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Perceived popularity of adolescents who use weapons in violence and adolescents who only carry weapons

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Abstract

Prior research has found that persistently delinquent youth or more violent youth were less popular than their less delinquent peers (Young, 2013). However, recent research has also found that weapon carrying is associated with being more popular in adolescence (Dijkstra et al., 2010). The present paper examines the perceived popularity of adolescents who carry weapons in comparison to those who both carry and use weapons in acts of violence or threatened violence. Data consist of two waves from the National Longitudinal Study of Adolescent to Adult Health. Analyses use OLS regression with lagged predictors. This paper found no differences in number of friends between weapon carriers and weapon users. However, among both male and female gang members, those who did not use or carry weapons (abstainers) named significantly fewer friends than weapon users. Among females, weapon abstainers both named and were named by significantly more people than weapon users. These differences were not observed for males. Implications of these results and directions for future research are discussed.

Keywords

weapon carrying; gangs; adolescence; popularity

Introduction

In 2014, homicide was the third leading cause of death for teens ages 15 to 19 in the U.S. (Child Trends, 2015). Overall, juvenile offenders account for the majority of U.S. violent crimes against those ages 8 to 15 (Office of Juvenile Justice and Delinquency Prevention, 2005). Roughly a third of child homicides, specifically, were committed by juvenile offenders in 2014 (Child Trends, 2015). Injuries and trauma resulting from juvenile violence are also concerning. In 2009, an average of 20 U.S. children and adolescents were hospitalized each day due to firearm injuries (Leventhal, Gaither, and Sege, 2014). Roughly 7% of respondents to the 2013 High School Youth Risk Behavior Survey reported that they were threatened or injured with a weapon on school property at least once in the past year (Centers for Disease Control, 2014).

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The present study focuses on adolescent weapon carrying in the U.S., specifically. Weapon carrying among youth in the U.S. is not a rare event. Approximately 18% of respondents (28% of males) to the 2013 High School Youth Risk Behavior Survey reported carrying a weapon at some point in the past month; around 5% reported carrying a gun (Centers for Disease Control, 2014). Although less common than weapon carrying in other contexts, more than 5% of respondents reported carrying a gun, knife, or club to school in the past 30 days (Centers for Disease Control, 2014). Research using the National Longitudinal Study of Adolescent to Adult Health, which is also used in the present study, found that the prevalence of past-month school weapon carrying increased from 7th to 8th grade, peaking in 9th grade at 13.2%. These percentages have declined substantially since the early 1990's, but remain a cause for concern (Brown, 2004; Centers for Disease Control, 2014).

Existing U.S. research has found that weapon carriers are at higher risk for violence than those who do not carry weapons (DuRant RH, Kahn J, Beckford P, and Woods ER, 1997). However, this trend varies by weapon type. Webster, Gainer, and Champion (1993) found that gun carrying was associated with highly aggressive delinquency; knife carrying was associated with aggression, but not with serious delinquency. DuRant and colleagues (1997) identified a subgroup of weapon carriers who were generally non-violent, but had a history of victimization. The observations indicate that a more nuanced understanding of weapon carrying and weapon use is needed. However, individuals cannot be examined as if acting in isolation. Adolescents are legally barred from purchasing or carrying weapons. Thus, the role of other individuals in facilitating youth weapon carrying must be acknowledged. Adolescents, in particular, spend a great deal of time with peers; as a result, peer approval may weigh heavily in the decision to carry a weapon (Dijkstra et al., 2010).

The present paper focuses on overall perceived and peer-rated popularity, the degree to which adolescents are seen as desirable friends by others of the same age. Past research identified social networks as a key avenue for the transmission of gun violence (Tracy, Braga, and Papachristos, 2016). As a result, a more detailed understanding of how weapon carrying behaviors diffuse to other adolescents may provide an avenue for weapon carrying prevention. This, in turn, may reduce the number of injuries and deaths among youth discussed previously. Recent research has found that weapon carrying is associated with being more popular in adolescence (Dijkstra et al., 2010, 2012). This link is believed to be the product of both selection (weapon carriers choosing other weapon carriers as friends) and peer influence. In contrast, other research has found that persistently delinquent youth do not benefit from increased popularity (Rulison, Kreager, and Wayne, 2014; Young, 2013). The present paper explores this difference in the delinquency-popularity link by examining the number of friends indicated by youth who carry weapons, by youth who both carry and have used weapons in violent acts, and by youth who report no weapon carrying behavior. This study uses two waves of U.S. data from the National Longitudinal Study of Adolescent to Adult Health (Add Health). Using two waves of data allows this study to take into account past levels of perceived popularity as well as past weapon-related behavior. As the data are drawn from a sample of U.S. adolescents, the following review of the literature will also focus on research in the U.S.

Why do adolescents carry weapons?

