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Patterns of Gun Acquisition, Carrying, and Use Among Juvenile and Adult Arrestees: Evidence from a High-Crime City

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Researchers continue to examine the macrolevel trends of gun crime but little consensus exists regarding the microlevel determinants of gun behaviors. Moreover, little is known if patterns of gun behavior vary between adults and juveniles. This research examines patterns of gun possession, carrying, and use across adult and juvenile arrestees. This research moves beyond descriptive studies of aggregate gun patterns and explores the demographic and perceptual correlates that may inhibit or facilitate gun behaviors. Current results illustrate the prevalence of gun-involved behaviors among adults and juveniles, though juveniles were more likely to carry and fire a gun. Results also suggest that gun behaviors among juveniles are largely driven by gang membership, while ready access to guns, fear of the street, and the risks of arrest influence adult behaviors. Present findings have implications for gun policy, particularly as it relates the role of deterrence-based programming and demand-side initiatives.

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Introduction

Firearms violence has received substantial attention from researchers and policymakers over the past two decades. The increase in rates of firearm violence in the late 1980s and early 1990s (Fox & Zawitz, 2006) prompted considerable discussion as to the nature, causes, and control of firearms violence in the United States (Wellford, Pepper, & Petrie, 2005; Zimring & Hawkins, 1997), with particular attention to juvenile offenders who accounted for a large proportion of the increase in gun violence (Cook & Laub, 1998; Snyder & Sickmund, 2006). While this increased interest in firearms violence suggests that many agree on the utility of gun-related research, there is little consensus on the factors that best explain variation in gun behaviors and even less agreement on if these factors differ between juveniles and adults.

Over a decade ago, Reiss and Roth (1993, p. 279) called for surveys of juveniles and adults to assess the patterns of "… gun ownership, motives and sources for obtaining guns." Despite the critical nature of such knowledge for understanding firearm use in the United States, there has been little research that has followed up on this mandate. The present study formally addresses this dearth in the literature and, in particular, extends the research in three ways. First, we assess whether theoretical factors presumed to affect gun behaviors systematically vary across juvenile and adult arrestees. While a number of studies have documented patterns of gun behavior among youth or adult offenders (Bennett & Holloway, 2004; Sheley & Wright, 1995; Wright & Rossi, 1994), few studies have done so concurrently, and the existing comparative literature is largely descriptive in nature (Decker, Pennell, & Caldwell, 1997; Harlow, 2001). The current research, using more than 950 juvenile and adult arrestees detained in St. Louis, Missouri, considers the theoretical correlates of gun behavior within a multivariate framework. By incorporating perceptual measures of fear of the street, firearms access, and sanction risk, we explore the relative utility of theories of deterrence and self-help in explaining gun behaviors. Finally, we broaden the scope of extant research by focusing on three measures of gun behavior—possession, carrying, and use—as opposed to concentrating on any one of these outcomes individually.

Gun Behaviors among Adult and Juvenile Offenders

To date, most knowledge concerning gun behaviors among offenders has been obtained from inmate or arrestee surveys. The most prominent of these studies were conducted by Wright and Rossi (1994) and Sheley and Wright (1995). Specifically, Wright and Rossi (1994) selected a sample of 1,900 male felons from 11 adult prisons in 10 states and found that 75 percent of these felons

reported ever owning or possessing a gun. In addition, three-quarters of gun owners in their sample reported ever carrying a gun outside the home, while 50 percent of gun owners admitted to ever firing a gun at someone. Turning their focus to youth, Sheley and Wright (1995) undertook a similar study of patterns of gun acquisition and use among a sample of 835 serious male offenders detained in six juvenile correctional facilities in four states.[1] Even though participants were considerably younger in age than detainees in the Wright and Rossi (1994) study, prior gun behaviors were extremely common among detained youths in Sheley and Wright's (1995) study. For instance, across all respondents in the sample, 86 percent had owned a gun at some point; 84 percent had carried a gun outside the home two years prior to their confinement; and 76 percent had previously shot at someone.

Particularly relevant to the current research, other self-report studies have utilized samples that have allowed for more direct comparisons between adult and youthful offenders in the prevalence of gun behaviors. Decker, Pennell, and Caldwell (1997), for example, used data from the Drug Use Forecasting (DUF) program to assess variation in gun behaviors among 8,000 juvenile and adult arrestees in 11 large US cities. In fact, Decker and colleagues (1997) disaggregated the prevalence of select gun behaviors by age (juvenile and adult) and gender. Across all 11 cities, 42 percent of adult and juvenile males reported ever owning or possessing a gun. When the focus turned to gun carrying and use, however, differences between juveniles and adults emerged. In particular, among male gun owners in the sample, roughly one-quarter of adults and more than one-third of juveniles reported ever carrying a gun outside the home at least "some of the time." Additionally, one-third of juvenile males who owned a gun, compared to just one-fifth of adult males, reported having previously used a gun to commit a crime. Harlow (2001) also reported on patterns of gun possession and use among 14,285 juvenile and adult offenders (both male and female) serving time in 275 state prisons.[2] Much like Decker et al. (1997), Harlow disaggregated the prevalence of certain gun behaviors by age. She found that, when asked about possessing a gun during their most recent offense, offenders aged 20 or younger were more likely to be armed (36 percent) than offenders aged 21 or older (17 percent).

These findings suggest that gun possession and use are quite prevalent among detained persons, particularly among serious male offenders. The widespread involvement in gun behaviors across these studies affirms Wilkinson and Fagan's (2001) observation that research undertaken with detained persons

1. Because all but one of these juvenile institutions was a maximum-security facility, Sheley and Wright (1995) noted that the mean age of the participants (17 years old) neared the age of majority, with 41 percent of the inmates aged 18 or older.

2. Harlow (2001) also reported findings from the 1991 Survey of Inmates in State Correctional Facilities (SISCF) and the 1997 Survey of Inmates in Federal Correctional Facilities (SIFCF). Comments here focus on the findings from the most recently collected data (i.e., 1997), as well as results from the more comprehensive sample of detained offenders (i.e., state inmates).

overcomes the low "base rate problem" that often plagues studies examining gun behaviors among population- or school-based samples. As further suggested by Bennett and Holloway (2004), the elevated rate of gun involvement among offenders makes them ideal subjects for supplying information that in turn can be used to better design gun-crime reduction strategies. To this end, the above studies suggest that a more complete picture of gun behaviors and markets can be drawn by acquiring information from both juvenile and adult offenders.

