



# SHAPING THE INDIVIDUAL: SOCIAL VULNERABILITY FOR GUN OWNERSHIP AND GUN ATTITUDES

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## ABSTRACT

While research has documented links between perceived crime risk and gun ownership, there is much more limited research regarding how other indicators of community vulnerability like poverty or racial/ ethnic composition impact individual-level gun ownership and related attitudes. This study used a nationwide web survey of 524 U.S. adults. Respondents provided their zipcodes. These were matched to zipcode-specific indicators of community vulnerability from the 2014 Social Vulnerability Index (SVI). Findings indicated that an increase in household composition vulnerability (dependent children under age 18, those over age 65+, and single parents) and disability-related community vulnerability was associated with increased likelihood of gun ownership and pro-gun attitudes. Community vulnerability measured by minority status and English language proficiency had the opposite association. The effect of perceived safety on gun-related attitudes was greater for respondents in these communities. Individual demographics do not fully account for the diversity in gun control attitudes prevalent in the U.S. today. More research is needed to assess which community features signal vulnerability to individuals.

**Keywords:** Community, vulnerability, gun ownership, gun attitudes

## INTRODUCTION

Past literature has examined gun ownership and gun attitudes typically by focusing either on aggregate trends (i.e. crime rates, changes in law, or politics) (Killias 1993) or individual-level factors that drive gun ownership like

fear or victimization (Kleck, Kovandzic, Saber, & Hauser 2011). Yet, community-level vulnerability shapes individual perceptions of risk and vulnerability. Research by Scarborough and colleagues (2010), for instance, found that individuals who felt their community lacked social cohesion, one form of community vulnerability, were more fearful of crime. Likewise, those who felt their community had more run-down facilities, overgrown weeds and shrubs, or litter also

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reported being more fearful (Scarborough et al. 2010). These relationships remained even after the authors accounted for individual demographics, underscoring the importance of accounting for environment when studying individual-level attitudes and behavior. Unfortunately, the existing literature on the topic has neglected a thorough analysis of the effect of community vulnerability, perceived or objective, for individual firearms ownership or gun-related attitudes.

Yet, past research demonstrated that those who felt more fearful or vulnerable were more likely to own firearms, have intent to purchase firearms, and feel more positively towards firearms. Several past studies, for example, found that rates of gun ownership and weapon carrying were higher when individuals feared crime (Cao, Cullen, & Link 1997; Kleck et al. 2011; McDowall & Loftin 1983; Smith & Uchida 1988) or when individuals felt they could not depend on their neighbors (Cao et al. 1997).

Prior crime victims expressed greater intent to purchase a gun for self-protection in another study (Kleck et al. 2011). Poll data from 2017 found that about a quarter of handgun owners reported carrying a handgun on their person all or most of the time (Parker, Horowitz, Igielnik, Oliphant, & Brown 2017). Among handgun owners who felt unsafe in their neighborhoods or communities, this figure jumped to 41% (Parker et al. 2017).

The role of gun ownership in the U.S. cannot be understated. Although the exact number of civilian firearms in the U.S. is unknown, the Small Arms Survey (2011) estimated that the U.S. had the highest per capita civilian gun stockpile in 2007, at approximately 90 firearms per 100 residents. Some sources estimated this figure to be closer to one firearm per U.S. resident (Desilver 2013). Additionally, Americans' top reason for owning a firearm is personal protection (Swift 2013). Thus, perceived vulnerability

and perceived risk may play a key role in gun ownership. Aside from a few dated studies (Cao et al. 1997; Lizotte & Bordua 1980), there remains only limited available research on how indicators of community vulnerability shape individual views. DeJong (1997), for example, found that the percent of single parent households with children aged twelve through twenty predicted defensive gun ownership for women. The impact of other types of community characteristics, as will be discussed, remains unknown, as is their impact on present-day gun ownership. Three research questions are addressed by the present study. First, how is community vulnerability, measured objectively, related to individual gun ownership? Second, how is community vulnerability related to individual attitudes towards guns? Third, how do community vulnerability and perceptions of personal safety interact?

## **GUN OWNERSHIP**

Demographics of gun owners are well-established in the literature. In past research, males, non-Hispanic Whites, older adults, and those residing in rural areas were more likely to report household gun ownership than those without these characteristics (Morin 2014). According to a nationwide survey in 2014, gun ownership rates were similar in the South, Midwest, and West, though lower in the Northeast (Morin 2014). In the same study, households with children under 12 were just as likely as other households to have firearms in the home (Morin, 2014). Politically, those in gun owning households were more likely to identify as Republican or Independent than Democrat (Gewurz 2013).

Of gun owners in 2017, roughly 72% reported owning a handgun, 62% reported owning a rifle, and 52% reported owning a shotgun (Parker et al. 2017). Of gun owners with only one firearm, 62% owned a handgun in 2017 (Parker et al. 2017). As handguns may be used for different purposes than others guns

(personal protection, for instance), this study distinguishes handguns from other gun types. Additionally, reporting can be inconsistent within a household. One study, for example, found that married women in gun owning households underreported household gun ownership by roughly 7% and undercounted the number of guns in the household (Ludwig, Cook, & Smith 1998). For this reason, the present study examines both personal and household gun ownership. Gun owners have diverse reasons for owning guns, though self-protection is most common. Qualitative research by Carlson (2015) found that men from economically depressed areas owned gun partially to establish their roles as protectors when breadwinning became a less accessible means of establishing masculinity. For these men, gun ownership was a way to reclaim lost power and control (Mencken & Froese 2019).

