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Do Weapons Facilitate Adolescent Delinquency? An Examination of Weapon Carrying and Delinquency Among Adolescents

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Abstract

This article examines whether weapon carrying influences the frequency and variety of violent, property, and drug delinquency adolescents commit through fixed-effects analyses of data from the Rochester Youth Development Study (RYDS). We conclude that weapon carrying contributes to violent, substance, and property delinquency, and delinquent behaviors learned during weapon carrying continue to affect substance and property delinquency long after carrying has ceased.

Keywords

weapons; adolescents; delinquency; crime; guns

Introduction

Weapon carrying has long been recognized as a risk factor for adolescent crime and violence (Centers for Disease Control and Prevention [CDC], 2015). Adolescents obtain and choose to carry weapons for numerous reasons, including fear of victimization (Cao, Zhang, & He, 2008; Wilcox, May, & Roberts, 2006; Wright, Rossi, & Daly, 1983), protection (Melde, Esbensen, & Taylor, 2009), a power boost when participating in delinquent behaviors (May & Jarjoura, 2006), and peer or gang influence (Bjerregaard & Lizotte, 1995; Lizotte, Krohn, Howell, Tobin, & Howard, 2000; Watkins, Huebner, & Decker, 2008). Recent CDC studies report that nationwide, 16% of students report carrying a weapon at least 1 day in the last 30 days (CDC, 2015). The CDC (2015) further reports that the prevalence of weapon carrying has remained stable over the past 15 years—findings that have been corroborated in other recent research (Aspy et al., 2004; Perlus, Brooks-Russell, Wang, & Iannotti, 2014). These

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Authors' Note

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trends are mirrored in our nation's schools with between 5% and 18% of adolescents reporting carrying a weapon on school property in the 30 days prior to being surveyed (CDC, 2013, 2015; Rajan, Namdar, & Ruggles, 2015).

The stability in the prevalence of weapon carrying is a public health concern. The direct relationship between weapon carrying and crime is undebated, and the effect of weapons, particularly guns, on our society is considered a "public health crisis" (American Medical Association, 2016). Adolescents who participate in violent or physically aggressive situations often carry weapons (DuRant, Getts, Cadenhead, & Woods, 1995; DuRant, Kahn, Beckford, & Woods, 1997; Kodjo, Auinger, & Ryan, 2003; Stickley et al., 2015; Webster, Gainer, & Champion, 1993). Weapon carrying is also associated with higher rates of property crime (Bailey, Flewelling, & Rosenbaum, 1997; Sheley & Wright, 1995; Yun & Hwang, 2011), and other risky behaviors, including substance use and sales (Black & Ricardo, 1994; Dudovitz, McCoy, & Chung, 2015; DuRant, Krowchuk, Kreiter, Sinal, & Woods, 1999; Kodjo et al., 2003; McKeganey & Norrie, 2000; Perlus et al., 2014; Shetgiri, Boots, Lin, & Cheng, 2016; Stayton, Mcveigh, Olson, Perkins, & Kerker, 2011; Vaughn et al., 2012).

In this study, we look to explore whether carrying specific types of weapons influence different types of adolescent delinquency. We then consider how participation in delinquency changes between periods prior to weapon carrying, during carrying, and after carrying has ceased.

Theory

Generally, two theories explain the relationship between weapons and committing crime: weapon effects and crime facilitation.¹ Both theories are predicated on the perceived and actual advantage weapons provide weapon carriers. Possessing weapons while committing deviance increases the odds that other parties will cooperate, gives perceived or actual advantages to weapon carriers, and increases the deadliness of assaults (Wright et al., 1983).

Where weapon effects and crime facilitation theories diverge is in their explanations for how weapons factor in to the commission of a crime. Premised on the understanding that weapons can serve as tools of coercion, protection, confidence, and harm, crime facilitation theory suggests that people choose to carry weapons when they plan to commit crimes (Alzheimer, 2010; Wright & Rossi, 1986). Similarly, individuals determined to inflict harm on others are likely to carry a weapon to facilitate their intent. The findings made by Melde et al. (2009) in their examination of multiple pathways to the initiation of weapon carrying support this theory. They conclude that offenders carry weapons more often than nonoffenders, lending support for the idea that weapons serve a utilitarian purpose in the commission of crime. Namely, offenders seek out weapons for the successful completion of the act and/or to heighten their image as a criminal.

¹We use Wright and Rossi's (1986) term *crime facilitation* to refer to the theory that individuals seek out weapons to facilitate criminal activities.