Theoretical Mechanisms

Several theoretical perspectives have emerged to explain gun behaviors. In particular, we focus on three perceptual mechanisms hypothesized to affect involvement in gun behaviors (fear and perceived risk of victimization, access to firearms, and perceived sanction risk), and assess whether gang membership influences gun behaviors, net of prior criminal involvement. Despite distinct policy implications associated with each of these theoretical mechanisms, indicators of perceived risk of crime and gang membership have received much more attention in the literature than has perceived firearms access and presumed sanction risk. In the discussion that follows, we examine how these theoretical mechanisms have been tested in prior research, and, where applicable, studies or theoretical arguments are noted when the evidence suggests that these mechanisms differentially influence the gun behaviors of juveniles or adults.

Fear and Perceived Risk

The "fear and loathing" hypothesis (Wright, Rossi, & Daly, 1983) is one of the earliest and most cited explanations of gun behaviors. This explanation proposes that individuals acquire or carry firearms due to a fear of crime or a perceived risk of becoming a victim of violence. Under these circumstances, gun acquisition or carrying is considered a form of "self-help" because the possession of a firearm is largely driven by a desire to prevent potential offenders from successfully perpetrating crimes against oneself, family, or property (Black, 1983; Smith & Uchida, 1988; Wilcox, 2002). There is empirical support for this hypothesis among adults (Kleck, 1991; McDowall, 1995). For example, Lizotte, Bordua, and White (1981) found that, among a sample of adult residents in Illinois, respondents who scored higher on a fear of crime index were more likely to own a firearm for protection. Additional population-based studies also have found a relationship between fear of crime and gun ownership (Hill, Howell, & Driver, 1985; Stinchcombe et al., 1980; Young, 1986). Firearms research involving adults has seldom been extended beyond gun ownership. However, with a nationally representative sample of adults,

Kleck and Gertz (1998) found that persons who reported knowing someone who was a victim of a serious crime (a possible mechanism by which one estimates their own perceived risk of crime) were more likely to report carrying a gun for protection.

Direct or indirect tests of the fear hypothesis among juveniles have traditionally centered on weapons and, to a lesser extent, gun carrying rather than ownership (Arria, Borges, & Anthony, 1997; Forrest, Zychowski, Stuhldreher, & Ryan, 2000; Luster & Oh, 2001; Wilcox, May, & Roberts, 2006). For example, researchers have assessed the relationship between fear or perceived risk and school weapon carrying, with findings generally offering little to no support for the fear and loathing hypothesis (Bailey, Flewelling, & Rosenbaum, 1997; Wilcox & Clayton, 2001; Wilcox Rountree, 2000). Some research has explicitly addressed youth gun carrying in the broader community (not limited to school), but such studies have seldom assessed the influence of fear or perceived risk of crime on gun carrying among adolescents (Cook & Ludwig, 2004; Molnar, Miller, Azrael, & Buka, 2004; Patchin et al., 2006).

Firearms Access

Research has assessed the relationship between gun availability and gun crime more generally (see Hepburn & Hemenway, 2004), but less is known about the association between gun access and behaviors that may precede firearm crime such as gun acquisition and carrying. While it seems logical to presume that a greater supply of guns in a community will translate into greater availability of firearms at the individual level, some have proposed the futility hypothesis which " … holds that changes in the general prevalence of guns will have no effect on whether adolescents [or offenders] carry or own guns" (Cook & Ludwig, 2004, p. 30). This thesis has been derived largely from self-report studies with incarcerated youths and adults, with the findings suggesting that firearms distributed in the secondary market are readily available to at-risk persons, and that at-risk persons are quite motivated to acquire guns which consequently makes them relatively insensitive to changes in gun prevalence (Sheley & Wright, 1995; Wright & Rossi, 1994).

Researchers have conducted few direct empirical assessments of the relationship between gun prevalence and gun behaviors preceding crime despite the clear policy implications of the futility hypothesis. The research that has been conducted suggests that the availability of guns may increase gun-related behaviors. For example, Cook and Ludwig (2004) found that the likelihood of an adolescent carrying a gun increased with the level of gun ownership within a juvenile's county of residence. However, the existing research has largely relied on indirect or aggregate measures of private gun ownership (see Wintemute, 2003). Cook and Ludwig (2004), for instance, used a proxy of gun ownership that measured the percentage of suicides committed with firearms within a county.

Perceptions of Sanction Risk

Deterrence theory has served as the foundation of many demand-side gun policies which assume that gun behaviors can be affected by increasing the threat or salience of punishment. To date, most deterrence-related studies use interrupted time-series models to evaluate the influence of gun-focused policies (e.g., targeted police patrols) on the aggregate level of gun crime within affected areas (see Levitt, 2002 and Wellford, Pepper, & Petrie, 2005 for a review of this research).

Seldom do these studies assess the effect of gun policies on individual perceptions of sanction risk, which is a primary mechanism by which deterrence-based policies are presumed to affect criminal behavior. Demand-side gun policies are grounded in deterrence theory by way of objectively increasing the severity of punishment or certainty of apprehension associated with illegally carrying or using a firearm. Common demand-side initiatives include sentence enhancements for gun misuse (see Marvell & Moody, 1995; McDowall, Loftin, & Wiersema, 1992) and intensified police patrols aimed at reducing gun crime in targeted areas (see McGarrell & Chermak, 2003; Sherman, 2001). In the current research, we examine the potential influence of perceived sanction risk on gun behaviors and, in the process, assess the underlying deterrence supposition that the perceived threat of punishment makes the illicit possession and use of firearms less attractive.

Gang Membership

The strong, positive relationship between gang membership and gun behaviors has been well documented. Extant research has uniformly found that gang members are more likely to be involved in criminal activity than their non-gang counterparts, especially serious crime such as gun violence (Thornberry et al., 2003). This gang membership effect has been consistently uncovered in the literature " … regardless of when, where, and how the data were collected" (Thornberry, Krohn, Lizotte, & Chard-Wierschem, 1993, p. 55). In fact, gang membership has been shown to intensify delinquent behavior in ways that exceeds the simple effects of association with delinquent peers. For example, Esbensen and Huizinga (1993), with data from the Denver Youth Survey, found that gang members self-report two to three times more delinquency, even when controlling for association with non-gang delinquent peers and prior delinquency (see also Battin et al. 1998; Gordon et al., 2004). Such findings are also supported by ethnographic research on gangs (Decker & Van Winkle, 1996; Hagedorn, 1988; Vigil, 1988) that shows engaging in and the threat of violence are core values to gang membership and behavior.

