemotional outcomes among youth. Incorporate the dimensions of CVE (type, severity, physical proximity and chronicity) into studies to develop a better understanding of how distinct exposure produce distinct outcomes. More collaboration between practitioners and researchers.
Youth exposure to violence involving a gun: evidence for adverse childhood experience classification, Rajan et al., 2019 (Systematic Review)	U.S., NA, children	Injury from a gun, witnessing, hearing gunshots, and/or knowing a friend or family member who had been shot with a gun	Health outcomes	There is a need to acknowledge the spectrum of experiences that constitute exposure to gun violence. There is substantial evidence to support the classification of gun violence exposure as an ACE.	Research on ACEs traditionally do not encompass exposure to violence involving a gun. Operationalization of exposure to gun violence varies widely throughout the literature.	Youth gun violence exposure should be classified as an ACE. Exposure to gun violence should include the entire range of experiences including injury, threat, witnessing gunfire, hearing gunshots, knowing a friend or family member who has been shot, and having close friends or a sibling who carries a firearm. Children should be screened for gun violence exposure, not only by physicians but also by other practitioners such as teachers, school nurses, and counselors.

*Study location deduced from the author affiliations.

Inconsistent Operationalization of Community Gun Violence

The set experiences which comprise exposure to community gun violence remain ill-defined, limiting the utility of the growing body of evidence in this area (Kennedy & Ceballo, 2014). In terms of indirect exposure, there appear to be three broad categories examined throughout the literature. First, much of the research on indirect exposure to gun violence is concerned with experiences of seeing gunfire or hearing gunshots (Mitchell et al., 2019; Rajan et al., 2019; Turner et al., 2019), although a substantial portion is limited solely to experiences of witnessing gunfire (Bingenheimer, 2005; Hsu et al., 2020; Wamser-Nanney et al., 2019).

A smaller number of studies consider knowing a close friend or family member has been shot or carries a firearm, to be indirect exposures to gun violence as well (Rajan et al., 2019; Schaechter & Alvarez, 2016). A study of low-income Latinx and Black adults found that having a victim of gun violence in one's social network increases mental health symptoms (Smith et al., 2020). Knowing a victim of gun violence is often considered a separate exposure from witnessing, as the cognitive and emotional implications following exposure may be vastly different. Cognitive processing of the event is moderated by the child's age, extent of knowledge, relational proximity to the victim, and outcome of the incident (e.g., injury or death). Few studies have explored the impact of a child's general awareness of and perception of gun violence in their neighborhood. Perceptions of neighborhood safety may be an important mediator between exposure to community violence and developmental outcomes in youth (Overstreet & Mazza, 2003). Some even posit that the mere presence of a gun induces distress, exacting a psychological toll over time by disrupting youth's sense of safety (Quimby et al., 2018). Research documenting physiological responses to guns under experimental conditions supports this theory, with male college students who interacted with a gun experiencing increases in testosterone levels and aggressive behavior as opposed to those who interacted with a toy (Klinesmith et al., 2006). Furthermore, a study of low-income Black youth in Chicago found that merely knowing someone who owns a gun was associated with both internalizing (anxiety, depression, and trauma) and externalizing (aggression and delinquency) symptoms (Quimby et al., 2018). The same study interestingly found that gun exposure (not gun violence) was related to reduced trauma symptoms in girls. This outcome is hypothesized to be a result of a regained sense of control that the presence of guns may offer girls who often lack other forms of power (Quimby et al., 2018). The idea that merely hearing about community gun violence may be detrimental to youth mental health is in line with the criterion for a PTSD diagnosis, which emphasizes *perceived* threat of a traumatic event and subjective distress rather than direct experiences (Kennedy & Ceballo, 2014).

There remains controversy as to whether exposure to gun violence in the media meaningfully impacts youth, although studies rarely differentiate between fictional (e.g., film, video games) and non-

fictional (e.g., news, social media) content in terms of the influence (Garbarino et al., 2002; Schaechter & Alvarez, 2016). An emerging body of research has begun to explore the impacts of nationwide coverage of mass shootings, particularly in schools, on youth wellbeing. While extremely disturbing, these sorts of highly publicized incidents represent the tip of the iceberg in terms of gun violence in the U.S. The emotional intensity of such horrific events feeds into a bias toward overestimating the likelihood of mass shootings. As a result, media, advocacy efforts, and funds often skew toward preventing these sensationalist yet rare tragedies, rather than the more chronic forms of gun violence impacting lower-income communities of color.

The broad scope of experiences that may fall under the umbrella of gun violence exposure has yet to be fully considered and classified throughout the literature. For example, the impacts of exposure to unintentional and self-inflicted gun violence (i.e., suicide) on youth are rarely discussed in studies of violence exposure. Only a handful of studies have looked at the experience of being threatened with a firearm (McGee et al., 2017). While gun violence perpetration has been linked to negative psychosocial outcomes, these associations remain tenuous given the extensive overlap between gun violence victims and perpetrators (Hsu et al., 2020; Schaechter & Alvarez, 2016). Moreover, youth who are indirectly exposed to community gun violence often also experience domestic violence and child maltreatment due to shared contextual factors (Kennedy & Ceballo, 2014; Turner et al., 2019). A persistent methodological challenge in distinguishing community from domestic violence is that both often stem from disputes between family or friends (Scott, 1999). Nonetheless, witnessing violence has been more strongly linked to violence perpetration, while victimization is correlated with emotional dysregulation and poor social adjustment (Guerra et al., 2003; Schwartz & Proctor, 2000). Figure 3 integrates definitions across the literature to develop a typology of gun violence exposure ranging from direct victimization to community exposure.

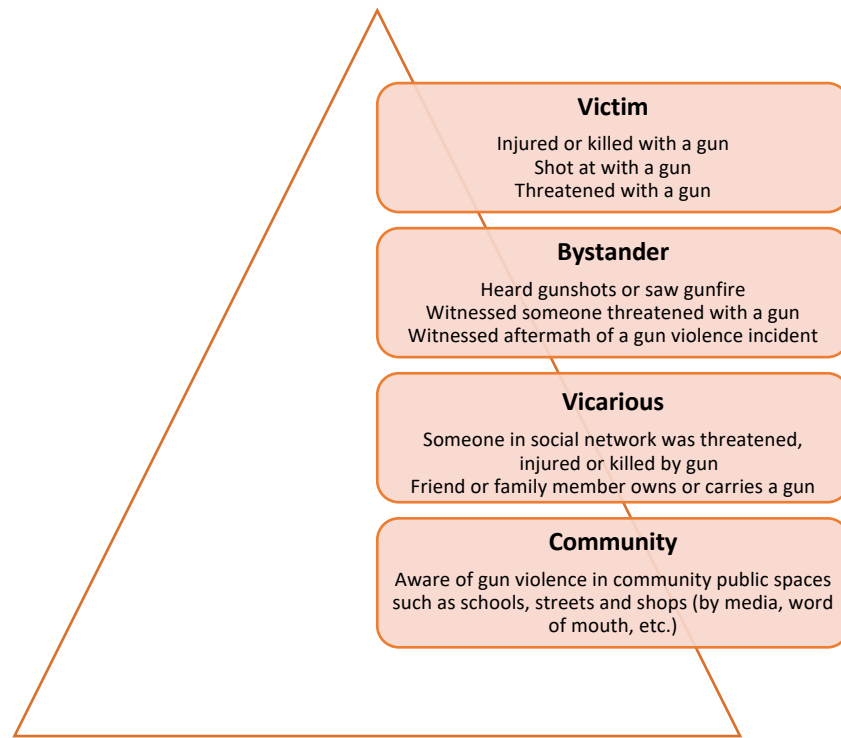


Figure 3. A typology of gun violence exposure. Note: some categories may overlap (e.g., encountered a crime scene where a known person was injured or killed with a gun)

