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Armed Kids, Armed Adults? Weapon Carrying From Adolescence to Adulthood

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Abstract

While much existing research has examined either juvenile or adult weapon carrying, this study assesses whether carrying a weapon to school as a juvenile is predictive of bringing a handgun to school or work in adulthood. Data are drawn from the National Longitudinal Study of Adolescent Health. Results show a decline in weapon carrying behavior over time. However, youth who report school weapon carrying in adolescence are much more likely to report carrying a handgun to school or work in adulthood. Findings also demonstrate that victimization, rather than offending behavior, is predictive of adulthood handgun carrying at school and work.

Keywords

gun violence; juveniles; weapon carrying; desistance

Introduction

Between 1999 and 2006, more than 23,000 children died from firearm injuries (M. L. Nance, Carr, Kallan, Branas, & Wiebe, 2010). Nonfatal firearm injuries totaled more than 115,000 between 1993 and 1997 (Powell, Jovtis, & Tanz, 2001). Although these incidents occur across both rural and urban areas, the incidence of firearm injury in urban areas is particularly troubling. One Pennsylvania-based study found that rates of serious firearm injuries among youth in urban areas were more than 10 times higher than those among youth in rural areas (M. L. Nance et al., 2002). While unintentional injuries were most common in rural areas, assaultive injuries were most common in urban areas (M. L. Nance et al., 2002). Although adults caused some of these injuries and fatalities, juveniles are responsible for the majority of violent crimes against those of age 8–15 (Office of Juvenile Justice and Delinquency Prevention, 2005). Further, across 35 countries, Pickett and colleagues (2005) found that juvenile weapon carrying was associated with increased risk for serious, repeated, and hospitalized medical injury among juveniles.

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In most states, juveniles are legally prohibited from possessing and carrying firearms outside of the supervision of parents or guardians. Federal legislation including the Gun-Free Schools Act of 1994 and 2002 as well as the Gun-Free School Zones Act of 1990 make Federal funding contingent on zero-tolerance weapons policies in school districts (U.S. Department of Education, 2005). In spite of these and other prohibitions, 18% of respondents to the 2013 High School Youth Risk Behavior Survey reported carrying a gun, knife, or club in the month preceding the survey, and that figure was 28% among males (Centers for Disease Control, 2014a). Roughly 5% of respondents reported carrying a weapon to school, and this figure was 7.6% for males (Centers for Disease Control, 2014a). Although these percentages have declined fairly consistently since the early 1990s (Brown, 2004; Centers for Disease Control, 2014a), the potential for juvenile weapon carrying to result in injury or other problematic behavior remains a concern.

The present article explores the stability of juvenile weapon carrying behavior over time. Specifically, this article addresses whether juvenile weapon carrying at school is predictive of adulthood weapon carrying in the school and workplace. Unfortunately, very little is known about workplace weapon carrying. In one study, 18% of emergency room physicians in a Michigan sample reported obtaining a gun as a response to actual or perceived workplace violence, and the number of guns these physicians brought to work is unknown (Kowalenko, Walters, Khare, & Compton, 2005). Another study examining workplace firearm policy found that workplaces where guns were permitted were 5 times more likely to experience a workplace homicide than those where no weapons were permitted (Loomis, Marshall, & Ta, 2005). However, the authors noted that the reasons for employers having these policies were unknown. One possibility offered by Loomis, Marshall, and Ta (2005) was that businesses with a history of crime might have allowed weapons in the workplace as a protective or deterrent measure. This selection effect makes it difficult to determine whether the presence of guns in the workplace reduced or increased violence in these businesses. The authors also did not have data on how many weapons employees brought to work, why, how often, or how many of the homicides involved firearms (Loomis et al., 2005).

Workplace homicides, regardless of cause, are uncommon. According to the Census of Fatal Occupational Injuries for 2013, one of every six workplace fatalities were attributed to workplace violence; however, only 397 workplace homicides were reported (Bureau of Labor Statistics, 2014). Nonfatal violence is much more common. According to the National Crime Victimization Survey, approximately 572,000 nonfatal violent crimes occurred against individuals 16 years and older while they were at work in 2009 (Centers for Disease Control, 2014b). Unfortunately, the role of workplace weapon carrying is unclear. It is unknown how many workplace homicides or injuries involve weapons that employees bring to the workplace. It is also unknown whether firearms in the workplace might deter or escalate violence. To partially address this gap in knowledge, this article examines juvenile weapon carrying at school as a potential risk factor for adult school and workplace weapon carrying.

