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Adolescent Weapon Carrying Inside and Outside of School: The Impact of Experiences and Perceptions of Violence

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Abstract

This study examined factors that distinguish adolescent weapon carrying in school compared to only in the community. We look at how experiences (offending, victimization, and gang-involvement) and perceptions (school, neighborhood, individual) toward violence are associated with self-reported weapon carrying in these two locations. Data came from two waves of the University of Missouri – St. Louis Comprehensive School Safety Initiative, a longitudinal study on the causes and consequences of school violence. Multinomial logistic regression was used to predict weapon carrying among three mutually exclusive categories: those who do not carry, those who carry only in the community, and those who carry both in school and in the community. We find that victim/offenders are more likely to carry weapons regardless of context, but school weapon carrying is positively associated with fatalism and gang-involvement. One school factor, school commitment, impacted carrying both inside and outside of school. Our results identify unique factors that can reduce adolescent weapon carrying in general and specifically in school.

Keywords Weapons · School safety · Violent attitudes · Juvenile delinquency · Victimization

Introduction

Decades of research has accumulated on the various reasons why adolescents carry weapons (Comer & Connolly, 2020; Melde et al., 2009), yet scholarly attention toward differentiating weapon carrying at school from outside of school has been comparatively lacking (c.f., Docherty et al., 2020; Mukherjee et al., 2022). In general, there are at least three motivations for adolescent weapon carrying noted in

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the literature (Melde et al., 2009). First, youth may carry as a response to fear of crime and the threat of victimization (Wilcox et al., 2006). A weapon may symbolize protection and allow students to navigate dangerous situations. Second, youth may carry weapons as a tool to complete other types of criminal activity (May & Jarjoura, 2006). In this sense, the weapon has less symbolic meaning as it relates to the underlying motivation to carry. Finally, youth may carry weapons as part of a violent identity or lifestyle (Fagan & Wilkinson, 1998). These multiple explanations raise the question if there is variation in the reasoning behind weapon carrying. If so, specific factors could be targeted to reduce weapon carrying among students in school.

Although carrying weapons at school has received considerable scholarly attention (Bailey et al., 1997; Brady et al., 2020; Comer & Connolly, 2020; Rountree, 2000; Simon et al., 1997; Teasdale & Bradley, 2022; Watts et al., 2019; Williams et al., 2002), few studies have been able to disentangle carrying weapons across different contexts. It is well established that different social contexts can have different influences on behavior (e.g., Bronfenbrenner, 1979; Ruiz et al., 2018), and it stands to reason that schools and neighborhoods may have unique conditions that contribute to adolescent weapon carrying. For example, peer influence (McGloin & Thomas, 2019), perceptions of safety (Hong & Eamon, 2012) and experiences with victimization (Espelage, 2014) have all been shown to vary across contexts. Would these factors impact the likelihood of carrying a weapon inside of school compared to those who only carry weapons outside of school?

The current study aims to better understand adolescent weapon carrying by using data from the UMSL Comprehensive School Safety Initiative, a longitudinal study of the causes and consequences of school violence. These data contain information on students who carry weapons both inside and outside of school, as well as those who only carry weapons outside of school.[1] By examining known correlates of weapon carrying over time, we can identify unique factors that are independently related to school weapon carrying. Specifically, we examine how 1) victimization/offending, and 2) peers, perceptions, and attitudes toward school and violence are related to carrying weapons in and out of school.

Literature Review

Many factors have been tied to weapon carrying among youth in the research literature. Evidence suggests that males are more likely to carry guns than are females (Dong & Wiebe, 2018; Felson & Pare, 2010; Lowry et al., 2023; Vaughn et al., 2017) and that Black youth are more likely to carry guns than are White youth (Comer & Connolly, 2020; Felson & Pare, 2010; Gaylord-Harden et al., 2022) Experiences with victimization and offending can create the desire for protection but

[1] The preferred typology would separate those students who only carry in school. The low sample size ($n = 13$) prevents us from drawing conclusions from this group and therefore they are removed from the analysis.

may also be part of a deviant lifestyle (e.g., Lowry et al., 2023; Melde et al., 2009). Peers may provide pressure to carry as a way to gain status (Dijkstra et al., 2010; Cao et al., 2008) but youth may also carry as a response to fear when it is known others are armed (Hemenway et al., 2011). Finally, there are various perceptions and attitudes that have been linked with weapon carrying, such as bonds with school (Hemenway et al., 2011; Watts et al., 2019), fear (Esselmont, 2014), and identifying with the "code of the street" (Anderson, 1999; Stewart & Simons, 2010). Yet less is known about how these factors impact weapon carrying inside compared to outside of school. We will further review this literature, beginning with the relationship between victimization/offending and weapon carrying.

Victimization and Offending

Although involvement in a delinquent lifestyle increases the likelihood of carrying weapons (Melde et al., 2009; Rountree, 2000), the overlap between victimization and offending highlights multiple reasons why such youth may carry in the first place. For example, the "fear and victimization hypothesis" (Melde et al., 2009; Newton & Zimring, 1969) suggests victims of crime may arm themselves to prevent additional victimization. This has been found in bullying literature where victims of bullying are more likely to carry weapons (Brady et al., 2020; Docherty et al., 2019; Esselmont, 2014; Oliphant, 2023; Valdebenito et al., 2017). While youth have reported that protection is the main reason they carry (Fagan & Wilkinson, 1998; Simon et al., 1997), prior research shows that gun carrying is positively associated with more general victimization (Felson & Pare, 2010; Spano et al., 2008), violent victimization (Cunningham et al., 2018; Spano et al., 2012; Wilcox et al., 2006), and gun victimization (Watts, 2019).