A primary predictor of adolescent weapon carrying is gang affiliation. Lizotte and colleagues (2000) examined illegal gun carrying among young, urban males using the Rochester (New York) Youth Development Survey. Findings indicated that gang affiliation was strongly predictive of gun carrying in early adolescence (Lizotte et al., 2000). For older adolescents, heavy drug use and involvement in drug sales were both significant predictors of gun carrying (Lizotte et al., 2000); both drug users and drug sellers, groups that do not always overlap, were more likely to carry guns. Lack of association with gang affiliation for older adolescents was attributed to the decline in gang membership as respondents aged (Lizotte et al., 2000). However, there is significant overlap between gang affiliation and involvement in the drug trade. More recent research with juvenile arrestees and other offenders found that gang affiliation was, again, a strong predictor of gun ownership and gun carrying (Steinman and Zimmerman, 2003; Webster et al., 1993; Watkins, Huebner, and Decker, 2008). Although the studies above all address firearms, Lane, Cunningham, and Ellen (2004) also found that a history of delinquency was positively associated with future intentions to carry a knife among both males and females.

Lizotte et al (2000) attributed the connection between gangs and gun carrying to a desire for protection from dangerous circumstances. Rival gangs and illegal drug trade present the potential for violence; gang members may not feel protected by more traditional forces of social control, like police, and use guns as a form of social control instead (Lizotte et al., 2000). In past studies, personal protection was the primary reason adolescents expressed for carrying or owning firearms (Lizotte, Tesoriero, Thornberry, and Krohn, 1994; May, 1999; Sheley and Wright, 1993). Ash and colleagues (1996), using structured interviews with incarcerated juveniles, found that 40% of respondents reported that they felt safer with a gun. It is important to note that not all juveniles who carry guns or other weapons are involved in gangs or other illegal activity, however (Brown, 2004).

Victimization experiences have also been linked to weapon carrying among adolescents. Vaughn, Howard, and Harper-Chang (2006), examining a sample of incarcerated youth, found that prior victimization and trauma increased likelihood of weapon carrying. Young, Black male victims described weapon carrying as a response to a lack of faith in police in a study by Rich and Grey (2005). Similarly, Simon and colleagues (1997) found that perceived victimization risk increased likelihood of in-school weapon carrying. Knowing victims of violence also predicts weapon carrying. Webster, Gainer, and Champion (1993) found that knowing many victims of violence was associated with both knife carrying and gun carrying, while serious delinquency was only associated with gun carrying. A more recent study found that peer-reported victimization also increased the likelihood of weapon carrying (Dijkstra et al., 2012).

Popularity of delinquent and aggressive behavior

Another reason adolescents may choose to carry weapons is to gain social acceptance among peers. Dijkstra and colleagues (2010), in a longitudinal study of high-risk middle school and high school students, found that weapon carrying was associated with an increase in the number of students who indicated the respondent as a friend. Weapon carrying also reduced

the number of individuals the respondent listed as a friend, a suggested indicator of increasing social standing (Dijkstra et al., 2010). In a later study, the same authors determined that weapon carrying of best friends positively predicted one's own weapon carrying, signifying peer influence for this behavior (Dijkstra et al., 2012). Although males reported weapon carrying more frequently than females, the process predicting weapon carrying did not differ between males and females (Dijkstra et al., 2012).

The findings of Dijkstra and colleagues (2010, 2012) are consistent with Moffitt's developmental taxonomy of adolescent offenders (Moffitt, 1993). Moffitt's theory suggested that delinquent youth, and their delinquent behaviors, become socially acceptable and desirable for a brief time during adolescence. That weapon carrying was associated with increased social status by youth in the Dijkstra studies (2010, 2012) is in line with this proposition. As Moffitt (1993) described, a small group of offenders, the life-course persistent, displays problematic behavior across the life course. These behaviors result from a combination of early-life neuropsychological deficits and the cumulative and contemporary consequences resulting from these deficits (Moffitt, 1993). The problematic behavior of these offenders can include weapon carrying and weapon use. Research by Farrington and colleagues (2009) found that most persistent offenders had at least one conviction for a violent offense over the life course. Monahan et al (2009) also documented that persistently delinquent youth struggled with suppression of aggression.

In contrast to these life-course persistent offenders, Moffitt argued that most offenders offend primarily during adolescence. Farrington et al (2009) found that only 15% of adolescence-limited offenders had a conviction for a violent offense over the life course. According to Moffitt, adolescents experience a maturity gap, a gap in time between physical maturity and the availability of full adult rights, responsibilities, and privileges (Moffitt, 1993). Adolescents facing this gap seek mature status and independence from adults. In other words, youth want to show that they are adults, not children, and are ready for the responsibilities of adulthood. According to Moffitt's theory, teens outside of the life-course-persistent category admire and emulate the behavior of life-course persistent offenders because they view the delinquent behavior of the life-course persistent offenders as a marker of maturity and independence (Moffitt, 1993). These youth are perceived as engaging in adult rather than child-like behavior. For this reason, weapon carrying of persistent offenders might be seen as an indicator of maturity that teens view as desirable. This expectation is supported by the finding of Dijkstra and colleagues (2010, 2012) that weapon carrying was socially desirable among adolescents.

There does seem to be a limit in the degree to which delinquent behavior is socially accepted, however. Weerman and Bijleveld (2007) found that seriously delinquent boys were nominated as friends less often than boys engaged in minor delinquency. Likewise, Kreager (2007) found that violence was negatively associated with number of reported friendships across both males and females. However, Kreager (2007) determined that violence was positively associated with number of friendships for males who performed poorly in school. This interaction was not observed for females. Another study found that chronically violent youth were less popular in adolescence than other youth; this was the case even after accounting for gains in popularity consistent with Moffitt's expectations for life-course

persistent offenders (Young, 2013). Rulison, Kreager, and Osgood (2014) found no evidence that persistently delinquent youth gained popularity in adolescence.