In contradiction to this assertion, weapon effects theory suggests weapon carrying “triggers” increased participation in delinquency and crime (Berkowitz & LePage, 1967; Kellermann et al., 1993; Kleck & Hogan, 1999; Wilcox et al., 2006). This theory suggests weapons embolden individuals in ways that would not occur or to extents that could not be reached were they not carrying weapons (Berkowitz & LePage, 1967; Wright et al., 1983). Thus, individuals who carry weapons might be more inclined to engage in deviant behavior when opportunities arise, where they might have avoided, forgone, or been unable to pursue such behavior in the absence of weapons (Wright et al., 1983). This is supported by Phillips and Maume’s (2007) conclusion that weapons escalate violence in conflict situations, and Wells and Horney (2002) find that in situations where individuals possess weapons, they are more likely to attack than in situations absent weapons.

The fundamental difference between weapon effects and crime facilitation theories is the temporal order of weapon carrying and the act of committing crime or delinquency. The underlying assertion of weapon triggering theory is that weapon carrying precedes criminal intent, while crime facilitation theory proposes that delinquent or criminal intent precedes and motivates weapon carrying. Previous research suggests a myriad of motivations for initial weapon carrying among adolescents, including intent to commit crimes (Blumberg et al., 2009; Blumstein, 1995; May & Jarjoura, 2006), fear and protection from victimization (Cao, Cullen, & Link, 1997; Wilcox et al., 2006; Wright et al., 1983), normalization of carrying by peers (Lizotte et al., 2000), and in attempts to look cool or convey status (Cook, Ludwig, Venkatesh, & Braga, 2007). It is very possible that both theories have their place in our understanding of weapon carrying behaviors, or even that they work in concert. Together, weapon effects and crime facilitation theories lead us to the hypothesis that regardless of adolescent’s initial motivations for carrying weapons, adolescent delinquency increases while carrying weapons, and decreases when adolescents are not carrying weapons.

In the current study, we expand on previous literature by using longitudinal data to investigate whether weapons (in the forms of guns, pocketknives, large knives, and other weapons) adversely influence adolescent participation in violent, substance, and property delinquency. We do this by conducting fixed-effects analyses to isolate the impact of weapon carrying on delinquent and criminal behavior. Previous research by Watkins et al. (2008) and Lizotte et al. (2000) suggests that motivations or gun carrying covariates change with age. As such, we first explore adolescent delinquency in 6-month increments between ages 14 and 18 years to determine whether delinquency increases during periods when adolescents carry weapons. We then explore the temporal order and residual effects of adolescent weapon carrying on delinquency by exploring adolescents’ participation in delinquency in three blocks of time: before, during, and after weapon carrying. Following previous research, we analyze separate models that take weapon type and category of crime into account.

Method

Data

We utilize data from the Rochester Youth Development Study (RYDS), an ongoing longitudinal study examining antisocial and delinquent behaviors. Beginning in 1988 with 1,000 middle-school students in the Rochester (New York) Public School System, RYDS has interviewed students from early adolescence through adulthood.

Past research demonstrates the precedence and importance of separating adolescent and adult weapon carrying behaviors (Lizotte, Howard, Krohn, & Thornberry, 1997; Lizotte et al., 2000; Lizotte & Sheppard, 2001; Sheley & Wright, 1993, 1995; Watkins et al., 2008; Wright, Sheley, & Smith, 1992). As such, we use data from Waves 1 through 9, nine surveys collected at 6-month increments when respondents aged between 14 and 18 years, to capture adolescent weapon carrying and delinquent behaviors. During this phase of data collection, participants were interviewed 9 times at 6-month intervals.

RYDS experienced only 1% attrition per year during this first phase. At Wave 9, 88% of the original sample is still participating.² Table 1 presents basic characteristics of the sample at Waves 1 and 9. As one can see, the distributions are remarkably similar from the different waves.

The longitudinal nature of the RYDS allowed us to conduct fixed-effects and difference-in-differences analyses and explore the influence of weapon carrying on adolescent delinquency while controlling for maturation effects. With access to nine time points of data covering the adolescent life course, extremely low participant mortality, and consistent measures of weapon carrying and delinquency, the RYDS is ideal for studying the relationship between different types of weapon carrying and delinquency during adolescence. Similarly, the number of waves and repetition of measures adds validity to the data and analysis.