To better understand the impact of different victimization experiences on weapon carrying, Melde and colleagues (Melde et al., 2009) incorporated measures of self-reported delinquency, thus allowing them to differentiate between "pure" victims, "pure" offenders, and those with both victimization and offending experiences. This differentiation is important due to the "crime facilitation" hypothesis, whereby guns and weapons are seen as a tool to facilitate crime (Emmert et al., 2018; May & Jarjoura, 2006), in addition to the accumulation of evidence linking weapon carrying and delinquency (Keil et al., 2020; Spano et al., 2012). Melde and colleagues (Melde et al., 2009) also examined the link between gang membership and weapon carrying, arguing that gang-involved youth are more likely to carry than non-members (Decker & Van Winkle, 1996; Decker et al., 2022). Using a longitudinal sample of students across seven cities, Melde and colleagues (Melde et al., 2009) found that those with offending experiences (especially gang members) are more likely to carry than those without these experiences, but those who have also been victims are more likely to report elevated levels of perceived risk, which is positively associated with weapon carrying. Among the pure offenders in this study, fear is inversely related to weapon carrying. In a more recent test looking at victimization and fear, Li and colleagues (Li et al., 2021) found that prior victimization only differentiates

between those who have never carried and infrequent carriers, while high-rate carriers reported lower levels of fear than low-rate or non-carriers.

Referring back to the three motivations for weapon carrying identified by Melde and colleagues (Melde et al., 2009), experiences with victimization and the perceived threat of victimization, combined with involvement in a delinquent lifestyle, may contribute to adolescent weapon carrying. Still, it appears that the overlap with offending and victimization may drive this association, as those with only victimization experiences are less likely to carry than those who are also offenders. Moreover, gang involvement appears to elevate the risk of weapon carrying among those who have offended.

Peers, Perceptions, and Attitudes

Decades of research have demonstrated the robust ways that peers influence delinquent attitudes and behaviors (see McGloin & Thomas, 2019), including weapon carrying. For example, both peer gun ownership and peer gun carrying have been found to impact self-reporting gun carrying at school (Bailey et al., 1997; Dijkstra et al., 2010; Docherty et al., 2019; Hemenway et al., 2011). Dijkstra and colleagues (Dijkstra et al., 2010) drew from Warr (2002) and suggest this association is due to guns representing a symbol of status. Warr (2002) argues that fear of losing status with one's close friends and a desire to maintain loyalty can facilitate behavioral compliance with a group even if it goes against one's own moral inhibitions (see also Costello & Hope, 2016). However, influence may also operate through a "contagion effect" whereby youth become fearful of others carrying guns and carry themselves in response to the ever-present threat of victimization (Fagan & Wilkinson, 1998; Hemenway et al., 2011).

Research also suggests that being near violence and victimization is a risk factor for youth weapon carrying (Turanovic, 2022). For example, having a family member that was shot (Hemenway et al., 2011), being directly exposed to gun violence (Beardslee et al., 2018; Docherty et al., 2020; Kodjo et al., 2003), or living in a highly disadvantaged neighborhood (Molnar et al., 2004) are all positively associated with youth weapon carrying. Research also shows a significant association between exposure to gun violence at school and in-school weapon carrying among youth (Lowry et al., 2023).

Additionally, various studies have identified the many perceptions and attitudes of school and violence that are linked with weapon carrying. As it relates to the school context, some studies draw from social control theory and how bonds to social institutions, like the school, can insulate youth from delinquency (Hirschi, 1969). For example, attachment to school (Watts et al., 2019) and having supportive adults at school (Hemenway et al., 2011) are linked with being less likely to carry weapons at school. There is some evidence that perceptions of school, such as fear of being victimized, mediates the association between actual victimization and weapon carrying (Esselmont, 2014).

As it relates to neighborhoods, disorder is positively associated with weapon carrying, while collective efficacy has been shown to reduce the likelihood of carrying

(Molnar et al., 2004). Cultural influences that relate to neighborhoods, such as code of the street (Anderson, 1999; Felson & Pare, 2010; Stewart & Simons, 2010) and having a deviant identity (Felson & Pare, 2010; Rountree, 2000), have been found to directly impact weapon carrying. For example, Fagan and Wilkison (1998) draw from Anderson's (1999) code of the street and argue that prestige is needed to navigate social life in certain communities, and this prestige is often gained by projecting toughness and carrying weapons is one way to secure this identity. Moreover, Anderson (1999: 321) argues distrust in the police leads to the belief that individuals must engage in street justice to ensure their safety since they cannot rely on the police to respond to crime. Youth may arm themselves as a result of exposure and internalization of this code.