The present study also builds on prior research in the following ways. First, this study is a longitudinal assessment of weapon carrying that follows juveniles into adulthood. While

many studies examine weapon carrying in either adolescence or adulthood, this study spans both periods of the life course. Second, this article uses a broad definition of weapon carrying in adolescence. Although many studies specifically addressed firearms, assaultive injuries can occur with any weapon. Further, juveniles without access to firearms may choose to carry other weapons. Lastly, this study utilizes a large, nationally representative sample of adolescents. Since the urban–rural differences in weapon carrying and related injuries have been found in other studies, this large sample allows an examination of whether the stability of weapon carrying behavior varies between urban and rural areas. Also, this sample is more encompassing than samples of institutionalized or adjudicated juvenile offenders, and inclusion in the sample is not contingent on involvement with the Juvenile Justice System.

Juvenile Weapon Carrying

Much existing research has focused on the prevalence of juvenile gun carrying. Past research has found that males are more likely than females to carry guns (Hemenway, Prothrow-Stith, Bergstein, Ander, & Kennedy, 1996; Lizotte, Krohn, Howell, Tobin, & Howard, 2000). Other predictors and correlates include exposure to violence or disadvantaged communities, having peers who own and carry weapons, and delinquent behavior (Hemenway et al., 1996; Webster, Gainer, & Champion, 1993). Juvenile gun carrying is also positively related to the rate of gun ownership in the surrounding community (Cook & Ludwig, 2004). While these studies documented the correlates of juvenile gun carrying, other research has attempted to determine why juveniles choose to own or carry weapons.

Using the Rochester Youth Development Survey, Lizotte, Krohn, Howell, Tobin, and Howard (2000) examined the predictors of illegal gun carrying among young urban males. Results showed that gang membership was highly predictive of gun carrying in early adolescence (Lizotte et al., 2000). For older adolescents, involvement in drug trade and heavy drug use were significant predictors. Steinman and Zimmerman also observed this behavior in a sample of African American males (2003). Similar results were found by Webster, Gainer, and Champion (1993). Lizotte et al. (2000) attribute their findings to a desire for protection from dangerous situations and partially to a desire for social status. Other research showed that the desire for protection was the primary reason adolescents owned or carried firearms (Lizotte, Tesoriero, Thornberry, & Krohn, 1994; May, 1999; Sheley & Wright, 1993). Structured interviews with incarcerated juvenile offenders corroborated these findings. Forty percentage of respondents reported that they felt safer with a gun and 40% reported feeling a thrill or sense of empowerment from owning a weapon (Ash, Kellermann, Fuqua-Whitley, & Johnson, 1996).

Not all adolescents carry guns for use in illegal activity, however (Brown, 2004). Lizotte et al. (Lizotte, Bordua, & White, 1981; Lizotte et al., 1994) identified two categories of adolescent gun owners: protection gun owners and sport gun owners. Unlike the protection gun owners discussed previously, sport gun owners carried guns less frequently, were more likely to own long guns than handguns, and had only a slight increase in delinquent activity compared to adolescents without guns (Lizotte et al., 1994). Protective gun owners were more likely to be associated with peers who owned guns for protection (Lizotte et al., 1994).

As Brown (2004) noted, however, the studies discussed about this point do not necessarily imply that most juvenile gun owners use the guns for illicit purposes. Although that association has been established, there are many adolescents who own weapons and never carry them to school or use them for illicit purposes (Brown, 2004).

Cycle of Violence

One subject that cannot be ignored in a study of weapon carrying is the heavy overlap among offending, victimization, and other risk behaviors. Some have argued that those who are victimized as children or adolescents will be more likely to victimize others, thereby creating a cycle of violence (Widom, 1989). Fagan (2005), for example, found that experiencing physical abuse in adolescence increased the likelihood of later criminal offending. Heyman and Slep (2002) found that women exposed to multiple forms of violence as children had a greater likelihood of family violence themselves. A plethora of existing research has established that adolescent victimization is associated with risk behaviors that include substance use, aggression, and fighting, as well as promiscuity (Champion et al., 2004; Cleary, 2000; Kilpatrick et al., 2000).

The victimization–offending link has also been studied with regard to weapon carrying in adolescence. Vaughn, Howard, and Harper-Chang (2006), using interviews with offenders, found that prior victimization and trauma made weapon carrying more likely. However, gang involvement and substance use were stronger predictors of weapon carrying (Vaughn, Howard, & Harper-Chang, 2006). Similarly, Melde, Ebensen, and Taylor (2009) found that gang involvement was a key predictor of weapon carrying (Melde, Ebensen, & Taylor, 2009). However, the authors also noted a link to victimization. Perceived victimization risk predicted weapon carrying for adolescents reporting both victimization and offending experiences (Melde et al., 2009). This was not the case, however, for adolescents only reporting involvement in offending (Melde et al., 2009). Melde and colleagues (2009) consequently argued that the link between victimization and weapon carrying is complex and dependent upon multiple factors. The implications of these findings overall are that juveniles may respond to victimization or fear of victimization by carrying weapons, which in turn may potentially lead to violence. This cycle may help to explain patterns in weapon carrying behavior over time.