Gun ownership may be viewed by others as a form of self-protection based on perceived risk of victimization. Stoebe, Leander, and Kruglanski (2017) found that defensive gun ownership was a response to both perceptions of specific threats (assault) as well as diffuse threats (general belief in a dangerous world). Estimates of actual defensive gun use vary. Hemenway and colleagues (Hemenway & Solnick 2015), for example, estimated that defensive gun use occurred in less than 1% of contact-based violent crimes. This type of gun use was more prevalent among males and those from rural areas than others. Other authors have noted that the number of defensive gun uses could be much higher (Kleck 2018a). A recent experiment found that reports of defensive gun use were 125% more likely if respondents were asked directly about defensive gun use (Kleck 2018b).

### **COMMUNITY VULNERABILITY**

The existing literature on community vulnerability has focused on two related constructs: vulnerability and resilience.

In this paper, the term community social vulnerability is used to refer to the likelihood that a community will experience a hazardous event (i.e. risk) and that the individuals within a community will be harmed by such an event (Cutter, Boruff, & Shirley 2003). Hazards may include natural disasters or man-made events like terrorist attacks but also more commonplace forms of violence, including gun violence. This paper specifically focuses on social conditions and demographic features of communities since not all communities experiencing a hazard are equally vulnerable. Resilience is a term used to refer to the ability of a community to effectively assess, respond, and recover from a hazardous event. While related, the terms are not synonyms (Cutter et al. 2008). A community, for example, can be at high-risk for some sort of event, but be poorly equipped to handle such an event. The present study will focus on vulnerability. Past research determined that many demographic factors including community race/ ethnicity makeup, percent of the population in poverty, and average level of education were predictive of community social vulnerability (Reid et al. 2009). Rygel and colleagues (2006) noted that race/ ethnicity was linked to vulnerability due to higher rates of poverty among minorities as well as possible language barriers that make recovery from or response to a traumatic event more challenging. Other research found that racial and ethnic minorities were at much higher risk for gun violence at the individual and community level (Beard et al. 2017). Communities facing a greater level of poverty may be vulnerable to a variety of risks due to inadequate housing, insufficient finances to cover damages, and fewer opportunities for education or employment (Bjarnadottir, Li, & Stewart, 2011; Rygel et al. 2006).

While higher wealth could also make a community a potential target, the existing literature found that communities with less wealth were less able to prepare for and recover from traumatic events (Cutter et al.

2003).

Further research documented a link between gun violence and rising unemployment. This link was attributed to uncertainty in the transition from school to work in early adulthood (Pah et al. 2017). Level of education is associated with poverty rates (Cutter et al. 2003).

Women have also been identified as more vulnerable to community-wide disasters due to higher rates of poverty (Amaro et al. 2005; Rygel et al. 2006). Yet, women are at lower risk for gun violence. Additionally, women tend to be less pro-gun than men; even pro-gun women were found to be less politically engaged than pro-gun men in past research (Goss 2017). However, women were found to be more fearful of crime and perceived higher crime risk for certain crime types (Adams & Serpe 2000; Collins 2016).

Social isolation and percent of the population that is elderly were additional factors identified by Reid (2009) as indicators of community social vulnerability. Communities with a higher proportion of elderly respondents were found to be at higher risk because the elderly experienced mobility or health concerns that were present at lower rates in younger populations (Bjarnadottir et al. 2011). Additionally, inadequate social support leaves these subgroups vulnerable (Rygel et al. 2006). Cutter and colleagues (2003) identified eleven key factors associated with community vulnerability. Beyond those already described, these included building density, community reliance on a single economic sector, housing types (i.e. mobile homes) and ownership, and percent employed in low wage or public-sector positions. As indicated by this brief overview, the concept of community social vulnerability is complex, making examination of any one factor, by itself, problematic.

In addition to community features mentioned in the Introduction, other community-level

indicators have been linked to individual-level perceived risk (Scarborough et al. 2010). Pickett and colleagues (2012), for instance, found that perceived community racial composition was positively associated with perceived victimization risk. Namely, Whites who perceived that a greater proportion of their neighborhood consisted of Black residents perceived greater risk of victimization than those who perceived themselves as residing in a less diverse neighborhood. Other research found that Blacks living in more racially/ ethnically diverse communities had lower levels of fear than those in more homogenous communities (Brunton-Smith & Sturgis 2011). Brunton-Smith and Sturgis (2011), additionally, found that neighborhood-level socioeconomic characteristics moderated fear of crime. Costanza (2013) et al determined that a community's median household income predicted the prevalence of concealed carry permits, though possible mediation by perceived crime risk was not explored.

## **HAZARDS OF PLACE MODEL**

The present paper follows the convention of prior studies (Bjarnadottir et al. 2011; Cutter et al. 2003) by using a community social vulnerability index that incorporates all of the community characteristics identified above. This approach is loosely based on the Hazards of Place Model proposed by Cutter and colleagues (Cutter 1996). Under this model, risk refers to the likelihood of a hazard occurring while mitigation refers to a community's pre-planning, experience, or training for possible events. The interplay between these two factors creates what Cutter et al (1996) refer to as hazard potential. However, potential does not take into account features of the population or area that may result in varying levels of actual vulnerability. Factors noted in the previous document. Other responses were excluded from analysis because respondents failed

section, such as socioeconomic, demographic, or geographic features, modify a community's hazard potential to determine a specific community's level of vulnerability.