Gun violence has become an inescapable reality across the U.S., where there are more civilian firearms per capita than in any other country (Furman, 2018). Yet, few studies have examined the impacts of its ubiquity at the community-level. While a vast body of literature exists on the influence of community violence on youth, the meaning of “community” varies considerably from study to study. The term “community violence” is sometimes employed to differentiate violence that occurs in homes (domestic violence) from violence occurring in public spaces, such as schools, streets, parks, and stores. In other instances, community violence refers to all violence occurring within a community, whether inside homes, between strangers, or across street blocks.

Firearm Violence: A Distinctly Lethal Threat

Although the scope and health effects of violence exposure have been documented for decades, most studies do not distinguish between exposure to *gun-related* violence as opposed to other forms of violence, and *indirect* exposure as opposed to direct victimization (Turner et al., 2019). Firearms are one of the only weapons designed solely to threaten, seriously injure or kill. For example, robberies involving guns are 10 times more likely to result in a fatality than those involving other weapons (Reich et al., 2002). Consequently, violence with a gun represents a more profound threat to safety than that involving other weapons. According to Maslow’s Hierarchy of Needs, a human’s safety and security are second only to physiological needs (Lorion & Saltzman, 1993). Additionally, gun violence exposure is especially

far-reaching relative to other forms of violence, with gunshots resounding across multiple street blocks, making indirect exposure a particularly pertinent concern. The nature of community gun violence is such that a child does not need to be directly exposed to suffer its effects. Rather, gun violence ripples across a child's ecosystem, through a diminished sense of safety, parental distress, and broader neighborhood disorder (Kim, 2019; Sharkey et al., 2012).

As prior research has established, community violence poses a lower immediate threat than direct adverse experiences such as domestic violence and physical/sexual abuse. However, community violence involving a firearm likely triggers a stronger stress response and disturbance to physiological regulatory systems given its level of threat relative to violence involving other weapons (McLaughlin & Sheridan, 2016). An analysis among a national probability sample of adolescents demonstrated that those who feared injury or death during an incident were about 9 times more likely to develop depressive symptoms (Zinzow et al., 2009). The same study found that witnessing community violence with a weapon was associated with an increased risk of depression. A study using data from the National Crime Victimization Survey found that victims of violence involving a firearm were more likely to experience severe distress and functional impairment than victims of non-firearm-related violence (Kagawa et al., 2020). Another study of urban preschoolers found that handling of parents' firearms in the home was correlated with more aggressive behavior, suggesting gun exposure may contribute to externalizing behaviors from a young age (Hardy et al., 1996). Indirect exposure to gun violence conceivably leads to greater perceived threat appraisal among youth due to the erratic nature of gunfire and high risk of injury or death if exposed.

Dimensions of Gun Violence Exposure

Recent research into the conceptualization of community violence exposure has raised the importance of more precisely defining and studying the various dimensions of exposure and their moderating effects on psychosocial outcomes. The child maltreatment and trauma fields overall have shown that dimensions of exposure, such as frequency, degree of injury, chronicity, and age at first report contribute to notable differences in developmental outcomes. This more nuanced conceptualization has led to a more precise understanding of the moderators and consequences of different traumatic events. The body of literature on exposure to community violence exposure, and more specifically indirect gun violence exposure, has lagged in this theoretical shift. Emerging evidence supports the integration of the following dimensions of community violence exposure into its conceptualization: type, severity, physical proximity, relational proximity, and chronicity of exposure (Kennedy & Ceballo, 2014). These dimensions interact with each other and with individual, familial, and community-level characteristics to produce a distinct set of symptoms among exposed youth. Although there seem to be broad patterns of symptoms, researchers have observed variable outcomes within and between individuals.

Urban youth are exposed to many different forms of violence, with about 3 in 5 children experiencing either physical assault, sexual victimization, maltreatment, property victimization, or witnessing violence (Finkelhor et al., 2015). The contextual factors of violence exposure lead to variable outcomes among youth, with certain forms of violence being associated with distinct psychopathologies. For example, a study of young women found that different types of trauma (traumatic bereavement, sexual assault, and physical assault) during adolescence were each associated with significantly different mental health outcomes (Krupnick et al., 2004). Similarly, the severity of violence exposure is a critical moderating factor in determining its impact. However, questions remain as to whether to classify severity on some ‘objective’ scale of intensity (i.e., getting shot is worse than seeing someone get shot) or based on the *perceived* severity of exposure. Whether a child feared for their own life, that of a loved one, or witnessed gunfire among strangers may be critically important to their interpretation and processing of the event. As aforementioned, violence involving a firearm is conceivably greater in intensity than violence involving less lethal weapons and thus, increases risk of psychosocial sequelae such as post-traumatic symptoms (Slovak, 2002).

U.S.-based studies of community violence exposure have demonstrated that physical proximity to violence moderates the severity of resulting symptoms (Scott, 1999). For example, a study of a sniper attack in a schoolyard revealed that children directly victimized experienced the most severe symptoms, followed by children present in the schoolyard, children who heard gunfire from the classrooms, and finally, those who were not present but had knowledge of the event (Pynoos, 1987). Similarly, a geospatial analysis of community exposure to gun violence in 20 large cities across the U.S. found that geographical proximity between gun homicides and adolescents’ homes or schools was associated with significantly worse anxiety and depression symptoms (Leibbrand et al., 2020). Based on this evidence, a child’s physical proximity to incidents of community gun violence should be considered when assessing its psychological impact.

In addition to physical proximity, relational proximity has been shown to moderate the effects of community gun violence exposure on children and adolescents. Youth who witness known individuals being shot are at higher risk of experiencing traumatic symptoms as a result. Among a national household probability sample of adolescents, those who witnessed incidents of violence involving a known non-relative were more likely to develop PTSD (Zinzow et al., 2009). Furthermore, studies examining the effects of network exposure to gun homicides demonstrate that relational proximity is significantly linked to gun violence victimization (Papachristos & Wildeman, 2014). Overall, more personal experiences of gun violence, such as direct victimization or victimization of a loved one, tend to generate internalizing symptoms in youth, while more distal experiences, such as hearing of a shooting in one’s community or among strangers, are associated with externalizing problems, such as aggression (Leibbrand et al., 2020).

These findings indicate the importance of accounting for relationship to victim when determining the severity and potential consequences of exposure to gun violence among youth. For example, a multivariate analysis of gun violence among urban youth used a scoring system to account for level of exposure, with higher scores indicating a closer relationship to the victim (McGee et al., 2017).

