

# Preparing for Disaster: a Cross-Sectional Study of Social Connection and Gun Violence

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**Abstract** Living in communities with persistent gun violence is associated with negative social, behavioral, and health outcomes, analogous to those of a natural disaster. Taking a disaster-preparedness approach may identify targets for community-based action to respond to on-going gun violence. We assessed the relevance of adapting a disaster-preparedness approach to gun violence and, specifically, the relationship between perceived collective efficacy, its subscales of social cohesion and informal social control, and exposure to gun

violence. In 2014, we conducted a cross-sectional study using a community-based participatory research approach in two neighborhoods in New Haven, CT, with high violent crime rates. Participants were  $\geq 18$  years of age and English speaking. We measured exposure to gun violence by adapting the Project on Human Development in Chicago Neighborhoods Exposure to Violence Scale. We examined the association between perceived collective efficacy, measured by the Sampson Collective Efficacy Scale, and exposure to gun violence

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using multivariate modeling. We obtained 153 surveys (51% response rate, 14% refusal rate, and 35% non-response rate). Ninety-five percent reported hearing gunfire, 58% had friend or family member killed by gun violence, and 33% were physically present during a shooting. In the fully adjusted model, one standard deviation higher perceived collective efficacy was associated with lower reported exposure to gun violence ( $\beta = -0.91, p < 0.001$ ). We demonstrated that it is possible to activate community members and local officials to engage in gun violence research. A novel, community-based approach adapted from disaster-preparedness literature may be an effective framework for mitigating exposure to gun violence in communities with persistent gun violence.

**Keywords** Gun violence · Community resilience · Disaster · Collective efficacy · Social cohesion

## Introduction

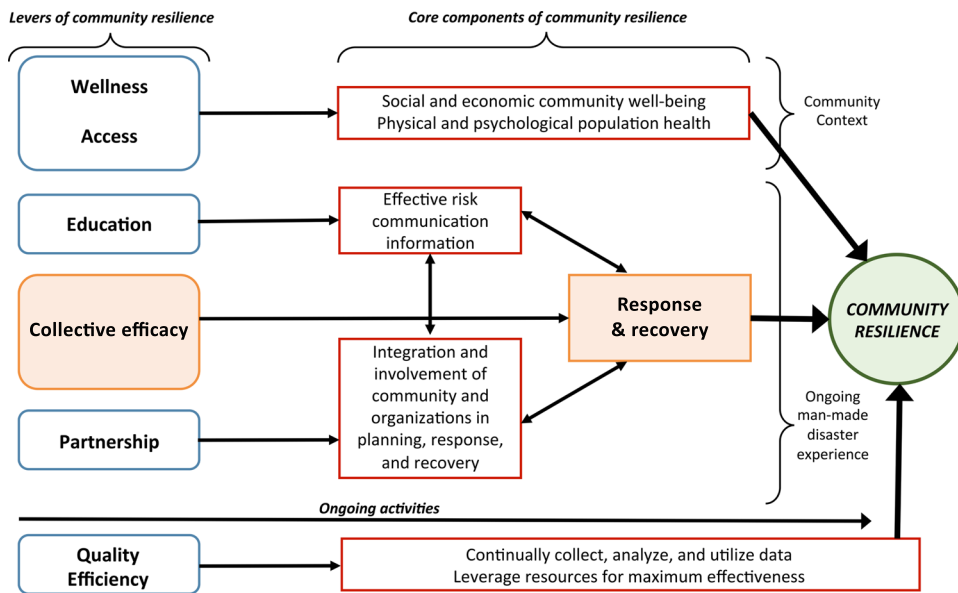
Gun assaults wound or kill 60,000 people in the USA each year, mostly young African-American and Hispanic men [1, 2]. The direct and indirect health effects of gun violence are felt not only by those involved in gun violence but also by entire neighborhoods living with chronic and persistent gun violence. Living in communities with persistent gun violence is associated with negative social, behavioral, and health outcomes including poor cognitive functioning, depression, and post-traumatic stress disorder [3–5]. Living in environments with chronic threat and perceived lack of safety is also associated with subsequent involvement in criminal activity [6–8]. Because gun assaults are disproportionately concentrated within communities where more racial and ethnic minorities live, the health consequences of gun violence are experienced disproportionately by racial and ethnic minorities [9, 10].