Relative to adolescence, however, the strength of the relationship between gang membership and involvement in gun behaviors as an adult is less clear. Lizotte and colleagues (2000) found that, after controlling for the contemporaneous and

lagged influence of relevant variables, current gang membership had a substantial effect on gun carrying in adolescence but dissipated in adulthood. Conversely, if gang membership among adults largely reflects a selection process where those who remain attached to the gang are the most "hardened" members (Flannery, Huff, & Manos, 1998), the effect of gang membership on involvement in gun behaviors may be just as salient among adults as juveniles. Overall, research suggests that gang members are more actively involved in gun-related behaviors than non-gang members, but the relationship between age, gang membership, and gun-related behaviors is less clear.

Present Study

We augment prior research by focusing on gun acquisition, carrying, and use among a juvenile and adult arrestee sample. The current research builds on general population samples which may fail to capture the most active offenders. Conversely, studies with incarcerated persons may reflect mnemonic effects or recollections of a street market that has changed since an individual was incarcerated. Over time, inmates lose touch with the characteristics of street gun markets, as prices, access, availability, and motives change. Finally, a sample of offenders interviewed at the time of arrest will include a large proportion of what Kleck (1991, p. 46) described as "relatively weakly motivated, infrequent offenders."

In addition, we include individual, perceptual measures of fear of gun crime and community gun prevalence to understand the role of self-protection in decisions to carry and use guns. We also explore the possible deterrent effect of legal penalties for gun carrying and use on behavior by including measures of perceptions of the risk of arrest and relative concerns over the penalties of gun use. Despite growth in the perceptual deterrence literature (see Nagin 1998; Pratt et al., 2006), most existing research has been undertaken with population- or school-based samples and has not considered the relationship between the perceived threat of punishment for gun crimes and individual gun-related behaviors. This research extends the literature by assessing the effects of perceived sanction risk on gun-related behaviors among arrestees. Together, these variables provide a greater context for the understanding of gun behaviors.

Finally, we include a number of individual-level controls central to understanding gun behaviors. In particular, we focus on gang membership in predicting involvement in gun behaviors. Traditionally, gun studies have largely been undertaken with "age-truncated" samples by way of focusing almost exclusively on either juveniles or adults. Gun research conducted with adults, however, has seldom examined gang membership directly and, as a result, the literature provides much greater insights into the strength of the relationship between gang membership and involvement in gun behaviors among juveniles rather than adults. This gap in the gun research is noteworthy given pressing concerns over

older or aging gang members. As Howell (1998, p. 2) indicated, "Although younger members are becoming more common, it is older membership that has increased the most" (see also Klein, 1995). This is of particular importance for the current study as Decker and Curry (2002) have indicated that the St. Louis police department estimated that roughly half of all gang members in the city were aged 17 or older. Given that adults account for a sizeable proportion of all gang members, yet are seldom examined in the literature, this study advances gun research by assessing if gang membership has a similar effect on gun-related behaviors among juveniles and adults.

Methodology

Data

Data for the study were drawn from a larger research project examining firearm involvement in the city of St. Louis. This study was conducted with males held in the adult jail and juvenile detention facility in the city of St. Louis at six points in time between 2003 and 2007. The juvenile facility is a secure placement facility and houses boys under the age of 17 who are awaiting trial for a law violation. The facility is designed to provide short-term placement for youth with most stays ranging between three and 90 days. The city of St. Louis adult jail facility also holds individuals awaiting arraignment or trial. All of the subjects housed in the facilities during the interview periods were eligible for inclusion in the study and were invited to participate in an interview, and the response rate for both samples averaged 90 percent.

Individual-level data were obtained through comprehensive interviews with youth and adult arrestees. Research staff administered surveys to individuals in a private setting, and each question and corresponding answers were read aloud to the arrestee to increase comprehension. The survey contained both open- and close-ended questions, and was developed based on research of similar phenomenon (Decker et al., 1997; Wright & Rossi, 1994). The results for the interviews have been combined over the four-year period and include data from 629 adults and 338 juveniles.[3]

The city of St. Louis is unique and appropriate site for the current study, as it has high levels of violent crime and has ranked among the most violent cities for over forty years. For example, the St. Louis homicide rate is four times the national average, and rates of robbery and aggravated assault in St. Louis typically rank among the five highest in the United States. Each year law enforcement officials seize over 2,000 guns in the city. The city population is roughly equally divided between African Americans and Whites and over one-quarter of

3. Tests of statistical significance were conducted to determine if significant differences in sample characteristics were present across interview periods. None of the demographic or perceptional characteristics within juvenile or adult offenders were statistically different across the interview periods for key variables including age, race, charge, and perceived risk of arrest.

city residents (26 percent) are under eighteen years of age. Economic indicators also show a highly distressed city. The city unemployment rate was reported at 12 percent for the 2000 Census. Median household income was just over $27,000, and 22 percent of households lived below the poverty level.

Measures

Dependent measures

Three dependent measures—gun possession, frequency of gun carrying, and gun use— were selected to represent various dimensions of gun-involved behaviors. Moving beyond research that centers only on gun procurement or carrying allows us to identify correlates common to gun behaviors and to understand factors that may separate simple gun possession from that of gun use. The *gun possession* measure is dichotomous (1 = individual had owned or possessed a gun at some point in their life; 0 = individual did not report owning or possessing a gun). Gun possession was prevalent among the juvenile and adult sample with 65 percent of adults and 59 percent of juveniles reporting that they had owned or possessed a gun at some point in their lives (see Table 1).

Arrestees also were asked to report the frequency of *gun carrying* outside of their home during the previous twelve months (0 = never; 1 = seldom-once per month; 2 = frequently-most or nearly all of the time). Gun carrying outside of the home was much more prevalent among the juvenile arrestee group. Nearly half (46 percent) of juveniles reported that they carried a gun outside of their home most or all of the time, while 41 percent responded that they seldom carried, and 13 percent indicated that they had not carried a gun in the last year. In contrast, 69 percent of adults indicated that they never carried a gun in the past year, and only 19 percent reported that they seldom carried and 12 percent noted that they frequently carried a weapon outside the home.