Adult Weapon Carrying

Prior research has also examined the subject of adult weapon carrying, with a primary focus on firearms. Drawing on the National Self-Defense Survey, Kleck and Gertz (1998) found that roughly 8% of adults carried guns in the past year. The authors estimated that 2.7 million adults carried guns on their person for protection in 1998 (Kleck & Gertz, 1998). Examining both juvenile and adult arrestees, Watkins, Huebner, and Decker (2008) identified few differences in gun possession or gun carrying between juvenile and adult subgroups. Gang membership was the strongest predictor of both groups (Watkins, Huebner, & Decker, 2008). Increased access to guns was a significant predictor of gun carrying for adults but not for juveniles (Watkins et al., 2008). However, increased access to guns was a predictor of gun ownership for both groups (Watkins et al., 2008). Kleck and Gertz (1998) found that adult gun carrying was more common among males, Blacks, those living in the

South and West, crime victims, those with ties to crime victims, those who perceived crime to be a problem in their neighborhood, and those with a “self-help” orientation.

As with juveniles, Lizotte, Tesoriero, Thornberry, and Krohn (1994) categorized adult gun owners into two types: low risk and high risk. Low-risk owners were similar to the juvenile sport gun owners (Lizotte et al., 1994). They were generally not involved in criminal activity, lived in more rural areas, and owned guns for sport (Lizotte et al., 1994). High-risk owners, in contrast, were similar to the juvenile protective gun owners. These individuals were more likely to live in urban environments and use guns for illicit purposes (Lizotte et al., 1994). As with juveniles, these results indicate that not all adult gun carrying is associated with illicit activities or violence.

While it appears that the correlates of weapon carrying, at least for firearms, in adolescence and adulthood are very similar, the question of stability remains. Are juveniles who carry weapons in adolescence more likely to carry weapons in adulthood than those who do not? More specifically, are those who carry weapons to school in adolescence also likely to carry guns into the school or workplace as adults? Addressing these questions may provide valuable insight into why firearms are brought into the workplace.

One possible reason why stability in illicit gun carrying would be expected is that much of the research identifies gun carrying among juveniles as part of a risky lifestyle. Studies discussed previously have associated gun carrying with gang membership, drug trade, and drug use as well as other forms of violence and criminality (Lizotte et al., 2000; Steinman & Zimmerman, 2003; Webster et al., 1993). From this perspective, risky behaviors may diffuse across various social contexts, such as school and work, encountered by an individual. Incarceration and other challenges resulting from a risky lifestyle may also negatively affect the employment and overall social success of these individuals (Apel & Sweeten, 2010). On the contrary, it is well established that criminal and delinquent behavior peaks in the late teens and declines thereafter for most individuals (Steffensmeier, Allan, Harer, & Streifel, 1989). As a result, desistance from risky behaviors such as weapon carrying might be expected. Employment might also be perceived as a marker of the transition to adulthood (Arnett, 2000), thereby reducing risky behaviors like weapon carrying. From this perspective, adolescents who carry guns to school may not continue this behavior as adults. The present article assesses the validity of these contradictory expectations.

Data and Method

This study uses data from The National Longitudinal Study of Adolescent Health (Add Health). Add Health is an ongoing study of a nationally representative, school-based sample of individuals who were in Grades 7–12 in 1994 (Harris, 2009). While the primary focus of Add Health is on adolescent health and related behaviors, the data also incorporate measures of crime, victimization, employment, and weapon use/access. The present article uses the first three waves of data collection, spanning adolescence, and early adulthood. Respondents range from age 18 to 26 in the third wave of data collection.

The Add Health sample is based on 80 high schools selected as representative of the United States in 1994 (Harris, Halpern, Smolen, & Haberstick, 2006). An additional 52 middle

schools, selected with probability proportional to the number of students contributed to the high school (Harris et al., 2006), were included in the study (Harris, 2009). In addition to the in-school questionnaires, a stratified random subsample of approximately 200 students from each of the 80 pairs of schools was selected to participate in detailed home interviews ($n = 20,745$) in 1994/1995 (Harris, 2011). Wave 2 interviews were administered in 1996 ($n = 14,738$), and Wave 3 interviews were administered in 2001 and 2002 ($n = 15,197$; Harris, 2011).

Since the outcome variable of interest is dichotomous (whether a respondent brings a gun to school or work), analyses utilize logistic regression. All tables present odds ratios for ease of interpretation. Analyses are weighted to properly account for the Add Health design. Analyses are based on 3,801 respondents, and these are respondents included in the public access Add Health data files with complete data on the dependent variable, nonmissing design weights, and sufficient data on predictors of imputation. Missing values on predictors are imputed using *Stata*'s multiple imputation procedure (Little & Rubin, 2002). Since the proportion of missing data on some control variables is quite high, 40 imputed data sets are used. This number is based on the recommendations of Graham, Olchowski, and Gilreath (2007, table 5).