In light of these findings, it appears that youth who carry weapons and youth who engage in a moderate amount of delinquency may benefit from increased popularity in adolescence. This conclusion is consistent with Moffitt's proposition that both life-course persistent and adolescence-limited offenders view delinquency as a marker of mature status (and thus desirable) during this period of the life course. However, the results of Young (2013) and Rulison et al (2014) suggest that youth engaging in high levels of delinquency do not reap a popularity benefit. The present paper argues that use of a weapon in an act of violence is more severe than carrying a weapon. Based on this argument, and the findings noted above, it is expected that:

Hypothesis 1 Weapon carriers will have a greater number of friends than weapon users and abstainers.

As discussed previously, prior literature has found a strong link between gang membership and weapon carrying and use. Sex differences have also been noted in prior research. These observations result in the following:

Hypothesis 2 Weapon carrying and weapon use will be associated with a greater number of friends for males, but not for females.

Hypothesis 3 Weapon users with a gang affiliation will have a greater number of friends than gang-affiliated weapon carriers and abstainers.

Data

This study uses data from The National Longitudinal Study of Adolescent to Adult Health (Add Health), an ongoing study of a nationally representative, school-based sample of individuals who were in grades 7 through 12 in 1994 (Harris, 2009). While the primary focus of Add Health is on adolescent health and related behaviors, the data also incorporate measures of delinquency, victimization, attitudes, criminal justice system involvement, and weapon use/access. The present paper uses the first two waves of data, spanning adolescence, which also include the friendship measures needed to assess perceived and peer-rated popularity. Although the data were collected in the 1990's, a key advantage of the data for the present study is its inclusion of detailed measures of popularity through the collection of friendship nominations (names of friends). These measures allow an examination of both perceived popularity (a common indicator used in existing research) as well as peer-rated popularity. The latter is unavailable in many datasets that have a weapon carrying item. The data are also longitudinal, permitting more extensive controls for past behaviors and past popularity than cross-sectional research would allow. However, changes in crime patterns, weapons, and policy since the 1990's must be kept in mind when interpreting results.

The Add Health sample is based on 80 high schools selected as representative of the United States in 1994 (Harris, 2009, 2011). An additional 52 middle schools, selected with probability proportional to the number of students contributed to the high school, were also

included in the study (Harris, 2009, 2011). In addition to the in-school questionnaires, a stratified random subsample of roughly 200 students from each of the 80 pairs of schools was selected to participate in detailed home interviews ($n = 20,745$) in 1994/95 (Harris, 2011). Wave Two interviews were administered in 1996 ($n = 14,738$) (Harris, 2011). Analyses are based on 2,207 respondents; these are respondents with non-missing design weights at Wave Two who also have complete friendship nomination data. The data consist of multiple observations on each respondent across two time points.

Measures

Number of friends

Number of friends is the dependent variable in all models, measures by both a peer-rated measure and a measure based on self-perception. As part of the in-home interview a subset of respondents ($n = 7,106$ in Wave One, $n = 2,729$ in Wave Two) were asked to select the names of up to five close female friends and five close male friends from school rosters. These nominations were used to calculate a measure of *indegree*, the number of individuals naming a respondent as a friend. Indegree is informative about the degree to which a respondent is well-liked by his or her peers. This paper also evaluates changes in *outdegree*, the number of individuals a respondent names as friends (up to 10). This measure is informative about the degree to which a person feels connected to the school social network. Since many friendship ties in the data were not reciprocated (Lin and Weinberg, 2014), indegree and outdegree generally differ for a given respondent. Use of both measures in analyses helps to distinguish between self-perceived and peer-perceived social desirability. While used as dependent variables, models account for change over time by including prior wave indegree and outdegree as controls.

Unfortunately not all respondents were asked to list 10 friends; some were only asked to list the closest male friend and the closest female friend. Those not asked for friendship nominations and those not asked for the full set of five males and five females were excluded from analysis since number of friends and changes in this number over time could not accurately be determined. The Add Health study also only calculated social network characteristics (including the measures used here) for schools with a 50% or higher response rate. As a result, the number of individuals used as the basis for analysis is 2,207 and is no longer nationally representative.

Weapon carrying and use

Weapon carrying is one of two primary independent variables in all models. In Wave One, respondents were asked: During the past 30 days, on how many days did you carry a weapon—such as a gun, knife, or club—to school? Response categories were never (coded as 1), one day, two or three days, four or five days, or six or more days (coded as 5). Respondents were also asked if they had ever carried a weapon to school. Another item asked respondents if they had ever drunk alcohol while carrying a weapon. Response options were yes or no. A comparable question was asked regarding weapon carrying while using drugs. Since weapon carrying is uncommon in the sample, these measures are used to create a single, dichotomous indicator of any past weapon carrying behavior. Additionally, if the respondent

reported weapon use, weapon carrying is assumed even if weapon carrying was not reported in the items above.