Unfortunately, no study to date has examined the impact of community social vulnerability, collectively, on individual gun ownership or gun attitudes. Since fear of crime and perceived risk are distinct concepts, this study narrows its focus to perceived risk. Drawing on prior literature, this paper tests the following hypotheses:

- 1) Individuals living in areas with higher community social vulnerability will be more likely to report gun ownership and will have more pro-gun attitudes.
- 2) Individuals who perceive their community as unsafe will be more likely to report gun ownership and will have more pro-gun attitudes.
- 3) Gun owners who perceive their community as unsafe will be more likely to report that their primary reason for owning a gun is personal safety than to report other reasons for gun ownership.
- 4) The effects of community vulnerability on gun ownership, reasons for gun ownership, and gun-related attitudes will be mediated by perceived safety.

## **METHODS**

Individual-level data for this study is based on analysis of a 45-question, online survey with responses collected in February 2016. The survey addressed topics including gun ownership, opinions about guns and their owners, basic demographics, as well as perceptions of safety. In 2015, the Qualtrics survey research company was contracted to locate a nationwide sample of at least 250 gun owners and 250 non-owners to complete this survey. The only other requirement was that respondents be age 18 or older.

Qualtrics maintains and contracts with active market research panels consisting of more than six million English-speaking, non-institutionalized adults able to give consent. Typically, respondents join a panel through one of three different processes including a double opt-in process, recruitment, or voluntary sign-up.

When an individual qualifies for a survey, they are notified via email and invited to participate. Panelists typically receive small incentives given on a point system; these points can be pooled and later redeemed in the form of gift cards, sky miles, credit for online games, etc.

Qualtrics sent 3,003 potential respondents an email invitation in February 2016, informing them that the survey was for research purposes, the title of the study, and how long the survey was expected to take. To avoid self-selection bias, the survey invitation did not include specific details about the contents of the survey. The survey invitation included a link to participate.

Potential respondents who clicked this link were asked whether they had a gun in their household and if they were age 18 or older. If eligible (and the target of 250 respondents for a given ownership category not yet met), the respondent was then directed to the survey itself, electronically. Due to budget constraints, the survey was limited to a sample size of approximately 500 valid responses. Survey questions were presented in the same order to all respondents. Respondents took 8.2 minutes to complete the survey, on average. From the 3,003 survey invitations, 1,228 responses (40.89%) were received before quotas were met. Of these, 524 were considered valid and complete responses. (17.45% of total invitations). Eleven responses were excluded because the respondent was under age 18. Another 37 responses excluded because they did not agree to the terms of the informed consent

document. Other responses were excluded from analysis because respondents failed data quality checkpoints (i.e. questions asking the respondent to select a specific response to indicate attentiveness) or because respondents completed the survey too quickly (<1/3 of the median response time) to suggest an attentive response. The sample is not nationally representative due to the Qualtrics opt-in process, the low response rate, and the quotas for gun ownership.

Data on community social vulnerability were obtained from the 2014 Social Vulnerability Index (SVI) made available by the Agency for Toxic Substances and Disease Registry, a subunit of the Centers for Disease Control and Prevention (2017). The CDC defines community social vulnerability as a community's ability to manage and remain resilient when confronted with a natural or human-caused crisis situation. Using data from the U.S. Census, the SVI ranks census tracts on 15 social factors that include measures of socioeconomic status, household composition and disability, minority status and language use, as well as housing and transportation. Each census tract is given a score ranging from 0 to 1 on each of these four themes, as well as an overall social vulnerability score (Agency for Toxic Substances and Disease Registry, 2017). Higher values indicate greater community vulnerability.

As part of the web survey described previously, respondents were asked to indicate the zip code of their primary place of residence. These were matched to census tracts using the 2014 crosswalk files provided by the U.S. Department of Housing and Urban Development (2017). Since multiple census tracts may be matched to a given zip code, the SVI scores for a given respondent are the average of those scores for all census tracts matched to a respondent's zip code. For example, if the respondent's zip code is

associated with two census tracts, the SVI for that respondent is the average of the scores assigned to those two census tracts.

## **MEASURES**

### ***Pro-Gun Attitudes***

Pro-gun attitudes were measured as a summative score on six attitudinal items (alpha = 0.83), each asking respondents their extent of agreement or disagreement with a given statement.

These items each ranged from 1 (strongly disagree) to 4 (strongly agree), with no neutral option. Items included "people who own guns are not as trustworthy as people who do not own guns," "people who own guns are more violent than people who do not own guns," "my community would be safer if more people owned guns," "my community would be safer if more people carried guns in public," "people who own guns are more patriotic than people who do not own guns," and "I am more likely to visit a business where weapons are permitted." Responses were coded such that higher values indicate more pro-gun attitudes.

### ***Gun Ownership***

Respondents were first asked "Do you have a gun in your home?" (yes/no). If answered in the affirmative, respondents were asked "Do you have a handgun in your home?" (yes/no) as well as "Do you personally own a gun, or do the gun or guns in your household belong to another household member?" (personally own, other household member owns). Respondents who reported personally owning a gun were asked their primary reason for gun ownership (personal protection, sport, need for work, some other reason). Responses were dichotomized as personal protection or other reason.