Measures

Weapon carrying—The primary outcome variable is based on a Wave 3 question asking respondents, how often in the past 12 months did you carry a handgun at school or work? Response categories were never, 1 or 2 times, 3 or 4 times, or 5 or more times. Given that weapon carrying is uncommon, responses are dichotomized as never or at least once. In Waves 1 and 2, respondents were asked, during the past 30 days, on how many days did you carry a weapon—such as a gun, knife, or club—to school? Similar response categories were provided. These responses were also dichotomized. In addition to these predictors, analyses include a dichotomous variable from Wave 2, indicating whether or not respondents felt they had easy access to a gun within the home.

It is important to note here that some occupations or professions may require individuals to regularly carry or have access to firearms. A total of 55 respondents in the sample reported employment in the protective services (law enforcement, private security, etc.) or military-specific occupations. None of these respondents reported carrying a handgun to school or work in Wave 3. Since the handgun carrying question is part of a section on delinquent and criminal behaviors, it is likely that these individuals were correctly interpreting the question as referring to unauthorized handgun carrying.

Substance use—Wave 2 cigarette use was measured by an in-home interview question asking respondents how many days in the past 30 days they used cigarettes. Respondents were also asked how many times in the past 30 days they used marijuana. Since responses are heavily skewed toward never, responses are dichotomized as *never* (0) or *once or more* (1). For drinking, a question asked respondents how often they used alcohol in the past 12 months. Response categories ranged from *every day* (1) to *never* (7). Responses are dichotomized.

Delinquency—Wave 2 delinquency was measured using a 15-item delinquency scale asking respondents to report how often (never, once or twice, 3 or 4 times, and 5 or more times) they engaged in certain behaviors during the past 12 months. Behaviors included vandalism, lying to parents or guardians, theft of varying amounts, fighting, running away from home, joyriding, burglary, robbery, selling drugs, and being overly loud in a public place. A summative scale of these items, however, would be problematic. The modal score for delinquency items is 0 and items tend to be highly correlated, leading to poor distribution of the overall sum. Further, summative scales assume equal intervals of measurement, and it is difficult to argue that each of these items is “equally” delinquent in a substantive sense (Osgood, McMorris, & Potenza, 2002). As a result of these concerns, each item’s responses are dichotomized as never or at least once and analyses use item response theory (IRT) scaled delinquency measures. Based on individual scale items, IRT makes use of mathematical models that map item-level responses for a set of items to a position on a latent, continuous, equal-interval variable with a mean of 0 (Osgood et al., 2002). Post-estimation produces Empirical Bayes predicted values on this latent variable. These measures were generated using Samejima’s Graded Response Model implemented using the generalized linear latent and mixed models (GLAMM) module in the Stata software (Samejima, 1997).

Victimization—During the in-home interview respondents were asked, during the past 12 months, how often did each of the following things happen? Among this series of items are “someone pulled a knife or gun on you,” “someone shot you,” “someone cut or stabbed you,” and “you were jumped.” Each is coded as *never* (0), *once* (1), or *more than once* (2). Given the severity of these forms of victimization, they are uncommon in the sample. Consequently, responses were used to create a dichotomous indicator of whether the respondent reported a violent victimization in either Wave 1 or Wave 2.

Other controls—Other controls include sex, age, race (Black, White, and other), resident mother’s education (college degree or some college vs. no college education), and urban neighborhood (yes/no) at Wave 1. Analyses also control for gang membership (yes/no) at Waves 2 and 3.

Results

Table 1 presents the means, proportions, standard deviations, and ranges of all variables included in the analyses. Demographic characteristics of respondents are in line with the sampling design of Add Health. In this sample, the proportion of respondents carrying weapons to school or work declines from Wave 1 to Wave 2. The decline from Wave 2 to Wave 3 is unclear since adolescent measures assess weapon carrying over the past 30 days, while the Wave 3 measure asks respondents to report behavior over the past 12 months. Approximately one in five respondents reports easy access to a gun at home in Wave 2. A sizable proportion of the sample, nearly one in four respondents, reports at least one incident of violent victimization in adolescence. Experimentation with substances is also prevalent in this sample, as would be expected with a study of adolescents. Although these descriptive statistics give some idea of the prevalence of weapon carrying wave by wave, they do not

indicate whether early weapon carrying is actually predictive of later weapon carrying for an individual.