The lack of longitudinal studies documenting the effects of cumulative exposure to local gun violence represents an important gap in the literature (Beardslee et al., 2018; Lee et al., 2020; McGee et al., 2017). Longitudinal data would allow for better differentiation between the effects of acute versus accumulated exposures. For example, externalizing outcomes predominantly observed among exposed adolescents, as opposed to younger children, are hypothesized to be a result of desensitization to violence over time (Bingenheimer, 2005; Quimby et al., 2018). Youth repeatedly exposed over long periods of time are prone to developing normative beliefs about community violence and subsequently, maladaptive cognitive frameworks and coping behaviors. Furthermore, most youth impacted by gun violence are chronically exposed throughout their childhoods warranting more longitudinal research among high-risk populations (Scott, 1999).

Gun Violence Exposure across Developmental Stages

The effects of exposure to local gun violence on youth vary substantially across developmental stages. Although younger children may experience more profound psychological disturbances as a result of exposure, older children are at higher risk of experiencing cumulative exposures over time (Shakoor & Chalmers, 1991). Research to date suggests that younger children exhibit more internalizing symptoms (i.e., depression, anxiety, and/or intrusive thoughts) while older youth present externalizing behaviors (i.e., aggression) as coping mechanisms or ways to regain control over an environment they perceive as unsafe (Quimby et al., 2018).

Traumatic experiences, including witnessing violence, during early childhood interfere with healthy development, and can induce affective, somatic, behavioral, cognitive, relational, and self-esteem-related impairments (Berkowitz, 2003; van der Kolk, 2005). Although infants and toddlers cannot yet conceptualize firearms and do not necessarily grasp their lethality, they are likely to mimic their parent or caregiver's response and are therefore, more adversely impacted by parental distress (Al'Uqdah et al., 2015; Schaechter & Alvarez, 2016; van der Kolk, 2005). For example, a study of 160 children 0 to 11 years old found that maternal distress partially explained the relationship between community violence exposure and behavioral (internalizing and externalizing) problems in children, when controlling for socioeconomic status and family aggression (Linares et al., 2001). Recently, attention has been drawn toward the role of maladaptive learning, particularly fear conditioning, in producing psychopathologies in children exposed to adversity early on (McLaughlin & Sheridan, 2016).

Young children may also somatize emotional distress resulting from exposure to violence. A study of 268 African-American 6-8-year-old children in the Detroit area found that witnessing community violence predicted PTSD symptoms, difficulty sleeping and headaches while controlling for depression, anxiety, child abuse, domestic violence, and life stress (Bailey et al., 2005). A systematic review assessing literature on the link between exposure to community violence and physical health outcomes found the strongest evidence for positive associations with cardiovascular (blood pressure) and sleep outcomes (Wright et al., 2016). The potential mechanisms underlying the association between gun violence exposure and physiological outcomes include dysregulation of the hypothalamic-pituitary-adrenocortical axis induced by psychosocial distress (Rosas-Salazar et al., 2016). Furthermore, threat appraisal (how youth evaluate what is “at stake” in a situation) has been proposed as an important mediating, and in some cases moderating, process determining the impact of gun violence exposure on physiological outcomes (Wright et al., 2016).

It is hypothesized that youth who become desensitized to community violence over time are, in turn, more likely to experience externalizing problems (Kennedy & Ceballo, 2014). According to *pathological adaptation theory*, youth who are chronically exposed to community violence develop coping mechanisms that minimize psychological distress but increase propensity for aggressive behavior (Ng-Mak et al., 2004). Violence victimization is strongly linked to violence perpetration among adolescents (Guerra et al., 2003). Qualitative studies elucidate the mental models that youth develop as a result of chronic exposure to community violence. This environment often cultivates a sense of helplessness and even fatalism in adolescents, which, when paired with poor executive functioning, can lead to greater risk-taking and create added vulnerabilities for marginalized youth, including anger, dissociation, posttraumatic stress symptoms, and aggression (Quimby et al., 2018). Despite this pattern of desensitization and ensuing externalizing behavior, adolescents may still experience internalizing symptoms following exposure. Among a national sample of adolescents who witnessed community violence, the prevalence of PTSD and major depressive episodes was estimated at 7% and 11%, respectively (Zinzow et al., 2009).

Vulnerable Populations and Cycles of Violence

A public health approach demands not only the mitigation of the direct impacts of community gun violence on youth but also strategic efforts toward addressing its root causes. This requires looking beyond victims of gun violence to perpetrators. In fact, the distinction between perpetrator and victim is not as relevant to gun violence when viewed from a public health lens. Gun violence perpetrators are frequently also victims of gun violence, both comprising overlapping at-risk subpopulations (Abt, 2019; Hsu et al., 2020). Among seriously delinquent youth, incidents of exposure to community violence are often indistinguishable from violence involvement and deviant peer affiliation. However, adolescent

behavior is not considered a risk factor for exposure. Rather, family and neighborhood context determine adolescents' violence involvement, both as perpetrators and victims (Halliday-Boykins & Graham, 2001). Youth often carry guns as a response to prior exposure to violence and a subsequently low sense of safety in their community (McGee et al., 2017; Schaechter & Alvarez, 2016). Gun violence perpetration is, however, considered a risk factor for psychosocial sequelae (Hsu et al., 2020; Schaechter & Alvarez, 2016).

Exposure to gun violence is inextricably linked to structural inequality, with low-income communities of color being disproportionately affected. Moreover, the distress resulting from exposure to community violence is compounded by intergenerational and daily racial discrimination, historical trauma, and mass incarceration. The presence of gun violence in low-income, largely Black communities is a reflection of a long legacy of systemic racism that continues to be perpetuated by current policies (Papachristos & Wildeman, 2014; Quimby et al., 2018). Although it is beyond the scope of this paper, Black Americans often experience racial profiling and brutality at the hands of law enforcement, fostering a climate of fear and distress, and making them vulnerable to adverse mental health outcomes in addition to those resulting from cumulative exposures to community violence (Smith et al., 2020). More recent research has attempted to integrate neighborhood disadvantage into conceptualizations of exposure to violence. According to the Stress Process Model, stressors are interconnected, accumulating over the life course. For example, exposure to community violence is often concurrent with exposure to domestic violence. Despite experiencing chronic neighborhood violence, many communities display collective resilience, a widely recognized protective factor for youth (Foster & Brooks-Gunn, 2009).

Discussion

Exposure to community gun violence is a serious, yet underappreciated threat to youth development and wellbeing. Its impacts on youth are far-reaching, yet the full scope of exposure is difficult to measure for many reasons. There is a wide variation in how researchers define and categorize exposure to gun violence, ranging from solely considering direct victimization to accounting for exposure to gun violence through media or news outlets. The mere awareness of gun violence in one's neighborhood is credibly harmful in itself as youth are forced to constantly cope with its looming threat. While there is a plethora of evidence on the effects of community violence on children and adolescents, only a small portion of the literature focuses exclusively on the impacts of indirect exposure to violence involving a firearm. The limited evidence available suggests that gun violence hampers healthy brain development among children in ways distinct from other forms of violence, resulting in both short- and long-term psychological and physiological effects. Lastly, there is a need to integrate models of poly-victimization and acknowledge that exposure to community gun violence is often one of many stressors impacting the well-being of low-income youth of color (Gorman-Smith & Tolan, 1998).