Weapon use is the second primary independent variable across models. Respondents were asked if they had pulled a gun or knife on someone in the past 12 months. Answer choices were never, once, and more than once. Another item, with the same response options, asked respondents if they shot or stabbed anyone in the past 12 months. Respondents were also asked how often in the past 12 months they had used a weapon or threatened to use a weapon to get something from someone. Response options were never, 1 or 2 times, 3 or 4 times, and 5 or more times. Finally, respondents were asked if they had ever used a weapon in a fight. As all of these behaviors are rare in the present sample, a single, dichotomous measure is used to indicate whether a given respondent reported any of these weapon use behaviors over the past 12 months.

Victimization

Since prior research indicated that victimization played a role in weapon carrying, victimization history is included as a control variable (Vaughn, Howard, & Harper-Chang, 2006). During the in-home interview respondents were asked: *During the past 12 months, how often did each of the following things happen?* Among this series of items are ‘someone pulled a knife or gun on you,’ ‘someone shot you,’ ‘someone cut or stabbed you,’ and ‘you were jumped.’ Each is coded as never (0), once (1), or more than once (2). The summative scale of these items as coded (range: 0 to 8; $\alpha = 0.61$ in Wave One) reflects frequency of violent victimization. Since responses were heavily skewed towards 0, a variety score indicates how many of these four types of victimization were experienced in the past year (range: 0 to 4; $\alpha = 0.94$ in Wave One). This score is used to create a dichotomous indicator of whether a respondent experienced any form of violent victimization in the past 12 months.

Delinquency

Since prior research indicated that delinquency and gang affiliation played a role in weapon carrying, delinquency is included as a control variable (Lizotte et al., 2000). Delinquency was measured using a 15-item delinquency scale asking respondents to report how often (never, once or twice, three or four times, five or more times) they engaged in certain behaviors during the past 12 months. Behaviors included vandalism, lying to parents or guardians, theft of varying amounts, fighting, running away from home, joyriding, burglary, robbery, selling drugs, and being overly loud in a public place. A summative scale of these items would be problematic since the modal score for delinquency items is 0 and items tend to be highly correlated, leading to poor distribution of the overall sum. Also, summative scales assume equal intervals of measurement and it is difficult to argue that each of these items is equally delinquent (Osgood, McMorris, and Potenza, 2002). For instance, is robbery as serious as lying to a parent? Analyses, instead, use Item Response Theory (IRT) scaled delinquency measures. IRT uses mathematical models that map item-level responses for a set of items to a position on a latent, continuous, equal-interval variable with a mean of 0 (Osgood, McMorris, and Potenza, 2002). Post-estimation produces Empirical Bayes predicted values on this latent variable. These measures were generated using Samejima's

Graded Response Model implemented using the GLAMM module in the *Stata* software (Samejima, 1997).

Gang membership, also used as a control variable, is assessed by a question at Wave Two asking respondents to indicate if they have ever been initiated into a named gang. Unfortunately, this question was not asked at Wave One.

Demographic controls

Models also control for demographic characteristics associated with weapon carrying in prior studies. These include sex, age, race (black, white, other), and gang membership status at Wave Two.

Method

Cross-sectional examination of number of friendships and demographic differences between weapon carriers with and without weapon use is based on descriptive assessment of group differences. T-tests are used to assess whether differences between the groups are statistically significant. Longitudinal tests of the effects of weapon carrying and weapon use on later number of friendships (and differences between the two groups) utilize OLS regression with number of friends as the dependent variable since number of friendships is a count variable with a large range (0 to 19 for indegree and 0–10 for outdegree). Wave One measures are used as predictors and controls and Wave Two number of friendships measures are used as outcomes.

Results

Descriptive statistics

Descriptive statistics for the full sample are shown, by wave, in Table 1. Percentage male, mean age, and percentages across races are consistent with the Add Health sampling design. Weapon use and carrying are less prevalent in Wave Two, likely reflecting a combination of attrition of high-risk respondents as well as the process of desistance in weapon carrying that occurs in the teen years (Wallace, 2015). Gang membership is fairly uncommon, reported by approximately 6% of respondents at Wave Two. By construction, delinquency has a mean of nearly zero and a standard deviation close to one. In Wave One, respondents reported approximately four close friends, while approximately four other students reported the respondent as a close friend. These values drop somewhat in the second wave.

Descriptive statistics for weapon users, weapon carriers, and abstainers (no weapon carrying or use), by wave, are shown in Table 2. Visually, abstainers have higher indegree and outdegree than those who use or carry weapons in either wave. Differences between weapon users and weapon carriers are a bit less clear. For indegree, carriers have a higher value than users in Wave Two, but not in Wave One. For outdegree, weapon carriers appear to have slightly higher values than users for both waves. A t-test of group differences between weapon users and weapon carriers reveals no significant difference in indegree. There is a significant difference for outdegree ($p = 0.03$); weapon carriers have significantly higher outdegree than weapon users. However, these tests only indicate cross-sectional

differences, not change over time, and do not take into account key covariates that may affect estimates.