Measurement

Dependent variables—We expect that weapon carrying will influence crime and delinquency differently depending on crime type. Therefore, dependent variables are constructed for each of three types of crime: violent,³ substance,⁴ and property.⁵ Table 2 provides descriptive statistics for these variables. The first set of dependent variables

²A formal test of Rochester Youth Development Study (RYDS) participant attrition reveals that the participants retained do not significantly differ from those lost on multiple dimensions, including gender, social class, family structure, substance use, delinquency, property crime, and violent crime (see Krohn & Thornberry, 1999). None of the difference tests reached statistical significance ($p < .05$).

³To ensure that violence index measures referencing weapons do not confound our analyses, we construct a second measure of violence excluding the index items “used a weapon with the idea of seriously hurting or killing someone” and “used a weapon or force to make someone give you money or things.” Analyses of the restricted violence measure demonstrate equivalent significant findings to those measured with the full index. It is also important to note that individuals can carry a weapon without ever using it for intimidation or violence. Thus, confounding proves not to be an issue when we include index measures indicating weapons use.

⁴Previous research has reached differing conclusions about the relationship between drug use, drug selling, and weapon carrying. Black and Ricardo (1994) find statistically significant correlations between weapon carrying, drug use, and drug trafficking. By comparison, Kacanek and Hemenway (2006) found that hard drug use was only associated with gun carrying among their female respondents. Despite these disparate findings, we find a remarkably high correlation between respondents who use and sell drugs or alcohol. Therefore, we include both substance selling and using in our measure of substance delinquency.

⁵Appendix lists the interview items included in each measure.

includes three ratio-level measures, which are used in the difference-in-differences analyses that examine the effects of weapon carrying over time. These variables measure the number of different types of delinquency adolescents report engaging in, and are referred to as variety dependent variables. The table demonstrates that more than half of all respondents report they do not engage in any form of violent, substance, and property delinquency in each interview wave (median = 0).

The second set of dependent variables is similar and includes ratio-level measures of how frequently adolescents participated in delinquent activities within each of the three types of delinquency. These three measures are referred to as frequency dependent variables. Again, we see that the median frequency of each type of delinquency is zero, suggesting at least half of the respondents do not report delinquent acts within each wave. Each of the delinquency measures demonstrates skew toward higher delinquency counts, with larger standard deviations than mean values. For example, respondents report participating in an average of 1.3 acts of violent delinquency over a 6-month period, with a comparatively large standard deviation of 7.3. We log each dependent measure in all analyses to account for this skew.⁶

The final set of dependent variables examined includes ratio-level measures of the variety and frequency of violent, substance, and property delinquency adolescents partake in for a pre-weapon carrying period, weapon carrying period, and post-weapon carrying period. These variables were created for use in the fixed-effects analyses, and are constructed around a period of weapon carrying, so it is important to note that we only use these measures for the 101 adolescents who report carrying weapons. First, we identify the wave when each adolescent first carried a weapon and the wave of cessation. Then, we average each adolescent's violent, substance, and property delinquency separately for all waves prior to the first wave at which weapon carrying is reported. This is followed by a similar calculation of delinquency during the waves included in the weapon carrying period, and finally for all waves following cessation.⁷ For adolescents who reported carrying weapons sporadically across the nine waves, we studied the first instance in which they carried a weapon, and the post-weapon carrying period was limited to the postcarrying waves prior to respondents' return to weapon carrying. As demonstrated in Table 2, the mean values of each type of delinquency are low prior to weapon carrying, increase during weapon carrying, and decrease to values between precarrying and carrying levels once weapon carrying has ceased.

Independent variables—This study utilizes five independent variables (see Table 2).

Weapon carrying, is a binary variable (1 = carries weapon) that measures whether adolescents report carrying “a hidden weapon” in each of the nine waves measured in this study. On average, 17% of the adolescents carry weapons at each interview.

⁶It was not possible to estimate fixed-effects Poisson regressions in SAS across the nine time observations (only two), so we use logged dependent measures for all our analyses for consistency and comparability.

⁷Adolescents who report carrying weapons in Waves 1 and/or 9 are excluded from these measures and subsequent analyses, as it is not possible to establish pre- or post-weapon carrying observations for these youths. Tests of the characteristics and delinquency levels of excluded youths demonstrate that these adolescents do not significantly differ from youths included.

We also break down the impact of carrying different types of weapons. *Gun carrying*, *pocketknife carrying*, *large knife carrying*, and *other weapon carrying* are binary measures of whether adolescents report carrying each respective weapon (1 = carrying the weapon), and are measured for each of the nine waves.⁸ Table 2 shows that on average, 5% of adolescents carry guns, 4% carry pocketknives, 6% carry large knives, and 2% carry other types of weapons.⁹ These percentages suggest little variability in type of weapon carried by adolescents in our sample.