Current approaches to gun violence, which have focused largely on limiting access to firearms, creating safer ones, or on counseling victims and remediating perpetrators [11–18], do not address broader community factors that influence the occurrence of violence [19–23]. Furthermore, these approaches neither address the full extent of the effects of living in communities with persistent gun violence nor include the perspectives of individuals living in communities with high rates of gun violence [24–26]. In response to increases in

national and local levels of gun violence in New Haven in 2011 and the mass school shooting in Newtown, CT, our community convened a new multi-sector partnership of diverse city, community, and academic organizations to address this increase in violence: the New Haven Community Violence Prevention Group (NHCVPG). Realizing that the repercussions of violent acts extend beyond perpetrators and victims and affect community members more broadly, we framed gun violence as a disaster: “a sudden event that causes great damage and/or loss of life, which produces conditions whereby the continuity of structure and process of social units becomes problematic” [27].

Understanding gun violence as a chronic, man-made disaster, we embedded our community’s violence prevention plan in a disaster-preparedness framework that addressed both the psychosocial and logistical aspects of our response. Specifically, we adapted the *Building Resilience to Disasters*, a framework developed for disaster preparedness by RAND and currently used by the Office of the Assistant Secretary for Preparedness and Response, to guide multiple sectors and the broader community in response to gun violence (Fig. 1) [28]. The disaster-preparedness framework includes ways that community members themselves, in concert with local government or public safety agencies, can prepare for a disaster to prevent loss of life and to lessen the resultant fracturing of social structures. This framework focuses on strengthening multiple levers for preparedness: wellness, access, education, collective efficacy, partnership, quality, and efficiency.

Though the framework offers multiple levers for strengthening community resilience, community members and stakeholders from key sectors involved in addressing gun violence asserted that it was most important and feasible to focus our initial local efforts on the lever of collective efficacy. *Collective efficacy* is the ability of community members to leverage their social ties on their own behalf [29, 30]. Our community partners expressed that increased collective efficacy would allow the community to improve responsiveness to disaster as a result of relationships forged and capacity built to efficiently and effectively assess and address local needs, including psychosocial and logistical needs. Collective efficacy is comprised of two subscales: social cohesion (i.e., the bonds among community members) and informal social control (i.e., the capacity of a community to regulate its own members and realize



**Fig. 1** RAND *Building Resilience to Disasters* framework of levers and core components of community resilience, adapted to man-made disaster

collective goals through informal rather than formal mechanisms) [29, 30].

In this study, we aimed to test the premise that this community disaster-preparedness approach would be relevant to our community that suffers from the chronic, man-made disaster of persistent gun violence. To accomplish this aim, we first sought to determine if it were possible to effectively activate community members and local officials to engage in this community-based approach to prevent and respond to gun violence. We also tested the relationship between community members’ perceived collective efficacy (the selected lever of community resilience) and their reported exposure to gun violence. We hypothesized that community members with higher perceived collective efficacy would be less likely to report exposure to gun violence. If this hypothesis holds, it would suggest that efforts to increase neighborhood collective efficacy could result in reduction of exposure to gun violence.

**Methods**

**Study Design**

We used a community-based participatory research approach in which community members and researchers value each other’s expertise and contribute

collaboratively and equally in all phases of research [31]. We engaged in regular interaction and dialogue with community members and other stakeholders through open meetings within each neighborhood, participated in neighborhood- and city-wide forums, directed door-to-door outreach, and held meetings with key stakeholders. To examine the hypothesized inverse relationships between perceived collective efficacy, its subscales, and exposure to gun violence, we designed a cross-sectional study, which included primary data collection with a survey instrument that we administered within two self-identified high violence neighborhoods of New Haven, CT.