Other descriptive differences are also worthy of note. Weapon use and carrying appears to be much more common among males, which is consistent with prior literature (Dijkstra et al., 2012). Experiencing a form of violent victimization in the past year is more common among both weapon carriers and users, though more common among weapon users. This is also consistent with prior literature suggesting a link between victimization and weapon use/carrying (Simon et al., 1997). Delinquency is substantially higher among weapon users than both other groups. Lastly, gang membership appears more prevalent among weapon users than among youth who only carry weapons.

Differences by weapon carrying and use

Results of longitudinal regression models for the full sample are shown in Table 3. These models assess differences in perceived and peer-rated popularity of weapon users, carriers, and abstainers. Number of friends at Wave one is, not surprisingly, the strongest predictor of number of friends in Wave Two. For both indegree and outdegree, the results reveal no statistically significant differences in number of friends based on weapon carrying and weapon use. This is the case in models without and without control variables. However, multiplicative interaction terms reveal significant differences between males and females, suggesting that the full models shown in Table 3 might be masking subgroup differences. Results calculated separately by sex and gang membership are shown in Table 4.

Differences by gang membership and sex

Models in Table 4 assess perceived popularity of weapon carriers, weapon users, and abstainers distinguished by gang membership and sex. Weapon users are the reference category. Results for models with indegree as outcome are shown in the top panel. Those for outdegree as outcome are shown in the bottom panel. Among non-gang members, there are no significant differences in outdegree or indegree between weapon users and weapon carriers, nor between weapon users and those with no weapon use (abstainers). For gang members, there are no significant differences in indegree between weapon users and weapon carriers, nor between weapon users and abstainers. However, for outdegree, there is a significant difference in number of friends between weapon users and weapon abstainers. Weapon abstainers name significantly fewer friends than weapon users. There is no significant difference in outdegree between weapon carriers and weapon users for gang members.

Table 4 also considers males and females separately, irrespective of their gang membership status. For females, there is a marginally significant difference in indegree between weapon users and weapon abstainers. Weapon abstainers are named as friends by significantly more people than are weapon users. There is no significant difference between weapon carriers and weapon users for females. For outdegree, the same trends are observed except that the difference between weapon users and weapon abstainers is statistically significant. For males, there are no significant differences in outdegree or indegree between weapon users and weapon carriers, nor between weapon users and abstainers.

Discussion

According to Moffitt's developmental taxonomy of juvenile offenders, delinquency can become a marker of mature status in adolescence, leading to increased prevalence of delinquent behaviors as well as increasing popularity of youth who engage in these behaviors. Consistent with this argument, prior research found that weapon carrying was associated with popularity among adolescents (Dijkstra et al., 2010). However, there seems to be a limit to the social acceptability of delinquency. Other research found that persistently delinquent youth or more violent youth were less popular than their less delinquent peers (Weerman and Bijleveld, 2007; Young, 2013). Extending these ideas to weapon carrying, the present paper examined the number of friends of adolescents who carried weapons in comparison to those who both carried and used weapons in acts of violence or threatened violence.

This paper hypothesized that youth who carried weapons would have more friends than those who also used weapons for violence. Instead, this paper found no differences in number of friends between weapon carriers and weapon users. It was also expected that weapon carrying and weapon use would be associated with a greater number of friends for males, but not for females. This hypothesis was supported for females. Among females, weapon abstiners both named and were named by significantly more people than weapon users. Lastly, it was hypothesized that weapon users with a gang affiliation would have a greater number of friends than gang-affiliated weapon carriers and abstiners. As expected, gang-affiliated weapon abstiners named significantly fewer friends than weapon users. Possible explanations for these findings, implications for future research, limitations, and policy implications are discussed below.

First, this study did not find a significant difference in either indegree or outdegree between weapon carriers and weapon users. Models switching the reference category to be weapon abstiners (not shown) also found no significant differences between weapon carriers and weapon abstiners. In contrast, Dijkstra and colleagues (2010), using data collected in the 2000's, found that weapon carrying was associated with an increase in the number of students who indicated the respondent as a friend (indegree). Dijkstra and colleagues (2010) also found that weapon carrying reduced the number of individuals the respondent listed as a friend (outdegree). There are several possible explanations for the inconsistencies between these results and those for the present study.

One explanation is the structure of the sample itself. Dijkstra and colleagues (2010) studied a sample of high-risk, predominately Hispanic, males enrolled in grades 7 through 10. The Add Health sample is not a high-risk sample, is larger in size, includes a much higher percentage of white respondents, and incorporates a wider grade range (Harris, 2011). Additionally, the data used for the present study were collected in the 1990's. These differences, alone, may account for the inconsistency in findings. The closest approximation to the Dijkstra and colleagues (2010) sample that the present study can make is by looking at the gang member subgroup in Table 4. Within that subgroup, weapon users had higher outdegree than weapon abstiners, however. This trend held even in additional models (not

shown) that treated weapon carriers and weapon users as a combined subgroup; gang members with any form of weapon use or carrying had higher outdegree than abstainers.