Table 2 presents the results of logistic regression models predicting handgun carrying at school or work in Wave 3 based on previous weapon carrying behavior and other covariates. Models A, B, and C include only prior weapon carrying behavior as covariates. As findings show, weapon carrying in both Wave 1 and Wave 2 is predictive of handgun carrying in Wave 3. Alone, Wave 1 weapon carrying triples the likelihood of later handgun carrying, and Wave 2 weapon carrying is associated with more than 5 times increase in the likelihood of adulthood handgun carrying. However, the effects of Wave 1 weapon carrying are nearly cut in half when Wave 2 weapon carrying is simultaneously incorporated in Model C. Given this pattern, a four-step test for mediation of Wave 1 weapon carrying by Wave 2 weapon carrying was conducted. First is Model A of Table 2, which shows a statistically significant impact of Wave 1 weapon carrying on Wave 3 handgun carrying. Second, a model with Wave 1 weapon carrying predicting Wave 2 weapon carrying indicated a statistically significant effect (odds ratio: 15.3, $p < .001$). Third, Wave 2 weapon carrying significantly predicts Wave 3 handgun carrying in Model B of Table 2. The last step in the test for mediation is the model shown as Model C in Table 2, with both of the early wave weapon carrying variables. Since Wave 1 weapon carrying fails to be statistically significant when controlling for Wave 2 weapon carrying, the results of the four-step test indicate a full mediation effect.

As a result of this mediation pattern, remaining models include only the more time proximate Wave 2 measure of past weapon carrying. Across models, however, past weapon carrying is a strong and statistically significant predictor of handgun carrying in adulthood. In Model D of Table 2, where all controls are included, carrying a weapon in Wave 2 more than triples the likelihood that a respondent will report handgun carrying in Wave 3. While descriptive statistics show that handgun carrying in the school or workplace in adulthood is uncommon overall, this finding demonstrates some consistency in behavior across time.

Of the controls included in Model D of Table 2, those emerging as strong and statistically significant predictors are being male and having reported a violent victimization in one or both of the first two waves of data collection. Having a victimization experience in adolescence more than doubles the likelihood of later handgun carrying. Males are more than 6 times more likely than females to carry a handgun in Wave 3. Interestingly, results do not show a significant association with delinquent behavior, substance use, or gang membership.

To further assess the victimization effect, Table 3 shows a series of models operationalizing violent victimization in several different ways. Model A of Table 3 omits the victimization control entirely. Wave 2 weapon carrying remains a statistically significant predictor even in the absence of this control variable, and prior weapon carrying more than triples the likelihood of later handgun carrying. To assess whether repeat victimization was particularly important, a dummy variable indicating whether a respondent reported victimization at both Wave 1 and Wave 2 was included in Model B of Table 3. The effect of this predictor was nonsignificant. To further test the victimization effect, indicators of Wave 1 and Wave 2

victimization were added to the model separately in Model C to replace the dummy indicator for any prior victimization. Neither dummy variable was statistically significant. The last model in Table 3, Model D, includes a variable indicating whether the respondent has ever reported victimization but includes both gun access and weapon carrying as covariates. Victimization remains a statistically significant predictor of later handgun carrying. Across each of the models in Table 3, the one additional covariate that is statistically significant is being male. Again, males are more than 6 times more likely than females to carry handguns to school or work in adulthood.

A remaining question tested by this article is whether exposure to guns in the home influences later handgun carrying at school or work. Models with and without prior weapon carrying included are reported in Table 2 as Models E and F. Across both of these models, adolescents reporting that they have easy access to guns in the home at Wave 2 are not significantly more or less likely to carry handguns to work or school in adulthood. Weapon carrying, however, remains a strong and statistically significant predictor even with the control for easy gun access, and prior weapon carrying still more than triples the likelihood of later handgun carrying. Table 3, Model D, shows a model with both gun access and weapon carrying included. Gun access also fails to achieve statistical significance in this model. From these results, it appears that prior weapon carrying in adolescence and not simply weapon exposure is a key correlate of adult handgun carrying in the school or workplace.

Discussion

What is perhaps most reassuring about these findings is that they are consistent with an overall pattern of desistance as youth age into adulthood (Lauritsen, 1998; Steffensmeier et al., 1989). Reported rates of weapon carrying are highest in Wave 1 and decline thereafter. Few adults report carrying a handgun to school or work. This pattern matches the age–crime curve (Steffensmeier et al., 1989) and theories of emerging adulthood (Arnett, 2000), although some individuals may also have experienced survey fatigue after multiple waves of data collection (Lauritsen, 1998).

Another plausible explanation for the early decline is attrition of high-risk respondents from the study (Kalsbeek, Yang, & Agans, 2002) since past research has associated weapon carrying with a delinquent lifestyle (Lizotte et al., 2000). However, approximately 15% of the Wave 3 sample respondents reported being members of named gangs in the past year. Although the *Juvenile Offenders and Victims 2006 National Report* found that 1 in 12 individuals reported being a member of a gang at some point (Snyder & Sickmund, 2006), Wave 3 includes some adult respondents. National estimates indicate that more gang members are adults than juveniles, which is consistent with the higher proportion of gang members in the sample used by the present study (National Gang Center, 2014). The higher proportion also suggests that high-risk respondent attrition is not necessarily causing the decrease in reported handgun carrying.