**Study Team**

In 2013, the NHCVPG created the Community Resilience Steering Committee, a multidisciplinary committee comprised of community members, service providers such as local non-profit organizations and the New Haven Police Department, and Yale University researchers to test these hypotheses. The Community Resilience Steering Committee identified community leaders and residents within two of the six neighborhoods with the highest rates of gun violence to participate in the study design, implementation, and dissemination of data.

## Study Population

The two study neighborhoods have violent crime rates of 30 per 1000 residents and homicide rates of 15 per 100,000 residents [32]. The population within these neighborhoods is mostly female (55–56%), predominantly African-American (63–85%), low income (65–70% with average annual household income <US\$50,000), and with high unemployment (approximately 23–25%) [33]. For the community survey, we identified households within defined areas of these neighborhoods using random walk methodology, selecting an initial household at random and then identifying every other household from that initial one [34]. Respondents were required to be at least 18 years of age, a resident of the specified address, English speaking, and able to provide verbal informed consent.

## Survey Development

*Exposure to gun violence*, our dependent variable, was measured using the 20 items that related to gun violence in the Project on Human Development in Chicago Neighborhoods (PHDCN) Exposure to Violence instrument [35]. To create the Exposure to Gun Violence Score, we summed scores for responses to each of the 11 dichotomous items included, giving a score of 1 for each affirmative response and a score of 0 for each negative response. A score of 0 represents no exposure to gun violence, including never hearing a gunshot; each additional point signifies an exposure ranging from having a friend hurt by a violent act to having been present on more than one occasion when someone was shot.

We assessed perceived collective efficacy as our primary independent variable. In our survey, we utilized the nine-item Collective Efficacy Scale designed by Sampson et al., which is comprised of the four-item Social Cohesion Subscale and the five-item Informal Social Control Subscale [36]. We utilized the scale to assess individual-level perceptions of neighborhood collective efficacy, a variation with precedence in the literature on the original use of the scale, which was initially designed to assess these entities as group constructs [37, 38]. As a measure of the group level construct of collective efficacy, the Collective Efficacy Scale has good internal consistency and reliability and has

been used in other populations with similar demographics [30].

*Social cohesion* represents the bonds among community members [29]. The Social Cohesion Subscale consists of four items, including “people around here are willing to help their neighbors,” and “people in this neighborhood do not share the same values,” to which respondents reply using a five-point Likert scale from strongly agree to strongly disagree. *Informal social control* refers to the ability of community members to achieve public order themselves through informal mechanisms [30]. The five items of the Informal Social Control Subscale ask respondents to assess on a five-point Likert scale how likely it is that neighbors would intervene under certain circumstances, such as if budget cuts threatened closure of the local fire station. We reverse scored negatively worded items and summed responses.

We collected information on respondent demographics and the characteristics of their households, including age, number of residents in household, number of children in household, number of years living in the neighborhood, home ownership, and employment status. We also gathered information reflecting how residents have or have not planned for episodes of gun violence, such as whether respondents had discussed firearms with children in their households, whether households had a family plan in case of gun violence, and whether respondents or other household members, including children, had burial insurance.

## Data Collection

We recruited and trained 17 community members in research methodology and survey administration, based on the well-established *Data and Democracy* curriculum [39]. During scheduled sessions, a team of two to three surveyors approached each pre-identified household, with one surveyor administering the survey and the other survey team member(s) providing logistical support. Each household was approached once per session and up to three times in total during three separate sessions, which we varied to include weekday afternoons and evenings as well as weekend mornings and afternoons. We surveyed until we completed a minimum of 75 surveys in each neighborhood.

The trained community members obtained verbal informed consent from all participants and verbally administered the surveys. All responses were documented with paper and pencil. We debriefed with each survey team at the end of each session to assess for survey completeness and legibility, address issues with survey administration, and assess the psychological well-being of surveyors. We completed primary data collection between May and August 2014. All data were coded and transcribed into an Excel spreadsheet.