One relatively unexplored factor related to these cultural adaptations is fatalism, or the belief that life is predetermined, and little can be done to alter the future (Solomon, 2003). Broadly, studies have shown that those who felt they would not live to see 21 were more likely to engage in both violent and non-violent delinquency (Haynie et al., 2014). While studies have shown a significant association between devotion to the street code and the anticipation of an early death (Wolff et al., 2020), it remains unclear how fatalism is associated with weapon carrying independent of other attitudes.

Taken together, there is evidence that peers can influence adolescent weapon carrying through the use and display of weapons in addition vicarious experiences with victimization. Certain neighborhood conditions impact adolescent weapon carrying in the streets, but less is known if this impacts weapon carrying at school. Other cultural adaptations like code of the street, which is typically studied in neighborhoods, are linked with weapon carrying. Yet less is known about how attitudes linked with violence, like fatalism, broadly impact weapon carrying either inside or outside of school.

Comparing in School and Out of School Weapon Carrying

While there is much literature on the factors associated with gun carrying at school (Comer & Connolly, 2020; Watts et al., 2019; Williams et al., 2002), weapon carrying at school (Bailey et al., 1997; Brady et al., 2020; Rountree, 2000; Simon et al., 1997; Teasdale & Bradley, 2022), weapon carrying in general (Dijkstraet al., 2010; Esselmont, 2014; Felson & Pare, 2010; Melde et al., 2009; Oliphant, 2023), gun carrying in general (Hemenway et al., 2011; Molnar et al., 2004), and weapon/gun carrying in general (Felson & Pare, 2010), there are only a few studies that have given consideration to factors that distinguish in school versus out of school carrying. It is often assumed that factors that are related to weapon carrying in general are the same as those related to weapon carrying in school (Buker et al., 2023; Docherty et al., 2020), but given different influences between and across contexts, this assumption has yet to be fully tested.

In one of the few studies specifically examining gun carrying both at school and in general, Docherty and colleagues (Docherty et al., 2020) utilized data from 246 schools in Arizona and in addition to several of known correlates of offending, including physical aggression, having friends who carry guns, and

gang involvement, they found that those who only carry in school are more likely to be influenced by feeling unsafe in their neighborhood and prior victimization, including threats. The only difference among those more likely to carry outside of school is that they were more likely to be White. Given these differences, Docherty and colleagues (Docherty et al., 2020) concluded that the few students who bring guns to school largely have similar risk factors compared to youth who carry in general. Thus, policies aimed at reducing gun carrying broadly should reduce gun carrying at school.

Buker and colleagues (Buker et al., 2023) came to a similar conclusion using a convenience sample of schools across three states. They examined factors associated with gun carrying in public compared to taking a gun to school and found that self-reported delinquency was strongly related to carrying both in and out of school. They examined mutually exclusive measures of bullying victimization and perpetration, with victim/offenders being more likely to carry in general, but not in school. Given the findings related to delinquency, they suggest that the prevention of students carrying guns in school should not be treated any differently than the prevention of gun carrying in general. They acknowledge the limitations of their cross-sectional data, which also excludes cultural factors related to gun carrying. It is unclear if other factors could be identified to differentiate between weapon carrying across contexts.

Some studies that have looked at weapon carrying in and out of school have had data limitations that inhibited the conclusions that could be drawn. For example, Mukherjee and colleagues (Mukherjee et al., 2022) used data from multiple waves of the YRBS to focus on how safety concerns are associated with both gun and general weapon carrying. Although they found that many of the risk factors are similar for carrying across contexts, their measure of school carrying focused on guns specifically, but their general measure of carrying outside of school focused on weapons broadly. Moreover, due to the design of the study, within-individual changes over time could not be examined. Valdebenito and colleagues (Valdebenito et al., 2017) completed a systematic review of the literature on bullying and weapon carrying and concluded those with both victimization and offending experiences were more likely to carry in school, while pure bully offenders were more likely to carry weapons regardless of location, but this review didn't directly compare in and out of school carrying. Additionally, several studies are cross-sectional and use one-year recall periods which limit conclusions that can be made due to lack of temporal ordering (e.g., Esselmont, 2014; Felson & Pare, 2010; Hemenway et al., 2011; Kodjo et al., 2003).

The current study addresses key limitations in prior research by using longitudinal data to explore how experiences with 1) victimization and offending, and 2) peers, perception, and attitudes toward school and violence impact weapon carrying in and out of school. Importantly, our mutually exclusive typology allows us to isolate factors that independently impact the carrying of weapons only in the community compared to those impacting the carrying of weapons both in school and the community. Prior research tends to suggest risk factors for weapon carrying are the same across contexts; however, few studies have combined self-reported behavior, experiences with violence, and cultural measures.

Methods

Sample

We draw from two waves of a longitudinal study focusing on the causes and consequences of school violence in St. Louis, Missouri. Six school districts were chosen that represent a diverse sample based on school size, racial composition, disciplinary incidents, and the percent of students eligible for free and reduced-cost lunch. For example, the racial composition ranges from a low of 6% Black to a high of 84%, with an average of 42%. Between 16 and 95% of students within each school were eligible for free and reduced lunch and there were between 0.3 to 12.4 disciplinary incidents per 100 students in each school.