There are two ways one might interpret outdegree. One is that outdegree is a measure of a person's perceived social desirability and acceptance in the social network. Under this interpretation, the results of the present study show that weapon users in gangs viewed themselves as (or desired to be) more socially connected than weapon abstainers in gangs. Another way to interpret outdegree is to consider the nature of the social hierarchy. According to Snijders and colleagues (Snijders, van de Bunt, and Steglich, 2010), in a perfect social hierarchy, those at the bottom will have high outdegree and low indegree; the reverse will be true of those at the top. However, gangs are not a perfect hierarchy. The most structurally critical gang members (in terms of indegree, outdegree, and connectedness) may not be gang leaders (Short and Hughes, 2006). As a result, a gang member with low outdegree might still hold a great deal of power in the gang.

A second explanation is measurement of weapon carrying. As described in the Limitations section below, the present study used a measure of weapon carrying that may not have captured all contexts where weapon carrying might occur. As a result, weapon carrying may have been underestimated, resulting in a corresponding overestimate in the number of weapon abstainers. Another key difference is that the present study distinguished weapon carriers from those who both carried and used weapons in violence. While Dijkstra and colleagues (2010) did use a peer-assessment of aggression, their aggression measure did not include weapon use. Weapon carrying is arguably less visible than weapon use, which may help explain why there were significant user-abstainer differences, but not carrier-abstainer or carrier-user differences in indegree and outdegree.

A final possibility is that weapon use and weapon carrying may simply be viewed as similar behaviors by adolescents. If this is the case, then there would be no additional popularity benefit from using a weapon. Both would be markers of mature status under Moffitt's theory. Although past research from the 1990's and early 2000's found that persistently delinquent youth or more violent youth were less popular than their less delinquent peers (Weerman and Bijleveld, 2007; Young, 2013), it may be the case that weapon carrying and weapon use are seen as equally violent by youth.

Another interesting finding that emerged from the present study was the effect of weapon use for female indegree and outdegree. Among females, weapon users had lower indegree and outdegree than weapon abstainers. While this may be an artifact of the very small number of females who engaged in weapon use, this finding is consistent with research by Kreager (2007), which found that violence was negatively associated with number of reported friendships across both males and females. In the present study, however, no comparable differences were found for males. However, Kreager (2007), who also used Add Health data, found that violence was positively associated with number of friendships for males who performed poorly in school, suggesting that within-sex subgroup differences need to be further examined.

Practical implications

The results of this study suggest that gang members who use weapons in acts of violence or threatened violence perceive themselves as more socially connected, and potentially as more popular. While results did not show a comparable effect for how others perceive weapon users (indegree), this finding remains concerning. If those who use weapons perceive this behavior as rewarding, then violence may be the result. Intervention programs may be able to adjust this problematic thinking process. The ReACTION program in New York City, for example, is a program for middle and high school students (New Yorkers Against Gun Violence Education Fund, 2013). Students meet with program staff weekly for approximately one year to focus on topics including myths about gun violence, improving interactions with peers, and community engagement. Post-surveys of participating students indicated decreased likelihood of carrying or using guns, better understanding of the potential for gun-related harm, and increased perceptions of self-efficacy for preventing peer gun violence (New Yorkers Against Gun Violence Education Fund, 2013). While the program does not currently delve into weapon carrying and perceptions of popularity, this subject could easily be incorporated into the segment of the program on myths about gun violence. For example, the program could emphasize to youth that carrying a gun is not a positive way to achieve popularity, and that there are better ways to gain social status. Unlike deterrence-based prevention strategies, programs like these teach youth behavioral and cognitive skills that may prevent both weapon carrying and other associated problem behaviors. While preventing youth gang involvement would be ideal, programs like this one may be able to influence even current gang members.

Future research

While this study identified a significant difference in number of friendships between weapon users and weapon abstainers, outdegree and indegree are not the only way to operationalize social acceptance, popularity, or friendship (Snijders et al., 2010). For example, is an adolescent central to his or her peer group or more of a peripheral member (Osgood, Feinberg, Wallace, and Moody, 2014)? Of what quality are the friendships the adolescents report? Weapon users in gangs, for example, may report more friendships, but these friendships may be of poor quality or involve infrequent contact. Future research addressing these other dimensions of friendship and social desirability may be able to yield insight into how weapons impact social relations.

A second need for future research lies in the issue of detection. Although weapon use and carrying occur both in and out of schools, it is typically unknown how many of these incidents have been detected or observed by peers, school officials, parents, or others. Without this information, it is difficult to distinguish social changes that might occur as a result of weapon-related behavior from social changes that might occur based on some other trait or change in an adolescent. In future research, it would be helpful to know how frequently youth carry weapons and show them to their friends, how often youth talk about weapons with their friends, and other related factors that may explain the links among weapon use, carrying, and social acceptance.

Limitations

The present study should be interpreted with several caveats in mind. First, Add Health is a self-report study without corroborating official data for measures of crime. As a result, the accuracy of this study is reliant on accuracy in juvenile reporting both of delinquent behavior overall and weapon carrying behavior specifically. Rates of school weapon carrying in the sample used by this study are lower than those reported in the High School Youth Risk Behavior Survey (Centers for Disease Control, 2014), where more than 5% of respondents indicated carrying a weapon to school in the past month. However, Add Health surveyed students in grades 7 through 12 while the High School Youth Risk Behavior Survey targets those in grades 9 through 12. Inclusion of younger respondents in Add Health may account for the lower rates.