Analytical Method

Difference-in-differences analyses—We begin by using difference-in-differences analyses (in the form of generalized linear models [GLM] with logged dependent variables) to explore the relationship between carrying weapons and adolescent delinquency in 6-month increments. Difference-in-differences analysis conducts both within-person and between-person comparisons.¹⁰ The within-person analysis allows us to observe and control for how delinquency changes as adolescents age by comparing respondents' delinquency at 6-month intervals with their delinquency at age 14 years (Wave 1), which serves as a baseline. At the same time, the between-person analysis compares adolescents' delinquency during times of weapon carrying with the delinquency exhibited by adolescents who do not carry weapons during the same period of time.

The difference-in-differences analysis accomplishes both within- and between-person analyses through control variables. First, a dichotomous variable is included to uniquely identify each individual in the sample so that they can be compared with themselves and each other across interview waves.¹¹ Second, a dichotomous variable is included to mark each age interval observed. Finally, dichotomous variables (*gun carrying*, *pocketknife carrying*, *large knife carrying*, and *other weapon carrying*) are included to differentiate periods when adolescents carry specific types of weapons from periods when they do not report carrying weapons. The difference-in-differences models follow the form:

⁸It is important to note that RYDS asks respondents in each wave whether they have carried a weapon since they were last interviewed. Respondents who indicate that they have carried a weapon are then asked what types of weapons they have carried. The survey only records the most serious or dangerous weapon that each adolescent reports carrying in a wave. While we do not capture information about every weapon carried at each wave, we recognize that some adolescents carry more than one type of weapon at a time. In addition, while some would not consider a pocketknife a weapon in the same sense as a gun and large knife, we include this measure because some of the respondents of this survey do. For the purpose of measuring whether weapons embolden adolescent's behaviors, it is not necessary that others perceive the item carried as a weapon, only that the adolescent does.

⁹Despite the fact that the independent variables *gun*, *pocketknife*, *large knife*, and *other weapon carrying* disaggregate from the independent variable *weapon carrying*, the sum of the means of these variables is slightly smaller than the mean for *weapon carrying*. This is simply a result of rounding error.

¹⁰By using the ABSORB statement in PROC GLM, all variables are converted to deviation scores and accurate degrees of freedom are used to compute the standard errors and *p* values.

¹¹These individual dummy variables are not listed in the formula, but individual-level differences in the variables are denoted in the formula as *i*.

$$\begin{aligned}
& \ln(\text{delinquency})_{it}^{\lambda} \\
&= \alpha_i + \beta_1(\text{age } 14.5)_i + \beta_2(\text{age } 15)_i + \beta_3(\text{age } 15.5)_i + \beta_4(\text{age } 16)_i \\
&+ \beta_5(\text{age } 16.5)_i + \beta_6(\text{age } 17)_i + \beta_7(\text{age } 17.5)_i + \beta_8(\text{age } 18)_i \\
&+ \beta_9(\text{gun carrying})_{it} + \beta_{10}(\text{pocketknife carrying})_{it} \\
&+ \beta_{11}(\text{large knife carrying})_{it} + \beta_{12}(\text{other weapon carrying})_{it},
\end{aligned}$$

where λ represents the full set of time and individual effects, i individual-variant effects, t time-variant effects, and α_i the unobserved time-invariant individual effect. This equation establishes whether there is trending delinquency as adolescents age, and whether the variety and frequency of delinquency performed by adolescents is influenced by specific types of weapon carrying. Factors related to maturation are controlled. By separating age trending, we eliminate the possibility that changes in delinquency are age dependent.

Fixed-effects analyses—We also conduct fixed-effects analyses to discern whether delinquency increases when adolescents carry weapons, and whether delinquency persists after weapon carrying desists. To do this, we measure delinquency during three periods: pre-weapon carrying, carrying, and post-weapon carrying. The fixed-effects models conduct within-person analyses only for the 101 respondents in our sample who report carrying weapons.