All 12 middle schools within the six districts were chosen for participation. During the first wave, two cohorts were selected, representing students from the 7th and 8th grade. Consent was obtained from 3,663 parents, capturing about 78% of those eligible across the six districts. Consent rates varied between schools (62% to 89%) and across school districts (70% to 84%). A total of 3,640 students (99.4% of those eligible) completed the initial online survey during the 2017 spring semester. The following year (spring 2018), 3,165 students in 8th and 9th grade (84% of those eligible) completed wave 2, with 2,753 students in 9th and 10th grade completing wave 3 in spring 2019 (75% of those eligible). Since measures differentiating between inside and outside of school weapon carrying were not added until wave 2, the current analysis is restricted to the last two waves of this study.

Due to respondents not answering all items for all variables under consideration, missing values are handled via multiple imputation using chained equations (Royston, 2005). Here, information from all control variables is used to impute values for missing data. Under the assumption that data are missing truly at random, this method should produce estimates that are consistent with listwise deletion (Allison, 2002). The imputation process is repeated across five data sets with results reflecting the average effects across data sets. The dependent variable was not imputed using this method. Multiple imputation led to 145 cases being added to the sample, bringing the analytic sample to 2,560. As a sensitivity check, the models were re-estimated using listwise deletion. Any deviations are noted in the text.

Dependent Variable

Weapon Carrying is measured by first asking "Have you ever carried a hidden weapon for protection" with a follow-up question asking about frequency over six months. Later in the survey, respondents are asked "Have you ever carried a hidden weapon for protection at school" with a similar follow-up question. At wave 3, a total of 2,392 respondents (91.2%) indicated they do not carry a weapon, 147 (5.6%) report they only carry outside of school, 13 (0.5%) report they only carry in school, and 71 (2.7%) report they carry both inside and outside of school. Due to the low number of students who carry only at school, these respondents were removed from the analysis in order to create distinct, mutually exclusive groups of students.

For our purposes, we create a weapon carrying categorical variable with those who never carry = 0 (91.7% of the sample), those who reported carrying a weapon in the community = 1 (5.6%), and those who report carrying a weapon both in school and the community = 2 (2.7%).

Independent Variables

To capture the victim/offender overlap, we combine measures of self-reported victimization and offending at wave 2 to create a mutually exclusive, categorical variable. Self-reported victimization is measured by asking respondents if they had experienced any of 7 types of victimization during the past six months (being hit, robbed, attacked with/without a weapon, having things stolen). Self-reported delinquency is measured by asking respondents if they participated in any of 12 activities over the past six months (skipping class, lying about age, avoid paying for things, destroying property, stealing something less than $50, stealing something more than $50, burglary, simple assault, aggravated assault, robbery, gang fights, and selling drugs). Three dummy variables are created reflecting the mutually exclusive typology: ***Only Victim*** refers to those who report victimization but not delinquency, ***Only Offender*** refers to those who report delinquency but not victimization, and ***Victim/Offender*** refers to those who report both. **Gang membership** is a dummy variable measured by asking respondents "are you now in a gang." (yes = 1). There are noted limitations using a single-item measure that relies on self-nomination, although there is a long history of its use with established validity (see Esbensen et al., 2001).

Three peer variables capture additional experiences with delinquency and victimization. ***Friend brought a gun to school*** is measured by asking "During the last year, how many of your friends have done the following" with "brought a gun to school" as an option. Response categories include "none of them (= 1), few of them, half of them, most of them, all of them (= 5)." ***Peer assault with weapon*** uses a similar measure and captures friends who "attacked someone with a weapon." ***Vicarious violent school victimization*** is measured by asking "Have you ever seen or heard about these things happening to someone else, and if yes, how often in the past six months" with "someone being badly beaten up or attacked with a weapon at this school" as an option. Response categories for the six-month reference period ranged from 0 to 5 or more.

Five additional measures are included that reflect various attitudes and perceptions of schools and violence adapted from Esbensen and colleagues (Esbensen et al., 2013). ***School commitment*** averages five items that capture how much respondents agree with the following statements: homework is a waste of time, I try hard in school, in general I like school, grades are important to me, and I usually finish my homework. Response categories range from strongly disagree (= 1) to strongly agree (= 5). The items load on a single factor and demonstrate strong internal reliability ($a = 0.70$). ***School collective efficacy*** averages three items that capture how much respondents agree with the following: if there is a problem at school students get together to deal with it, people in this school care about what happens here, and people in this school can be trusted ($a = 0.70$). ***Gunshots in neighborhood*** are a problem is a single item in which respondents report how much of a problem

it is 'hearing gunshots in your neighborhood" (1 = not a problem, 3 = a big problem). ***Fatalism*** is also a single item and captures agreement (strongly disagree = 1, strongly agree = 5) with "there is nothing I can do to change the future." ***Code of the street*** averages five items that capture agreement with the following: People will take advantage of you if you don't show how tough you are, people do not respect a person who is afraid to fight physically for his/her rights, sometimes you need to threaten people in order to get them to treat you fairly, it is important to show others that you cannot be intimidated, and people tend to respect a person who is tough and aggressive (*a = 0.83)*.