Improving the detection and assessment of exposure to community gun violence is a critical first step in addressing its effects (Voisin, 2007). Recent work has been done to develop comprehensive gun violence risk tools. For example, preliminary results from a prospective cohort study demonstrate that the SaFETy (Serious fighting, Friend weapon carrying, community Environment, and firearm Threats) screening tool is a feasible and valid method of identifying youth at high risk of future firearm violence (victimization, perpetration, firearm injury, or firearm death) (Goldstick et al., 2017). The questionnaire includes items assessing interpersonal violence, community violence exposure, mental health, substance use, and peer influence. Of note, frequency and severity of exposures and behaviors are integrated into many items and weighed into the composite risk score calculation, capturing meaningful dimensions of gun violence exposure. This questionnaire is not gender or age-adjusted, and was tested among a sample of high-risk substance-using 14-24-year-old youth in an emergency department, limiting its generalizability to non-clinical community settings, younger children, and lower risk populations. A related methodological challenge in collecting this data is parents' demonstrated propensity toward underestimating children's exposure to violence (Zimmerman & Pogarsky, 2011). Researchers attribute this to trivialization of child-reported events, inadequate supervision, child desensitization to violence, and poor parent-child communication due to mistrust or fear of parental restrictions of autonomy. Further research should aim to develop gun violence risk tools that capture a range of gun violence exposures from knowing a friend who carries a gun to being directly threatened or injured, along with the relevant dimensions of exposure. Risk stratification would allow for a more targeted and efficient allocation of resources toward those youth most at risk of gun violence exposure, victimization, and perpetration. Moreover, documenting the various dimensions of community gun violence may offer insight into the spaces where youth are at highest risk of exposure and interventions may be most effective.

The nation's current reckoning with systemic racism highlights the importance of positioning community gun violence within a context of structural inequity. Geospatial analyses have shed light on the intersecting social determinants of community gun violence. For example, an analysis of neighborhood trauma in Syracuse, New York revealed a syndemic of lead exposure, community violence, and poor academic outcomes (Lane et al., 2017). Public health researchers and practitioners are called to identify the ways in which community violence is rooted in systemic oppression, and anti-Black policies such as segregation, police brutality, and income inequality (Quimby et al., 2018; Roundtable on Population Health Improvement et al., 2017). Neighborhood crime is often used as a justification for continued neglect and disinvestment in low-income communities of color, contrasting with the massive mobilization of recent years to prevent gun violence impacting more affluent, white children. Community gun violence feeds into cycles of violence by demoralizing youth, inducing gun carrying, and fostering community disorder. The body of evidence to date proposes that depersonalized exposure is more likely

to increase aggression and lead to future gun violence perpetration than more direct forms of gun violence victimization.

Protective factors and patterns of resilience that buffer the negative impacts of exposure to chronic community violence among youth are equally important to consider (Kennedy & Ceballo, 2014). Identified domains of resilience include personal resources (e.g., temperament, social skills, and social engagement), family support, and community buffers (e.g., teachers, neighbors, institutional structures) (Copeland-Linder et al., 2010; Howard, 1996). Interventions that bolster resilience across ecologies, including parental monitoring, community cohesion, school safety, youth empowerment, and access to mental health services, have the potential to reduce distress associated with exposure to community gun violence (Luthar & Goldstein, 2004). Given the interconnectedness of gun violence with other issues such as poverty and domestic violence, wrap-around services within schools can be particularly effective in supporting exposed youth (Copeland-Linder et al., 2010). Family-based counseling that aims to strengthen emotional cohesion and enhance monitoring is a promising intervention to reduce the psychological trauma resulting from exposure to community gun violence (Luthar & Goldstein, 2004). School-based screening and group therapy – most often Cognitive Behavioral Therapy – is the most common intervention employed to reduce internalizing symptoms among youth after exposure to community gun violence (Ali-Saleh Darawshy et al., 2020; Saltzman et al., 2001; Stein, Jaycox, Kataoka, Wong, et al., 2003). Youth living in neighborhoods with high rates of gun violence should be routinely screened for exposure in schools and health care facilities and referred to social and psychological services accordingly. This is particularly important to identify students who may be exhibiting externalizing behaviors such as aggression and mislabeled as “problematic” rather than being referred to resources (Voisin & Berringer, 2015). While there are many interventions to mitigate the psychological sequelae resulting from exposure to community gun violence, very few aim to reduce exposure by preventing community violence (Ali-Saleh Darawshy et al., 2020). Notably, a classroom-based intervention implemented in two Colombian cities with high rates of community violence was effective in curbing aggression among elementary school students through social-emotional learning, parent workshops, home visits, and extracurricular peer groups (Chaux et al., 2017). Violence prevention curricula and community-based deterrence programs in addition to systemic reforms (e.g., criminal justice, gun accessibility, poverty alleviation) have the potential to reduce exposure and interrupt cycles of violence among youth although more rigorous research is needed to establish these relationships (Ali-Saleh Darawshy et al., 2020).

Limitations

This review has many limitations that warrant consideration. While selection criteria were limited to urban youth, rural youth are also exposed to gun violence, perhaps through different modalities. This

review excluded many forms of gun violence, including suicide, accidental shootings, and police violence, all of which have distinct, yet significant, impacts on exposed youth. This review was limited to studies of populations in the U.S., which has a unique gun violence landscape due to the second amendment, lobbying by interest groups, the proliferation and cultural symbolism of firearms, and its hyper-politicization at the federal level. Studies that explored exposure to community violence and may have touched on gun violence as one of many exposures were excluded from the formal review, but drawn upon to complement the major findings. Finally, this review did not include studies predating 1995 and thus, could have missed important data collected prior.

Conclusion

For every individual that is shot, many children may be exposed and traumatized as a result. Gun violence is far-reaching and secondhand exposure among youth widespread, with its impact rippling out into the surrounding community during the incident and afterward. While the field of research on gun violence has benefited from increased funding and public attention in the last decades, the public health implications of youth exposure to community gun violence remain poorly understood. A theoretical shift within the community gun violence literature is warranted, from broad definitions of exposure to a more nuanced, multi-dimensional conceptualization which accounts for type, severity, physical proximity, relational proximity, and chronicity. In order to build a comprehensive understanding of the scope, risk factors and consequences of community gun violence, each of its relevant constructs must be systematically defined and potential moderating characteristics accounted for. Intrapersonal and contextual factors that merit further investigation include childhood traumas, ongoing stressors, and coping resources. Types of exposures should be differentiated between in the literature and dimensions of exposure incorporated, to the extent possible, into analyses. Future studies should integrate a more exhaustive examination of the contextual factors surrounding gun violence and consider their implications for primary prevention strategies.