### ***Perceived Safety***

Respondents were asked "How safe or unsafe do you feel in the following locations on a

typical day?” Location categories of home, work, local shopping malls, local restaurants, school(s), and homes of friends or family were presented in a matrix-style question format. Response options were very unsafe (1), unsafe (2), neutral (3), safe (4), very safe (5), and not applicable. These responses were averaged to form a perceived safety score ( $\alpha = 0.88$ ).

### **Social Vulnerability Index (SVI)**

As stated in the Data section, the SVI is based on 15 measures grouped under four themes: socioeconomic status, household composition and disability, minority status and language use, housing and transportation (Agency for Toxic Substances and Disease Registry, 2017). The SVI consists of a score assigned to each of these four themes, ranging from 0 to 1, as well as an overall ranking across the four themes that also ranges from 0 to 1. Higher values reflect greater community vulnerability (Agency for Toxic Substances and Disease Registry 2017). For this study, the four separate scores are used, as some components of social vulnerability may be more influential than others. The socioeconomic status theme was measured using income, poverty, employment, and education variables. These measures indicate the extent to which a community is economically disadvantaged. Prior research linked community socioeconomic variables like these to fear of crime (Brunton, Smith & Sturgis 2011). The household composition/ disability theme was measured using age, single parenting, and disability variables. Specifically, household composition included dependent children under age 18, those over age 65+, and single parents.

The development of this theme was based on the premise that these specific subgroups, in addition to those with disabilities, would be more likely to require financial, medical, or transportation assistance following a disaster (Flanagan, Gregory, Hallisey, Heitgerd, &

Lewis 2011). For the purposes of the current study, an area with a high proportion of people in these subgroups may also contribute to fear of crime (the youth variable in particular). A high proportion of single parent households, for example, may trigger perceptions of social isolation or disconnectedness in the community (Scarborough et al. 2010).

The minority status/ language theme was measured using race (Black, Native America, Asian and Pacific Islander), ethnicity (Hispanic), and English as a second language variables. The development of this theme centered on the notion that minority groups have faced social and economic marginalization. Past research also found that community racial/ ethnic composition as related to fear of crime (Pickett et al. 2012). The final theme, housing/ transportation, was measured using housing structure, vehicle access, and crowding variables. Each of these is closely linked to poverty. Further information on the SVI's development and methodology have been published elsewhere (Flanagan et al. 2011).

### **Control Variables**

Political views (liberal, moderate, conservative), marital status (married, single, divorced/ widowed/ separated), and presence of children in the home (yes/no) were included as controls. Other predictors were demographics including sex, race (white or non-white), age (18-19, 20-24, 25-29, 30-34, ..., 85-89, 90 or older), region of residence (northeast, west, midwest, south), highest level of education attained (< high school, high school/ GED, some college, 2-year degree, 4-year degree, Master's, Ph.D., professional degree (J.D.)), and household income (<\$20K, \$20-29K, \$30-39K, ..., \$90-99K, \$100K +, and other/ decline to answer). Regions were based on the U.S. Census (2014). Political views were assessed by respondents to self-identify as very liberal, liberal, moderate, conservative, or very

conservative. Given number of categories and natural ordering, age, education, and income are treated as continuous variables in analyses and descriptive statistics. These controls are included since both gun ownership and fear of crime vary by these demographic characteristics (Franklin, Franklin, & Fearn 2008; Gewurz 2013).

An additional control assesses experience with victimization, as prior victims may react differently to gun-related issues than those who have not experienced victimization. Respondents were asked "During the past 2 years, did anyone deliberately injure you or threaten to injure you?" with yes or no as response options.

### ***Plan of Analysis***

Three dependent variables are examined: gun ownership, pro-gun attitudes, and reasons for personal gun ownership. Since household gun ownership is a dichotomous variable, logistic regression is used to test models with this outcome. Logistic regression is also used for supplementary models examining personal gun ownership, reasons for personal gun ownership, and handgun ownership more specifically, as these are also dichotomous outcomes. Odds ratios are displayed in tables. An odds ratio is interpreted as the degree to which a one-unit increase in a predictor increases or decreases the odds of gun ownership. Pro-gun attitudes are treated as a continuous dependent variable.

OLS regression is used for models with this outcome. Since gun owners were oversampled by design, all models are estimated using a correction (design weight) for oversampling based on the Gallup estimate that 39% of Americans resided in a household with a gun in 2016. Descriptive statistics in Table 1 are unweighted. All remaining tables show estimates from weighted models.

## **RESULTS**

Descriptive statistics for individual-level predictors and outcomes are shown in Table 1. By design, about half of the sample reported household gun ownership; about a third of the sample indicated personal ownership specifically. Most of the latter, 77%, reported that their primary reason for owning a gun was personal protection.

On average, respondents tended to be more favorable towards guns than unfavorable. The modal self-reported political leaning was moderate. Respondents also reported feeling safe in their communities. Both victimization and arrest history were quite rare in the sample at under 9%. Most respondents were White, though the percentage was only slightly higher than U.S. Census estimates (U.S. Census Bureau 2015).

