


# Anxious About Social Violence: The Emotional Underpinnings of Support for Gun Control

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*Objective.* We theorize that anxiety (fear) related to mass shootings and social violence increases support for gun control among the American public. *Methods.* We support our theory with a regression discontinuity analysis based on an actual mass shooting, observational analyses from the same data set testing the relationship between fear and support for gun control, and two survey experiments that prime anxiety in the context of mass shootings and social violence. *Findings.* We show that support for gun control increased on the day after an actual mass shooting. Observational analysis shows a positive correlation between fear of crime and support for gun control. One priming experiment shows that inducing anxiety about mass shootings increases support for gun control. A second priming experiment shows that exposure to a story about social violence activates anxiety and also increases support for gun control. *Conclusions.* Our analyses show that anxiety related to mass shootings and mass violence increases support for gun control.

In recent years, Americans have experienced multiple occurrences of two forms of social violence. On the one hand, mass shootings, which seem to occur randomly and unexpectedly, can lead to numerous fatalities. On the other hand, violent demonstrations and rioting that can happen in response to external events such as police shootings, but also include an element of surprise and unpredictability, can lead to property destruction, but also injuries to participants, bystanders, and police officers, and sometimes even death. The threat associated with such seemingly unpredictable and uncontrollable events can elicit fear (i.e., anxiety) in the public (Albertson and Gadarian, 2015). Does anxiety associated with such events influence public support for gun control? If so how?

A broader set of studies in sociology and political science has explored the relationship between fear and gun ownership. Studies have tested whether fear is a driver of decisions to buy a firearm. The results on that are mixed (Dowd-Arrow, Hill, and Burdette, 2019; Filindra, Kaplan, and Buyuker, 2020; Hauser and Kleck, 2013), although there is some evidence that firearm ownership may act as a “palliative,” as it correlates with lower levels of various phobias (Dowd-Arrow, Hill, and Burdette, 2019). However, these studies do not test the effects of fear on gun control preferences, so any evidence from this literature is indirect, through the role of fear in gun ownership decisions.

Recent studies of public opinion show that mass shootings can lead to an uptick in support for gun control. Specifically, Newman and Hartman (2017) find that proximity

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SOCIAL SCIENCE QUARTERLY

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DOI: 10.1111/ssqu.12857

to the location of a mass shooting correlates with increased support for gun control. The implication is that temporal or spatial proximity to such events increases anxiety in people and anxiety may increase support for gun control. However, these findings are contested (Rogowski and Tucker, 2018; Barney and Schaffner, 2019). Experiments have also shown that exposure to stories about mass shootings can lead to increased support for gun control but have not explored the role of anxiety (McGinty, Webster, and Barry, 2013).<sup>1</sup>

Observational studies have sought to link anxiety from mass shootings to support for gun control. Specifically, Joslyn and Haider-Markel (2018) have used survey analyses to show that individuals who felt more anxious about mass shootings were also more likely to support gun control measures. Studies of gun control policy generally suggest that fear of crime increases rather than decreases support for gun control (e.g., Celinska, 2007; Filindra and Kaplan, 2016, 2017), which further suggests that anxiety may be the mechanism linking people's response to social violence and support for gun control. However, these studies do not investigate the context of either mass shootings or social violence specifically. Furthermore, the evidence that we have on the role of anxiety, so far, comes from observational analyses.

This study brings new evidence to bear that links anxiety in response to mass shootings and social violence more broadly to increased support for gun control. First, we use a regression discontinuity model on a 2015 nationally representative survey that coincided with a mass shooting to estimate the actual effects that a major incident of social violence has on the public's support for gun control. This analysis begins to identify a causal link between fear of mass shootings and support for gun control. Second, we analyze the same data observationally to demonstrate a positive relationship between stated fear of crime and support for gun control. Third, a priming study shows that experimentally activating anxiety related to mass shootings also increases support for gun control. Finally, a second experiment shows that eliciting concerns about social violence and riots can increase feelings of anxiety and strengthen support for gun control.

### *Anxiety and Guns*

Mass shootings and social violence can induce high levels of fear or anxiety in the public. Psychological theories of anxiety use the terms "fear," "anxiety," and "stress" interchangeably to denote a type of negative emotion that emerges in response to threatening external stimuli (Neuman et al., 2007). This emotional response induces people to be more alert to a situation, seek more information about it, and seek ways to control it so that the negative emotion can dissipate (Albertson and Gadarian, 2015).

When exposed to external, unpredictable, and uncontrollable threats, people become fearful and anxiety has implications for how people evaluate risk and for the types of political responses that they seek in order to attenuate the fear and reduce the perceived risk. First, high anxiety tends to induce people to overestimate the prevalence of risk (Lerner et al., 2003). It also motivates individuals to focus on managing risk and exposure to harm (Eysenck, 1992). The result is that when faced with unmanageable high-anxiety situations, people turn to government to help them mitigate perceived risk. Thus, when anxious, people may be more likely to support restrictions, regulations, and punitive social control measures if they believe that such policies will enhance their security, reduce risk, and thus take away the negative feeling of anxiety (Albertson and Gadarian, 2015).

<sup>1</sup>Although not necessarily stated as such, public health campaigns that focus on gun violence as a way to increase support for gun control may also activate, at least in part, fear and anxiety.

Studies of anxiety have mainly focused on one type of seemingly random, unpredictable, and deadly form of social violence: terrorism. These studies show that when people are induced to think about terrorism, they can become anxious. In turn, priming terrorism-related anxiety can increase support for punitive social control measures, restrictions on civil liberties, and immigration exclusion (Dowler, 2003; Keil and Vito, 1991; Brader, Valentino, and Suhay, 2008; Best, Krueger, and Pearson-Merkowitz, 2012; Lerner et al., 2003; Davis and Silver, 2004). However, these studies have not tied their findings to guns or gun control.