References

- Abt, T. (2019). *Bleeding out: The devastating consequences of urban violence-- and a bold new plan for peace in the streets* (First edition). Basic Books.
- Ali-Saleh Darawshy, N., Gewirtz, A., & Marsalis, S. (2020). Psychological Intervention and Prevention Programs for Child and Adolescent Exposure to Community Violence: A Systematic Review. *Clinical Child and Family Psychology Review*, 23(3), 365–378. <https://doi.org/10.1007/s10567-020-00315-3>

- Al'Uqdah, S. N., Grant, S., Malone, C. M., McGee, T., & Toldson, I. A. (2015). Impact of Community Violence on Parenting Behaviors and Children's Outcomes. *The Journal of Negro Education*, 84(3), 428. <https://doi.org/10.7709/jnegroeducation.84.3.0428>
- Bailey, B. N., Delaney-Black, V., Hannigan, J. H., Ager, J., Sokol, R. J., & Covington, C. Y. (2005). Somatic Complaints in Children and Community Violence Exposure: *Journal of Developmental & Behavioral Pediatrics*, 26(5), 341–348. <https://doi.org/10.1097/00004703-200510000-00001>
- Beardslee, J., Mulvey, E., Schubert, C., Allison, P., Infante, A., & Pardini, D. (2018). Gun- and Non-Gun-Related Violence Exposure and Risk for Subsequent Gun Carrying Among Male Juvenile Offenders. *Journal of the American Academy of Child & Adolescent Psychiatry*, 57(4), 274–279. <https://doi.org/10.1016/j.jaac.2018.01.012>
- Bell, C. C., & Jenkins, E. J. (1993). Community Violence and Children on Chicago's Southside. *Psychiatry*, 56(1), 46–54. <https://doi.org/10.1080/00332747.1993.11024620>
- Berkowitz, S. J. (2003). Children Exposed to Community Violence: The Rationale for Early Intervention. *Clinical Child and Family Psychology Review*, 6(4), 293–302. <https://doi.org/10.1023/B:CCFP.0000006295.54479.3d>
- Bingenheimer, J. B. (2005). Firearm Violence Exposure and Serious Violent Behavior. *Science*, 308(5726), 1323–1326. <https://doi.org/10.1126/science.1110096>
- Braga, A. A., Papachristos, A. V., & Hureau, D. M. (2010). The Concentration and Stability of Gun Violence at Micro Places in Boston, 1980–2008. *Journal of Quantitative Criminology*, 26(1), 33–53. <https://doi.org/10.1007/s10940-009-9082-x>
- Braga, A. A., & Weisburd, D. L. (2015). Focused Deterrence and the Prevention of Violent Gun Injuries: Practice, Theoretical Principles, and Scientific Evidence. *Annual Review of Public Health*, 36(1), 55–68. <https://doi.org/10.1146/annurev-publhealth-031914-122444>
- Branas, C. C., South, E., Kondo, M. C., Hohl, B. C., Bourgois, P., Wiebe, D. J., & MacDonald, J. M. (2018). Citywide cluster randomized trial to restore blighted vacant land and its effects on

- violence, crime, and fear. *Proceedings of the National Academy of Sciences*, 115(12), 2946–2951.
<https://doi.org/10.1073/pnas.1718503115>
- Campbell, C., & Schwarz, D. F. (1996). Prevalence and impact of exposure to interpersonal violence among suburban and urban middle school students. *Pediatrics*, 98(3 Pt 1), 396–402.
- Centers for Disease Control and Prevention. (2018). *Fatal and Nonfatal Injury Reports* [Web-based Injury Statistics Query and Reporting System (WISQARS)]. <https://www.cdc.gov/injury/wisqars>.
- Chaux, E., Barrera, M., Molano, A., Velásquez, A. M., Castellanos, M., Chaparro, M. P., & Bustamante, A. (2017). Classrooms in Peace Within Violent Contexts: Field Evaluation of Aulas en Paz in Colombia. *Prevention Science*, 18(7), 828–838. <https://doi.org/10.1007/s11121-017-0754-8>
- Chien, L.-C., Gakh, M., Coughenour, C., & Lin, R.-T. (2020). Temporal trend of research related to gun violence from 1981 to 2018 in the United States: A bibliometric analysis. *Injury Epidemiology*, 7(1), 9. <https://doi.org/10.1186/s40621-020-0235-6>
- Cooley-Quille, M., Boyd, R. C., Frantz, E., & Walsh, J. (2001). Emotional and Behavioral Impact of Exposure to Community Violence in Inner-City Adolescents. *Journal of Clinical Child & Adolescent Psychology*, 30(2), 199–206. https://doi.org/10.1207/S15374424JCCP3002_7
- Cooley-Strickland, M., Quille, T. J., Griffin, R. S., Stuart, E. A., Bradshaw, C. P., & Furr-Holden, D. (2009). Community Violence and Youth: Affect, Behavior, Substance Use, and Academics. *Clinical Child and Family Psychology Review*, 12(2), 127–156. <https://doi.org/10.1007/s10567-009-0051-6>
- Copeland-Linder, N., Lambert, S. F., & Ialongo, N. S. (2010). Community Violence, Protective Factors, and Adolescent Mental Health: A Profile Analysis. *Journal of Clinical Child & Adolescent Psychology*, 39(2), 176–186. <https://doi.org/10.1080/15374410903532601>
- Crebs, J. L., Sauaia, A., & Moore, E. E. (2016). Gun violence in the United States: A call to action. *Journal of Trauma and Acute Care Surgery*, 80(6), 847–848.
<https://doi.org/10.1097/TA.0000000000001054>

- Felitti, V. J., Anda, R. F., Nordenberg, D., Williamson, D. F., Spitz, A. M., Edwards, V., Koss, M. P., & Marks, J. S. (1998). Relationship of Childhood Abuse and Household Dysfunction to Many of the Leading Causes of Death in Adults. *American Journal of Preventive Medicine*, *14*(4), 245–258.
[https://doi.org/10.1016/S0749-3797\(98\)00017-8](https://doi.org/10.1016/S0749-3797(98)00017-8)
- Finkelhor, D. (2018). Screening for adverse childhood experiences (ACEs): Cautions and suggestions. *Child Abuse & Neglect*, *85*, 174–179. <https://doi.org/10.1016/j.chiabu.2017.07.016>
- Finkelhor, D., Turner, H. A., Shattuck, A., Hamby, S., & Kracke, K. (2015). *Children's exposure to violence, crime, and abuse: An update*. US Department of Justice, Office of Justice Programs, Office of Juvenile Justice and Delinquency Prevention.
- Ford, J. L., & Browning, C. R. (2014). Effects of exposure to violence with a weapon during adolescence on adult hypertension. *Annals of Epidemiology*, *24*(3), 193–198.
<https://doi.org/10.1016/j.annepidem.2013.12.004>
- Foster, H., & Brooks-Gunn, J. (2009). Toward a Stress Process Model of Children's Exposure to Physical Family and Community Violence. *Clinical Child and Family Psychology Review*, *12*(2), 71–94.
<https://doi.org/10.1007/s10567-009-0049-0>
- Furman, L. (2018). Firearm Violence: Silent Victims. *Pediatrics*, *142*(4), e20182060.
<https://doi.org/10.1542/peds.2018-2060>
- Garbarino, J., Bradshaw, C. P., & Vorrasi, J. A. (2002). Mitigating the Effects of Gun Violence on Children and Youth. *The Future of Children*, *12*(2), 72. <https://doi.org/10.2307/1602739>
- Goldstick, J. E., Carter, P. M., Walton, M. A., Dahlberg, L. L., Sumner, S. A., Zimmerman, M. A., & Cunningham, R. M. (2017). Development of the SaFETy Score: A Clinical Screening Tool for Predicting Future Firearm Violence Risk. *Annals of Internal Medicine*, *166*(10), 707.
<https://doi.org/10.7326/M16-1927>
- Gorman-Smith, D., & Tolan, P. (1998). The role of exposure to community violence and developmental problems among inner-city youth. *Development and Psychopathology*, *10*(1), 101–116.
<https://doi.org/10.1017/S0954579498001539>