Most respondents were female and more than 40% had children living at home. Likewise, most respondents were married and most had at least some college education. While there were too many age and income categories to display, the mean age of the sample fell in the 35-39 range and mean income fell in the \$50- 59K category. These values were in line with U.S. Census estimates (2015). In terms of the Social Vulnerability Index (SVI), which ranges from 0 to 1, respondent communities averaged 0.47 overall, 0.48 for the category of socioeconomics, 0.50 for the category of household composition and disability, 0.45 for the category of minority status and language, and 0.49 for the category of housing and transportation.

**Table 1: Descriptive statistics for individual-level independent and dependent variables (n = 524)**

	N	Mean or Proportion (SD)	Range
Gun owner (yes/ no)	524	0.50 (0.50)	(0, 1)
Personal gun owner (yes/ no)	515	0.32 (0.47)	(0, 1)
Handgun owner (yes /no)	514	0.43 (0.50)	(0, 1)
Pro-gun attitudes scale	524	2.52 (0.64)	(1, 4)
Perceived safety	524	3.93 (0.72)	(1, 5)
Victim in past 2 years (yes/ no)	524	0.08 (0.27)	(0, 1)
Ever arrested (yes/ no)	524	0.06 (0.25)	(0, 1)
White (yes/ no)	524	0.81 (0.39)	(0, 1)
Male (yes/ no)	524	0.26 (0.44)	(0, 1)
Personally owns gun for protection (yes/ no)	166	0.77 (0.42)	(0, 1)
Children in the home (yes/ no)	524	0.45 (0.50)	(0, 1)
	<b>Freq.</b>	<b>Percentage</b>	<b>95% CI</b>
<b>Education:</b>			
< High school	7	0.01	(0.01, 0.03)
High school/ GED	119	0.23	(0.19, 0.27)
Some college	148	0.28	(0.25, 0.32)
2-year degree	63	0.12	(0.09, 0.15)
4-year degree	141	0.27	(0.23, 0.31)
Master's degree	37	0.07	(0.05, 0.10)
Ph.D.	3	0.01	(0.00, 0.02)
<b>Political views:</b>			
Liberal	122	0.24	(0.20, 0.27)
Moderate	230	0.44	(0.40, 0.48)
Conservative	172	0.33	(0.29, 0.37)
<b>Marital Status:</b>			
Single	174	0.33	(0.29, 0.37)
Married	298	0.57	(0.53, 0.61)
Divorced, widowed, separated	52	0.10	(0.08, 0.13)
<b>Region:</b>			
Northeast	106	0.20	(0.17, 0.24)
Midwest	135	0.26	(0.22, 0.30)
West	91	0.17	(0.14, 0.21)
South	192	0.37	(0.33, 0.41)

\*Notes: CI refers to confidence interval. SD refers to standard deviation

Models examining gun ownership as the dependent variable are displayed in Table

2. In all models, South is the reference category for region, married is the reference category for marital status, and conservative

is the reference category for political orientation. Model A, which uses household gun ownership as outcome, includes all predictors except perceived safety. As shown, an increase in household composition and disability vulnerability was associated with a significant increase in the odds of gun ownership. An increase in minority status and language vulnerability, in contrast, was associated with a significant decrease in the

odds of gun ownership. Those with higher income and males had higher odds of gun ownership. Increased age, unexpectedly, was associated with decreased odds of gun ownership. Respondents in the Northeast and Midwest had significantly lower odds of gun ownership than those in the South while married respondents had significantly higher odds of gun ownership than those who were single. Lastly, liberals and moderates had

**Table 2: Logistic regression predicting gun ownership, odds ratios shown (n = 490)**

	Model A Household	Model B Household	Model C Personal	Model D Handgun
SVI: Socioeconomics	0.50 (0.50)	0.49 (0.49)	0.97 (1.03)	0.22 (0.47)
SVI: Housing comp & disability	10.14* (9.59)	9.74* (9.22)	9.54* (9.58)	2.55 (5.07)
SVI: Minority status & language	0.17**(0.10)	0.18* (0.10)	0.24* (0.15)	3.42 (4.22)
SVI: Housing & transport	1.83 (1.43)	1.79 (1.39)	0.55 (0.50)	1.38 (1.85)
Perceived safety	--	0.83 (0.12)	1.10 (0.18)	1.93* (0.54)
Liberal	0.38** (0.11)	0.38** (0.11)	0.66 (0.20)	3.48+ (2.50)
Moderate	0.38* (0.11)	0.46** (0.12)	0.52* (0.15)	1.98 (1.03)
Age	0.91* (0.04)	0.91* (0.04)	0.90* (0.04)	0.88 (0.07)
Male	1.74* (0.44)	1.78* (0.45)	5.05** (1.37)	1.14 (0.63)
White	1.42 (0.40)	1.52 (0.44)	1.08 (0.36)	0.98 (0.78)
Education	0.86+ (0.07)	0.86+ (0.07)	0.90 (0.08)	0.56** (0.12)
Income	1.17** (0.05)	1.18** (0.05)	1.20** (0.06)	1.34* (0.16)
Children in home	0.99 (0.22)	1.00 (0.22)	1.59+ (0.40)	1.39 (0.64)
Single	0.46** (0.12)	0.47** (0.12)	0.52* (0.16)	0.95 (0.57)
Divorced, widowed, separated	0.55 (0.21)	0.55 (0.22)	1.29 (0.52)	6.06 (6.93)
Northeast	0.31** (0.10)	0.3** (0.10)	0.31** (0.11)	0.27* (0.17)
Midwest	0.47** (0.13)	0.48** (0.13)	0.42** (0.13)	0.51 (0.27)
West	1.19 (0.37)	1.23 (0.38)	0.89 (0.31)	0.55 (0.40)
Past victimization	0.82 (0.34)	0.76 (0.32)	1.21 (0.51)	2.94 (2.73)
Ever arrested	1.12 (0.44)	1.13 (0.46)	0.82 (0.34)	0.19* (0.14)
Constant	1.37 (1.08)	2.59 (2.38)	0.23 (0.23)	1.57 (3.11)

