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LAW, CRIMINOLOGY & CRIMINAL JUSTICE | CRITICAL ESSAY

From depression to youth school gun carrying in America: Social connectedness may help break the link

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Abstract: School shootings are a serious US problem. Except for restricting the access to firearms, previous research has not identified mediating factors that block the pathway leading from adolescent depression to gun carrying and violence. Our examination of 1,878 adolescents in Boston public schools finds that adolescent depression is associated with carrying guns to school and that social connectedness—positive relationships between the youth and adults—may serve as a mediator between adolescent depression and taking guns to school. Parallel to gun control policy, reinforcing social connectedness may be an effective strategy to prevent mentally distressed youths from taking guns to school.

Subjects: Crime Prevention; Criminology and Criminal Justice; Attachment; Mental Health

Keywords: school gun carrying; adolescent depression; prevention; social connectedness

1. Introduction

In the wake of recent mass shootings in the United States, on 5 January 2016 President Barack Obama unveiled a new strategy to curb gun violence: mental health information will be incorporated in the background check system to prohibit mentally ill individuals from possessing a firearm (National Conference of State Legislatures, 2016). Although there is a heated debate about whether this policy might stigmatize people living with mental illness, and new Trump Presidency heralds its

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PUBLIC INTEREST STATEMENT

School shooting is a serious threat to campus safety. However, little is known about why adolescent depression is linked to gun carrying at school. By examining 1,878 adolescent students in Boston, the study finds that depressed students are three times more likely to carry a gun than those not depressed; but such risk can be reduced by positive relationships between the youth and supportive adults. In addition to gun control policies and early treatment for depression, enhancing the social connectedness between depressed adolescents and supportive adults may break this link.

own pro-gun policy to loosen gun-control statutes, the scientific literature indicates that depression and substance abuse are risk factors for adolescents' gun carrying (Shetgiri, Boots, Lin, & Cheng, 2016), school shooting (Muschert, 2007), and firearm-related suicides (Hemenway, 2004) in America.

2. School shootings, gun carrying, and mental illness

School shootings are major news events, and the number has reportedly increased in recent years, from 36 incidents in 2013, and 58 in 2014, to a record high as 76 in 2015 (Everytown for Gun Safety Support Fund, 2015). According to United States Secret Service and Department of Education's report, most perpetrators of school shootings experienced bullying and harassment by others prior to the incident (71%); had a history of suicidal thoughts or suicide attempts (78%); and exhibited a history of depression (61%) (Vossekuil, Fein, Reddy, Borum, & Modzeleski, 2004), rates far higher than the national average. For example, average rates of depression among adolescents aged 12 to 17 in the United States are 11.4% (National Institute of Mental Health, United States, 2014). Over one-third (34%) of perpetrators of school shootings experienced social isolation (i.e. the relative absence of social relationships) and were characterized by others as "loners" prior to the incident (Vossekuil et al., 2004).

Except for restricting the access to firearms (Hemenway, 2004), previous research has not identified mediating factors that block the pathway leading from adolescent depression to gun carrying and violence. Population studies may shed a light on mechanisms along the pathway, increasing our knowledge about possible ways to prevent gun violence and new tragedies.

3. Social connectedness as a mediator: Findings from the Boston youth survey

The 2008 Boston Youth Survey (BYS) was administered to a representative sample of 1,878 adolescents who were randomly selected from 22 Boston public high schools in the grades 9 through 12 (Harvard Youth Violence Prevention Center, 2008). In the present study, key variables include: (1) gun carrying at school during the past year; and (2) depression: respondents reported how often they "were very sad," "were grouchy, irritable, or in a bad mood," "felt hopeless about the future," "slept a lot more or a lot less than usual," and "had difficulty concentrating on school work." We dichotomized the depression variable; average depression scores above two standard deviations were classified as clinically significant depression (Sbordone, Saul, & Purisch, 2007).

A third key variable was social connectedness. Social connectedness is a central element of social capital (Bourdieu, 1984; Putnam, 2001; Tittenbrun, 2016), and can be defined as the personal belief that adults and/or peers care about them as individuals (Centers for Disease Control & Prevention, 2017). In this survey, respondents rated the extent to which they agreed with two statements, including "An adult in my household tells me that he or she loves me and/or wants good things for me;" and "An adult at my school would help me if I had a problem or were upset" (1 = strongly disagree, 2 = disagree, 3 = agree, 4 = strongly agree). We gave two points for strongly agree and one point for agree, to create a variable with values 1–4. Finally, we controlled for (4) demographic variables—age, sex, and race/ethnicity.

As shown in Table 1, approximately 10% of respondents were White, 47% Black, and 43% other races. Just over 1.5% of respondents reported carrying a gun to school, 12.1% of the sample was categorized as depressed, and the average social connectedness score was 2.38. Consistent with previous literature, depression was significantly associated with gun carrying: adolescents carrying a gun at school are 2.8 times more likely to experience depression when compared to those not carrying a gun (17.2 vs. 6.1%); the odds ratio of depression for gun-carrying adolescents was 3.1 after adjusting for the effects of age, sex, and race/ethnicity. Low levels of social connectedness were a predictor of school gun carrying.