For decades, fear or anxiety has been leveraged to explain Americans' relationship with guns and gun control. Surveys show that a key reason for gun ownership or intent to purchase a firearm is security: people indicate that owning a gun may make them more secure and less fearful of victimization (Pew Research Center, 2017). This has been leveraged by gun control activists to suggest that social violence and the fear associated with it may make citizens double-down on gun ownership and reduce public support for gun regulations (Lichtblau and Rich, 2012). Some evidence from California suggests that mass shootings lead to a spike in gun sales, which in turn could suggest a negative relationship between mass-shooting-induced anxiety and support for gun control (Callcut et al., 2019). However, a second study suggests that mass shootings are correlated with both increases and decreases in gun sales, but in different time periods (Liu and Wiebe, 2019).

Attitudinal studies have found little evidence that links anxiety to a desire for guns and a decline in support for gun control. A study conducted in the aftermath of a mass shooting showed that even though there was an increase in anxiety among non-gun owners, this fear did not translate into a desire to purchase a firearm, leading the authors to believe that the spike in gun sales after shootings is probably to be attributed to a very atypical minority (Stroebe, Pontus Lander, and Kruglanski, 2017). There is also evidence that gun owners are no more anxious about crime than are non-gun owners (Filindra, Kaplan, and Buyuker, 2020). Furthermore, Dowd-Arrow, Hill, and Burdette (2019) show that a variety of phobias as a general predisposition do not correlate with gun ownership; however, gun owners tend to be *less* phobic in some domains (e.g., they are less fearful of animals and insects). The same study, though, suggests that gun owners may be more fearful of mass shootings than are non-gun owners. This literature does not directly address gun control preferences.

On the other hand, observational studies focused on fear of crime and perceived risk of victimization as stable predispositions suggest that anxiety may contribute *positively* to support for gun control (Filindra and Kaplan, 2016, 2017; Kleck, Gertz, and Bratton, 2009). Studies focused more specifically on mass shootings have documented the importance of situational anxiety: both temporal and geographic proximity to such events leads to an increase in support for gun control. Newman and Hartman (2017) hypothesize, but do not directly test, that this relationship is the result of situational anxiety. An actual mass shooting increases the salience of social violence in citizens' minds. The anxiety produced by these negative thoughts about mass shootings contributes to an increase in public support for gun control. Joslyn and Haider-Markel (2018) test the anxiety hypothesis using observational data collected after a major mass shooting in Orlando. The study finds that anxiety induced people to become more supportive of gun control in an attempt to mitigate risks. However, other studies show no relationship between the occurrence of mass shootings and the public's support for gun restrictions, suggesting that situational anxiety may not affect gun policy preferences (Rogowski and Tucker, 2018; Barney and Schaffner, 2019).

Given that heightened anxiety leads to overestimation of risk, avoidance of danger, need for surveillance, and support for more intrusive government involvement, we hypothesize that anxiety related to highly unpredictable and violent events, such as mass shootings or social violence, should correlate positively with support for gun control.

## Observational Data and Methods

### *Regression Discontinuity Analysis*

On Sunday, June 17, 2015, 21-year-old Dylann Roof walked into the Emanuel African Methodist Episcopal Church of Charleston, South Carolina during Bible study. Roof pulled out a handgun and started shooting at the congregants, killing nine people and injuring one other person (Horowitz, Corasaniti, and Southall, 2015). The shooting received extensive media coverage for several days as police hunted for the killer and brought him into custody. This was one of the deadliest shootings in a house of worship to have ever taken place in the United States (Stelloh, 2017) and ranked among the deadliest mass shootings of the 21st century. Thus, this event represents a salient exogenous “crime” shock.

The national survey on gun policy attitudes used for our baseline observational analysis was fielded by YouGov on June 17–28, 2015, and thus overlapped with the shooting.<sup>2</sup> We analyze the survey data using two distinct methodologies: linear regression analysis and regression discontinuity design (RDD). While linear regression models can indicate attitudinal associations between fear of crime and gun policy preferences, the RDD model seeks to capture whether the shooting itself had an effect on public opinion toward gun policy and whether the effect is in the direction that we hypothesized, that is, whether the shooting increased support for guncontrol measures. If public opinion does not respond in the expected direction to a real-life gun-related atrocity such as this, it seems unlikely it will be movable at all based on experimental manipulation.

We employ a RDD to assess whether the Charleston incident produced a shift in gun control attitudes. A total of 229 responses were collected through the day and early evening of the shooting. Because the shooting occurred late in the day, we assume that all those interviewed that day were interviewed before media coverage had exposed them to this event. We therefore consider them in the “pretreatment” category. A total of 305 respondents were interviewed the day following the event, and the remaining 1,364 respondents completed their interviews over the next 10 days. We exploit the quasi-experimental nature of the data collection to test whether real-world major shooting events temporarily drive attitudes in support of gun control.

<sup>2</sup>The YouGov survey included a nationally representative sample of 1,900 U.S. adults. YouGov interviewed 2,060 respondents, who were then matched down to a sample of 1,900 to produce the final dataset. The respondents were grouped by race/ethnicity and matched on gender, age, and education to a final sampling target of 450 African Americans, 450 Latinos, and 1,000 non-Hispanic whites. The frame was constructed by stratified sampling from the full 2010 American Community Survey (ACS) sample with selection within strata by weighted sampling with replacements (using the person weights on the public use file). Data on voter registration status and turnout were matched to this frame using the November 2010 Current Population Survey. Data on interest in politics and party identification were then matched to this frame from the 2007 Pew Religious Life Survey. The matched cases were weighted to the sampling frame using propensity scores. The matched cases and the frame were combined and a logistic regression was estimated for inclusion in the frame. The propensity score function included age, gender, years of education, and ideology. The propensity scores were grouped into deciles of the estimated propensity score in the frame and post-stratified according to these deciles.

The dependent variable used in this analysis is an index variable consisting of responses to eight items related to gun policy restrictions. The survey scored all items on a four-point Likert scale (strongly agree, somewhat agree, somewhat disagree, strongly disagree). We recoded all variables in the direction of greater support for stricter gun restrictions and rescaled each as 0 to 1 ordinal scales.<sup>3</sup> Descriptive statistics for these items, along with the exact question wording, can be found in supplementary Appendix A.