Finally, the *gun use* measure queried individuals as to their use of a gun during the past year (1 = arrestee reported that they had fired a gun during the past year; 0 = individual did not fire a gun). A significant difference was observed between the juvenile and adult groups in terms of gun use. Overall, 55 percent of juveniles and 24 percent of adults who ever owned a firearm reported that they fired a gun in the past year.

Demographic characteristics

Consistent with previous research, a number of individual-level variables are added to statistical models as controls including race (1 = *Black*; 0 = White), *age* (in years at the time of interview), and criminal history (number of self-reported *prior convictions* for any crime). *Gang membership* also serves as a central

Table 1 Descriptive statistics: total sample

	Juveniles (n = 338)	Adults (n = 629)
Lifetime gun ownership	58.9%	65.0%
Frequency of gun carrying*†		
Never	13%	69%
Seldom	41%	19%
Frequently	46%	12%
Fired a gun in the last year*†	55%	24%
Demographic characteristics		
Age*	14.91	31.02
Black*	94%	87%
Gang membership*	56%	31%
Prior convictions	1.02	2.11
Offense characteristics		
Drug offense*	4%	14%
Personal offense*	30%	13%
Perceptual measures†		
Increased gun use	60%	62%
Crime gun prevalence*	55%	44%
Access to guns	61%	63%
Fear of the street	46%	41%
Increased risk of arrest	53%	49%
Gun use penalties*	39%	24%

*Significantly different at $p < .05$.
†Statistics represent only the 202 juveniles and 409 arrestees who indicated that they had owned a gun in their lifetime.

indicator in our models as it has been tied to gun involvement among youth and adults. Finally, two dichotomous measures of the nature of the current arrest, including *drug offense* and *personal offense*, are included. Property and non-classified offenses (e.g., probation violation, traffic crimes) serve as the reference category, and offense and prior conviction data are based on arrestee self-reports.[4] Although these measures are contemporaneous to the interview period and may not precede the gun-involved behaviors, it is important to understand the nature of the arrest as these behaviors may be indicators of risky behaviors (e.g., drug dealing, gang membership) that are correlates of gun involvement. In particular, the pervasiveness of drug use among arrestees has been well documented (see Decker, 2000); therefore, it is important to control for the nature of current offense behaviors, separate from prior convictions, as it may reduce

4. In total, 42 percent of juveniles were arrested for property crimes, primarily auto theft and motor vehicle tampering, and the remaining 23 percent were arrested for another non-classified offense (e.g., probation violation, traffic-related offense, status offense). Adults were most often arrested for non-classified offenses, primarily probation or parole violations; 14 percent of the adult sample were brought to the jail for property-related offenses.

omitted variable bias.[5] Further information on the variables used in the analyses is presented in Appendix A, and a correlation matrix is provided in Appendix B.

As noted in Table 1, the sample is primarily Black and most offenders had contact with the criminal justice system prior to their current arrest. As expected, the age distribution was significantly different across groups; the average age of the juvenile arrestee sample was 15 and the adult sample averaged 31 years of age. Juveniles were more often detained for personal offenses and less likely for drug-related crimes, while 14 percent of the adult sample was detained for a drug offense and 13 percent for a personal crime. Finally, gang membership was prevalent among both groups, but juvenile arrestees were significantly more likely to report gang membership with 56 percent of juveniles and 31 percent of adults indicating that they were a current member of a gang at the time of arrest.

Perceptual measures

A series of perceptual measures are included in our models to assess if they facilitate or inhibit gun-involved behaviors. As noted, self-protection has been offered as a primary explanation for gun possession among juveniles and adults (Sheley & Wright, 1995; Wright & Rossi, 1994). We therefore employ two measures that account for the perceived risk of gun use among offenders and persons on the street. Specifically, the *crime gun prevalence* measure queries arrestees on how likely it is that an offender will use a gun to commit a crime in St. Louis (1 = very likely; 0 = somewhat likely or not likely). Most of the sample perceived high levels of gun involvement in the community. Both juveniles (62 percent) and adults (60 percent) reported that offenders in St. Louis were very likely to use guns. The second perceived risk measure captures the *increase in gun prevalence* over the past year (1= the risk of confronting someone on the street who is armed is more than last year; 0 = the risk is less than last year). Juveniles were significantly more likely to report that there were more guns on the street in the last year, with 55 percent of juveniles and 44 percent of adults indicating increases. In addition, a relative *fear of the street* measure was also utilized that asked arrestees about the most important consideration when carrying a gun (1 = the threat of running into someone on the street who is armed with a gun; 0 = the risk of being arrested by the police for gun possession). Both samples were nearly evenly split in terms of the most important considerations of weapons carrying; 46 percent of juveniles and 41 percent of adults reported that they were more afraid of the street than the associated legal penalties.

Along with indicators of perceived risk and relative fear of the street, a binary measure of *access to guns* was included that queried respondents on the ease of

5. A measure of drug use was not available for the total sample of arrestees. This omission is a limitation of the research and should be addressed in future research.

obtaining a gun (1 = little or no trouble; 0 = a lot of trouble or almost impossible). Most respondents indicated that guns were readily available with 61 percent of adults and 63 percent of juveniles reporting that they would have little or no trouble obtaining a gun. We elected to use a microperceptual indicator of firearms access because, under certain circumstances, private gun ownership may be objectively prevalent within a community yet residents not view firearms as readily accessible "on the street" due to, for example, enhanced law enforcement efforts or an unwillingness of community residents to exchange firearms in the secondary market. A perceptual indicator of gun availability adjusts for such circumstances by accounting for within-community differences in the presumed ease of acquiring a gun. Moreover, in generalizing the findings of Cook and Ludwig (2004) and Wintemute (2003), we hypothesize that perceived firearms access is especially salient in shaping gun behaviors among juveniles.