Notes: \*\* p< 0.01. \* p< 0.05. + p<0.10. Standard errors displayed in parentheses.

significantly lower odds of gun ownership than conservatives. Model B used the same outcome, household gun ownership, but added perceived safety as a predictor. Perceived safety was not significantly associated with household gun ownership; no evidence of the hypothesized mediation effect was observed. While Models C and D show comparable models for personal and handgun ownership, respectively. Results are substantively similar to those for gun ownership more generally. As before, the minority status and language vulnerability SVI subdomain was associated with a decrease in the odds of personal gun ownership. An increase in household composition and disability vulnerability was associated with a significant increase in the odds of personal gun ownership. Estimates for control variables remain nearly the same

as in Model B. One exception is that there was no significant difference between liberals and conservatives, only between moderates and conservatives. Model D displays comparable estimates, but with handgun ownership as the dependent variable. With this outcome, none of the SVI domains emerged as a significant predictor. Results differ substantially from Models B and C in other ways as well. Higher perceived safety was associated with a significant increase in odds of handgun ownership. Having an arrest history or having a higher level of education were associated with decreased odds of handgun ownership. Although models omitting perceived safety were conducted to assess possible mediation, no evidence of mediation was found. Results remained substantively the same with and without perceived safety as a predictor.

**Table 3: OLS regression predicting gun attitudes, unstandardized estimates shown (n = 490)**

	Model A	Model B
SVI: Socioeconomics	-0.30 (0.24)	-0.30 (0.24)
SVI: Housing comp. & disability	0.70** (0.21)	0.70** (0.21)
SVI: Minority status & language	-0.41** (0.14)	-0.41** (0.14)
SVI: Housing & transport	0.17 (0.19)	0.17 (0.19)
Perceived safety	--	0.00 (0.04)
Liberal	-0.55** (0.08)	-0.55** (0.08)
Moderate	-0.31** (0.06)	-0.31** (0.06)
Age	-0.02+ (0.01)	-0.02+ (0.01)
Male	0.08 (0.06)	0.08 (0.06)
White	0.18** (0.07)	0.18** (0.07)
Education	-0.03 (0.02)	-0.03 (0.02)
Income	0.01 (0.01)	0.01 (0.01)
Children in home	0.01 (0.06)	0.01 (0.06)
Single	-0.10 (0.07)	-0.10 (0.07)
Divorced, widowed, separated	0.13 (0.09)	0.13 (0.09)
Northeast	-0.12 (0.08)	-0.12 (0.08)
Midwest	-0.19** (0.07)	-0.19** (0.07)
West	-0.04 (0.08)	-0.04 (0.08)
Past victimization	-0.03 (0.09)	-0.02 (0.09)
Ever arrested	0.27* (0.12)	0.27* (0.12)
Constant	2.73** (0.20)	2.72** (0.25)

Notes: \*\* p < 0.01. \* p < 0.05. + p < 0.10. Standard errors displayed in parentheses

Table 3 displays results of models with gun attitudes as the dependent variable. In all models, South is the reference category for region, married is the reference category for marital status, and conservative is the reference category for political orientation. Model A includes all predictors except for perceived safety. Two of the SVI domains were significantly associated with gun-related attitudes. As shown, an increase in housing composition and disability vulnerability was associated with a significant increase in pro-gun attitudes. An increase in minority status and language vulnerability, in contrast, was

associated with a significant decrease in pro-gun attitudes. These results parallel those for gun ownership. Liberals and moderates had significantly lower pro-gun attitudes than conservatives. Being white or having an arrest history, in contrast, was associated with more pro-gun attitudes. Those in the Midwest had lower pro-gun attitudes than those in the South, though other regional differences did not emerge. Perceived safety was added as a predictor in Model B. Results remained substantively the same as Model A, and no evidence of mediation by perceived safety was observed.

**Table 4: Logistic regression predicting protective gun ownership among personal gun owners, odds ratios shown (n = 158)**

	Model A	Model B
SVI: Socioeconomics	31.32+(64.42)	46.54+ (91.38)
SVI: Housing comp. & disability	0.58 (1.18)	0.72 (1.39)
SVI: Minority status & language	0.22 (0.24)	0.21 (0.22)
SVI: Housing & transport	0.01** (0.02)	0.01** (0.01)
Perceived safety	--	0.49+ (0.18)
Liberal	1.81 (1.38)	1.68 (1.18)
Moderate	0.95 (0.52)	1.16 (0.67)
Age	0.92 (0.09)	0.92 (0.09)
Male	0.61 (0.28)	0.60 (0.28)
White	0.89 (0.61)	1.09 (0.81)
Education	0.86 (0.16)	0.85 (0.16)
Income	1.17 (0.12)	1.20+ (0.12)
Children in home	2.46* (1.12)	1.90 (0.89)
Single	1.78 (0.84)	2.05 (1.05)
Divorced, widowed, separated	1.60 (1.52)	1.77 (1.67)
Northeast	0.33+ (0.21)	0.33+ (0.22)
Midwest	0.76 (0.55)	0.70 (0.53)
West	0.64 (0.36)	0.80 (0.45)
Past victimization	1.62 (1.15)	1.35 (1.04)
Ever arrested	1.07 (0.97)	1.17 (1.06)
Constant	17.01+ (28.46)	210.42*(508.71)

Notes: \*\* p< 0.01. \* p< 0.05. + p<0.10. Standard errors displayed in parentheses.