Our first analysis treats respondent interview date as the running (or score) variable. June 18 (the day after the shooting) is our discontinuity because all the interviews on June 17 were collected prior to the shooting or before information about the event began circulating through the media. Respondents to the left of the discontinuity are in the “control” condition, whereas respondents to the right are in the “treated” category.

Given the continuous nature of our dependent variable, we estimate a linear regression discontinuity, polynomial order 1, with June 18 as our discontinuity. We estimate both a baseline model without controls, then a model with demographic controls (see supplementary Appendix A2 for balance table on pre-/postdiscontinuity). In addition, we estimate a “same” slope model where we treat the slope as the same on either side of the discontinuity (Cattaneo, Idrobo, and Titiunik, 2017). Since our hypothesis is directional, we provide results for one-tailed tests of significance. The first model (Table 1, Column 1) reveals a discontinuity coefficient of 0.053, indicating that respondents interviewed just after the public was notified about the shooting were more supportive of gun restrictions by 0.053 scaled points ( $p < 0.001$ , one-tailed). This is equivalent to a roughly one-point increase on a 25-point dependent variable scale, redounding to a 4 percent average treatment effect. While the effect size appears small, the very fact we find opinion change in response to an exogenous shock on guncontrol attitudes is unexpected, given that policy preferences and attitudes are thought to be highly stable (Page and Shapiro, 1992). In short, the shooting appears to have elicited attitudes in the direction of favoring more gun regulation.

Figure 1 provides a graphical representation of the shift in the coefficient for our gun-policy index at the discontinuity point. This RDplot shows a vertical discontinuity line with respondents interviewed on the left treated as “control” and respondents to the right as “treatment.” The figure demonstrates an increase in support for guncontrol policies in the days following the shooting.

Table 1, Column 2, shows that these results hold even when demographic controls are included in the model ( $b = 0.059$ ;  $p < 0.05$ ). This reassures us that the results are robust to a variety of model specifications, which control for different covariate distributions on either side of the discontinuity, especially because the proportion of gun owners prior to the event is higher than after.

As a robustness check, we estimated two additional models of opinion on issues that should be unrelated to gun policy: welfare and abortion. Our argument is that the mass shooting should invoke opinion change on guns but not on welfare or abortion because the latter issues were not invoked by the mass shooting, nor would further regulation of abortion or welfare mitigate the risk of victimization by a mass shooting. The results, presented in supplementary Appendix A3, reveal what we would expect. The discontinuity coefficients for both welfare and abortion are effectively zero ( $-0.004$  and  $-0.007$ ). In other words, only guncontrol attitudes shifted after the shooting. These placebo tests provide additional assurance that the Charleston event provoked gun policy attitude change.

To provide additional assurances, we estimated daily discontinuity effects. If public opinion was truly responding to the mass shooting, then we might expect gun attitudes to vary

<sup>3</sup>The eight items were combined into a single additive index variable ( $\alpha = 0.873$ ).

TABLE 1

Gun Policy Attitudes: Dylan Roof Shooting RDD Model (DV = Gun Policy Index)

	Base (1)	Covariates (2)
Discontinuity effect	0.053*** (0.024)	0.044*** (0.021)
X slope (same)	0.003 (0.003)	0.002 (0.003)
Education		0.012** (0.005)
Black		0.065*** (0.018)
White		-0.073*** (0.016)
Female		0.099*** (0.012)
Born again		-0.092*** (0.013)
Age		0.002*** (0.0004)
Income 40–80K		0.008 (0.015)
Income 80–120K		0.007 (0.018)
Income 120K +		0.057** (0.025)
Income missing		-0.022 (0.019)
Gun owner/household		-0.214*** (0.013)
Constant	0.510*** (0.019)	0.461*** (0.041)
Observations	1,900	1,900
$R^2$	0.006	0.240
Adjusted $R^2$	0.005	0.235
Res. Std. Error	0.291	0.255
$F$ -Stat	(df = 1,897) 5.575*** (df = 2; 1,897)	(df = 1,886) 45.829*** (df = 13; 1,886)

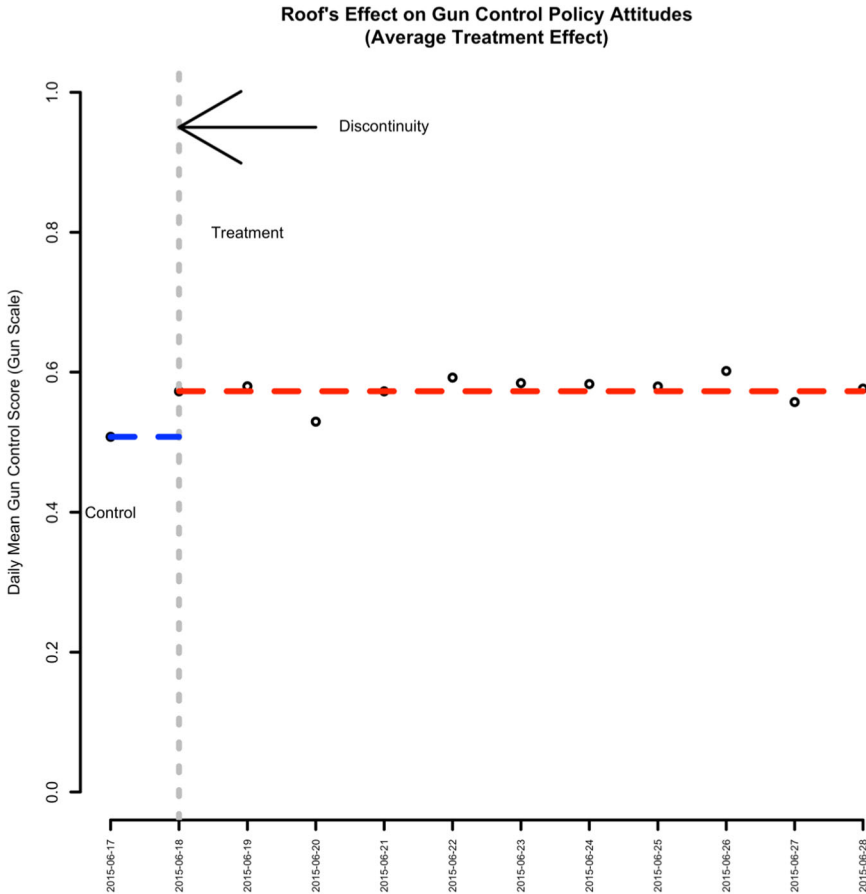
\* $p < 0.1$ ; \*\* $p < 0.05$ ; \*\*\* $p < 0.01$  (one tailed).