In an effort to test the mediating effect of social connectedness on the relationship between depression and school gun carrying, we performed structural equation modeling (SEM) and found a significant indirect effect ($p < .05$) that leads from depression to social connectedness and then to

Table 1. Background characteristics and risk estimates for gun carrying at school

Variable	1. Background characteristics			2. Risk estimates			
	Total sample (n = 1,878)	(1) Gun-carrying youth (n = 29)	(2) Other youth (n = 1,849)	Crude odds ratio Gun vs. no gun	(95% CI)	Adjusted odds ratio ^a Gun vs. no gun	(95% CI)
<i>Outcome variable</i>							
Gun carrying at school (%)	1.54						
<i>Independent variable</i>							
Depression scores above 2 standard deviations ^b (%)	12.1	17.2	6.1	3.2*	(1.19–8.54)	3.1*	(1.13–8.26)
<i>Demographic variables</i>							
Age (years)	16.3	16.4	16.3	1.08	(.81–1.44)	1.07	(.80–1.43)
<i>Sex</i>							
Female (%; reference)	52.4	31	54				
Male (%)	47.6	69	46	2.61*	(1.18–5.77)	2.64*	(1.19–5.86)
<i>Race/ethnicity</i>							
White (%; reference)	10.1	10.3	10.7				
Black (%)	47.3	58.6	45.9	1.31	(.38–4.53)	1.44	(.41–4.99)
Other (%)	42.6	31.3	43.4	.74	(.20–2.75)	.79	(.21–2.95)
<i>Potential mediator</i>							
Social connectedness (1–4 points)	2.38	1.88	2.41	.71*	(.52–.97) ^c	.71*	(.52–.97) ^c

^aControlling for demographic variables, including age, sex, and race/ethnicity.

^bThe scale of depression in which scores 2 standard deviations above the mean would considered to be clinically significant.

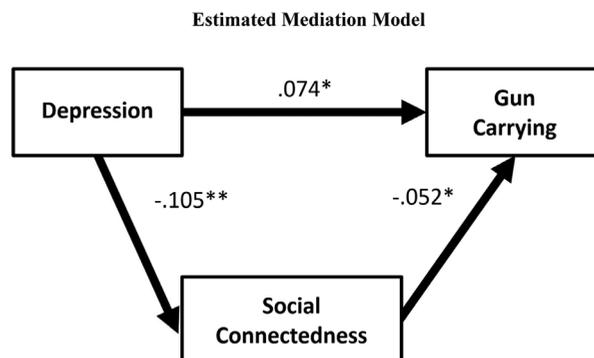
^cRounded values were reported in this table; the 95% confidence interval was .517–.969 for crude odds ratio and .516–.971 for adjusted odds ratio.

* $p < .05$.

gun carrying (Figure 1). The mediating effect of social connectedness accounts for 7% of depression's overall impact on gun carrying, indicating that positive relationships with adults may weaken the link between depression and gun carrying.

Figure 1. Estimated mediation model.

Notes: Standardized path coefficients controlling for age, sex, and race/ethnicity were reported in this graph; the goodness-of-fit statistics indicated a good fit for three models (RMSEA < .001, CFI = 1, TLI = 1); * $p < .05$ ** $p < .01$.



4. Moving forward: Why social connectedness matters?

Positive relationships are a vital component of health and well-being. Social connectedness is associated with better health outcomes, a lower likelihood of depression, and less violent behaviors (Barger, Messerli-Bürge, & Barth, 2014; Stoddard, McMorris, & Sieving, 2011; Umberson & Montez, 2011). For example, a large-scale national study in Switzerland found that being lonely and perceiving unmet emotional support are the strongest and most consistent predictor of depression (Barger et al., 2014). In line with empirical findings, John Bowlby's Attachment Theory (1969) indicates that soothing social relationships with others are a "safe haven" from where children return for comfort and safety in the face of threat. Consequently, as explained in Travis Hirschi's Social Control Theory (1969), attachment to teachers and parents increases self-control and reduces the likelihood of committing criminal acts. Given the social isolation commonly experienced by school attackers (Vossekuil et al., 2004), re-establishment and re-enforcement of positive relationship with supportive adults may reduce aggression both internally and toward the outside world.

Our study has various limitations. As a cross-sectional study, our findings cannot be interpreted as proving causal. Our data come from only one city, and may not be generalizable to other locations. We rely entirely on self-reports, and adolescents are not completely reliable reporters; like participants in most survey research, adolescents are subject to social desirability bias (Krumpal, 2013), which can be overcome by collecting information from multiple informants such as parents and school teachers in future research. While our sample size is relatively large, we have only 29 cases of individuals reporting that they carried a gun to school; a larger sample would help establish that the relationships we found are stable. We classified only 17% of the school gun carriers as depressed; 83% were not, so even reducing depression substantially would not have an enormous effect on school gun carrying. Finally, since only a tiny percentage of school gun carriers became active school shooters, the precise effect of reducing school gun carrying generally on school shooting is unknown because gun carrying does not necessarily lead to gun charging. Clearly, most depressed adolescents do not use guns. Gun users, on the other hand, are not limited to depressed students. To accurately estimate the risk of school shooting, triggering points such as being bullied or heated moments should be taken into account (Vossekuil et al., 2004). However, since school shooters appear far more likely to experience depression and social isolation than school gun carriers generally, reducing social isolation may have a larger effect on the likelihood of school shootings by adolescents than on the overall likelihood that an adolescent will bring a gun to school.

5. Concluding remarks

Our study indicates that the quality of social relationships is associated with less depression and a lower likelihood of school gun carrying. Carrying guns to school by adolescents in Boston is illegal and dangerous. Gun carrying by adolescents is also contagious (Hemenway, Prothrow-Stith, Bergstein, Ander, & Kennedy, 1996) so ways to reduce some school gun carrying can have a sizeable impact. In addition to President Obama's executive action on background checks, reinforcing social connectedness may be an effective strategy to prevent mentally distressed youths from taking guns to school. While new Trump administration may repeal gun-control policies, more urgent research is needed to determine whether depressed adolescents may become depressed adults without the necessary background checks to circumvent legal firearm ownership, and, within a culture likely to have easy access to firearms, what strategies can effectively reduce school gun carrying.

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