In moving the focus from motivating to inhibiting factors of gun possession and use, most research has either assessed the efficacy of targeted deterrence programming, like the lever pulling mechanisms used in Operation Ceasefire, on aggregate crime trends (Braga, Kennedy, Piehl, & Waring, 2001), or used national samples to examine the relationship between perceived sanctions and individual-level behaviors (see Kleck, Sever, Li, & Gertz, 2005). Less is known about how the deterrence message affects individual-level gun behaviors among arrestees and others involved in crime. Accordingly, two measures were included to capture the arrestees' understanding of and adherence to gun penalties. The *risk of arrest* measure queried individuals as to whether their risk of arrest had increased over the past year (1 = the risk of arrest for illegally carrying a gun is more than last year; 0 = the risk is amount the same or less than last year). Approximately half of both samples indicated that gun-related penalties have increased in the last year. Arrestees were also asked to report if they consider the *gun use penalties* before engaging in a gun crime (1 = yes; 0 = no). Juveniles were significantly more likely to report that they contemplated the legal restrictions on guns before carrying. Yet, the legal penalties had little deterrent power with only 24 percent of adults and 39 percent of juveniles reporting that they would consider the gun penalties before carrying.

Results

Lifetime Gun Possession

As noted, gun possession and ownership is prevalent among the juvenile and adult arrestee samples and the descriptive analysis suggests the presence of substantive differences between the groups. To examine the patterns of gun possession in a more rigorous manner, we estimated separate logistic regression models for the adult and juvenile samples. In addition, z scores were calculated for each of the exogenous predictors in the models according to the formula presented by Paternoster, Brame, Mazerolle, and Piquero (1998).

As described in Table 2, we observed only subtle differences in the correlates of gun possession between juvenile and adult arrestees. Gang membership emerged as the strongest predictor. The odds ratios suggest that juvenile arrestees who report gang membership were five times as likely to report lifetime gun ownership, and adult gang membership was associated with a sixfold increase in lifetime ownership. This finding corresponds with the existing literature that suggests a strong, positive correlation between gang involvement and guns. Age was also significant in the adult model and likely reflects disparate opportunities, or time at risk, for gun ownership among older arrestees. Finally, race and measures of prior criminal history and current arrest charge were not significant in either model.

As expected, access to guns has a moderate, positive effect on gun possession by juveniles and adults. The strength of the coefficients suggest that gun ownership may be especially contingent on perceived access among juveniles because the results of the z-score analysis indicates that the differences between the groups are statistically significant ($z = 2.34$). In addition, the relationship between gun use penalties and gun possession was only significant in

Table 2 Determinants of lifetime gun ownership, logistic regression models: total sample

	Juveniles ($n = 338$)			Adults ($n = 629$)		
	B	*SE*	Odds	*B*	*SE*	Odds
Constant	−3.73	1.82		−1.85	.44	
Demographic characteristics						
Age	.13	.13		.05***	.01	1.05
Black	.59	.59		−.06	.28	
Gang membership	1.65***	.28	5.20	1.80***	.25	6.04
Prior convictions	.06	.10		.00	.02	
Drug offense	.68	.69		−.08	.27	
Personal offense	.49	.32		.39	.30	
Perceptual measures						
Increased gun use	−.49	.29		.16	.19	
Crime gun prevalence	.19	.29		.28	.19	
Access to guns	1.53***	.30	4.60	.70***	.19	2.01
Fear of the street	.24	.29		.19	.19	
Increased risk of arrest	.10	.29		−.11	.19	
Gun use penalties	−.74**	.28	.48	−.35	.22	
Model fit						
−2 log likelihood	352.22			698.87		
Model χ^2	126.72***		112.47***			
Cox and Snell R^2	.31			.16		
Nagelkerke R^2	.43			.23		

†$p<.10$; *$p<.05$; **$p<.01$; ***$p<.001$ (two-tailed tests).

the juvenile model. Juveniles who reported that they considered the gun use penalties were half as likely to report ever owing a gun. None of the other perceptual measures achieved statistical significance, and few differences were observed between the adult and juvenile groups. In fact, only the contrast for the firearms access measure was significantly different, suggesting that the motivations for gun ownership may be similar for adult and juvenile arrestees.

Gun Carrying

The results from the first phase of logistic regression analysis reveal little substantive differences in the patterns of lifetime gun possession between the adult and juvenile samples. Focusing the initial analyses on the total sample, however, might obscure patterns among the most highly motivated offenders. Therefore, we next examine the predictive ability of our demographic and perceptual variables on the frequency of gun carrying and likelihood of gun use among the 202 juvenile and 409 adult arrestees who reported possessing a gun at some point in their lives. Restricting the sample to arrestees with prior experience with guns allows us to focus on arrestees with a greater likelihood of recent gun involvement and addresses some of the concerns of past research that has focused on general population samples, most of which likely have little experience with guns (Kleck, 1991) and are not the highly motivated groups of most interest to policymakers.

The next model addresses the frequency of gun carrying outside the home. Because the dependent variable is ordinal-level, we elected to estimate a series of ordered probit models (Long, 1997). Table 3 displays the results of the gun carrying model. Similar to our previous findings, there were few differences between the adult and juvenile models. Only the z-score contrast for the age measure achieved statistical significance ($z = 1.99$) and likely reflects the truncated age distribution for the juvenile sample. In addition, gang membership was a strong, significant factor in both models thus further highlighting the interconnectedness between gang membership and gun involvement. In contrast, race was significant in the juvenile model but not in the adult model.

The effect of the perceptual variables varied for juveniles and adults. Adults who were more afraid of the street than legal penalties reported carrying a weapon with more frequency, but the effect was small and this measure was not significant in the juvenile model. Increased access to guns was also associated with an increase in gun carrying but only in the adult model. In fact, only the perception of increased gun use achieved significance in the juvenile model and the relationship observed was contrary to expectations. Juveniles who perceived an increase in the prevalence of guns over the past year were less likely to report carrying a gun. None of the deterrent measures were statistically significant, which suggests that for the juvenile group of offenders more involved in gun activity (carrying) that deterrent penalties held little effect.