### Statistical Analysis

We produced descriptive results for the full sample and stratified by neighborhood. We used chi-square tests to examine differences by neighborhood. We then assessed the association between one standard deviation (1SD) change in the perceived collective efficacy score and reported exposure to gun violence using linear regression. Unadjusted associations were assessed, followed by adjustment for the following covariates, chosen a priori based on prior literature: age group, sex, number of years residing in the neighborhood, home ownership status, employment status, and presence of children and/or older persons in the household [30]. Subsequently, we examined unadjusted and adjusted associations between 1SD change in each subscale of perceived social cohesion and perceived informal social control and reported exposure to gun violence.

All analyses were conducted using Stata 13.1 (StataCorp, College Station, TX). All statistical tests were two-tailed with alpha equal to 0.05. The Yale University Institutional Review Board approved this study.

### Results

Key stakeholders, including local government officials, public safety officials, the public health department, the healthcare system, local non-profit organizations, and researchers from other disciplines, have not only remained but have become increasingly engaged in the effort to study collective efficacy and gun violence in these neighborhoods. Moreover, we successfully trained 17 volunteers from these communities to administer surveys assessing sensitive topics such as exposure to gun violence and neighborhood preparedness, with many of these trained community

members remaining active in the effort after completion of the survey process.

### Survey Response Rates, Demographics, and Household Characteristics

We approached 300 households and obtained 153 surveys. Our response rate was 51%, refusal rate 14%, and non-response rate 35%. Forty-five percent of respondents were 25 to 44 years of age, and 56% were female (Table 1). The median number of years that respondents had lived in the neighborhood was 8.5 years. The average household size was 3.3 residents. Nearly two thirds of respondents reported renting with a minority reporting property ownership.

**Table 1** Respondent demographics and household characteristics

Respondent demographics	
Female (%)	56
Age (%)	
18–24 years	7
25–44 years	45
45–64 years	34
>64 years	14
Employment status (%)	
Full-time	43
Part-time	9
Not employed	46
Household characteristics	
Median length of time living in neighborhood (years, IQR)	8.5 (2.0–25.5)
Mean number of people living in household (N, SD)	3.3 (1.9)
Homeownership status (%)	
Owned by household resident	16
Rented by household resident	64
Other	20
Household employment status (%)	
At least one adult employed full-time	63
No adult employed full-time, at least one adult employed part-time	9
No adult employed part- or full-time	28
Household composition (%)	
Households with at least one resident <18 years old	56
Households with at least one resident >64 years old	58

## Exposure to Gun Violence

The mean Exposure to Gun Violence Score for the total sample was 5.67 (SD 2.67; Table 2), indicating that the average respondent had more than five different types of exposure to gun violence in his or her lifetime. There was no difference in Exposure to Gun Violence Scores between neighborhoods ( $p = 0.68$ ). Nearly all

**Table 2** Select items from Exposure to Violence Scale

Exposure to Gun Violence Item	Yes (%)
Have any of your family members or friends been hurt by a violent act?	67
Have any of your family members or friends been killed by a violent act?	58
Have you ever heard a gunshot?	95
If heard gunshot, when was the last time you heard a gunshot:	
Within the last week?	33
Within the last month?	22
Within the last year?	26
More than one year ago?	12
Where did that happen:	
In neighborhood?	81
In front of home?	1
In hallway/building?	1
In home?	2
At school?	1
Other location?	7
Have you heard a gunshot more than once?	84
If so, how frequently do you hear gunshots?	
Daily?	11
Weekly?	21
Monthly?	26
Less than monthly?	39
Have you ever seen or been present when someone was shot?	33
If present, did you know the person or people who got shot?	70
If present, did the person die?	46
If present, have you seen this more than once?	61
Are you afraid you or your family might be hurt by violence in your neighborhood?	36
Are you afraid you or your family might be hurt by violence in front of your home?	29
Are you afraid you or your family might be hurt by violence inside your home?	14
Are you afraid you or your family might be hurt by violence at school or work?	21

respondents had heard a gunshot (95%), and among those, 21% reported hearing a gun shot at least weekly. Two thirds reported having a family member or friend hurt by a violent act, and more than half reported having a family member or friend killed by a violent act. One third had been physically present when someone was shot, and of those, nearly two thirds reported having been present more than once when someone was shot. Among households with children, 67% of respondents had spoken with the children about guns. Approximately half of respondents living in households with families (54%) reported that they had established a family plan in case of gun violence. Forty-one percent of respondents reported having burial insurance for themselves, with 48% reporting having burial insurance for either some or all of the adult household members and 37% reporting having burial insurance for either some or all of the children in the household.

