

# Prospective Psychosocial, Interpersonal, and Behavioral Predictors of Handgun Carrying among Adolescents

## ABSTRACT

**Objectives.** This study identified behavioral and psychosocial/interpersonal factors in young adolescence that are associated with handgun carrying in later adolescence.

**Methods.** A sample of 2200 high school students was surveyed at 9th grade and again at 12th grade.

**Results.** Multivariate logistic regression analyses indicated that measures of risk-taking preference, depression, stress, temper, and drug use assessed while the students were in 9th grade were predictive of handgun carrying in 12th grade for both male and female students.

**Conclusions.** These findings suggest the need for a comprehensive approach to prevention that focuses on both individual and interpersonal factors associated with adolescents' decision to carry a handgun. (*Am J Public Health*. 1998;88:960-963)

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## Introduction

In the United States, firearm homicide and firearm suicide are the second and third most frequent causes of death, respectively, among adolescents between the ages of 15 and 19 years.<sup>1</sup> The results of the 1995 national Youth Risk Behavior Survey indicate that 7.6% of high school students reported carrying a gun in the previous 30 days.<sup>2</sup> Among adolescents, the immediate availability of firearms presents a risk for fatal violent injury.<sup>3,4</sup> As a result of the risks associated with weapon possession, the US Department of Health and Human Services has established reduction of weapon carrying by adolescents as a national objective for the year 2000.<sup>5</sup>

Adolescents report self-protection as the primary motivation for carrying a weapon.<sup>6,7</sup> Empirical research indicates that adolescents who perceive greater violence in their schools, who perceive a greater number of guns in their neighborhoods or schools, or who have been threatened or shot at with a gun are more likely to carry a gun.<sup>8</sup> Some researchers, however, attribute gun carrying among adolescents to general or aggressive delinquency.<sup>9,10</sup> The social psychological framework of problem behavior theory has been suggested as a heuristic for better understanding weapon carrying among adolescents.<sup>10</sup> According to this theory, behaviors that violate the social and legal norms of society are symptoms of a general propensity to engage in nonconventional behaviors ("problem proneness").<sup>11,12</sup>

The current literature on the correlates of weapon carrying is limited to cross-sectional data, and the majority of studies focus on the association between weapon carrying and participation in other problem behaviors such as selling and using drugs, gang membership, aggressive behavior, and school suspensions.<sup>9,13-15</sup> This study attempted to expand the understanding of handgun carrying among adolescents by (1) examining the predictive utility of several psychosocial/interpersonal variables that are suggestive of problem proneness but have not been studied in relation to handgun carrying, (2) examining the strength of these associations by gender over a 3-year period, and (3)

assessing students' exposure to neighborhood crime as an indication of the self-protection motivation for handgun carrying.

## Methods

### Subjects

The data for this study were collected as part of a larger longitudinal survey of adolescent substance use. The initial sample consisted of complete sweeps of 7th-grade classrooms in 47 junior high schools selected from 6 school districts in San Diego and Los Angeles counties. Data were collected in classroom settings (9th grade) and via classroom pullouts (12th grade) by trained data collectors from the University of Southern California.

Of the 4805 students who arrived in the major receiving high schools in 9th grade, 4370 were surveyed in 9th grade (91% response rate), and 2421 responded in 12th grade (45% attrition). The attrition rate between 9th grade and 12th grade reflects the fact that 3 years had elapsed and students had relocated, had graduated early, were irregularly attending classes, had dropped out of high school, or had refused participation. The final sample consisted of 2200 students (969 boys and 1231 girls) with complete data on demographic variables and measures of handgun carrying and exposure to neighborhood crime (91% of the 12th-grade sample).