Table 3 Determinants of frequency of gun carrying in prior year, ordered probit models: gun owners only

	Juveniles (n = 202)			Adults (n = 409)		
	B	*SE*	Odds	*B*	*SE*	Odds
Constant	−3.73	1.82		−1.85	.44	
Demographic characteristics						
Age	.20	.13	−.06***	.01	.01	1.05
Black	1.53*	.68	.30	.40	.28	
Gang membership	1.12***	.34	.58**	.24	.25	6.04
Prior convictions	.07	.08	.04	.03	.02	
Drug offense	−.51	.67	−.35	.34	.27	
Personal offense	−.43	.31	−.24	.33	.30	
Perceptual measures						
Increased gun use	−.61*	.30	−.09	.23	.19	
Crime gun prevalence	.30	.30	−.09	.24	.19	
Access to guns	.58	.37	1.22***	.30	.19	2.01
Fear of the street	.00	.29	.38†	.23	.19	
Increased risk of arrest	.34	.29	−.17	.23	.19	
Gun use penalties	.24	.31	.09	.28	.22	
Model fit						
−2 log likelihood	359.34		610.75			
Model χ^2	30.09**		67.20***			
Cox and Snell R^2	.14		.15			
Nagelkerke R^2	.16		.19			

†p<.10; *p<.05; **p<.01; ***p<.001 (two-tailed tests).

Gun Use

The results of the gun use analyses are presented in Table 4. Similar to previous models, gang membership was a strong, positive correlate of gun use. In fact, juveniles who reported that they were a member of a gang were over four times as likely to report firing a gun in the past year than non-gang members. The effect of gang membership for the adult sample was also strong, but the relative effect of gang membership for adults was half that of juveniles and the significant z test suggests that gang membership has substantially different effects on gun use for juveniles than adults. Age was also significant for the adult sample, further suggesting that older offenders are less likely to use guns. In addition, adult arrestees jailed for personal crimes were more likely to have reported firing a gun, but a significant relationship between current offense type and the gun outcome was not observed for the juvenile sample. Finally, measures of race and criminal history were not significant for either group.

Turning to the perceptual measures, significant differences between adults and juveniles were observed on measures of the deterrent nature of arrest and

the fear of the street. Adult arrestees who perceived that the chances of arrest for a gun-related crime had increased in the past year were 44 percent less likely to report firing a gun in the prior 12 months. Ready access to guns increased the chances that an adult would fire a gun and the size of the odds ratio substantiates this relationship. In addition, adult arrestees who reported that they were more afraid of the street than the legal penalties associated with gun use were two times as likely to have reported firing a gun and the effect is significantly different by arrestee age group. In fact, none of the perceptual measures were significant for the juvenile sample, and the self-protection considerations did not achieve statistical significance in the adult and juvenile models.

Summary and Discussion

The purpose of the current study was to assess differences in the prevalence and correlates of three measures of gun behavior—possession, carrying, and use—across a sample of juvenile and adult arrestees in St. Louis. We first examined

Table 4 Determinants of gun use, logistic regression models: gun owners only

	Juveniles (n = 202)			Adults (n = 409)			Comparison
	B	*SE*	Odds	*B*	*SE*	Odds	*Z* score
Constant	−3.42	2.36		−1.13	.79		
Demographic characteristics							
Age	.15	.14		−.05***	.02	.96	
Black	.25	.73		.09	.48		
Gang membership	1.42***	.37	4.15	.48†	.28	1.61	2.03
Prior convictions	−.01	.08		.01	.04		
Drug offense	.16	.75		−.20	.42		
Personal offense	−.20	.33		.63†	.36	1.87	
Perceptual measures							
Increased gun use	.49	.32		.10	.29		
Crime gun prevalence	−.20	.32		.40	.27		
Access to guns	.00	.40		.66*	.35	1.93	
Fear of the street	−.10	.31		.70**	.27	2.02	1.96
Increased risk of arrest	.13	.31		−.59*	.28	.56	1.72
Gun use penalties	−.24	.33		.50	.33		
Model fit							
−2 log likelihood	255.99			347.51			
Model	22.06*			39.16***			
Cox and Snell R^2	.10			.11			
Nagelkerke R^2	.14			.17			

†p<.10; *p<.05; **p<.01; ***p<.001 (two-tailed tests).

variation in the prevalence of gun behaviors among juvenile and adult arrestees. Consistent with other offender-based studies (Birkbeck, 1998; Limber & Pagliocca, 2000; Sheley & Wright, 1995), we found that nearly two-thirds of each age group reported ready access to firearms and that over half of the adult and juvenile arrestees disclosed owning or possessing a gun at some point in their life. More noteworthy were the observed differences between the two groups in gun carrying and use. That is, in the subsample of arrestees who reported previous experience with guns, juveniles were four times as likely to report carrying a gun on a daily basis and twice as likely to indicate that they had fired a gun in the last year when compared to adults. Decker et al. (1997) similarly found that differences between juvenile and adult arrestees were more evident when examining gun carrying and use as opposed to ownership. These findings support the conclusion that juvenile or younger offenders are more willing than older offenders to carry and use firearms (see also Harlow, 2001). Ownership of firearms for juveniles seems to connote something different than for adults, suggesting a more fluid gun market for younger offenders.

Another aim of this research was to examine whether theoretical factors presumed to inhibit or facilitate gun behaviors systematically vary across juvenile and adult arrestees. In reference to deterrence, more than half of respondents indicated that they were more afraid of the penalties associated with gun possession than confronting an armed person on the street; however, less than half of juveniles (39 percent) and adults (24 percent) reported that they considered the penalties of gun use before carrying out gun behaviors. In the multivariate context, consideration of gun penalties was negatively associated with gun possession for juveniles; however, we did not observe a similar relationship for gun carrying and use. These findings suggest that, for juveniles, the deterrence message may be more efficacious for youth who are only marginally involved in the violent subculture. In contrast, once juveniles have become involved with guns (and often gangs) the deterrent effect of arrest or threat of punishment diminishes. This represents a tall order for deterrence-based initiatives, as the youth most heavily involved in gun use may be the least likely to be influenced by deterrence messages.

These results suggest that juveniles are not likely to be deterred from carrying or using a gun once they have acquired one. This may be due to a more immediate need to carry or use a firearm after it is obtained as opposed to just idly storing it for some future purpose that has not been identified. Such a conclusion is consistent with the distinction between adult and juvenile ownership, and suggests that for juveniles there is a more immediate and purposive character to gun acquisition. Although we are unable to test this supposition directly, future research could utilize "event" and "crime" calendars (see Horney, Osgood, & Marshall, 1995) with juvenile offenders to assess the immediacy of gun use after its acquisition. Gun trace data from the Bureau of Alcohol, Tobacco, Firearms and Explosives (BATFE) offer some insight into the "time-to-crime" lag for illicit gun use by juvenile offenders (see BATFE, 2002), but these data only allow a time-to-crime interval to be calculated by using the first retail

sale of a gun as the baseline for estimating such a lag. Of course, BATFE data would only prove beneficial in addressing the above supposition if juveniles acquired a firearm in the retail market; a questionable assumption given existing self-report findings (see, e.g., Smith, 1996; Webster et al., 2002). A better understanding of the window of opportunity available for conveying a deterrence message both before and after juveniles have acquired a firearm may assist demand-side initiatives aimed at reducing youth gun crime.