the most on the day of the discontinuity, rather than on other days. To examine whether this is true, we estimated daily RDD models beginning with the second day in the survey (the model's RDD "cutpoint") and running through the second to last day of the survey. The figure in supplementary Appendix A4 reveals statistically significant discontinuity effects only when the cutpoint is set to June 18. In other words, the only day that induced a statistically significant discontinuity effect was the day after the shooting. No other days produced a discontinuity. This further strengthens of our findings.

The first day after the shooting is the time when people's responses reflect their immediate, unprocessed response. Roof was captured and processed by police a day after the shooting, which may have contributed to a dissipation of anxiety as the incipient source of danger had been neutralized and the likelihood of future violence eliminated.

FIGURE 1

Discontinuity Plot Showing Average Treatment Effect of Mass Shooting in South Carolina



Furthermore, within two days, political parties, the National Rifle Association, and others had developed frames that contextualized and explained the shooting in ways consistent with their ideology and political goals (McCarthy and Gambino, 2015). Data from newspaper coverage of the incident based on a Lexis Nexis search also suggest that attention to the story was intense on June 19 and 20 and declined thereafter. A search for “Dylan Roof” revealed 75 articles on June 18, 173 on June 19, 166 on June 20, and 59 on June 21 as the media started to move to other stories.

### Limitations of RDD Methods

The regression discontinuity analysis has its limitations. A key concern with this model is that we have fewer than two days of interview observations prior to the Roof shooting. This means that there are differences in the sample sizes included in the “pretreatment”

and in the “posttreatment” conditions. The balance tests and models with controls mitigate some of these concerns but not fully.

Another substantive concern is the highly racialized nature of the Charleston shooting. Unlike other shootings such as Stockton, Columbine, Newtown, Aurora, Las Vegas, or Parkland, which targeted schools or other public settings but were not explicitly racially motivated, the Charleston shooter was a white supremacist who targeted a black church for the explicit purpose of igniting a race war. It is difficult to assess in what ways the racial motivation of the shooter may have affected the responses of various social groups in the American public.<sup>4</sup> In other words, while likely heightening anxiety of social violence among black Americans, the Roof shooting may have activated empathetic anger about racially motivated hate crimes among sympathetic nonblack respondents. This latter response is distinct from the social-violence-induced anxiety stimulus we seek here to understand. Given these constraints, we reinforce these natural, quasi-experimental results by analyzing the relationship between anxiety and guncontrol attitudes using standard linear regression methods on the same survey data.

### Observational Analysis

As a next step, we specified linear regression models using the same dependent variable as described earlier. The survey included three measures that relate to anxiety about victimization. Unfortunately, these items do not address mass shootings but are more broadly about crime. One item asks respondents “*Is there any area right around your home where you would be afraid to walk alone at night? (Yes/No)*” and the other two seek to estimate the respondents’ perceptions of the crime rate in the nation and in their communities. Specifically, the items ask: “*In the past five years, do you think that crime in [your community/the United States] has increased a lot, increased somewhat, stayed the same, decreased somewhat or decreased a lot?*” The first item specifies fear so it represents a good measure of anxiety. We assert that these two additional items can serve as proxies for the level of underlying anxiety a person may have. People who think that crime in the nation and/or their community has increased may be more anxious about victimization than those who believe that crime is on the decline. If this is the case, we expect a positive correlation between these measures and support for gun control.

Following extant research, our models include controls for experience with victimization (Kleck, 1996), racial resentment (O’Brien et al., 2013), egalitarianism (Filindra and Kaplan, 2016), small government ideology (Filindra and Kaplan, 2017), gun ownership (Kleck, 1996), partisanship, and ideology (Joslyn, 2020). We also include key demographics as follows: gender, age, education, income, race (white or black), and born-again Protestant. All variables have been recorded on 0–1 scales consistent with the original nature of the scale.

<sup>4</sup>Appendix Tables A5.1–A5.3 replicate our RDD analysis with several split-sample models. Table A5.1 demonstrates that racial resentment (split sampled at above/below the mean) does not appear to cleave (white and/or Latino) gun control opinion as a function of the shooting. While low racially resentful respondents reveal a statistically significant discontinuity coefficient, the linear hypothesis testing the two D coefficients is insignificant. Table A5.2 (split sampled based on dummy question) demonstrates that while those afraid to walk alone may be more inclined to respond in the pro-gun-control direction as a function of the Roof incident, once again the linear hypothesis test across D coefficients is insignificant. This indicates that preexisting anxiety about crime did not affect response to gun control in the context of the shooting. Finally, Table A5.3 shows that black and nonblack respondents did not respond differentially to the shooting in terms of gun control opinion change. This suggests that regardless of subgroup membership, people have similar responses to an anxiety-inducing exogenous event such as a shooting.



The first set of regressions in Table 2 corresponds to all respondents. The second set of regressions presented in Table 2 corresponds to gun owners. The literature to date has shown that gun owners may be less fearful and exhibit fewer phobias (Dowd-Arrow, Hill, and Burdette, 2019). However, we know less about whether or not anxiety and fear contribute to support for gun control among gun owners.