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**TABLE 1—Handgun Carrying among 12th-Grade Students in San Diego and Los Angeles Counties, by Gender, Race/Ethnicity, Median Income, and Perceptions of Neighborhood Crime, 1991**

	Gun Carrying		Odds Ratio (95% CI)	Adjusted Odds Ratio (95% CI)
	No. (%)	Yes, No. (%)		
<b>Gender</b>				
Female	1166 (94.7)	65 (5.3)	1.00	1.00
Male	758 (78.2)	211 (21.8)	4.99 (3.73, 6.69)	4.96 (3.69, 6.67)
<b>Race/ethnicity</b>				
Non-Hispanic White	586 (88.5)	76 (11.5)	1.00	1.00
African American	148 (82.7)	31 (17.3)	1.62 (1.03, 2.55)	1.17 (0.69, 1.99)
Latino	737 (87.2)	108 (12.8)	1.13 (0.83, 1.55)	0.92 (0.65, 1.32)
Asian	218 (88.3)	29 (11.7)	1.03 (0.65, 1.62)	0.81 (0.50, 1.31)
Other	235 (88.0)	32 (12.0)	1.05 (0.68, 1.63)	0.95 (0.59, 1.51)
<b>Income tertile</b>				
Low	596 (85.3)	103 (14.7)	1.00	1.00
Middle	694 (86.1)	112 (13.9)	0.93 (0.70, 1.25)	1.04 (0.75, 1.45)
High	634 (91.2)	61 (8.8)	0.56 (0.40, 0.78)	0.67 (0.45, 1.00)
<b>Neighborhood crime (5 items)<sup>a</sup></b>				
Never	701 (92.9)	62 (8.1)	1.00	1.00
Less than once a month	736 (89.3)	88 (10.7)	1.35 (0.96, 1.90)	1.31 (0.92, 1.86)
Once a month or more	487 (79.4)	126 (20.6)	2.93 (2.11, 4.05)	2.50 (1.77, 3.53)

Note. Adjusted models include gender, race/ethnicity, median income, and perceptions of neighborhood crime. CI = confidence interval.

<sup>a</sup>How often students had seen or heard about vandalism, junkies, burglaries, assaults, or shootings within a few blocks of their house.

### Measures

Handgun carrying was assessed by informing students that "we would like to know about any weapons you have or carry even if you plan to use them only for self-protection" and then asking them to respond yes or no to the question "Have you ever carried a gun on yourself or in your car?"

The following predictor variables were assessed: exposure to neighborhood crime at grade 12; behavioral indicators such as academic performance, attendance at religious services, number of parties attended, and substance use; and psychosocial/interpersonal variables, including risk taking, depression, stress, family conflict, quick temper, and value placed on health (measured at 9th grade). The psychosocial/interpersonal scales were adapted from published instruments and were found to have adequate internal consistency (i.e., Cronbach's alphas at or above .77; see Table 2). The median family income for the zip code of residence was estimated from 1986 intercensal data. For students whose zip codes were unavailable or inaccurate, a value for median family income was obtained by averaging the median family income levels of the other students at their schools.

### Data Analyses

Logistic regression was used to determine whether each of the psychosocial and

behavioral variables, as measured in 9th grade, could predict handgun carrying in 12th grade. Each model was adjusted for race/eth-

nicity, median income, and perceptions of neighborhood crime and was calculated separately for male and female students.

**TABLE 2—Logistic Regression Analysis of Psychosocial/Interpersonal Variables Measured in 9th Grade (1988) Predicting Handgun Carrying in 12th Grade (1991) among Students in San Diego and Los Angeles Counties**