We construct these analyses in two ways. In the first models, we compare each respondent's delinquency pre-weapon carrying and post-weapon carrying with their delinquency while carrying weapons, in the form:

$$\begin{aligned}
\ln(\text{delinquency})_{it}^{\lambda} &= \alpha_i + \beta_1(\text{pre} - \text{weapon carrying})_i \\
&+ \beta_2(\text{post} - \text{weapon carrying})_i,
\end{aligned}$$

where $\ln(\text{delinquency})_{it}^{\lambda}$ it is the dependent delinquency measure observed for individual i at time t and α_i is the unobserved time-invariant individual effect. By so doing, each individual acts as their own control, while the measurement technique holds time-invariant unobservables constant. This allows us to determine whether participation in delinquency pre and post carrying differ from participation while carrying weapons. We also conduct fixed-effects analyses comparing weapon carrying and post-weapon carrying delinquencies with pre-weapon carrying delinquency, in the form:

$$\begin{aligned}
\ln(\text{delinquency})_{it}^{\lambda} &= \alpha_i + \beta_1(\text{weapon carrying})_i \\
&+ \beta_2(\text{post} - \text{weapon carrying})_i.
\end{aligned}$$

In so doing, we measure whether delinquent behaviors develop during weapon carrying and remain post weapon carrying, as we compare whether adolescents' participation in

postcarrying delinquency differs significantly from their participation in delinquency prior to carrying.

Results

Difference-in-Differences Analyses

Table 3 demonstrates the percent change in the variety and frequency of delinquency by age and each type of weapon carried. Across the 4.5 years, we measure delinquency; distinct trends emerge in the variety and frequency of violence, substance, and property delinquencies committed by adolescents; and we explain a sizable 38% to 55% of variance in delinquency based on age and weapon carrying. We discuss the model estimates below as percentage changes in variety and frequency of delinquency perpetrated by adolescents, as logged delinquency variables are used in each model to account for skew.

Rows 2 through 10 illustrate the percent change in adolescents' delinquency between ages 14 and 18 years in 6-month intervals when weapons are not carried. Rows 12 through 15 demonstrate the amount that gun, pocketknife, large knife, or other weapon carrying supplement delinquency estimates at any age measured.

The results of the difference-in-differences analysis indicate maturation affects delinquency. Between ages 14 and 18 years, violence and property delinquency decline while substance delinquency increases. Using violent delinquency at age 14 years as a baseline, the analysis indicates that by age 18, the variety of violent delinquency adolescents partake in has decreased 17% and frequency decreased by 29% compared with violent delinquency at age 14. By comparison, adolescents participate in 23% more forms and 91% more acts of substance delinquency at age 18 years than they do at age 14.¹² While property delinquency shows a generally declining trend in delinquency as adolescents age, there is an initial increase in property delinquency between ages 14 and 14.5. With a baseline property delinquency at age 14 years, adolescents participate in 3% more forms of property delinquency at age 14.5, only to decline until age 18 when adolescents participate in 14% fewer forms of property delinquency, at a 21% lower frequency, than at age 14 years. Controlling for these changes in violent, substance, and property delinquency as respondents age allows us to distinguish the influence of specific types of weapon carrying from maturation effects on different types of adolescent delinquency.

Carrying weapons in any form correspond with dramatic increases in adolescents' participation in all forms of delinquency compared with when the same youths do not carry. Controlling for changes in violence as adolescents age, carrying a gun at any age increases the variety of violent delinquency adolescents participate in by 58% and frequency by 145% compared with respondents' own delinquency when not carrying. Similarly, violent delinquency variety increases by 25% when adolescents carry pocketknives, 36% when carrying large knives, and 39% when carrying other types of weapons. Frequencies of

¹²One possible concern is that increasing alcohol behaviors with age could be responsible for our finding that substance delinquency increases as adolescents approach age 18. To address this concern, we tested this theory and found that even when the alcohol measures are excluded from the substance delinquency index, substance delinquency demonstrates a positive trend as adolescents age. As such, we feel confident that both alcohol and drug substance delinquency increase as adolescents age.

participation in violent delinquency increase by 48% when carrying pocketknives, 69% when carrying large knives, and 92% when carrying other weapons. This proves interesting, as not only is it clear that violent delinquency increases when adolescents carry weapons, we observe slight differences in the degree to which violent delinquency increases depending on the type of weapon carried, with gun carrying having the largest impact.

The same is true for substance delinquency. Carrying a gun at any age increases substance delinquency variety by 72% and frequency by 399%. The variety of substance delinquency adolescents participate in increases by 23% when adolescents carry pocketknives, 30% when carrying large knives, and 19% when carrying other types of weapons. And, frequency of substance delinquency increases by 45% when adolescents carry pocketknives, 82% when carrying large knives, and 19% when carrying other weapons. Thus, carrying a gun corresponds with the largest change in substance delinquency, followed by large knife, pocketknife, and other weapon carrying.