Logistic regression models predicting whether personal gun owners have guns for personal protection versus other reasons are shown in Table 4. Reference categories remain the

same as for Tables 2 and 3. Model A includes all predictors except perceived safety. As displayed, an increase in housing composition and disability vulnerability was associated

with a significant decrease in the odds of owning a gun for personal protection. Having children in the home was associated with a 2.5 times increase in the odds of protective gun ownership. No other predictors emerged as clearly statistically significant. With perceived safety added in Model B, the odds ratio for children in the home was sharply attenuated and reduced to non-significance. This suggests that perceived safety mediated the effect of children in the home on protective gun ownership. Yet, the effect of perceived safety, itself, was only marginally significant. No evidence of mediation by perceived safety for the SVI index variables was observed.

The fear of crime literature suggested significant variation by sex (Adams & Serpe, 2000). Exploratory moderation models, not shown, added multiplicative interaction terms to each of the models from Tables 2 through 4.

These consisted of sex multiplied by each of the four social vulnerability subscales. No evidence of moderation by sex was observed.

## DISCUSSION

This study set out to examine the connection between community social vulnerability and firearms, focusing on both gun-related attitudes and gun ownership. Community vulnerability was assessed under four thematic areas: socioeconomic status, household composition and disability, minority status and language use, housing and transportation (Agency for Toxic Substances and Disease Registry 2017). As expected, an increase in household composition and disability vulnerability was associated with increased likelihood of gun ownership. However, an increase in minority status and language vulnerability had the opposite effect. The same trends were found for pro-gun attitudes, providing partial support for the first two hypotheses. The remaining two social vulnerability themes had no significant

association with either gun-related attitudes or gun ownership. No evidence of mediation by perceived safety was observed for any of the four community social vulnerability indicators. However, perceived safety was associated with greater likelihood of handgun ownership. Possible explanations for findings, practical implications, study limitations, and directions for future research are described in the pages to follow.

The household composition and disability theme of social vulnerability is based on the percent of a community's population that is over age 65, dependent children under age 18, the proportion of residents with a disability, and the proportion of single-parent households (Agency for Toxic Substances and Disease Registry 2017). While age is a known predictor of gun ownership (Gewurz 2013), higher levels of community social vulnerability assessed by these measures were significant predictors of both individual gun ownership and individual pro-gun attitudes, even after taking individual demographics into account. While the combined score does not indicate which of the four measures might be more influential, the role of youth merits further mention. Past studies found that perceived social disorder was predictive of fear of crime (Collins 2016; LaGRANGE, FERRARO, & SUPANCIC 1992).

Indeed, Franklin and colleagues (2008) found that perception of disorder explained more variation in fear of crime across communities than did measures of vulnerability or social integration. Taylor and Covington (1993), specifically, found that the presence of unsupervised groups of teens predicted daytime fear of crime. Wyant (2008), using the presence of unsupervised teens as one component of an incivilities measure, found that perceptions of social incivilities predicted fear of crime. Though this study measures perceived risk rather than fear, these results may help explain why this particular

subdomain of the social vulnerability index was significantly linked to higher likelihood of gun ownership and more pro-gun attitudes. Americans' top reason for owning a gun is personal protection (Swift 2013).

However, the effects of the household composition and disability theme of social vulnerability held even in the presence of a control for perceived safety.

The minority status and language theme of social vulnerability, in contrast, is based on the proportion of racial/ ethnic minorities in a community as well as the proportion of community residents that do not speak English well (Agency for Toxic Substances and Disease Registry 2017). While it was hypothesized that increases in any form of vulnerability would be associated with increased gun ownership and increases in pro-gun attitudes, this dimension of social vulnerability did not follow that expectation. Most gun owners in the U.S. are White (Gewurz 2013), so decreased likelihood of gun ownership in communities with a more sizeable minority population is perhaps not unexpected. However, the social vulnerability finding held even when individual demographics were included in the models. Thus, some other explanation must be driving this effect. Results of the present study also indicated that minorities held fewer pro-gun attitudes, on average, than Whites.

One possible explanation is the prevalence of gun violence in minority communities. Past research found that racial and ethnic minorities were at much higher risk for gun violence at the individual and community level than Whites (Beard et al. 2017). Homicide, generally by firearm, is the leading cause of death for non-Hispanic Black men ages 15 to 35 (Currie 2018). Observing violence or awareness of community-level gun violence may dampen views towards firearms as a whole for those in these communities. One study found that racial and ethnic minorities

were less supportive of violence as a tool to prevent future violence as well as the right to kill another person in self-defense (Rose 2008). Interestingly, however, other research found that exposure to community violence was predictive of adolescent violent behavior (Rojas-Gaona, Hong, & Peguero 2016). While models included a very basic control for race (White/ non-White) as well as a measure of past victimization, exposure to violence was not assessed.