	No.	Boys, Odds Ratio (95% CI)	Girls, Odds Ratio (95% CI)
<b>Risk taking (3 items, <math>\alpha = 83</math>)</b>			
Low	651	1.00	1.00
Medium	731	1.86 (1.15, 3.01)	1.62 (0.77, 3.42)
High	560	3.08 (1.93, 4.93)	4.09 (1.97, 8.49)
<b>Depression (7 items, <math>\alpha = 77</math>)</b>			
Low	574	1.00	1.00
Medium	597	0.93 (0.60, 1.46)	1.09 (0.47, 2.55)
High	595	1.64 (1.09, 2.48)	2.39 (1.12, 5.11)
<b>Stress (5 items, <math>\alpha = 79</math>)</b>			
Low	650	1.00	1.00
Medium	561	1.24 (0.81, 1.89)	1.60 (0.68, 3.78)
High	621	1.88 (1.23, 2.88)	2.80 (1.29, 6.06)
<b>Family conflict (4 items, <math>\alpha = 77</math>)</b>			
Low	613	1.00	1.00
Medium	712	1.18 (0.78, 1.77)	0.95 (0.46, 1.96)
High	604	1.41 (0.93, 2.14)	1.80 (0.92, 3.52)
<b>Quick temper (1 item)</b>			
Low	633	1.00	1.00
Medium	813	1.30 (0.87, 1.94)	1.73 (0.82, 3.67)
High	383	1.94 (1.21, 3.10)	2.79 (1.27, 6.15)
<b>Health as a value (1 item)</b>			
Fun	388	1.00	1.00
Health	1398	0.67 (0.44, 1.00)	0.88 (0.45, 1.73)

Note. Models are adjusted for race/ethnicity, median income, and perceptions of neighborhood crime. CI = confidence interval.

## Results

A comparison of the longitudinal sample and the ninth-grade sample indicated that male, African-American, and Latino youth and youth from lower income neighborhoods were less likely to remain in the longitudinal sample. Furthermore, the longitudinal sample had less problematic scores on 10 of the 13 psychosocial and behavioral measures (i.e., all except temper, stress, and risk taking) assessed at ninth grade. Despite the apparent lower risk in the longitudinal sample, 21.8% of boys and 5.3% of girls in this sample reported carrying a gun.

### Demographic Variables

As shown in Table 1, boys were significantly more likely to report carrying a handgun than were girls. In the bivariate models, African-American students were significantly more likely than White students to report carrying a gun. However, after adjustment for gender, median income, and perceptions of neighborhood crime, the association between race/ethnicity and handgun carrying was no longer significant. Perceptions of neighborhood crime and median income ( $P = .05$ ) were each associated with handgun carrying in the adjusted models.

### Psychosocial/Interpersonal and Behavioral Variables

**Psychosocial/interpersonal variables.** The patterns of association between the psychosocial/interpersonal variables and handgun carrying were nearly identical across genders. The likelihood of carrying a handgun was positively associated with risk taking, depression, stress, and quick temper. The value placed on health approached significance for boys ( $P = .05$ ) but not girls (Table 2).

**Behavioral variables.** Boys who were truant from school, attended more parties, and used cigarettes, alcohol, or marijuana in 9th grade were more likely to report carrying a handgun in 12th grade. Academic grades and attendance at religious services were not associated with handgun carrying.

For girls, 9th-grade measures of cigarette, alcohol, and marijuana use were associated with reports of handgun carrying in 12th grade. There was a nonsignificant trend for an inverse association between academic grades and weapon carrying. Attending religious services and attending parties with peers were not associated with handgun carrying (Table 3).

**TABLE 3—Logistic Regression Analysis of Behavioral Variables Measured in 9th Grade Predicting Handgun Carrying in 12th Grade among Students in San Diego and Los Angeles Counties**