Similarly, property delinquency increases when adolescents carry weapons. Carrying a gun at any age increases property delinquency variety by 44% and frequency by 96%. Variety of property delinquency increases by 20% when carrying pocketknives, 28% when carrying large knives, and 20% when carrying other types of weapons. Frequencies of participation in property delinquency increase by 35% when carrying pocketknives, 55% when carrying large knives, and 32% when carrying other weapons. Again, this suggests that guns have the largest impact on property delinquency, followed by large knife, pocketknife, and other weapon carrying.

Thus, adolescents commit more forms and acts of delinquency when they carry weapons. Moreover, gun carrying has the strongest effect on each manifestation of delinquency. Next, we explore whether adolescents return to lower levels of delinquency after weapon carrying ends. We do this by measuring how delinquency changes between the period prior to weapon carrying, while carrying weapons, and following weapon carrying.

Fixed-Effects Analyses

Table 4 demonstrates the comparative differences in delinquent behaviors between periods when our subsample of weapon carriers does and does not carry weapons. To accommodate the small sample size and establish a strong temporal model, we do not disaggregate weapon carrying by type in these models. The top panel (rows 2-4) shows whether pre- and postcarrying delinquencies differ from delinquency levels exhibited while carrying weapons. The bottom panel (rows 5-7) illustrates whether post-weapon carrying delinquency levels return to what they were prior to carrying, thus establishing whether delinquent behaviors demonstrated while carrying weapons persist even after youth no longer carry. Remarkably, our models explain between 51% and 70% of variance observed in changes in adolescent violent, substance, and property delinquent behaviors.

Adolescents participate in significantly more violence—both variety (36% more) and frequency (68% more)—when carrying weapons than prior to carrying. Post weapon carrying, perpetration of violence fails to be significantly different from pre-weapon carrying levels. This suggests that when adolescents carry weapons, they participate in

significantly more violent delinquency than they do prior to carrying, and as soon as weapon carrying ends, violence drops to resemble initial levels. This finding indicates that weapons facilitate violent delinquency.

Similarly, adolescents participate in significantly more forms of substance deviance when carrying weapons than they do prior to and following weapon carrying. Adolescents participate in 38% more acts of substance delinquency while carrying weapons than they do prior to carrying. However, the variety of substance delinquency perpetrated during the post-weapon carrying period only drops by 6%, while the frequency of substance delinquency remains constant even after weapon carrying ends. Therefore, substance delinquency does not return to precarrying levels after weapon carrying. This suggests weapon carrying facilitates initial participation in substance delinquency, but either learning or addiction to substance delinquency occurs during weapon carrying, preventing delinquency from reverting to precarrying levels once carrying has ceased.

Weapon carrying and participation in property delinquency demonstrates a relationship similar to that observed for substance delinquency. Adolescents participate in significantly fewer forms (19% less) and acts (26% less) of property delinquency prior to carrying weapons than they do while carrying. In addition, adolescents demonstrate reductions in property delinquency after the cessation of weapon carrying (variety and frequency decrease by 13% and 23%, respectively). However, while property delinquency is significantly different during the pre- and postcarrying periods compared with the weapon carrying period, these periods are not equivalent to one another. Adolescents perpetrate significantly more property delinquency while carrying weapons and following weapon carrying compared with prior to carrying. Using property delinquency during pre-weapon carrying as a baseline, we observe that the variety and frequency of property delinquency increases by 23% and 34%, respectively, when adolescents carry weapons. During the post-weapon carrying period, adolescents continue to participate in 8% more variations of property delinquency and do so 10% more frequently than they did prior to weapon carrying. This suggests that while weapon carrying might correspond to initial increases in property delinquency, learning occurs during this period, thus sustaining levels of delinquency higher than precarrying levels.

Discussion

Just as weapon effects and crime facilitation theories suggest, we find that delinquency increases significantly when adolescents carry weapons. Difference-in-differences analyses demonstrate that adolescent participation in delinquency varies by age and type of delinquency, with violent and property delinquency generally decreasing with age, and substance delinquency increasing as adolescents get older. While carrying any type of weapon corresponds with increased delinquency, gun carrying is associated with the largest increases in all types of delinquency, followed by large knife, pocketknife, and other weapon carrying.