First, consistent with the extant literature, partisanship, ideology, small government beliefs, experience with victimization, and gun ownership are all statistically significant and negative predictors of gun control preferences. Racial resentment is also negative, consistent with expectations. The measure is not statistically significant in two of the three models but that is because the model includes nonwhites. In the models with whites only, racial resentment is significant in all three models (see supplementary Appendix Table A5). Income, being a woman, and age are positive predictors of support for gun control. Relative to Hispanics, whites and blacks appear less supportive of gun control. This reassures us as to the quality of our overall results.

The row “Crime perception” in Table 2 shows the coefficient of the relevant crime item, while the label of each model indicates which crime belief has been used. Table 2, Model 1, shows the results of a model that includes the item about being afraid to walk in the dark. The coefficient for this measure of fear is positive and statistically significant. The results suggest that those who are fearful of walking in the dark around their neighborhood are 3 percent more supportive of gun control. Similarly, the coefficient related to perception of crime in the nation is positive and statistically significant. Here, a change in perception of the national crime conditions from “decreased a lot” to “increased a lot” corresponds to a 9.5 percent increase in support for gun control. The coefficient corresponding to perceptions about crime in the community is not statistically significant but it is positive.

The next set of three models focuses specifically on those who have a gun in the home. Among this group, victimization does not have a significant effect on support for gun control. However, as was the case with the general population, racial resentment, ideology, partisanship, and beliefs in small government significantly depressed support for gun control. Egalitarianism, being a woman, age, and income corresponded to higher support for gun control even among those in gun owning households. This suggests that there are few differences in the underlying structure of how gun owners approach gun control relative to the population at large.

Next we look at our proxy measures of anxiety. In the first model, the coefficient for afraid to walk in the dark is positive but not statistically significant. However, the coefficient for both perceptions of crime in the nation and in the community is positive and statistically significant. Among those in gun owning households, anxiety arising from beliefs that crime is ascendant in the country or in the local community corresponds to an increase in support for gun control of 10 percent and 9 percent, respectively.

Since other studies have documented differences in the structure of gun control preferences between whites and people of color (Filindra and Kaplan, 2017), the Appendix (supplementary Table A5) includes the same models broken down for white and nonwhite respondents. These results show that among whites, fear of walking in the dark and beliefs that the national crime rate is increasing positively contribute to support for gun control. Among blacks, it is the two contextual variables, perceptions of the national and local community crime rates, that correlate significantly with support for gun control. Overall, our results suggest that anxiety operates in similar ways across race groups.

These results have limitations. The measures do not relate directly to anxiety about mass shootings or violent demonstrations but to more broad fears about crime. Furthermore,

TABLE 2  
OLS Regression Results (DV = Support for Gun Control Index)

	All Respondents			Gun Owners Only		
	Walk	National Crime	Community Crime	Walk	National Crime	Community Crime
Crime perception	0.027** (0.01)	0.095** (0.03)	0.026 (0.03)	0.015 (0.02)	0.104*** (0.03)	0.094** (0.04)
Victim of assault-self	-0.044** (0.02)	-0.038* (0.02)	-0.043* (0.02)	-0.029 (0.03)	-0.031 (0.03)	-0.041 (0.03)
Victim of assault-family	-0.059* (0.03)	-0.051* (0.03)	-0.053* (0.03)	0.015 (0.04)	0.009 (0.04)	0.009 (0.04)
Gun in the home	-0.15*** (0.01)	-0.152*** (0.01)	-0.151*** (0.01)			
Racial resentment	-0.041 (0.03)	-0.063** (0.03)	-0.042 (0.03)	-0.077* (0.04)	-0.105** (0.04)	-0.086** (0.04)
Small government ideology (libertarianism)	-0.225*** (0.02)	-0.228*** (0.02)	-0.223*** (0.02)	-0.22*** (0.03)	-0.22*** (0.03)	-0.221*** (0.03)
Egalitarianism	0.187*** (0.03)	0.175*** (0.03)	0.187*** (0.03)	0.126*** (0.04)	0.111*** (0.04)	0.123*** (0.04)
Ideology (conservative = 1)	-0.133*** (0.03)	-0.144*** (0.03)	-0.135*** (0.03)	-0.207*** (0.04)	-0.213*** (0.04)	-0.213*** (0.04)
Partisanship (GOP = 1)	-0.077*** (0.02)	-0.076*** (0.02)	-0.077*** (0.02)	-0.065** (0.03)	-0.069** (0.03)	-0.062 (0.03)
Woman	0.068*** (0.01)	0.062*** (0.01)	0.07*** (0.01)	0.104*** (0.02)	0.099*** (0.02)	0.104*** (0.02)
Black	-0.039* (0.02)	-0.046** (0.02)	-0.039* (0.02)	-0.025 (0.03)	-0.037 (0.03)	-0.027 (0.03)
White	-0.03* (0.02)	-0.031* (0.02)	-0.033* (0.02)	-0.022 (0.02)	-0.024 (0.02)	-0.025 (0.02)
Age (continuous)	0.001*** (0.00)	0.001*** (0.00)	0.001*** (0.00)	0.001*** (0.00)	0.001** (0.00)	0.001** (0.00)
Protestant, born again	0.004 (0.01)	0.001 (0.01)	0.005 (0.01)	0.015 (0.02)	0.009 (0.02)	0.015 (0.02)

Continued

TABLE 2  
Continued

	All Respondents			Gun Owners Only		
	Walk	National Crime	Community Crime	Walk	National Crime	Community Crime
Education	-0.042* (0.02)	-0.031 (0.02)	-0.044* (0.02)	-0.048* (0.03)	-0.03 (0.03)	-0.049* (0.03)
Income	0.113*** (0.04)	0.123*** (0.04)	0.114*** (0.04)	0.106** (0.04)	0.106** (0.04)	0.11** (0.04)
Income unknown	0.016 (0.02)	0.018 (0.02)	0.016 (0.02)	-0.004 (0.03)	-0.001 (0.03)	0 (0.03)
Constant	0.631*** (0.05)	0.608*** (0.05)	0.63*** (0.05)	0.553*** (0.07)	0.525*** (0.07)	0.516*** (0.07)
N	1900	1900	1900	604	604	604
Adj R <sup>2</sup>	0.545	0.548	0.543	0.522	0.53	0.527
F	103.769	97.716	101.8	51.69	52.261	53.579

\*\*\*p < 0.01; \*\*p < 0.05; \*p < 0.1; data are weighted; numbers in parentheses represent robust standard errors.

our analyses are correlational so we cannot infer a causal relationship between anxiety and support for gun control from these results alone.