	No.	Boys, Odds Ratio (95% CI)	Girls, Odds Ratio (95% CI)
Days absent from school in previous month (unrelated to illness)			
0	1235	1.00	1.00
1–2	462	1.40 (0.92, 2.13)	0.78 (0.41, 1.51)
3 or more	243	2.37 (1.50, 3.73)	0.91 (0.39, 2.11)
Grades			
Mostly A's or A's and B's	986	1.00	1.00
Mostly B's or B's and C's	804	0.95 (0.65, 1.36)	1.74 (0.96, 3.15)
Mostly C's or below	399	1.31 (0.87, 1.98)	1.97 (0.97, 4.00)
Frequency of religious service attendance			
Never or hardly ever	724	1.00	1.00
Sometimes	474	0.87 (0.57, 1.34)	1.09 (0.52, 2.28)
Often	714	0.93 (0.62, 1.39)	1.09 (0.56, 2.08)
No. of parties attended in previous month with friends			
0	894	1.00	1.00
1	415	1.12 (0.71, 1.75)	1.19 (0.57, 2.46)
2 or more	607	1.91 (1.31, 2.78)	1.38 (0.74, 2.57)
No. of cigarettes smoked in lifetime			
0	949	1.00	1.00
1–4	786	1.89 (1.31, 2.72)	0.99 (0.49, 2.04)
5 or more	456	2.22 (1.45, 3.39)	5.12 (2.74, 9.59)
Lifetime alcohol use, no. of occasions			
0	457	1.00	1.00
1–4	933	1.11 (0.70, 1.74)	1.06 (0.45, 2.49)
5 or more	800	1.86 (1.20, 2.88)	3.68 (1.64, 8.25)
Lifetime marijuana use, no. of occasions			
0	1735	1.00	1.00
1–4	279	2.11 (1.37, 3.24)	1.48 (0.72, 3.03)
5 or more	177	2.31 (1.41, 3.80)	3.57 (1.77, 7.22)

Note. Models are adjusted for race/ethnicity, median income, and perceptions of neighborhood crime. CI = confidence interval.

## Discussion

Bivariate analyses indicated that the African-American students were more likely to carry handguns. However, the association was not significant after adjustment for gender, family income, and perceptions of neighborhood crime. This finding supports results from previous research suggesting that the association between race/ethnicity and violent behavior is eliminated if socioeconomic status and environmental characteristics are controlled.<sup>16</sup> Even after adjustment for gender and race/ethnicity, students who live in neighborhoods with relatively low median incomes and students who live in neighborhoods in which crime is routinely witnessed are more likely to carry handguns. These students may be motivated to arm themselves as a form of self-protection.

The findings indicate that the pattern of associations between handgun carrying and

measures of problem proneness observed in previous cross-sectional studies appears to persist over time. Therefore, certain characteristics of adolescents who are in their first year of high school are predictive of their risk for carrying a handgun prior to completion of high school. These results support the suggestion that handgun carrying may be another facet of problem proneness. However, the extent to which handgun carrying is motivated by problem proneness relative to the perceived need for self-protection is in need of additional study. Previous research has shown that adolescents who engage in delinquent behavior are more likely to be victimized.<sup>17</sup> Therefore, the association between problem proneness and handgun carrying may be mediated by victimization and perceived need for self-protection. Also, problem proneness and need for self-protection may both develop as a consequence of living in a dangerous envi-

ronment. These findings may be seen as suggestive of the need for a comprehensive approach to the prevention of handgun carrying among adolescents in which substance use, stress management, depression, anger control, importance of health as a value, and perceived utility of handguns for self-protection are addressed.

Overall, most of the behavioral and psychosocial variables that were significantly associated with handgun carrying for one gender also were significant for the other, suggesting that the etiological factors that influence handgun carrying are similar for males and females. However, the odds ratios for girls were consistently higher than those for boys. This finding supports the suggestion that handgun carrying represents a last-resort approach to a difficult situation that only the most socially nonconventional females are willing to take.<sup>13</sup> Future research should examine gender differences in norms regarding handgun carrying among adolescents.

The generalizability of these findings is potentially limited by the likelihood that the high school students sampled are not representative of the general population of 17- and 18-year-old adolescents. Only the students who completed the surveys at both time points were included in the analyses. The prevalence of handgun carrying is likely to be higher among adolescents who dropped out or were expelled from high school. However, the pattern of associations observed is likely to hold for high-risk adolescents. □

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