Finally, several demographic control variables are included. ***Male*** is a dichotomous indicator for gender (male = 1). Race is captured by creating three mutually exclusive racial categories. ***Black*** is a dichotomous indicator for those who identify as non-Hispanic Black, while ***Other Race*** is a dichotomous indicator referring to those who identify as Asian, Native American, Hispanic, multiracial, or if the respondent selected "other" as a response to the race question (with White as the referent). ***Grade Level*** differentiates between those in the 7th and 8th grade at time 1 (8th = 1).

Analytic Strategy

Due to the nominal nature of the weapon carrying typology, we use multinominal logistic regression to examine factors associated with weapon carrying. This analysis differentiates between those who only carry in the community from those who carry both at school and in the community, with no weapon carrying serving as the referent. Within these models, coefficients are interpreted using the relative risk ratio (RRR) $((e\beta - 1) \times 100)$, where values greater than one indicate the outcome is more likely in the comparison group, while values below one indicates the outcome is more likely in the reference group. To control for the fact there could be underlying similarities between students in the same school, robust standard errors are estimated through clustering by school.

Models use a stepwise approach to first examine how the demographic characteristics predict weapon carrying. Next, experiences with victimization and offending are added, followed by a final model that includes friends' experiences with violence/victimization, and perceptions of schools and violence. To preserve temporal ordering, weapon carrying is measured at time 3 with all other variables measured at time 2.

Results

Descriptive statistics for the full sample are presented in Table 1 along with a breakdown across categories of weapon carrying. For the full sample, around 46 percent are male, 42 percent are non-Hispanic White, 38 percent are non-Hispanic Black, and 20 percent are Hispanic or some other race. Around 5 percent of students report carrying a weapon only in the community, and an additional 2.7 percent report carrying a weapon both inside of school and in the community. Experiences with victimization and offending demonstrated the heterogeneity of this sample, with around

Table 1 Descriptive statistics

Variables	Full sample			No weapon carrying	Community carrying only	School & community carrying
	Mean/%	SD	Missing	Mean/%	Mean/%	Mean/%
Demographic Variables						
Male	0.46	–	20 (0.7%)	0.45	0.47	0.51
White	0.42	–	37 (1.3%)	0.44	0.32	0.23
Black	0.38	–	37 (1.3%)	0.37	0.42	0.62
Other Race	0.20	–	37 (1.3%)	0.19	0.27	0.15
Grade Level	0.49	–	0	0.48	0.56	0.51
Self-Reported Weapon Carrying			143 (5.2%)			
No Weapon Carrying	91.65%	–	–	–	–	–
Carried Outside of School	5.63%	–	–	–	–	–
Carried Inside of School	2.72%	–	–	–	–	–
Self-Reported Victimization/Offending			–	–	–	–
No Victim/Offender	0.49	–	72 (2.6%)	0.51	0.24	0.15
Only Victim	0.08	–	72 (2.6%)	0.08	0.04	0.03
Only Offender	0.28	–	72 (2.6%)	0.24	0.28	0.29
Victim/Offender	0.19	–	72 (2.6%)	0.16	0.43	0.52
Gang involved	0.03	–	92 (3.3%)	0.02	0.06	0.12
Peers, Attitudes, and Perceptions						
Friend brought gun to school	0.03	–	70 (2.5%)	0.03	0.04	0.09
Peer assault with weapon	1.09	0.40	79 (2.9%)	1.07	1.23	1.39
Vicarious violent school victimization	0.21	0.78	78 (2.8%)	0.17	0.50	0.61
School commitment	3.73	0.70	67 (2.4%)	3.76	3.49	3.40
School collective efficacy	2.70	0.87	83 (3.0%)	2.72	2.60	2.36
Gunshots in neighborhood	1.44	0.70	72 (2.6%)	1.41	1.71	1.77
Fatalism	2.33	1.12	120 (4.36%)	2.29	2.46	2.96

Table 1 (continued)

Variables	Full sample			No weapon carrying	Community carrying only	School & community carrying
	Mean/%	SD	Missing	Mean/%	Mean/%	Mean/%
Street code	2.92	0.92	90 (3.3%)	2.88	3.33	3.41
N	2,573			2,392	147	71

Notes: Community only refers to respondents who reported carrying a weapon in general but not in school. School and Community refers to respondents who reported weapon carrying both in school and out of school. The 13 respondents who only carry in school were removed from the analysis due to the small sample size

Abbreviations: *SD* standard deviation

half having no experiences and around 19 percent reporting both victimization and offending. Around 8 percent of the sample reports only being the victim of a crime, with 28 percent reporting only offending. Despite the high levels of self-reported delinquency, only 3 percent of the sample self-identify as a gang member. The same percent report having a peer who brought a gun to school.

There are clear bivariate racial differences that emerge when considering those who report carrying weapons. Among those who carry only in the community, around 42 percent are Black. When considering those who carry both in school and the community, this proportion increases to 62 percent. However, students who report a race other than White or Black are more likely to carry in the community only (27%) compared to the school and community (15%). Experiences with victimization and offending likewise appear to impact weapon carrying. Around 19 percent of the sample report being a victim/offender, and this proportion increases to 43 percent for those who carry only in the community, and 52 percent for those who carry in both school and the community. Those who are only victims report less weapon carrying (3% in school/community compared to 8% among those who don't carry) whereas those who are only offenders report slightly more weapon carrying (29% in school/community compared to 24% among those who don't carry). Although only 3 percent of the sample reports being gang-involved, 6 percent of those who only carry in the community and 12 percent of those who carry in school and the community are gang-involved. Finally, peers, attitudes, and perceptions likewise appear to impact weapon carrying. Compared to those who do not carry, those with friends who bring guns to school, who have more peers who assault others with weapons and who are violently attacked, who hear more gunshots in the neighborhood all report greater proportions of weapon carrying in the community only followed by in school and the community. Similar patterns are found for street code and fatalism, where the mean score is higher across weapon carrying categories.