## Collective Efficacy

The mean perceived Collective Efficacy Score for the total sample was 28.2 out of 45 (SD 6.97, Table 3). The mean perceived Social Cohesion Score for the total sample was 12.2 out of 20 (SD 2.98). Only one quarter of respondents either agreed or strongly agreed that people in their neighborhood could be trusted, whereas the majority (60%) either agreed or strongly agreed that people in their neighborhood are willing to help their neighbors. The mean perceived Informal Social Control Score for the total sample was 16.0 out of 25 (SD 4.81). Approximately half of respondents thought it was either likely or very likely that their neighbors would intervene if a fight occurred in front of their house, and the majority thought it was either likely or very likely that their neighbors would intervene if budget cuts threatened the local fire station. There was no difference in these scores between neighborhoods (collective efficacy  $p = 0.27$ , social cohesion  $p = 0.31$ , informal social control  $p = 0.33$ ).

## Multivariate Analysis

In the unadjusted model, 1SD change in perceived collective efficacy was negatively associated with exposure to gun violence ( $\beta = -0.90$ ,  $p < 0.001$ , Table 4). Similarly, 1SD changes in social cohesion and in informal social control were negatively associated with exposure to gun violence (social

**Table 3** Responses to Collective Efficacy Scale, comprised of Social Cohesion and Informal Social Control Subscales

Collective Efficacy Scale = Social Cohesion Subscale + Informal Social Control Subscale

Social Cohesion Subscale	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
This is a close-knit neighborhood.	12	31	31	16	9
People around here are willing to help their neighbors.	16	44	21	15	4
People in this neighborhood do not share the same values.	15	33	21	28	3
People in this neighborhood can be trusted.	7	18	36	22	16
Informal Social Control Subscale	Very likely	Likely	Neither likely nor unlikely	Unlikely	Very unlikely
How likely is it that neighbors would do something about it if:					
Children were skipping school and hanging out on a street corner?	12	20	18	31	19
Children were spray-painting graffiti on a local building?	19	30	18	18	13
A child was showing disrespect to an adult?	20	23	20	18	18
A fight broke out in front of your house and someone was being beaten up or threatened?	27	22	18	21	11
The fire station closest to your house was going to be closed down by the city because of budget cuts?	31	29	19	11	9

cohesion  $\beta = -0.69, p = 0.002$ ; informal social control  $\beta = -0.83, p < 0.001$ ). Results did not change after adjustment for covariates (collective efficacy adjusted  $\beta = -0.91, p < 0.001$ ; social cohesion adjusted  $\beta = -0.67, p = 0.004$ ; informal social control adjusted  $\beta = -0.84, p = 0.001$ ).

**Table 4** Correlations of one standard deviation differences in perceived collective efficacy, social cohesion, and informal social control with reported exposure to gun violence

Independent variable	Model	$\beta$	<i>p</i> value
Collective Efficacy	Unadjusted	<i>-0.90</i>	<i>&lt;0.001</i>
	Model 1 <sup>a</sup>	<i>-0.87</i>	<i>&lt;0.001</i>
	Model 2 <sup>b</sup>	<i>-0.91</i>	<i>&lt;0.001</i>
Social Cohesion	Unadjusted	<i>-0.69</i>	<i>0.002</i>
	Model 1 <sup>a</sup>	<i>-0.62</i>	<i>0.008</i>
	Model 2 <sup>b</sup>	<i>-0.67</i>	<i>0.004</i>
Informal Social Control	Unadjusted	<i>-0.83</i>	<i>&lt;0.001</i>
	Model 1 <sup>a</sup>	<i>-0.79</i>	<i>0.001</i>
	Model 2 <sup>b</sup>	<i>-0.84</i>	<i>0.001</i>

Italics indicates statistical significance ( $p < 0.05$ )