While further research is needed to fully assess individual change, existing theory also offers an explanation for declines in illicit weapon carrying over time. According to Moffitt's dual

taxonomy of juvenile offenders (1993), for instance, most juveniles engage in delinquent and risky behaviors due to a maturity gap, and adolescents are physically mature but lack adult status. As adult rights and responsibilities are bestowed on these individuals, Moffitt argues that their delinquent behaviors subside (Moffitt, 1993). Consistent with such an explanation, Lizotte and colleagues (2000) found that youth carried weapons partially out of a desire for social status. Following Moffitt's arguments, the status conferred by carrying a weapon may be replaced by other status markers as adolescents age into adulthood. Common markers for adulthood might be employment (Sampson & Laub, 1990), marriage (Laub, Nagin, & Sampson, 1998; Sampson & Laub, 1990), or parenthood (Kreager, Matsueda, & Erosheva, 2010).

In spite of an overall trend toward desistance, models predicting adulthood gun carrying demonstrate that, like many behaviors, past actions are strong predictors of current behavior. Adolescents who carried a weapon to school or work in the past are much more likely to report that same behavior as adults than those who did not. The results of this article indicate that adult handgun carrying is also more likely for males and those experiencing violent victimization in the past.

While the finding that males are more likely to carry weapons as adults is not surprising since more males carry firearms, the victimization effect is particularly pronounced. Experiencing victimization in adolescence more than doubles one's odds of carrying a handgun to school or work in adulthood. This effect is not specific to victimization in a particular wave. Instead, any violent victimization in adolescence or repeated victimization in adolescence increases one's likelihood of later gun carrying. This is consistent with past research which noted that both adolescents and adults owned and carry firearms out of a desire for self-protection (Kleck & Gertz, 1998; Lizotte et al., 1981, 2000, 1994).

Although prior studies have identified gang involvement and offending as highly related to victimization and weapon carrying (Melde et al., 2009; Vaughn et al., 2006), the present study found only victimization to be predictive of adulthood handgun carrying at school or work. There are several possible explanations for this discrepancy. One is context, and the present study only examines gun carrying at school or work. Other studies of juvenile weapon carrying have focused on weapon carrying across contexts and situations. Another explanation is the nature of the sample. While some studies rely on samples of offenders (Vaughn et al., 2006), the present study uses a more diverse, nationwide sample that is not contingent on offending history. As a result, the sample likely captures adolescents who engage in behaviors like weapon carrying but have not yet come to the attention of the Juvenile Justice System.

Another notable finding is the lack of evidence for a rural–urban gap in weapon carrying or a race gap in weapon carrying. Rates of juvenile firearm injury reported in urban versus rural areas by M. L. Nance et al. (2002, 2010) led the author to expect that those growing up in urban areas might be more likely to carry handguns to school or work as adults. Increased exposure to violence in urban communities, as well as the potential for gang involvement in urban areas, would both arguably correlate with weapon carrying (Melde et al., 2009; Vaughn et al., 2006). However, this expectation was not supported by the models. It may

simply be the case that the urban–rural is less influential than predictors like violent victimization, offending, and gang involvement.

Although it is not necessarily clear from the data whether the adolescents were carrying firearms or some other type of weapon to school, results do raise some concerns about illegal firearms. Most states explicitly prohibit juveniles from possessing and carrying firearms outside of the supervision of parents or guardians. Additionally, most schools have their own zero-tolerance policies with respect to firearms and other weapons (U.S. Department of Education, 2005). As a result, the weapon carrying reported by adolescents in Add Health is illegal or, at the very least, illicit. In Wave 3, however, the juveniles have aged into adulthood. Not all workplaces, colleges, or universities have policies banning weapons. In some states, such as Kansas, law states that a college or university cannot ban concealed weapons without ensuring that adequate security measures have already been taken (National Conference of State Legislatures, 2015). Although there are exceptions to these policies, it is clear that the legality of weapon carrying varies greatly from adolescence to adulthood.

One concern raised by this issue is whether juveniles progress to legal firearm ownership and firearm carrying or whether they persist in illegal behaviors. Although the Add Health survey asks about handgun ownership in adulthood, it does not ask whether the firearm was purchased legally. The survey also does not ask respondents whether it was permissible to carry weapons into the school or workplace in adulthood. If it is the case that juveniles who carry firearms are more likely to own and carry illegal firearms as adults, then proactively identifying these juveniles may present an avenue through which trade in illegal firearms may be interrupted. Interrupting the illegal gun trade, in turn, has implications for reducing gun violence. Approximately 40% of offenders serving time in state prisons reported that they obtained their guns illegally (Harlow, 2001). In another study of guns recovered from offenders, roughly 35% of guns obtained from those of age 21–24 had a time-to-crime of less than 3 years (Wintemute, Romero, Wright, & Grassel, 2004). A short time-to-crime is an indicator of gun trafficking (U.S. Department of Justice, 2004).