Table 2 uses a multinomial logistic regression to explore the various factors associated with weapon carrying only in the community compared to carrying at both school and in the community. Model 1 includes a baseline focusing on the demographic characteristics. Compared to those who did not carry a weapon, the relative risk of carrying a gun only in the community is expected to increase by a factor of 1.87 ($p < 0.05$) among those who identify as another race. No other differences emerge when considering only the community. When looking at those who carry both at school and the community, non-Hispanic Black students have a relative risk that is 2.98 ($p < 0.01$) higher compared to those who do not carry.

Model 2 adds in experiences with victimization and offending. We see these factors completely attenuate the association between other race and weapon carrying, which is no longer significant. Yet, non-Hispanic Black students still have a greater risk of weapon carrying in the school and community. Those who are only offenders and who are victim/offenders both experience greater risk of weapon carrying across contexts, with the relative risk being greater for victim/offenders. When considering carrying a weapon in the community, the risk for offenders increases by a factor of 2.43 ($p < 0.001$) and for victim/offenders it increases by a factor of 5.22 ($p < 0.001$). Both groups experience elevated risk of carrying in school and the community (3.10 and 7.87 respectively).

Table 2 Multinomial logistic regression predicting weapon carrying inside and outside of school ($n = 2{,}560$)

	Model 1				Model 2				Model 3			
	Community only		School and community		Community only		School and community		Community only		School and community	
Variables	RRR	SE	RRR	SE	RRR	SE	RRR	SE	RRR	SE	RRR	SE
Demographics												
Male	1.15	0.14	1.31	0.30	1.18	0.15	1.31	0.30	1.06	0.16	1.17	0.30
Black	1.49	0.29	2.98 **	0.33	1.11	0.26	2.04	0.30	0.82	0.26	1.55	0.32
Other Race	1.87 *	0.25	1.61	0.38	1.46	0.25	1.15	0.39	1.16	0.25	0.93	0.42
Grade Level	1.34	0.24	1.22	0.20	1.35	0.21	1.23	0.17	1.32	0.21	1.24	0.16
Victimization/Offending												
Only Victim	–	–	–	–	1.20	0.41	1.17	0.76	0.95	0.42	0.92	0.78
Only Offender	–	–	–	–	2.43 ***	0.25	3.10 ***	0.31	1.85 *	0.25	2.10 *	0.32
Victim/Offender	–	–	–	–	5.22 ***	0.20	7.87 ***	0.32	3.35 ***	0.31	4.45 ***	0.37
Gang involved	–	–	–	–	1.73	0.50	3.88 ***	0.28	1.25	0.47	2.55 ***	0.24
Peers, Perceptions, and Attitudes					–	–	–	–				
Friend brought gun to school	–	–	–	–	–	–	–	–	0.46	0.49	0.98	0.54
Peer assault with weapon	–	–	–	–	–	–	–	–	1.48 *	0.15	1.57 **	0.15
Vicarious victimization	–	–	–	–	–	–	–	–	1.23 **	0.08	1.20	0.12
School commitment	–	–	–	–	–	–	–	–	0.70 **	0.12	0.70 **	0.13
School collective efficacy	–	–	–	–	–	–	–	–	1.10	0.13	0.80	0.12
Gunshots in neighborhood	–	–	–	–	–	–	–	–	1.39 **	0.12	1.20	0.11
Fatalism	–	–	–	–	–	–	–	–	1.00	0.07	1.35 ***	0.08
Street code	–	–	–	–	–	–	–	–	1.28	0.14	1.17	0.09

Notes: Estimated using robust standard errors and multiple imputation using chained equations. Community only refers to respondents who reported carrying a weapon in general but not in school. School and Community refers to respondents who reported weapon carrying both in school and out of school. The 13 respondents who only carry in school were removed from the analysis due to the small sample size

Abbreviations: *RRR* relative risk ration, *SE* standard error

*$p < 0.05$; ** $p < 0.01$; ***$p < 0.001$

The one unique finding that emerges here is for gang-involved youth. There are no differences in community weapon carrying, but the relative risk of carrying both in school and the community is expected to increase by a factor of 3.88 ($p<0.001$ among gang-involved youth. For those who only report being a victim without offending, there is no association with weapon carrying across either context.