While all weapon types play a vital role in adolescent delinquency, only violent delinquency is both facilitated by and dependent on weapon carrying. More specifically, fixed-effects

analyses illustrate adolescents demonstrate low levels of participation in violent delinquency in periods prior to carrying weapons. Yet, participation in violent delinquency increases during periods when adolescents carry weapons, and decreases to precarrying levels once adolescents abandon their weapons. Moreover, these effects are not due to maturation or trends in aging. Our finding further supports the premise that carrying or possession of weapons increases violence perpetration as noted by Loftin, McDowall, Wiersema, and Cottey (1991) and Wells and Horney (2002). By comparison, weapon carrying facilitates substance and property delinquency, but engagement in these crimes is not dependent on carrying. We draw this conclusion from the finding that substance and property delinquency are low in periods prior to weapon carrying, increase while carrying, and never fully return to precarrying delinquency levels once adolescents discontinue carrying. Again, these effects are not due to maturation or trends in aging.

It is conceivable that there are some changing correlates of both weapon carrying and offending that operate to explain the relationships observed here. For example, Lizotte et al. (2000) and Watkins et al. (2008) note that weapon carrying is highly correlated to behaviors such as gang membership. However, both studies also note that the correlates of weapon carrying (including gang membership) vary with age. Thus, holding age trending effects constant, and given the enormous variance explained (between 40% and 70%), the consistently estimated effects across different weapon types, and over a long period of the adolescent life course, it seems unlikely that misspecification could explain away our findings. That being said, further study of the relationship between weapon carrying and delinquency benefits from measures of gang membership, weapon carrying motivations, and victimization.

We conclude that weapon carrying contributes to delinquency among adolescents, and delinquent behaviors learned during weapon carrying continue to affect substance and property delinquency long after carrying has ceased. By comparison, violent delinquency depends on weapon carrying. These findings represent another step toward untangling the complicated relationship between weapon carrying and crime.

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Appendix

Dependent Index Measures.

Dependent variable	Index behaviors
Violent delinquency	Used a weapon with the idea of seriously hurting or killing someone Hit someone with the idea of hurting them (other than behavior reported for previous question)

Dependent variable	Index behaviors
	<ul style="list-style-type: none"> Been involved in gang fights Thrown objects such as rocks or bottles at people (other than events already mentioned) Used a weapon or force to make someone give you money or things Physically hurt or threatened to hurt someone to get them to have sex with you Had or tried to have sexual relations with someone against their will (other than events already mentioned)
Substance delinquency	<ul style="list-style-type: none"> Sold marijuana Sold other drugs such as heroin, cocaine, crack, or LSD Drink beer or wine without your parents' permission Drink hard liquor without your parents' permission Use marijuana Inhale things to get high Use hallucinogens like LSD or psychedelics Use cocaine or coke, other than crack Use crack Use heroin Use angel dust or PCP Use tranquilizers Use barbiturates or downers Use amphetamines or uppers
Property delinquency	<ul style="list-style-type: none"> Damaged, destroyed, or marked up someone else's property on purpose Set fire on purpose or tried to set fire to a house, building, or car Avoided paying for things, like a movie, taking bus rides, using a computer, or anything else Gone into or broken into a building to steal or damage something Tried to steal or actually stolen money or things Tried to steal or actually stolen money or things worth between \$5 and \$50 How about between \$50 and \$100 How about more than \$100 Shoplifted or taken something from a store on purpose (excluding anything already mentioned) Snatched someone's purse or wallet or picked someone's pocket Stolen something from a car that did not belong to you Tried to buy or sell things that were stolen Taken a car or motorcycle for a ride without the owner's permission Stolen or tried to steal a car or other motor vehicle Forged a check or used fake money to pay for something Used or tried to use a credit card, bank card, or automatic teller card without permission Tried to cheat someone by selling them something that was worthless or not what you said it was

Biographies

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Alan J. Lizotte is distinguished professor in the School of Criminal Justice at the University at Albany. He continues to be co-principal investigator on the RYDS, an ongoing 30-year longitudinal study of three generations of 1,000 families in Rochester, New York. He has served as executive counselor for the American Society of Criminology (ASC) where he is also a fellow. With colleagues, he has published several books and monographs, including *Gangs and Delinquency in Developmental Perspective* that received the Hindelang Award from the ASC. He has also mentored 30 students through to a PhD.

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Table 1

Sample Descriptive Statistics.

	Wave 1 (%)	Wave 9 (%)
Gender		
Male	74.1	72.4
Female	25.9	27.6
Race/ethnicity		
Black	68.9	68.2
Hispanic	17.3	16.7
White	13.8	15.1
Social class		
Lower class	42.9	42.8
Above lower class	57.1	57.2
Family structure		
Both natural parents	25.4	26.2
Other	74.6	73.7
Delinquency		
Drug use	8.0	7.7
Property crime	17.7	17.7
Violent crime	30.6	30.4
<i>N</i>	1,000	881

Table 2

Variable Descriptive Statistics.