Some existing programs have addressed the issue by educating youth about guns, gun violence, and how to resolve conflicts without guns. STAR or Straight Talk About Risks is one example of a program implemented in the school setting (Office of Juvenile Justice and Delinquency Prevention, 2015). STAR includes video and role-play activities to teach kids about anger management, conflict resolution, and the possible consequences of using a firearm to resolve conflict. Since 1992, it has been used in more than 90 school districts across the United States (Office of Juvenile Justice and Delinquency Prevention, 2015). Another example program is Hands Without Guns, an educational program designed to help youth change attitudes about guns and gun violence (Pete, 1999). Like STAR, this program has been adopted by several major cities in the United States, including Chicago and Boston (Pete, 1999). Programs such as these aim to change attitudes and behaviors, such as carrying weapons to school, that may lead to violence.

Although the questions and observations raised by this study are informative, some caveats are in order. First, very few individuals reported carrying a handgun to school or work in

adulthood. Due to the rarity of this outcome, the odds ratios in Table 2 may actually be underestimates (King & Zeng, 2001). A larger sample size would allow for greater statistical power and accuracy. Unfortunately, software that can better account for rare events, data with multiple imputation, and design effects simultaneously is quite limited and in development. Second, using the broad term “weapon” is both a strength and weakness of the present study. While using the broader term and corresponding data allows for an examination of juveniles who engage in multiple forms of weapon carrying, the data do not permit a distinction between those carrying firearms to school in adolescence versus other weapons. More detailed measures are needed to assess these patterns. Lastly, this study examines weapon carrying from adolescence through early adulthood, and consistency through later adulthood remains unknown. There is a significant need for further research to better understand patterns in weapon carrying across a broader span of the life course.

In particular, more precise estimates of how often an adult brings a weapon to the workplace are needed. While past research has indicated that some adults purchase weapons out of fear of workplace violence (Kowalenko et al., 2005) and that many adults routinely carry weapons for self-protection (Kleck & Gertz, 1998), the number of adults to actually bring these weapons to work is unknown. Given the more than 500,000 incidents of violence that occur at workplaces annually (Centers for Disease Control, 2014b), knowing the extent of workplace weapon carrying may provide critical information for employers and criminal justice practitioners. While some have argued that weapons act as a deterrent to violent crime (Kleck & DeLone, 1993; Kleck & Gertz, 1995; Lott, 2010), others argued that the presence of weapons may escalate a conflict (Felson & Steadman, 1983; Phillips & Maume, 2007).

Another question that remains unanswered by this study is why an adult would bring a handgun to school or work. Unfortunately, the Add Health data only include information about whether adults have carried handguns, not their reasons for doing so. Although existing studies have examined the predictors of adult weapon carrying overall, more research is needed to understand why individuals carry weapons in one context versus another. The reasons for carrying a weapon to work may be different from those for carrying a weapon in the community. For instance, are individuals carrying weapons to work out of fear of workplace violence? Fear of victimization in the surrounding area? Or for some other purpose unrelated to self-protection? As with getting more precise estimates of the prevalence of weapon carrying at work and school, understanding why adults carry weapons in these contexts may provide fruitful information for violence prevention.

In sum, this article sets out to determine if juvenile weapon carrying at school would be predictive of adulthood weapon carrying in the school and workplace. While the percentage of youth carrying guns to school is on the decline, firearm injuries led to the death of 18 children and young adults each day in the United States (Centers for Disease Control, 2015). As a result, the causes and correlates of juveniles’ contact with these weapons are both a health and criminological concern. Analysis of the data showed that, indeed, those who report weapon carrying in adolescence are more likely to report the same behaviors as adults. However, the data also reveal a pattern of desistance, and few youth overall carry handguns to school or work in adulthood. Additional research is needed to further assess

why some youth persist in weapon carrying behavior as well as how preventative efforts may impact adult and youth gun violence.

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Biography

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Table 1

Means of Predictors, Outcome, and Control Variables Prior to Imputation.

	<i>n</i>	Mean	SD	Min	Max
Carry weapon W1	3,781	0.089	0.285	0	1
Carry weapon W2	3,788	0.054	0.225	0	1
Carry handgun W3	3,801	0.011	0.102	0	1
Ever a victim	3,774	0.238	0.426	0	1
Male	3,801	0.459	0.498	0	1
Age W1	3,801	14.575	1.603	11	20
White	3,801	0.683	0.465	0	1
Black	3,801	0.235	0.424	0	1
Other race	3,801	0.096	0.295	0	1
Gang member W2	3,784	0.039	0.195	0	1
Gang member W3	3,795	0.152	0.359	0	1
Urban neighborhood W1	3,771	0.331	0.471	0	1
Mom college educated W1	3,490	0.519	0.500	0	1
Smoked cigarettes W2	3,785	0.320	0.467	0	1
Smoked pot W2	856	0.614	0.487	0	1
Drank alcohol W2	1,794	0.378	0.485	0	1
IRT delinquency W2	3,787	-0.011	0.747	-0.824	3.703
Easy gun access W2	3,786	0.190	0.392	0	1

Note. *N* = 3,801. IRT = item response theory; W1 = Wave 1; W2 = Wave 2; W3 = Wave 3.