### Experiment I: Mass Shooting

As part of a larger survey conducted between May 19 and 31, 2019, we sought to test if the salience of anxiety related to shootings or violent crime has different effects on people's support for gun control. The study included a nationally representative sample of 879 people drawn from an online panel by the survey provider Lucid. The sample was prestratified to ensure that it matched the U.S. adult population in terms of key demographics. Although this is a nonprobability sample, studies show that Lucid samples provide results that are similar to those produced by a probability sample (Tausanovitch et al., 2019).

The survey included an experiment meant to assess whether anxiety about mass shootings increases support for gun control. Half of the respondents were randomly assigned to a question asking respondents to indicate how true or false (four-point scale) were each of the following statements: (1) *Thinking about mass shootings makes me feel anxious*; (2) *I am scared that someone I know could be a victim in a mass shooting*; (3) *the idea that I could be hurt in a mass shootings is frightening to me*. The other half of the respondents were asked a set of three questions about furniture design. Specifically, the questions asked how true or false (four-point scale) were each of the following statements: (1) *Simplicity is the key to furniture design*; (2) *clean lines make furniture inviting and attractive*; (3) *most people prefer function over form when it comes to furniture*. This setup allows us to test what effect induced anxiety as relates to mass shootings may have on gun policy preferences and also, among those who received the anxiety treatment, whether anxiety salience is positively correlated with gun policy preferences.

Our treatment variable is an indicator denoting (1) for the treatment and (0) for the control. Our anxiety salience independent variable is an additive index of the three measures listed above. This measure is rescaled to range from 0 to 1 (continuous scale). Controls for the regression with observational data include gun ownership, criminal victimization, authoritarianism, partisanship, ideology, race (white/nonwhite), age, college degree, gender, income, and region.

The dependent variable is an additive index based on respondents' level of support for four gun policy items, all measured on four-point Likert scales: (1) support for an assault weapons ban; (2) support for a ban on high capacity ammunition magazines; (3) support for a federal database of all gun purchases; and (4) support for a ban on all handguns. The dependent variable is a continuous measure scaled from 0 to 1. The measure is reliable ( $\alpha = 0.76$ ). Descriptive statistics are in supplementary Appendix Table B1 and a balance table is in supplementary Appendix Table B2. Given the continuous nature of our dependent variable, we specified OLS regression models.

Table 3, Column 1, presents the results of a linear regression model that includes only the anxiety treatment variable. The coefficient is positive and statistically significant. The results suggest that eliciting thoughts about anxiety in the context of mass shootings increases support for gun control by 4 percent on our dependent variable. The mean support for gun control among those in the control group is 53 percent, but among the treatment group it increases to 58 percent.<sup>5</sup> This effect is small but meaningful and suggests that

<sup>5</sup>Our mean support for gun control is lower in this experiment because we only include four items, one of which is support for a ban on handguns. Studies show that more Americans oppose a ban on handguns even as they strongly support other forms of gun control (Filindra and Kaplan, 2017).

TABLE 3  
 OLS Regression Results (DV = Gun Control Index)

	Model 1 Base Model	Model 2 w/ Controls	Model 3 Salience
	b/se	b/se	b/se
Anxiety treatment	0.041** (0.02)	0.038** (0.02)	
Anxiety salience			0.315*** (0.05)
Gun in home			-0.1*** (0.02)
Woman			0.02 (0.03)
Income			0.016 (0.02)
College			0.025 (0.03)
Age			0.001 (0.00)
Partisanship (GOP = 1)			-0.148*** (0.04)
Ideology (conservative = 1)			-0.128** (0.06)
Authoritarianism			-0.041 (0.04)
Victim			-0.018 (0.02)
South			0.022 (0.04)
West			-0.055 (0.04)
Midwest			0.008 (0.04)
White			0.018 (0.03)
Constant	0.534*** (0.01)	0.727*** (0.05)	0.492*** (0.07)
<i>N</i>	879	743	397
Adj. <i>R</i> <sup>2</sup>	0.005	0.224	0.314
<i>F</i>	5.029	14.147	18.282

NOTE: Robust standard errors in parentheses. Model 2 controls for all variables shown in the table. The base in Model 3 reflects those respondents who received the anxiety treatment. We do not have data for the respondents in the control condition  
 \*\*\**p* < 0.01; \*\**p* < 0.05; \**p* < 0.1.

anxiety nudges gun control supporters to further increase their support. Model 2, which includes demographic controls, shows that the significant relationship remains even when controlling for several demographic variables and gun ownership. Table 3, Model 3, is based on those respondents who received the anxiety treatment only. Here, the key independent variable is anxiety salience, that is, how anxious people reported being in the thought of mass shootings. The results show that the level of anxiety reported by respondents is a statistically significant and positive predictor of support for gun control. As expected from previous studies, partisanship, ideology, and gun ownership are all

TABLE 4  
OLS Results (DV = Gun Control Index)

	Model 1 Base Model	Model 2 Interaction	Model 3 Gun in Home	Model 4 No Gun in Home
Anxiety treatment	0.041** (0.02)	0.066*** (0.02)	-0.005 (0.03)	0.066*** (0.02)
Gun in home	-0.142*** (0.02)	-0.104*** (0.03)		
Anxiety* Gun in home		-0.071* (0.04)		
Constant	0.592*** (0.01)	0.579*** (0.01)	0.475*** (0.02)	0.579*** (0.01)
<i>N</i>	831	831	297	534
<i>R</i> <sup>2</sup>	0.066	0.069	-0.003	0.015
<i>F</i>	28.462	20.035	0.026	9.188

\* $p < 0.1$ ; \*\* $p < 0.05$ ; \*\*\* $p < 0.01$ .

statistically significant and negative. None of the demographic predictors is significant but this could be a function of a relatively small sample. When anxiety is removed from the model, gender becomes statistically significant.