Regarding adults, we found that the perceived threat of punishment affected the likelihood of gun use but not acquisition. Specifically, adult arrestees who perceived that the chances of arrest had increased over the past year were less likely to use a gun. This finding suggests that adults may be more receptive than juveniles to a deterrence message after the acquisition of a gun. This finding supports recent work which suggests that offenders, in general, are amenable to a deterrence message because they are more acquainted with criminal sanctions (Pogarsky, 2007). In many respects, however, Nagin's (1998, p. 7) observation that "… the dearth of evidence on the policy-to-perceptions linkage is a major gap in knowledge of the etiology of deterrence" is still applicable, particularly with gun-related policies. While this study fills part of this void, more research is needed that directly assesses the "policy-to-perceptions linkage" and, more specifically, builds on current findings by considering if perceived risk of punishment has invariant effects across different types of offenders and gun-involved behaviors.

The role of perceived gun availability on arrestee behaviors was also considered. As noted, while prior research has assessed the impact of objective gun availability on involvement in gun carrying (see Cook & Ludwig, 2004; Wintemute, 2003), little is known about the potential influence of perceived access to firearms on gun behaviors. As expected, we found that juveniles and adults who felt that they could obtain a gun with little or no trouble were more likely to have owned a gun at some point. With gun carrying and use, however, perceived access was only significant in the adult models. We believe that these differences are important. For juveniles, perceived access to guns was not significant, perhaps reflecting the extent to which the juveniles in our sample were so deeply embedded in social networks with easy access to guns and other criminogenic commodities. These social networks may reflect negative peer relationships, particularly among gang members, that diminish deterrence messages and provide access to guns.

Current findings also highlight the continued relevance of gang membership for understanding gun behaviors. Gang membership was particularly influential in shaping gun behaviors among the juvenile arrestees. In fact, gang involvement increased the odds of juvenile arrestees reporting gun possession, carrying, and use by at least threefold. Therefore, current findings underscore the interconnectedness of gangs and youth violence that has been highlighted repeatedly in prior research (Esbensen & Huizinga, 1993; Thornberry et al., 2003). Furthermore, it was anticipated that, based on the findings of Lizotte et al. (2000), the effect of gang membership may be less salient among adult

arrestees. While current findings do suggest that gang involvement has a stronger effect on younger members, they also reveal that gang membership is still significant in explaining gun behaviors among adults. Accordingly, for those adults who decide to extend gang membership beyond adolescence or possibly involve themselves in a gang for the first time, current results indicate that the chances of such adults relinquishing gun behaviors are less likely. In addition, this research speaks to the potential effects of gang membership growing among older, adult members, a topic that has received relatively little attention in the literature (Klein, 1995; Howell, 1998). Thus, future research should continue to assess the potential influence of adult gang membership on violence and gun behaviors in particular and should not discount gang membership as a behavior limited to adolescence.

The final theoretical mechanism discussed pertains to the fear and loathing hypothesis (Wright et al., 1983), among the more popular explanations of gun behaviors. Our findings offer only mixed support for this thesis. Among adults, for instance, relative fear of the street affected gun carrying and use, but measures of the perceived likelihood of confronting an armed person on the street and the presumed chances of an offender using a gun to commit a crime had no impact on gun-involved behaviors. Moreover, because of the congregate nature of youth crime (McCord & Conway, 2005; Warr, 1996), we theorized that the frequency of communication among networks of youth offenders of the perceived risks of violence on the street would lead to fear of crime being a strong motivating factor for juveniles to acquire, carry, and use guns. However, fear and perceived risk exhibited no motivating influence on acquiring, carrying, and using a gun in our juvenile models. Lack of support for the fear and loathing hypothesis among juveniles is not completely at odds with prior research (see, e.g., Bailey et al., 1997; Wilcox & Clayton, 2001), however. It may be than that youth networks do not communicate deterrence messages, rather they may be effective mechanisms for communicating messages that diminish or counter deterrence.

Prior research has also extended the fear and loathing thesis by postulating that persons who have little faith or confidence in the formal institutions responsible for crime control, such as the police, will be more inclined to acquire a firearm (i.e., "collective security hypothesis"; see McDowall and Loftin, 1983). While this argument has been largely examined with population-based samples primarily composed of adults (Young, 1985; Young et al., 1987), perceptions of collective security may be especially salient in shaping gun behaviors among juveniles given the congregate nature of their delinquent behavior. For instance, existing evidence suggests that, on average, the level of support for the police among juveniles is not as strong as the level of support among adults (Hurst & Frank, 2000; Taylor et al., 2001). As a consequence, juveniles may feel compelled to acquire or carry a firearm due to their skepticism regarding the effectiveness of the police and other agents of social control (schools, parents, etc.) in providing for their safety. The salience of third party intervention in dispute resolution may be lower among juveniles, particularly

those heavily involved in delinquency for whom violence has become their violence resolution strategy. It may also be the case that gun carrying is more rational than counting on external social control agencies given the high levels of gun violence in urban areas such as St. Louis. Indeed, the average homicide rate from 2000 to 2004 among Black males, aged 15 to 17 in St. Louis was 95 per 100,000, nearly eighteen times the US average. Accordingly, future research should expand upon the fear and loathing thesis by assessing the effects of collective security on gun behaviors among juveniles in particular.

Gun research has typically examined a single outcome, such as gun ownership, and been restricted to either juveniles or adults. The current research moved beyond this piecemeal approach to the study of gun behaviors and examined a fuller range of gun-involved outcomes among juveniles and adults. Significant predictors of gun behaviors varied by age and the specific gun behavior examined. Consequently, current findings call into question the assumption that popular explanations—and control—of gun behavior are equally applicable to possession, carrying, and use. We contend, therefore, that a better understanding of gun-involved behavior can be achieved by testing the generality of theoretical mechanisms, such as fear and perceived risk, across multiple outcomes and diverse groups of offenders. Such tests also need to expand the inventory of perceived sanctions and include offender criminal history data in the analysis.