<sup>a</sup>Model 1 was adjusted for age, sex, and years living in the neighborhood

<sup>b</sup>Model 2 additionally adjusted model 1 for employment, home ownership, older persons living in the home, and children living in the home

### Discussion

In two neighborhoods with high rates of gun violence, we demonstrated that it is possible to activate community members and local officials to engage in research about gun violence. With all of these efforts, we built local capacity and interest in designing a community-based intervention that focuses on factors over which community members believed they had control that may prevent gun violence in communities where violence is endemic. The successful completion of this study shows that a preparedness framework, which requires multi-sector partnership, is relevant and desired, even in communities with longstanding tensions between community residents and police.

Through our community survey, we found that one out of three respondents had been physically present during a shooting and almost two thirds had a friend or family member killed by gun violence. Community members were afraid that they or their family might be harmed in their own neighborhoods. Many had prepared for future episodes of gun violence, including discussing firearm safety with their children and establishing a family plan in case of gun violence. These data affirm that community members are capable of and already engaged in preparing actively for gun violence, supporting that a preparedness framework to prevent

gun violence is relevant to residents living in communities with high rates of gun violence.

As we hypothesized, adult residents who endorsed higher neighborhood collective efficacy were less likely to report having been exposed to gun violence, even after accounting for salient characteristics of the household, such as length of residence, home ownership, employment, and age of residents. These results, which assess the perception of collective efficacy and exposure to gun violence specifically, extend prior research linking the prevalence of violence, defined broadly to include interpersonal violence, assault, and gun violence, to the lower collective efficacy [30, 40].

Associated with decreased likelihood of experiencing gun violence events, perceived collective efficacy may be a protective factor. A recent longitudinal study of 1114 youth between 11 and 16 years old in Chicago found that greater collective efficacy as measured at the neighborhood level, among other factors such as family support, positive peers, and meaningful opportunities for participation, had a positive effect on the healthy development of youth exposed to violence from living in neighborhoods with higher rates of violence [41]. Higher levels of collective efficacy may also allow community members to interrupt the cycle of violence in their neighborhood, by preventing retaliatory acts in the short term and by decreasing the risk of future violence by those exposed in the longer term. For instance, Molnar et al. report that the youth were less likely to carry a concealed firearm in neighborhoods with higher collective efficacy, independent of neighborhood economic indicators and individual and family factors [42]. As our data focuses on perceived neighborhood collective efficacy, future studies will need to explore the association between neighborhood collective efficacy and exposure to gun violence and if and how building collective efficacy, and in turn community resilience, can mitigate the effects of gun violence. Future steps therefore include evaluating the effectiveness of an intervention that builds community resilience in these same neighborhoods by strengthening perceived collective efficacy, among other levers in the adapted *Building Resilience to Disasters* framework.

### Limitations

Our study has limitations. First, based on 2010 Census data, between 14 and 17% of the adult population within these neighborhoods are 18 to 24 years old, so our sample underrepresents this age group which is affected by gun

violence [33]. However, in sensitivity analyses, we found no significant differences between the responses of the 18- to 24-year-old respondents and the remainder of our sample. Second, we administered the survey in English only, but the relatively low percentage of households that are primarily non-English speaking (9 and 14%) allowed for assessment of the vast majority of the population within these neighborhoods [33]. Third, our non-response rate was 35%. This was due in part to the sizable number of vacant addresses within the sampling frame, which from the 2010 Census was 13 and 17% in each of the two study neighborhoods [33]. Finally, the cross-sectional design of this study limited our ability to assess causality and, more particularly, the direction of any causal association. It is possible that persistent violence erodes community members' perceptions of collective efficacy. Nevertheless, these results represent an essential first step and provide the foundation for further study.

### Conclusions

The consequences of gun violence go beyond the numbers of victims wounded or killed. A novel approach to understanding and mitigating the exposure to persistent gun violence that addresses both the community social context and the community-level effects of high levels of exposure to gun violence is needed. A public health, disaster-preparedness, community-based approach that builds collective efficacy as a means of mitigating the effects of gun violence, while contributing to efforts to prevent future occurrences, is an approach worth testing.

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