- Goss, K. A. (2006). Disarmed: The missing movement for gun control in America. In *Disarmed: The missing movement for gun control in America* (p. 87). Princeton University Press.
- Green, B., Horel, T., & Papachristos, A. V. (2017). Modeling Contagion Through Social Networks to Explain and Predict Gunshot Violence in Chicago, 2006 to 2014. *JAMA Internal Medicine*, *177*(3), 326. <https://doi.org/10.1001/jamainternmed.2016.8245>
- Grinshteyn, E., & Hemenway, D. (2016). Violent Death Rates: The US Compared with Other High-income OECD Countries, 2010. *The American Journal of Medicine*, *129*(3), 266–273. <https://doi.org/10.1016/j.amjmed.2015.10.025>
- Guerra, N. G., Rowell Huesmann, L., & Spindler, A. (2003). Community Violence Exposure, Social Cognition, and Aggression Among Urban Elementary School Children. *Child Development*, *74*(5), 1561–1576. <https://doi.org/10.1111/1467-8624.00623>
- Halliday-Boykins, C. A., & Graham, S. (2001). At Both Ends of the Gun: Testing the Relationship Between Community Violence Exposure and Youth Violent Behavior. *Journal of Abnormal Child Psychology*, *29*(5), 383–402. <https://doi.org/10.1023/A:1010443302344>
- Hardy, M. S., Armstrong, F. D., Martin, B. L., & Strawn, K. N. (1996). A firearm safety program for children: They just can't say no. *Journal of Developmental and Behavioral Pediatrics: JDBP*, *17*(4), 216–221.
- Howard, D. E. (1996). Searching for resilience among African-American youth exposed to community violence: Theoretical issues. *Journal of Adolescent Health*, *18*(4), 254–262. [https://doi.org/10.1016/1054-139X\(95\)00230-P](https://doi.org/10.1016/1054-139X(95)00230-P)
- Hsu, H.-T., Fulginiti, A., Petering, R., Barman-Adhikari, A., Maria, D. S., Shelton, J., Bender, K., Narendorf, S., & Ferguson, K. (2020). Firearm Violence Exposure and Suicidal Ideation Among Young Adults Experiencing Homelessness. *Journal of Adolescent Health*, *67*(2), 286–289. <https://doi.org/10.1016/j.jadohealth.2020.02.018>
- Kagawa, R. M. C., Pear, V. A., Rudolph, K. E., Keyes, K. M., Cerdá, M., & Wintemute, G. J. (2020). Distress level and daily functioning problems attributed to firearm victimization:

- Sociodemographic-specific responses. *Annals of Epidemiology*, 41, 35-42.e3.
<https://doi.org/10.1016/j.annepidem.2019.12.002>
- Kalesan, B., Mobily, M. E., Keiser, O., Fagan, J. A., & Galea, S. (2016). Firearm legislation and firearm mortality in the USA: A cross-sectional, state-level study. *The Lancet*, 387(10030), 1847–1855.
[https://doi.org/10.1016/S0140-6736\(15\)01026-0](https://doi.org/10.1016/S0140-6736(15)01026-0)
- Kaufman, E. J., & Richmond, T. S. (2020). Beyond Band-Aids for Bullet Holes: Firearm Violence As a Public Health Priority. *Critical Care Medicine*, 48(3), 391–397.
<https://doi.org/10.1097/CCM.00000000000004147>
- Kellermann, A. L., Rivara, F. P., Rushforth, N. B., Banton, J. G., Reay, D. T., Francisco, J. T., Locci, A. B., Prodzinski, J., Hackman, B. B., & Somes, G. (1993). Gun Ownership as a Risk Factor for Homicide in the Home. *New England Journal of Medicine*, 329(15), 1084–1091.
<https://doi.org/10.1056/NEJM199310073291506>
- Kennedy, T. M., & Ceballo, R. (2014). Who, What, When, and Where? Toward a Dimensional Conceptualization of Community Violence Exposure. *Review of General Psychology*, 18(2), 69–81. <https://doi.org/10.1037/gpr0000005>
- Kim, D. (2019). Social determinants of health in relation to firearm-related homicides in the United States: A nationwide multilevel cross-sectional study. *PLOS Medicine*, 16(12), e1002978.
<https://doi.org/10.1371/journal.pmed.1002978>
- Klinesmith, J., Kasser, T., & McAndrew, F. T. (2006). Guns, Testosterone, and Aggression: An Experimental Test of a Mediational Hypothesis. *Psychological Science*, 17(7), 568–571.
<https://doi.org/10.1111/j.1467-9280.2006.01745.x>
- Krupnick, J. L., Green, B. L., Stockton, P., Goodman, L., Corcoran, C., & Petty, R. (2004). Mental Health Effects of Adolescent Trauma Exposure in a Female College Sample: Exploring Differential Outcomes Based on Experiences of Unique Trauma Types and Dimensions. *Psychiatry: Interpersonal and Biological Processes*, 67(3), 264–279.
<https://doi.org/10.1521/psyc.67.3.264.48986>

- Lane, S. D., Rubinstein, R. A., Bergen-Cico, D., Jennings-Bey, T., Fish, L. S., Larsen, D. A., Fullilove, M. T., Schimpff, T. R., Ducre, K. A., & Robinson, J. A. (2017). Neighborhood Trauma Due to Violence: A Multilevel Analysis. *Journal of Health Care for the Poor and Underserved, 28*(1), 446–462. <https://doi.org/10.1353/hpu.2017.0033>
- Lee, D. B., Hsieh, H.-F., Stoddard, S. A., Heinze, J. E., Carter, P. M., Goldstick, J. E., Cunningham, M. C., Cunningham, R. M., & Zimmerman, M. A. (2020). Longitudinal pathway from violence exposure to firearm carriage among adolescents: The role of future expectation. *Journal of Adolescence, 81*, 101–113. <https://doi.org/10.1016/j.adolescence.2020.03.009>
- Leibbrand, C., Hill, H., Rowhani-Rahbar, A., & Rivara, F. (2020). Invisible wounds: Community exposure to gun homicides and adolescents' mental health and behavioral outcomes. *SSM - Population Health, 12*, 100689. <https://doi.org/10.1016/j.ssmph.2020.100689>
- Linares, L. O., Heeren, T., Bronfman, E., Zuckerman, B., Augustyn, M., & Tronick, E. (2001). A Mediation Model for the Impact of Exposure to Community Violence on Early Child Behavior Problems. *Child Development, 72*(2), 639–652. <https://doi.org/10.1111/1467-8624.00302>
- Lorion, R. P., & Saltzman, W. (1993). Children's Exposure to Community Violence: Following a Path from Concern to Research to Action. *Psychiatry, 56*(1), 55–65. <https://doi.org/10.1080/00332747.1993.11024621>
- Luthar, S. S., & Goldstein, A. (2004). Children's Exposure to Community Violence: Implications for Understanding Risk and Resilience. *Journal of Clinical Child & Adolescent Psychology, 33*(3), 499–505. https://doi.org/10.1207/s15374424jccp3303_7
- McEwen, B. S. (1998). Stress, Adaptation, and Disease: Allostasis and Allostatic Load. *Annals of the New York Academy of Sciences, 840*(1), 33–44. <https://doi.org/10.1111/j.1749-6632.1998.tb09546.x>
- McGee, Z. T., Logan, K., Samuel, J., Nunn, T., & Halsall, J. (2017). A multivariate analysis of gun violence among urban youth: The impact of direct victimization, indirect victimization, and