Model 3 adds the various peer, perceptual, and attitudinal measures that have been linked with weapon carrying and other forms of delinquency. We see that the associations with race have been completed attenuated in this final model, where non-Hispanic Black students no longer experience greater risk of weapon carrying. All substantive findings for victimization and offending are consistent with the previous model except the strength of the relative risk has been attenuated across all items. Notably the RRR for victim/offender (4.45, $p<0.001$) is highest here among all covariates. Those who have peers who have assaulted others with a weapon are more likely to carry weapons both in the community (RRR = 1.48, $p<0.05$) and in the school/community (RRR = 1.57, $p<0.01$). The only other consistent finding is for school commitment, where a unit increase is expected to decrease the relative risk of weapon carrying in both contexts by a factor of 0.70 ($p<0.01$). The unique findings for gang-involved youth holds in model 3, where membership increases the risk of weapon carrying in both school and the community by a factor of 2.55 ($p<0.001$).

Three additional unique findings emerge in Model 3. When considering those who carry only in the community compared to those who do not carry at all, a unit increase in vicarious victimization is expected to increase the relative risk of weapon carrying by a factor of 1.23 ($p<0.01$). Gunshots in the neighborhood are likewise only associated with carrying only in the community (RRR = 1.39, $p<0.001$). When considering those who carry both in school and the community, it appears fatalism uniquely predicts weapon carrying. A unit increase in fatalism is expected to increase the relative risk by a factor of 1.35 ($p < 0.001$). In this model, having a friend who brought a gun to school, school collective efficacy, and code of the street were all unrelated to weapon carrying.[2]

As a sensitivity check, all three models were re-estimated using listwise deletion instead of multiple imputation. This led to 145 respondents being removed from the analysis. The substantive results are largely similar with two notable deviations. First, school collective efficacy now significantly predicts carrying a weapon inside of school and the community (RRR = 2.16, $p<0.05$). This factor is not associated with carrying only in the community. Second, hearing gunshots in the neighborhood is now associated with school and community carrying (IRR = 3.49, $p<0.01$) whereas with imputation, the only significant association was with carrying only in the community.

[2] When the demographic and peer/perception/attitude measures are removed from model 3, street code increases the risk of weapon carrying in both contexts and collective efficacy decreases the risk among those who carry in school and the community. However, neither of these are statistically significant when including other covariates.

Discussion

Prior research examining factors contributing to adolescent weapon carrying has largely concluded that those who carry weapons in school are similar to those who carry weapons in general (Buker et al., 2023; Docherty et al., 2020). Yet, few studies include longitudinal data on risk factors across multiple domains, and it remains unclear if there are unique characteristics that can be targeted to reduce weapon carrying specifically in school. We attempt to shed light on this issue using data from a sample of students across six school districts in St. Louis County, Missouri, where around eight percent of students reported carrying a weapon for protection during the last six months, with approximately six percent carrying only in the community and three percent carrying both in school and the community.

In line with prior work, we find several risk factors predict weapon carrying in general, irrespective of the context. Experiences with offending (either as only an offender or a victim/offender) increase the risk of weapon carrying across locations, although the risk is notably higher among those who also have victimization experiences. No evidence was found that being the victim of a crime, without involvement in other types of delinquency, increases the risk of weapon carrying. Peer experiences with offending likewise increase the risk of weapon carrying, where having a peer who attacked others with a weapon increase weapon carrying both outside and inside of school. The only protective factor found to *decrease* the risk of weapon carrying in all contexts is school commitment. Those who try hard in school and think grades are important are generally less likely to carry weapons.

Two factors were identified that uniquely increase weapon carrying only in the community. Those who have peers who have been victimized at school and who hear gunshots in their neighborhood are more likely to carry in the community but not in school. The latter finding is rather intuitive in that neighborhood conditions likely have a stronger impact on behavior in the community rather than in school. Nonetheless, it is unclear why vicarious victimization at school only impacts community weapon carrying. Under the fear and victimization hypothesis, those who are afraid of being victimized might preemptively arm themselves for protection. This fear can originate from direct or vicarious experiences, the latter of which is more common. It is possible this could impact those who wish to protect themselves to and from school but are unwilling to bring the weapon on to school property. We did not find evidence of this when looking at those who self-report victimization but not offending. Perhaps these vicarious experiences in school alter one's perceived risk of victimization, which impacts behavior outside of school. But these indirect experiences may not be strong enough to impact carrying a weapon in school.

Our keys findings center on the two factors that uniquely increase weapon carrying both in school and the community. First, we find that gang-involved youth are more likely to carry weapons on school property. Numerous studies document the elevated risk associated with gang membership which has been shown to increase victimization, school-based crime, school disorder, and weapon carrying (Carson & Esbensen, 2019; Decker & Van Winkle, 1996; Decker et al., 2022). When it comes to violence, schools can act as a staging area where identities and reputations are played out, thus making it an extension of the street (Anderson, 1999; Brunson & Miller, 2009; Garot, 2010; Lauger, 2012). Gang youth in Decker and Van Winkle's (1996) sample reported

bringing a weapon to school in response to threats of violence, but only as a deterrent. Although we find that experiences with offending and victimization increase weapon carrying regardless of context, the unique finding that gang-involved youth are more likely to carry in school can be used to guide interventions aiming to disrupt all forms of school violence, a point we return to in the policy implications section.

Second, we found that fatalism is positively associated with weapon carrying both at school and in the community. This measure captures the degree to which respondents feel helpless in changing the trajectory of their future. When youth feel they have no future due to lack of opportunity or loss of hope, it significantly diminishes their fear of negative repercussions for their behavior (Haynie et al., 2014) and increases delinquency (Bolland et al., 2005). Although this is viewed as a risk factor in criminology more broadly, the unique finding here demonstrating this impacts the likelihood of weapon carrying in school can be used to further guide efforts to keep schools safe.