Variables	Variety			Frequency		
	<i>M</i>	Median	<i>SD</i>	<i>M</i>	Median	<i>SD</i>
Dependent variables						
Difference-in-differences analyses						
Violent delinquency	0.341	0	0.729	1.268	0	7.303
Substance delinquency	0.560	0	1.047	11.188	0	74.686
Property delinquency	0.318	0	1.010	1.428	0	11.340
Fixed-effects analyses						
Pre-weapon carrying						
Violent delinquency	0.545	0	0.819	2.480	0	10.455
Substance delinquency	0.406	0	0.790	3.784	0	14.557
Property delinquency	0.257	0	0.523	0.840	0	3.487
Weapon carrying						
Violent delinquency	1.115	1	1.008	4.463	2	13.538
Substance delinquency	1.021	1	1.150	32.646	1	212.161
Property delinquency	0.686	0	1.082	2.454	0	9.357
Post-weapon carrying						
Violent delinquency	0.584	0	0.852	2.416	0	11.406
Substance delinquency	0.931	0	1.177	14.270	0	47.169
Property delinquency	0.515	0	1.301	1.446	0	5.334
Independent variables						
Weapon carrying	0.173	0	0.378			
Gun carrying	0.047	0	0.212			
Pocketknife carrying	0.037	0	0.189			
Large knife carrying	0.058	0	0.233			
Other weapon carrying	0.022	0	0.146			

Table 3

Difference-in-Differences Estimates of the Percent Change in Variety and Frequency of Delinquency by Age and Weapons Carried.

Variables	Violence		Substance		Property	
	Variety	Frequency	Variety	Frequency	Variety	Frequency
Age 14.5	-0.3	-4.8 *	6.6 ***	12.3 **	2.8 **	0.2
Age 15	-5.4 ***	-11.9 ***	6.6 ***	13.7 **	-2.5 ***	-5.1 *
Age 15.5	-6.7 ***	-16.0 ***	10.0 ***	30.6 ***	-4.5 ***	-9.2 ***
Age 16	-10.9 ***	-21.7 ***	12.0 ***	28.7 ***	-6.3 ***	-10.1 ***
Age 16.5	-11.8 ***	-22.5 ***	20.7 ***	64.4 ***	-5.3 ***	-7.9 **
Age 17	-13.7 ***	-24.6 ***	12.3 ***	48.1 ***	-10.7 ***	-15.2 ***
Age 17.5	-14.3 ***	-25.6 ***	20.2 ***	75.1 ***	-11.6 ***	-16.2 ***
Age 18	-17.2 ***	-29.2 ***	23.1 ***	90.6 ***	-14.4 ***	-20.5 ***
Gun carrying	58.2 ***	145.0 ***	71.6 ***	398.8 ***	44.3 ***	96.2 ***
Pocketknife carrying	24.7 ***	47.8 ***	23.1 ***	44.9 ***	19.5 ***	35.4 ***
Large knife carrying	36.3 ***	68.9 ***	30.0 ***	82.4 ***	27.6 ***	54.7 ***
Other weapon carrying	39.1 ***	91.7 ***	18.5 ***	42.3 ***	19.5 ***	31.8 ***
<i>N</i>	1,000	995	1,000	992	1,000	993
<i>R</i> ²	.445	.446	.538	.551	.405	.379

* $p < .05$.

** $p < .01$.

*** $p < .001$.

Fixed-Effects Estimates of Percent Change in Variety and Frequency of Delinquency During Pre-Weapon Carrying, Weapon Carrying, and Post-Weapon Carrying Periods.

Table 4

	Violence		Substance		Property	
	Variety	Frequency	Variety	Frequency	Variety	Frequency
Weapon carrying	36.1 ***	68.2 ***	38.0 ***	83.1 ***	23.4 ***	34.4 ***
Post-weapon carrying	2.7	-0.2	29.6 ***	83.8 ***	7.8 ***	9.6 *
Pre-weapon carrying	-26.5 ***	-40.5 ***	-27.5 ***	-45.4 ***	-18.9 ***	-25.6 **
Post-weapon carrying	-24.6 ***	-40.7 ***	-6.1 ***	0.4	-12.6 ***	-22.8 ***
<i>N</i>	101	100	101	98	101	100
<i>R</i> ²	.597	.635	.615	.699	.513	.515

* $p < .05$.

** $p < .01$.

*** $p < .001$.