Table 2
 Logistic Regression Predicting Wave 3 Handgun Carrying Presented as Odds Ratios.

	Model A	Model B	Model C	Model D	Model E	Model F
Carry weapon W1	3.195 ^{**} (1.324)		1.684 (1.023)			
Carry weapon W2		5.810 ^{**} (2.603)	4.416 [*] (2.829)	3.425 [*] (1.912)		3.343 [*] (1.805)
Ever a victim				2.581 [*] (0.999)	2.725 ^{**} (1.007)	2.534 [*] (0.973)
Male				6.388 ^{**} (3.611)	6.766 ^{**} (3.848)	6.280 ^{**} (3.541)
Age W1				0.962 (0.110)	0.939 (0.110)	0.962 (0.110)
White				1.017 (0.505)	0.913 (0.437)	0.980 (0.498)
Other race				0.996 (0.690)	0.975 (0.656)	0.991 (0.684)
Gang member W2				0.799 (0.562)	0.890 (0.632)	0.807 (0.564)
Gang member W3				0.929 (0.440)	0.993 (0.446)	0.929 (0.438)
Urban neighborhood W1				0.753 (0.356)	0.798 (0.360)	0.763 (0.357)
Mom college educated W1				1.469 (0.586)	1.436 (0.550)	1.461 (0.579)
Smoked cigarettes W2				1.417 (0.622)	1.427 (0.639)	1.415 (0.619)
Smoked pot W2				0.902 (0.515)	0.923 (0.523)	0.905 (0.512)
Drank alcohol W2				1.699 (0.861)	1.686 (0.872)	1.652 (0.855)
IRT delinquency W2				0.800 (0.233)	0.943 (0.262)	0.805 (0.230)
Easy gun access W2					1.319 (0.546)	1.227 (0.476)
Constant	0.009 ^{**} (0.002)	0.008 ^{**} (0.002)	0.008 ^{**} (0.002)	0.002 ^{**} (0.003)	0.003 ^{**} (0.005)	0.002 ^{**} (0.003)

Note. N = 3,801. Standard errors displayed in parentheses. IRT = item response theory; W1 = Wave 1; W2 = Wave 2; W3 = Wave 3.

^{**} p < .01.

^{*} p < .05.

⁺ p < .10.

Table 3

Logistic Regression Predicting Wave 3 Handgun Carrying Based on Victimization Presented as Odds Ratios.

	Model A	Model B	Model C	Model D
Carry weapon W2	3.873 [*] (2.106)	3.109 ⁺ (1.878)	3.317 [*] (1.885)	3.339 [*] (1.803)
Ever a victim				2.535 [*] (0.977)
Victim W1			1.986 (0.871)	
Victim W2			1.736 (0.887)	
Repeat victim		2.380 ⁺ (1.099)		
Male	7.621 ^{**} (4.325)	6.935 ^{**} (4.009)	6.337 ^{**} (3.630)	6.277 ^{**} (3.535)
Age W1	0.977 (0.113)	0.937 (0.108)	0.952 (0.108)	0.960 (0.110)
White	0.883 (0.425)	0.967 (0.460)	1.059 (0.521)	0.982 (0.499)
Other race	0.891 (0.600)	0.985 (0.656)	1.011 (0.685)	0.995 (0.687)
Gang member W2	0.901 (0.642)	0.952 (0.660)	0.764 (0.546)	0.803 (0.561)
Gang member W3	0.988 (0.465)	0.979 (0.462)	0.913 (0.424)	0.929 (0.438)
Urban neighborhood W1	0.819 (0.382)	0.812 (0.395)	0.744 (0.362)	0.767 (0.360)
Mom college educated W1	1.351 (0.535)	1.320 (0.535)	1.449 (0.574)	1.463 (0.581)
Smoked cigarettes W2	1.585 (0.690)	1.430 (0.645)	1.401 (0.615)	1.404 (0.611)
Smoked pot W2	0.952 (0.534)	0.911 (0.526)	0.911 (0.518)	0.906 (0.515)
Drank alcohol W2	1.800 (0.911)	1.687 (0.888)	1.664 (0.854)	1.695 (0.859)
IRT delinquency W2	0.900 (0.275)	0.765 (0.243)	0.790 (0.239)	0.803 (0.229)
Easy gun access W2				1.230 (0.479)
Constant	0.002 ^{**} (0.003)	0.003 ^{**} (0.006)	0.002 ^{**} (0.004)	0.002 ^{**} (0.003)

Note. $N = 3,801$. Standard errors displayed in parentheses. IRT = item response theory; W1 = Wave 1; W2 = Wave 2; W3 = Wave 3.

^{**}
 $p < .01$.

^{*}
 $p < .05$.

⁺
 $p < .10$.