Finally, although not unique to school carrying, the fact that school commitment reduces the risk of weapon carrying across contexts demonstrates a way that schools can have broader impact on adolescent behavior. There is a myriad of benefits when students try hard in school, and we find that this social bond reduces the risk of weapon carrying beyond the confines of the school's walls. Other factors that are significant across contexts, such as victimization/offending, are less amenable at the school level. Our findings suggest that encouraging students to value their education not only enhances their likelihood of completing school but can significantly reduce the likelihood they will carry weapons.

Policy Implications

Although the findings here largely support the notion that the factors that predict weapon carrying out of school are the same ones that predict weapon carrying in school, the unique findings for gang membership and fatalism can help guide future policy. Efforts to reduce gang membership among students should have a multitude of benefits given that gang membership increases offending among youth regardless of their preexisting behavioral differences prior to joining a gang (Decker et al., 2022). When looking at the three motivations for weapon carrying identified by Melde and colleagues (Melde et al., 2009), all three are applicable to gang-involved youth who may carry due to the threat of victimization, a tool to commit other crime, or as part of a deviant identity or lifestyle. Although these motivations could be targeted individually, reducing the number of gang-involved youth should lower the number of weapons brought into school. One approach with documented success is the Gang Resistance Education and Training (GREAT) program. The GREAT program has three goals: 1) teach youth how to avoid gang membership, 2) prevent violence and crime, and 3) improve relationships with law enforcement. A meta-analysis on gang interventions (Huey et al., 2016) concluded it is one of the more promising programs given the multiple evaluations that have concluded participation is linked with lower gang-involvement and improved relationships with law enforcement. It is currently rated as "effective" by the Office of Juvenile Justice and Delinquency Prevention and "promising" by Crime Solutions. Schools may see multiple benefits by offering this program, with our results suggesting it may lower the number of weapons brought in schools.

Additionally, our findings suggest reducing the perception of fatalism among students is another strategy to reduce the number of weapons in schools. The link between fatalism and delinquency is well-researched, with many studies finding a positive association between the two (Alm et al., 2019; Haynie et al., 2014; Jacobs & Cherbonneau, 2017; Warner & Swisher, 2014; Brezina, 2000). However, less is known about how fatalism specifically impacts weapon carrying. Haynie and colleagues (Haynie et al., 2014) found this association among boys but not girls, yet their study considered weapon use and delinquency broadly. Some have suggested fatalism could impact the association between fear and weapon carrying, yet this was not empirically tested (Dowd-Arrow et al., 2019). We believe our findings highlight the need for more research to understand how (and why) youth with these perceptions are at an increased risk of bringing weapons into school. Given the strong association with violence, it is possible this could be used to better identify those at risk of using a weapon at school compared to those who simply carry a weapon. The current data do not allow us to make this distinction, which could shed light into the type of students most likely to contribute to school violence above and beyond bringing weapons into the school environment. Regardless of this distinction, our findings suggest reducing fatalistic attitudes among students should improve school safety by lowering the risk of weapon carrying in school.

Limitations

There are a few notable limitations in the current study that can hopefully be addressed in future research. First, we sought to differentiate between those who carry in school compared to out of school, but our typology could only differentiate between those who only carry in the community to those who carry both in school and the community. Thirteen students reported carrying a weapon only in school. This unique group of students was unfortunately omitted due to the low sample size. It is unclear how risk and protective factors would differ among those who are driven to only be armed while on school property. This represents a small proportion of weapon carriers, yet it is a relatively understudied population. A larger sample would allow a typology to better distinguish between all locations where a student can carry a weapon.

Second, although we include students from a total of six districts (9 after transitioning to high school), all of these districts are in a Midwest region. To address this limited geographic representation, we encourage future research to replicate the study in other parts of the country with even more diverse samples. Along these lines, there are additional factors that could impact weapon carrying that are not included in the current study. For example, target hardening approaches used in schools, such as metal detectors or school resource officers, might impact the likelihood of bringing weapons onto school campus. While our data contain several individual factors, incorporating school-level variables related to security could shed additional light on what increases or decreases the risk of weapon carrying.

Finally, our data cannot distinguish between the different types of weapon carriers, meaning those who carry but do not use the weapon compared to those who both carry and actively use weapons as part of the commission of crime, for status, or to avoid victimization. These underlying motivations for weapon carrying could interact with these

various risk and protective factors. Importantly, these motivations could change over time due to ongoing experiences with victimization and offending, which are strongly linked to weapon carrying across contexts. Additional waves of data examining changes over time could help identify other risk/protective factors and areas for intervention.

Conclusion

The current study finds that reducing gang participation and perceptions of fatalism are unique ways that schools can lower the risk that weapons will be brought to campus. Moreover, increasing school commitment and reducing peer violence and victimization/offending can reduce weapon carrying regardless of context. While there is substantial evidence demonstrating that youth who carry weapons are similar whether they carry in or outside of school, our findings identify specific areas of intervention that can reduce the number of weapons brought onto school property.

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