Studies suggest that gun owners are less anxious and phobic overall but tend to be sensitive to the issue of mass shootings (Dowd-Arrow, Hill, and Burdette, 2019). Our analyses so far show that when it comes to fear as a stable predisposition, respondents in gun owning households react in the same way as those who do not own firearms. The observational data show that gun owners who believe that the national crime rate or the community crime rate is increasing are more likely to support gun control than those who do not harbor similar beliefs.

This experiment allows us to test whether inducing anxiety about mass shootings has differential effects on gun owners and non-gun owners. In Table 4, Model 1, we present the results of a regression that includes our two key predictors, the treatment variable and gun ownership, both of which are statistically significant. Table 4, Model 2, further includes an interaction between gun ownership and the treatment. The interaction term is negative and statistically significant ( $p < 0.05$ , one-tailed). For ease of interpreting the results, we split the sample between non-gun owners and those who have a gun in the household. As the second model in Table 4, Model 4, shows, when exposed to the anxiety prime, non-gun owners become more supportive of gun control ( $b = 0.066$ ;  $p < 0.001$ ). However, the prime appears to have no effect on gun owners (Model 3). These results suggest that induced anxiety about mass shootings increases support for gun control but only among non-gun owners. Contrary to Dowd-Arrow, Hill, and Burdette (2019), we find that those who have a firearm in the household do not appear to be as susceptible to anxiety about mass shootings.

## Experiment II: Social Violence

So far we have presented evidence that anxiety related to mass shootings leads to increased support for gun control. These findings reinforce extant literature by providing additional causal support. In this experiment, we extend the literature to test whether

anxiety related to social violence, that is, violent protests and riots, can also have a similar effect on support for gun control.

In this experiment, we test the effects of exposure to a story about generalized social violence on respondents' support for gun restrictions. This experiment also includes a manipulation check that directly measures anxiety.

This survey experiment was fielded between March 2–18, 2018 and it included 359 completed responses from a sample of self-identified white Americans drawn from the Qualtrics panel. Although the survey is not a probability sample, gender within age quotas were used to ensure a closer demographic match to the ANES. Survey respondents were randomly assigned to one of two groups. The control group was asked to read a story about furniture design, while the treatment group was asked to read an article entitled “Chaos at Your Door? A Dangerous World is Closing In. Drugs. Gangs. Criminals. Rioters. Terrorists. Madmen.” The story was an adaptation of an article published in the *American Rifleman*, the National Rifle Association's flagship publication (LaPierre, 2014). Similar to the original article, the treatment included pictures from violent protests. Both the text and the pictures were selected to induce fear and anxiety among our respondents. To avoid the activation of outgroup considerations, the pictures depict white rioters. The treatments can be found in supplementary Appendix C.

Balance tests on several demographic variables show no statistically significant difference in the allocation of respondents between the two groups, with the exception of education. Only 39 percent of the control group members hold college degrees, compared to 53 percent of those in the treatment group. Given this imbalance, we performed analyses with and without demographic controls. The results from both are very similar.

To ensure that the treatment affected respondents' level of anxiety, we included a manipulation test. Following exposure to the treatment, we included a manipulation check to ensure that the treatment elicited the expected emotional response. Respondents were asked to identify how they felt by choosing three from a list of 16 items tapping four distinct emotions: anxiety, enthusiasm, anger, and disgust. These items are drawn from the literature on emotions in social psychology and political science (Albertson and Gadarian, 2015). Four items correspond to anxiety: (1) worried, (2) anxious, (3) fearful, and (4) afraid. An additional four items correspond to anger, which, according to the literature, often co-occurs with anxiety in many settings (Lerner et al., 2003). These items are as follows: (1) mad, (2) angry, (3) irritated, and (4) upset. We created a binary variable measuring anxiety by counting whether or not a respondent selected at least one of these items. We followed the same procedure to create a measure of anger. A cross-tabulation with our treatment variable shows that 161 of the 231 respondents assigned to the treatment condition (70 percent) reported that the article made them feel anxious. By comparison, only 32 of 241 people assigned to the control group (13 percent) reported feeling anxious as a result of reading the control story about Ikea furniture. Similarly, 65 percent of the respondents in the treatment condition reported feelings of anger, but only 8 percent in the control condition said that the article made them feel angry. We specified a logistic regression using our measure of anxiety as the dependent variable and the treatment as the main independent variable and we controlled for anger (Table 5). The results show that even controlling for anger, respondents in the treatment condition were significantly more likely to report anxiety ( $b = 2.899$ ;  $OR = 18.171$ ;  $p < 0.001$ ). Anger is not a significant predictor of anxiety ( $b = -0.320$ ;  $p = 0.262$ ). The results remain the same when demographic controls are included in the model. The same is the case if we exclude speeders and those who failed attention checks.

TABLE 5  
Effect of Treatment on Emotional Response (Anxiety and Anger)

	Model 1 Anxiety	Model 2 Anxiety	Model 3 Anger
Treatment	2.709*** (0.237)	2.899*** (0.296)	3.074*** (0.275)
Anger		-0.320 (0.286)	
Constant	-1.876*** (0.189)	-1.853*** (0.190)	-2.458*** (0.239)
$\chi^2$	166.41	167.70	183.46
Log-likelihood	-236.082	-235.437	216.150
Pseudo- $R^2$	0.26	0.26	0.30
<i>N</i>	472	472	472

\* $p < 0.1$ ; \*\* $p < 0.05$ ; \*\*\* $p < 0.01$ .

TABLE 6  
OLS Regression Results and Social Violence Experiment (DV = Gun Control Index)

	Base Model	Control
Treatment	0.040** (0.013)	0.047** (0.019)
Constant	0.690*** (0.017)	0.662*** (0.027)
<i>F</i>	4.53	8.93
Adj. $R^2$	0.01	0.133
<i>N</i>	455	362

Controls: Age, gender, income, education, gun in home.