- victimization among peers. *Cogent Social Sciences*, 3(1), 1328772.
<https://doi.org/10.1080/23311886.2017.1328772>
- McLaughlin, K. A., & Lambert, H. K. (2017). Child trauma exposure and psychopathology: Mechanisms of risk and resilience. *Current Opinion in Psychology*, 14, 29–34.
<https://doi.org/10.1016/j.copsyc.2016.10.004>
- McLaughlin, K. A., & Sheridan, M. A. (2016). Beyond Cumulative Risk: A Dimensional Approach to Childhood Adversity. *Current Directions in Psychological Science*, 25(4), 239–245.
<https://doi.org/10.1177/0963721416655883>
- Mitchell, K. J., Hamby, S. L., Turner, H. A., Shattuck, A., & Jones, L. M. (2015). Weapon Involvement in the Victimization of Children. *Pediatrics*. 2015;136(1):10-17. *PEDIATRICS*, 136(3), 584–585.
<https://doi.org/10.1542/peds.2015-2235>
- Mitchell, K. J., Jones, L. M., Turner, H. A., Beseler, C. L., Hamby, S., & Wade, R. (2019). Understanding the Impact of Seeing Gun Violence and Hearing Gunshots in Public Places: Findings From the Youth Firearm Risk and Safety Study. *Journal of Interpersonal Violence*, 088626051985339.
<https://doi.org/10.1177/0886260519853393>
- Ng-Mak, D. S., Salzinger, S., Feldman, R. S., & Stueve, C. A. (2004). Pathologic Adaptation to Community Violence Among Inner-City Youth. *American Journal of Orthopsychiatry*, 74(2), 196–208. <https://doi.org/10.1037/0002-9432.74.2.196>
- Omnibus Consolidated Appropriations Act, no. Public Law 104Y208., pg. 245 (1997).
- Overstreet, S. (2000). Exposure to Community Violence: Defining the Problem and Understanding the Consequences. *Journal of Child and Family Studies*, 9(1), 7–25.
<https://doi.org/10.1023/A:1009403530517>
- Overstreet, S., & Mazza, J. (2003). An ecological-transactional understanding of community violence: Theoretical perspectives. *School Psychology Quarterly*, 18(1), 66–87.
<https://doi.org/10.1521/scpq.18.1.66.20874>

- Papachristos, A. V., Braga, A. A., & Hureau, D. M. (2012). Social Networks and the Risk of Gunshot Injury. *Journal of Urban Health, 89*(6), 992–1003. <https://doi.org/10.1007/s11524-012-9703-9>
- Papachristos, A. V., & Wildeman, C. (2014). Network Exposure and Homicide Victimization in an African American Community. *American Journal of Public Health, 104*(1), 143–150. <https://doi.org/10.2105/AJPH.2013.301441>
- Petruccelli, K., Davis, J., & Berman, T. (2019). Adverse childhood experiences and associated health outcomes: A systematic review and meta-analysis. *Child Abuse & Neglect, 97*, 104127. <https://doi.org/10.1016/j.chiabu.2019.104127>
- Pollard, E. L., & Lee, P. D. (2003). Child Well-being: A Systematic Review of the Literature. *Social Indicators Research, 61*(1), 59–78. <https://doi.org/10.1023/A:1021284215801>
- Pynoos, R. S. (1987). Life Threat and Posttraumatic Stress in School-age Children. *Archives of General Psychiatry, 44*(12), 1057. <https://doi.org/10.1001/archpsyc.1987.01800240031005>
- Quimby, D., Dusing, C. R., Deane, K., DiClemente, C. M., Morency, M. M., Miller, K. M., Thomas, A., & Richards, M. (2018). Gun Exposure Among Black American Youth Residing in Low-Income Urban Environments. *Journal of Black Psychology, 44*(4), 322–346. <https://doi.org/10.1177/0095798418773188>
- Rajan, S., Branas, C. C., Myers, D., & Agrawal, N. (2019). Youth exposure to violence involving a gun: Evidence for adverse childhood experience classification. *Journal of Behavioral Medicine, 42*(4), 646–657. <https://doi.org/10.1007/s10865-019-00053-0>
- Ramratnam, S. K., Han, Y.-Y., Rosas-Salazar, C., Forno, E., Brehm, J. M., Rosser, F., Marsland, A. L., Colón-Semidey, A., Alvarez, M., Miller, G. E., Acosta-Pérez, E., Canino, G., & Celedón, J. C. (2015). Exposure to gun violence and asthma among children in Puerto Rico. *Respiratory Medicine, 109*(8), 975–981. <https://doi.org/10.1016/j.rmed.2015.05.011>
- Reich, K., Culross, P. L., & Behrman, R. E. (2002). Children, Youth, and Gun Violence: Analysis and Recommendations. *The Future of Children, 12*(2), 4. <https://doi.org/10.2307/1602735>