Although current findings contribute to the literature in a number of ways, several caveats should be noted. First, the sample is limited to adult and juvenile arrestees in one city, and as a consequence the results can not be generalized broadly. In addition, given our cross-sectional research design, current findings can only speak to multivariate correlation and not causation. While longitudinal, panel data would be optimal for identifying temporal relationships among our variables, the primary aim of this research was still achieved with cross-sectional data in that we were able to assess if theoretical factors had similar effects on multiple gun behaviors among juvenile and adult arrestees. Furthermore, time and place effects also likely influenced the results of this research. Data for the current study were collected during a moderate decline in violent crime. In contrast, Sheley and Wright (1995) collected their data in 1991 during an upswing in serious predatory violence nationally. It is possible that the prevalence and use estimates uncovered here would change if similar data were collected during a different time period. Place effects are also evident in the literature (see Decker et al., 1997) which suggests that gun behaviors and markets are not unwavering across various regions of the country. Thus, findings here should be considered within the context of these likely time and place effects.

Despite these considerations, the current research documents the utility of comparing adult and juvenile offenders and the inclusion of multiple measures of gun behavior. In addition, this research used an important sample for understanding these behaviors, a pool of individuals recently arrested though extensively involved in offending. Different sets of findings emerged for juveniles and adults, as was the case across the three measures of gun behavior. Adults were more amenable to measures of perceptual deterrence than juveniles. The key

finding for policy is that juveniles seemed impervious to deterrence messages, particularly with regard to gun carrying and gun use. One clear policy implication is the need for early intervention with juveniles in prevention efforts before they come to possess their first gun. Recall that juveniles were more likely to carry and use firearms than their adult counterparts and seemed immune to deterrence messages, despite the fact that the mean age of our juvenile sample was fifteen. Prevention efforts therefore should be targeted at juveniles of a substantially younger age, perhaps as young as eight or ten years old when normative beliefs about conflict, guns and dispute resolution are formed. But there is another group of juveniles for whom a second set of policy responses will be more difficult to craft. These youth, largely undeterred by the threat of punishment for gun carrying or use, are more difficult to reach. Making the deterrence message more salient for these individuals will be important as will increasing their sense of the procedural fairness of juvenile and criminal justice penalties. Perhaps deterrence messages must be delivered directly in small groups by a group of peers and criminal justice officials in innovative ways. Alternatively, finding ways to increase the direct impact of deterrence policies on the routine activities of everyday life for such juveniles may also pay dividends. Clearly, this group of deep-end juvenile offenders is not being reached effectively by current efforts. After all, these juveniles are on the cusp of entering the adult criminal justice system, increasing problems of re-entry, state prison overcrowding and prolonged involvement in crime. These findings suggest the challenges of dealing with gangs and guns remains a key topic in the crime control agenda of American cities.

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Appendix A. Description of Variables

Variable	Definition
Outcome variables	
Gun possession	A dichotomous variable with individuals who reported that they had ever possessed a gun, whether they owned it, borrowed it, shared it with someone, were holding it for someone, or got it in any other way. Arrestees were asked to report any gun that they had, even if they never carried it and simply kept it somewhere. (1 = gun possession in their lifetime; 0 = Did not report gun possession in their lifetime).
Gun carrying	A continuous variable in which arrestees who report how often they had carried a gun outside of their home in the last 12. (1 = seldom—once per month; 2 (frequently-nearly most or all of the time) 0 = Did not report carrying a gun in the last 12 months).
Gun use	A dichotomous variable with arrestees who reported that they had fired a gun in the past year = 1; 0 = Did not reporting firing a gun in the past 12 months.
Explanatory variables	
Demographic characteristics	
Age	The arrestees age measured in years.
Black	A dichotomous variable with African American race = 1; 0 = white race.
Gang membership	A dichotomous variable with arrestees who indicated that they were part of a gang = 1; 0 = did not report gang membership.
Prior convictions	A self-report measure of the number of prior convictions for any crime.
Drug offense	A dichotomous measure of drug-related arrest 1 = arrest for drug-related offense including drug use, sales, and trafficking 0 = property crime/other offense
Personal offense	A dichotomous measure of personal arrests 1 = arrest for rape, robbery, assault homicide, arson, or kidnapping 0 = property crime/other offense.
Perceptual measures	
Increased gun use	Compared to a year ago, do you think your risk of confronting someone on the street who is armed with a gun is … (1 = more; 0 = about the same or less).
Crime gun prevalence	How likely is it that an offender in St. Louis will use a gun to commit a crime? 1 = very likely; 0 = somewhat likely or not likely.
Access to Guns	How much trouble would it be to get a gun (1 = little or no trouble; 0 = a lot of trouble or almost impossible).

Appendix A. Continued.

Variable	Definition
Fear of the street	Which is a more important consideration to you when you think about carrying a gun: (1 = the threat of running into someone on the street who is armed with a gun; 0 = the threat of being arrested by the police).
Increased risk of arrest	Compared to a year ago, do you think someone's risk of being arrested for illegally carrying a gun is 1 = more; 0 = about the same or less.
Gun use penalties	Do you consider the penalties for carrying a gun illegally before doing so? (1 = yes; 0 = no)

Appendix B. Correlation Matrix

	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9	X_{10}	X_{11}	X_{12}
X_1 Age	−.14*	−.29*	.24*	.05	−.14*	.08*	−.05	.01	−.08*	−.05	−.09*
X_2 Black		.11*	−.11*	.01	−.00	.06	.02	−.04	.00	.06	.07*
X_3 Gang membership			−.01	−.01	.11*	.09*	.03	.21*	.15*	.05	.01
X_4 Prior convictions				−.03	−.03	.01	−.03	.10*	−.04	.00	−.06
X_5 Drug offense					−.16*	−.01	−.05	−.01	−.02	.03	−.01
X_6 Personal offense						.04	.02	−.00	.03	.07*	.01
X_7 Increased gun use							.04	.05	.02	.07*	−.00
X_8 Crime gun prevalence								.11*	.08*	.15*	−.03
X_{10} Fear of the street										−.03	−.02
X_{11} Increased risk of arrest											−.02
X_{12} Gun use penalties											-

*$p < .05$.