\* $p < 0.1$ ; \*\* $p < 0.05$ ; \*\*\* $p < 0.01$ .

The dependent variable used in this analysis is a gunpolicy index that is very similar to the one that was employed in our first analysis. The index includes eight items ( $\alpha = 0.833$ ). There are two items that were not included in earlier studies: “allow guns to be sold at gun shows without background checks” (reverse coded) and “prohibit sales of firearms by private owners who cannot do background checks.” Both reflect policy proposals that have been debated in recent years. The supplementary Appendix provides descriptive statistics for all items in the index. Table 6 shows the results of OLS regression models with and without controls. In the base model, exposure to the violence treatment significantly increases support for gun restrictions, relative to the control group ( $b = 0.040$ ;  $p = 0.020$ ). This effect is similar in magnitude to the ones presented earlier (dependent variables are on the same 0–1 continuous scales). It suggests that exposure to an anxiety-inducing treatment about social violence increases support for gun control by 4 percent. The mean support for gun control among respondents in the control condition is 69.7 percent and among those in the treatment condition it is 73.6 percent. This suggests that anxiety pushes individuals who are already strong supporters of gun control (as is the general population) to more strongly support restrictions.

We also sought to address whether gun owners may respond differently than non-gun owners to induced anxiety related to social violence. A model in which we interacted gun



ownership with the treatment produced null results (not shown). One reason for the null interaction is that the experiment may be underpowered for interactions. This makes it impossible for us to determine whether the null effect is a real finding or simply the result of insufficient statistical power. If the result is in fact a representation of reality, this may suggest that anxiety related to different social phenomena may affect gun owners differently. Future research needs to address these questions.

Overall, results from this experiment further strengthen our contention that anxiety induced by social violence, not only mass shootings, can increase support for gun control among the public. Our studies also suggest that different types of anxiety may have similar effects on support for gun control, which would be consistent with Lerner et al.'s (2003) insights on how anxiety operates on risk perceptions. More research is needed on the effects of anxiety both in terms of situationally-induced anxiety and stable measures of anxiety as a trait. Additionally, scholars have suggested that anxiety can be framed by political actors and directed to motivated ends (Albertson and Gadarian, 2015). This suggests that certain population subgroups may respond differently to anxiety. This is especially the case for partisans (cf. Joslyn and Haider-Markel, 2018). More research is needed to address possible polarizing effects of partisanship and ideology in the context of anxiety.

### **Limitations**

Experiments provide evidence of causal relationships, but they also come with limitations. First, to the degree that our sample is not reflective of the population, our findings are limited in terms of external validity. The fact that our demographics closely track the ANES provides some reassurance in this respect.

Although the effect sizes that we present in this article are rather small, it is important to note that even small effect sizes can have important social consequences when scaled up and translated into population- and policy-level outcomes (McCartney and Rosenthal, 2000). Furthermore, the effect size should be evaluated in the context of how easy or difficult it is to move attitudes or behavior in a particular domain (Prentice and Miller, 1992). In today's polarized political environment, producing movement on salient policy domains is very difficult.

### **Conclusion**

There is bitter irony in the stipulated relationship between mass shootings and social-violence-induced anxiety and support for gun control. Lacking any strong identity-based appeals, supporters of gun control have had to focus their messaging, at least in part, on anxiety. Public health messaging that emphasizes the prevalence of gun violence and the effects on victims of mass shootings and other gun-related incidents can activate anxiety. However, our results and those of others show that the positive effect of anxiety on gun control preferences is modest and time limited. A mass shooting, like the Roof case in Charleston, SC in 2015, can act as a focusing event that activates anxiety. But the effects can quickly dissipate.

Mobilizing anxiety to sustain a gun control movement may require high and prolonged levels of social violence. The overall decline of social violence in American society, at least until recent waves of mass shootings and violent protests, may have weakened public

support for gun control because people had become less anxious and thus less focused on gun control.

Gun rights activists, on the other hand, rely on things that are easier to mobilize and sustain over time: identities. Studies suggest that identities are central motivators of action in politics. Identities certainly play a key role in the domain of gun control driving policy preferences (Filindra and Kaplan, 2016), partisan preferences (Lacombe, Howat, and Rothschild, 2019), and voter turnout (Joslyn, 2020). At the same time, anger and enthusiasm, which are often activated by identity threat, can mobilize people to vote and to be politically engaged (Valentino and Neuner, 2017). Given the strong social identities prevalent among gun owners, gun activists can easily communicate identity threats to elicit anger or point to potential policy successes to create enthusiasm. Thus, the asymmetry in mobilization and influence in the gun control debate may be located in good part in the role of emotions that each side is able to activate.

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## Supporting Information

Additional supporting information may be found online in the Supporting Information section at the end of the article.

**Appendix A1:** Descriptive Statistics for Individual Items in the Gun Policy Index (DV)

**Appendix A2:** RDD Balance Table on Key Covariates

**Appendix A3:** Placebo: Dylan Roof Shooting RDD Models (Welfare; Abortion)

**Appendix A4:** Daily Discontinuity Plot

**Appendix A4:** Additional Regression Discontinuity Specifications

**Table A4.1.** Gun Policy Attitudes: Dylan Roof Shooting RDD Model (Racial Resentment Split Sample, Subset: Anglos and Latinos)

**Table A4.2.** Gun Policy Attitudes: Dylan Roof Shooting RDD Model (Afraid to Walk Alone, Split Sample)

**Table A4.3.** Gun Policy Attitudes: Dylan Roof Shooting RDD Model (Non-Black vs. Black Split Sample)

**Table A5.** OLS Regression Results by Race (DV: Support for Gun Control Index)

**Appendix B:** Mass Shooting Anxiety Experiment

**Table B2.** Balance Table Experiment I

**Appendix C1.** Social Violence Story (Experiment II)

**Appendix C2.** Experiment II, Balance Table

**Appendix C2.** Experiment II: Descriptive Statistics for DV