Second, because this study relied on secondary data, the included measures were not ideal. Several of the Wave One measures addressed whether the respondent had ever carried a weapon. As a result, it is not clear when or how often the respondent may have done so. Also, Add Health does not include questions addressing out-of-school weapon carrying in all contexts. For these reasons, the weapon carrying indicator may not have captured all instances of weapon carrying.

Lastly, the Add Health data are nationally representative of all students in grades 7 through 12 in 1994, making the data somewhat dated at this point. The 1990's were a time when rates of juvenile crime were peaking, and results may not necessarily be representative of secondary students today. Laws, available weapons, and crime itself has changes since the time of data collection. As a result, research with a more current cohort of students is needed for context. Though a nationally representative sample is nearly always advantageous in obtaining accurate estimates of behavior, it is not always ideal for a study of delinquent behaviors that may be rare or more common among certain subgroups. The number of sample respondents reporting weapon carrying at school was quite low, limiting statistical power and making proper estimation more difficult. Future research utilizing a sample of high-risk respondents may help to better identify the role of weapon carrying and weapon use in social acceptance and popularity.

Conclusion

This paper examined the perceived and peer-rated popularity of youth who carry weapons, youth who both carry and use weapons in acts of violence, as well as youth who abstain from weapon carrying and weapon use. Moffitt's developmental taxonomy of offenders suggests that delinquency in adolescence should be viewed as a marker of matures status, and thus more desirable among these youth (1993). In line with this expectation, recent research found that weapon carrying was associated with being more popular in adolescence (Dijkstra et al., 2010, 2012). However, other studies found that the delinquency-popularity link seemed limited to more minor forms of delinquency (Young, 2013). This study used two waves of data from the National Longitudinal Study of Adolescent to Adult Health (Add Health) to address whether the popularity of weapon carrying youth and weapon using youth might also differ. This paper found no differences in number of friends between weapon

carriers and weapon users. However, among gang members, weapon abstainers named significantly fewer friends than weapon users. Among females, the opposite trend was observed.

The results of this study highlight the need for intervention programs that help youth change their views of violence. More than 5% of respondents to the 2013 High School Youth Risk Behavior Survey reported carrying a gun, knife, or club to school in the past 30 days (Centers for Disease Control, 2014). Although not all of these weapons will be used in violence, if youth believe weapon use will result in being more popular, weapon use may be more likely. Weapon carrying itself is associated with an increased likelihood of weapon use and violence (Webster et al., 1993). The drop in school weapon carrying since the 1990's is promising (Centers for Disease Control, 2014), but remains a public health concern. Results indicate the need to consider weapon carriers and weapon users separately, as these subgroups do not fully overlap.

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Table 1

Descriptive statistics for sample (n = 2,207)

	Wave 1				Wave 2			
	<i>n</i>	Mean (STD)	Minimum	Maximum	<i>n</i>	Mean (STD)	Minimum	Maximum
Male	2,207	0.50 (0.50)	0	1	--	--	--	--
White	2,201	0.56 (0.50)	0	1	--	--	--	--
Black	2,201	0.16 (0.36)	0	1	--	--	--	--
Other race	2,201	0.29 (0.45)	0	1	--	--	--	--
Gang member	2,191	0.06 (0.24)	0	1	--	--	--	--
Age	2,204	16.46 (1.36)	12	21	2,206	17.46 (1.37)	13	22
Weapon use	2,183	0.10 (0.30)	0	1	2,190	0.08 (0.27)	0	1
Weapon carrying	2,180	0.17 (0.37)	0	1	2,190	0.12 (0.32)	0	1
IRT delinquency	2,189	0.07 (0.81)	-0.97	3.61	2,198	0.03 (0.77)	-0.80	3.64
Indegree	1,470	4.09 (3.42)	0	19	2,207	1.844 (2.13)	0	19
Outdegree	1,470	4.14 (2.93)	0	10	2,207	3.02 (2.53)	0	10

Table 2

Descriptive statistics for weapon users, weapon carriers, and abstainers by wave

	<i>Wave 1</i>		<i>Wave 2</i>	
	Non-users and non-carriers (n=1,816)	Weapon users (n=226)	Non-users and non-carriers (n=1,938)	Weapon users (n=179)
Indegree	4.21 (3.45)	3.59 (3.53)	1.92 (2.19)	1.25 (1.52)
Outdegree	4.30 (2.91)	3.03 (2.77)	3.09 (2.54)	2.53 (2.32)
Male	0.45 (0.50)	0.77 (0.42)	--	--
Age wave one	16.43 (1.37)	16.67 (1.23)	--	--
White	0.57 (0.50)	0.48 (0.50)	--	--
Black	0.16 (0.37)	0.14 (0.35)	--	--
Violent victim	0.15 (0.36)	0.72 (0.45)	0.09 (0.29)	0.81 (0.39)
IRT delinquency	-0.11 (0.68)	1.20 (0.82)	-0.10 (0.65)	1.17 (0.88)
Gang wave two	--	--	0.03 (0.17)	0.39 (0.49)
Weapon carriers (n=73)				1.47 (1.78)
Weapon carriers (n=73)				2.74 (2.62)