The present study hypothesized that the effects of community social vulnerability would be mediated by perceived safety. This expectation was not supported by the data. Indeed, perceived safety was unrelated to household gun ownership, personal gun ownership, and gun attitudes. Perceived safety was only marginally related to odds of protective gun ownership, and in an unexpected direction. Only for handgun ownership did perceived safety emerge as a meaningful predictor. These results suggest that fear of crime is likely not the mechanism through which community social vulnerability impacts gun ownership, gun attitudes, and related constructs. Future research is needed to explore other possible mechanisms, such as community culture or history and social integration.

## **PRACTICAL IMPLICATIONS**

The present study found that features of the greater community significantly influenced individual gun ownership and perceptions of guns, even after accounting for perceived safety. In particular, there was a significant impact stemming from social vulnerability measured by a community's age demographics, single-parent households, and proportion of residents with disabilities. These observations indicate that gun ownership cannot be considered merely an individual choice, but instead a choice shaped by and perhaps constrained by the community in which that person resides.

## LIMITATIONS

This study has several limitations that must be kept in mind. First, the sample is not nationally representative. Even with the use of weights to correct for the overrepresentation of gun owners in the study's design, the sample still includes an overrepresentation of females in comparison to the overall U.S. population.

Second, the sample is small. Results that may emerge as statistically significant in a large sample may not be apparent in this study. Several results were only marginally significant, which may be due to sample size. The sample size is not sufficient for hierarchical linear modeling (HLM). Additionally, the response rate is low, which may be indicative of some degree of self-selection bias given the nature of the survey topic. This limits the generalizability of the results. Lastly, the survey asked respondents to report their views at a single point in time. Without a longitudinal study, change in behavior or attitudes over time, such as in response to a disaster or violent event, cannot be determined.

It is unknown, for instance whether a given respondent may have purchased a gun as a consequence of observing or experiencing an event in community. Kleck and colleagues (2011) used a hypothetical to work around the temporal order issue, but only one other study to date (Hauser & Kleck 2013) has used a true panel design.

## DIRECTIONS FOR FUTURE RESEARCH

The results of the present study suggest several fruitful avenues for future research. First, the sample used by the present study was of limited size and predominately consisted of White females. As a result, race was categorized very simply rather than as a complex breakdown by race and ethnicity. Given the significant link to the minority status and English language subdomain for social vulnerability, future work focusing on a more

diverse sample may help to better distinguish differences by race or ethnicity. The existing research on the Latino paradox, in particular, indicates that a sample that includes a sizeable number of Hispanics is needed. Past studies found that Latino communities which were expected to have higher rates of violence than other communities due to poverty and related factors actually had lower rates of violence (Burchfield & Silver 2013; Sampson 2008).

Additionally, it may be informative to examine both the SVI measure focusing on minority status in a community as well as some measure of residential segregation for that same community. A high proportion of minority residents could be distributed across a city or may be isolated to some sort of enclave. Without the additional measure, this difference cannot be assessed, nor can its potential impact on gun-related attitudes and behaviors. It is quite possible, for example, that the buffering effect of a high minority population may be partially attributed to low levels of segregation. This would be consistent with the Contact Hypothesis, which argues that greater levels of contact between Whites and minorities improve racial attitudes (Sigelman & Welch 1993).

Second, an examination of respondents' reasoning for their perceptions of safety may prove useful. In the present study, respondents were asked to indicate their perceived safety across a variety of locations using a Likert scale. However, no questions asked respondents why they felt particularly safe or unsafe in those areas. For instance, the role of past exposure to violence, even if not personal victimization, merits further investigation. If perceived collective efficacy indeed differs across low-minority and high-minority communities (Burchfield & Silver 2013), open-ended questions asking respondents to explain their perceptions of safety may indicate the degree to which

respondents take social ties into account in developing these perceptions. Past research found that both collective efficacy and social integration played a significant role in fear of crime (Gibson, Zhao, Lovrich, & Gaffney 2002). Yet, fear of crime among elderly individuals can also lead to increased interaction with and trust in neighbors (Oh & Kim 2009). The direction of this effect, which may indeed be reciprocal, needs additional examination within minority communities.

## CONCLUSION

The present study used data from a recent nationwide survey to investigate how community-level vulnerabilities shape individual firearm-related behaviors and attitudes. Since Americans' top reason for owning firearms is personal protection, it was largely expected that individuals who saw themselves, or their communities, as more vulnerable would be more supportive of gun ownership and guns more generally. As expected, an increase in household composition and disability-related vulnerability was associated with increased likelihood of gun ownership and more pro-gun attitudes at the individual level. However, patterns for vulnerability measured by minority population and English-language proficiency ran counter to expectations. Individuals living in areas with a more sizeable minority population seemed to experience a buffer effect; even those most personally fearful were less "pro-gun" in these areas. These results highlight the need for more detailed research concerning how community-level features can shape the individual, particularly the role of minority populations. Additionally, results further emphasize how individual demographics, alone, cannot fully account for the diversity in gun control attitudes prevalent in the U.S. today.

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