- Rosas-Salazar, C., Han, Y.-Y., Brehm, J. M., Forno, E., Acosta-Pérez, E., Cloutier, M. M., Alvarez, M., Colón-Semidey, A., Canino, G., & Celedón, J. C. (2016). Gun Violence, African Ancestry, and Asthma. *Chest*, *149*(6), 1436–1444. <https://doi.org/10.1016/j.chest.2016.02.639>
- Rosenberg, S. L., Miller, G. E., Brehm, J. M., & Celedón, J. C. (2014). Stress and asthma: Novel insights on genetic, epigenetic, and immunologic mechanisms. *Journal of Allergy and Clinical Immunology*, *134*(5), 1009–1015. <https://doi.org/10.1016/j.jaci.2014.07.005>
- Rostron, A. (2018). The Dickey Amendment on Federal Funding for Research on Gun Violence: A Legal Dissection. *American Journal of Public Health*, *108*(7), 865–867. <https://doi.org/10.2105/AJPH.2018.304450>
- Roundtable on Population Health Improvement, Board on Population Health and Public Health Practice, Health and Medicine Division, & National Academies of Sciences, Engineering, and Medicine. (2017). *Community Violence as a Population Health Issue: Proceedings of a Workshop* (J. Alper & D. Thompson, Eds.; p. 23661). National Academies Press. <https://doi.org/10.17226/23661>
- Saltzman, W. R., Pynoos, R. S., Layne, C. M., Steinberg, A. M., & Aisenberg, E. (2001). Trauma- and grief-focused intervention for adolescents exposed to community violence: Results of a school-based screening and group treatment protocol. *Group Dynamics: Theory, Research, and Practice*, *5*(4), 291–303. <https://doi.org/10.1037/1089-2699.5.4.291>
- Schachter, J., & Alvarez, P. G. (2016). Growing up – or not – with Gun Violence. *Pediatric Clinics of North America*, *63*(5), 813–826. <https://doi.org/10.1016/j.pcl.2016.06.004>
- Schwartz, D., & Proctor, L. J. (2000). Community violence exposure and children’s social adjustment in the school peer group: The mediating roles of emotion regulation and social cognition. *Journal of Consulting and Clinical Psychology*, *68*(4), 670–683. <https://doi.org/10.1037/0022-006X.68.4.670>
- Scott, B. T. (1999). Chronic Community Violence and the Children Who Are Exposed to It. *Journal of Emotional Abuse*, *1*(3), 23–37. https://doi.org/10.1300/J135v01n03_02

- Shakoor, B. H., & Chalmers, D. (1991). Co-victimization of African-American children who witness violence: Effects on cognitive, emotional, and behavioral development. *Journal of the National Medical Association, 83*(3), 233–238.
- Sharkey, P. T., Tirado-Strayer, N., Papachristos, A. V., & Raver, C. C. (2012). The Effect of Local Violence on Children’s Attention and Impulse Control. *American Journal of Public Health, 102*(12), 2287–2293. <https://doi.org/10.2105/AJPH.2012.300789>
- Slovak, K. (2002). Gun Violence and Children: Factors Related to Exposure and Trauma. *Health & Social Work, 27*(2), 104–112. <https://doi.org/10.1093/hsw/27.2.104>
- Smith, M. E., Sharpe, T. L., Richardson, J., Pahwa, R., Smith, D., & DeVylder, J. (2020). The impact of exposure to gun violence fatality on mental health outcomes in four urban U.S. settings. *Social Science & Medicine, 246*, 112587. <https://doi.org/10.1016/j.socscimed.2019.112587>
- Stein, B. D., Jaycox, L. H., Kataoka, S. H., Wong, M., Tu, W., Elliott, M. N., & Fink, A. (2003). A Mental Health Intervention for Schoolchildren Exposed to Violence: A Randomized Controlled Trial. *JAMA, 290*(5), 603. <https://doi.org/10.1001/jama.290.5.603>
- Stein, B. D., Jaycox, L. H., Kataoka, S., Rhodes, H. J., & Vestal, K. D. (2003). Prevalence of Child and Adolescent Exposure to Community Violence. *Clinical Child and Family Psychology Review, 6*(4), 247–264. <https://doi.org/10.1023/B:CCFP.0000006292.61072.d2>
- Stein, B. D., Zima, B. T., Elliott, M. N., Burnam, M. A., Shahinfar, A., Fox, N. A., & Leavitt, L. A. (2001). Violence Exposure Among School-Age Children in Foster Care: Relationship to Distress Symptoms. *Journal of the American Academy of Child & Adolescent Psychiatry, 40*(5), 588–594. <https://doi.org/10.1097/00004583-200105000-00019>
- The Health Consequences of Involuntary Smoking.* (1986). U.S. Dept. of Health and Human Services, Public Health Service, Office of the Surgeon General.
- Turner, H. A., Finkelhor, D., & Henly, M. (2018). Exposure to Family and Friend Homicide in a Nationally Representative Sample of Youth. *Journal of Interpersonal Violence, 0886260518787200*. <https://doi.org/10.1177/0886260518787200>

- Turner, H. A., Mitchell, K. J., Jones, L. M., Hamby, S., Wade, R., & Beseler, C. L. (2019). Gun Violence Exposure and Posttraumatic Symptoms Among Children and Youth. *Journal of Traumatic Stress*, 32(6), 881–889. <https://doi.org/10.1002/jts.22466>
- van der Kolk, B. A. (2005). Developmental Trauma Disorder: Toward a rational diagnosis for children with complex trauma histories. *Psychiatric Annals*, 35(5), 401–408. <https://doi.org/10.3928/00485713-20050501-06>
- Voisin, D. R. (2007). THE EFFECTS OF FAMILY AND COMMUNITY VIOLENCE EXPOSURE AMONG YOUTH: RECOMMENDATIONS FOR PRACTICE AND POLICY. *Journal of Social Work Education*, 43(1), 51–66. <https://doi.org/10.5175/JSWE.2007.200400473>
- Voisin, D. R., & Berringer, K. R. (2015). Interventions Targeting Exposure to Community Violence Sequelae Among Youth: A Commentary. *Clinical Social Work Journal*, 43(1), 98–108. <https://doi.org/10.1007/s10615-014-0506-1>
- Wamser-Nanney, R., Nanney, J. T., Conrad, E., & Constans, J. I. (2019). Childhood trauma exposure and gun violence risk factors among victims of gun violence. *Psychological Trauma: Theory, Research, Practice, and Policy*, 11(1), 99–106. <https://doi.org/10.1037/tra0000410>
- Weisburd, D., Groff, E. R., & Yang, S.-M. (2014). Understanding and Controlling Hot Spots of Crime: The Importance of Formal and Informal Social Controls. *Prevention Science*, 15(1), 31–43. <https://doi.org/10.1007/s11121-012-0351-9>
- Wintemute, G. J. (2015). The Epidemiology of Firearm Violence in the Twenty-First Century United States. *Annual Review of Public Health*, 36(1), 5–19. <https://doi.org/10.1146/annurev-publhealth-031914-122535>
- Wright, A. W., Austin, M., Booth, C., & Klierer, W. (2016). Exposure to Community Violence and Physical Health Outcomes in Youth: A Systematic Review. *Journal of Pediatric Psychology*, jsw088. <https://doi.org/10.1093/jpepsy/jsw088>

Yonas, M. A., Lange, N. E., & Celedón, J. C. (2012). Psychosocial stress and asthma morbidity. *Current Opinion in Allergy & Clinical Immunology*, 12(2), 202–210.

<https://doi.org/10.1097/ACI.0b013e32835090c9>

Zimmerman, G. M., & Pogarsky, G. (2011). The Consequences of Parental Underestimation and Overestimation of Youth Exposure to Violence. *Journal of Marriage and Family*, 73(1), 194–208. <https://doi.org/10.1111/j.1741-3737.2010.00798.x>

Zinzow, H. M., Ruggiero, K. J., Resnick, H., Hanson, R., Smith, D., Saunders, B., & Kilpatrick, D. (2009). Prevalence and mental health correlates of witnessed parental and community violence in a national sample of adolescents. *Journal of Child Psychology and Psychiatry*, 50(4), 441–450.

<https://doi.org/10.1111/j.1469-7610.2008.02004.x>