Notes: Standard deviation in parentheses

Table 3

OLS regression models predicting indegree and outdegree (n = 2,207)

	Indegree	Indegree	Indegree	Indegree	Outdegree	Outdegree	Outdegree
Indegree wave one	0.345 ** (0.039)	0.343 ** (0.040)	0.348 ** (0.039)		0.255 ** (0.047)	0.197 ** (0.047)	0.205 ** (0.047)
Outdegree wave one							
Weapon carrier wave one	0.738 (0.862)	0.710 (0.800)	0.426 (0.979)		0.604 (0.687)	0.475 (0.696)	1.815 (1.154)
Weapon abstainer wave one	0.046 (0.496)	0.259 (0.511)	1.367 + (0.877)		0.325 (0.452)	-0.002 (0.568)	1.876 ** (0.695)
Male		0.477 * (0.211)	2.362 * (0.936)			-0.255 (0.278)	2.305 ** (0.735)
Age wave one		0.006 (0.067)	-0.014 (0.063)			-0.147 + (0.089)	-0.167 + (0.087)
White		0.524 * (0.219)	0.375 * (0.188)			1.251 ** (0.273)	1.172 ** (0.270)
Black		-0.466 + (0.271)	-0.512 + (0.268)			-0.404 (0.370)	-0.372 (0.364)
Violent victim wave one		0.497 + (0.300)	0.444 (0.274)			0.095 (0.385)	0.125 (0.379)
IRT delinquency wave one		-0.047 (0.155)	-0.032 (0.151)			-0.154 (0.199)	-0.150 (0.197)
Gang member wave two		-0.070 (0.434)	-0.548 (0.812)			-0.066 (0.704)	-0.494 (0.677)
Male*Carrier wave one			0.350 (1.331)				-2.188 (1.407)
Male*Abstainer wave one			-2.094 * (0.973)				-2.760 ** (1.407)
Gang*Carrier wave one			-0.862 (1.306)				0.023 (1.226)
Gang*Abstainer wave one			0.806 (0.986)				0.023 (1.227)
Constant	0.449 (0.475)	-0.530 (1.396)	-1.385 (1.462)		2.076 ** (0.454)	4.153 * (1.643)	2.726 + (1.597)

Notes:

^a*** p<0.01. * p<0.05. + p<0.10.^bStandard errors displayed in parentheses

Table 4

OLS regression models for gang and sex subgroups (n = 2,207)

	Non-gang members	Gang members	Females	Males
Indegree models				
Indegree wave one	0.346 ** (0.041)	0.276 ** (0.081)	0.341 ** (0.053)	0.357 ** (0.057)
Weapon carrier wave one	0.808 (0.885)	0.290 (1.418)	0.451 (0.999)	0.642 (0.868)
Weapon abstainer wave one	0.243 (0.540)	0.977 (1.716)	1.767 + (0.903)	-0.387 (0.510)
Male	0.467 * (0.215)	1.274 + (0.761)	--	--
Age wave one	0.008 (0.069)	0.011 (0.196)	-0.038 (0.088)	-0.012 (0.094)
White	0.479 * (0.225)	1.309 (0.940)	0.072 (0.270)	0.641 * (0.262)
Black	-0.479 + (0.277)	0.064 (1.190)	-0.516 (0.372)	-0.644 + (0.379)
Violent victim wave one	0.506 + (0.307)	0.072 (1.074)	0.725 (0.490)	0.390 (0.335)
IRT delinquency wave one	-0.061 (0.163)	0.280 (0.523)	-0.131 (0.235)	-0.005 (0.200)
Gang member wave two	--	--	-0.328 (0.277)	-0.225 (0.572)
Constant	-0.528 (1.447)	-2.053 (3.664)	-0.858 (1.818)	0.651 (1.751)
Outdegree models				
Outdegree wave one	0.199 ** (0.049)	0.14 (0.199)	0.296 ** (0.067)	0.124 + (0.065)
Weapon carrier wave one	0.385 (0.753)	-1.745 (1.762)	1.749 (1.210)	-0.127 (0.771)
Weapon abstainer wave one	0.114 (0.586)	-3.400 ** (1.110)	1.976 * (0.825)	-0.843 (0.621)
Male	-0.254 (0.282)	0.153 (1.419)	--	--
Age wave one	-0.152 + (0.092)	0.049 (0.269)	-0.216 + (0.125)	-0.083 (0.115)
White	1.309 ** (0.280)	-0.582 (1.113)	1.101 ** (0.362)	1.194 ** (0.414)
Black	-0.386 (0.377)	-0.745 (1.431)	-0.293 (0.525)	-0.465 (0.487)
Violent victim wave one	0.206 (0.397)	-2.649 * (1.251)	-0.101 (0.657)	0.247 (0.452)
IRT delinquency wave one	-0.120 (0.207)	-0.727 (0.609)	-0.030 (0.303)	-0.291 (0.256)
Gang member wave two	--	--	0.517 (0.883)	-0.279 (0.830)
Constant	4.069 * (1.701)	7.244 + (3.859)	3.000 (2.256)	3.989 + (2.074)

Notes:

^a ** p<0.01. * p<0.05. + p<0.10.

Standard errors displayed in parentheses

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