

Parental Disengagement in Childhood and Adolescent Male Gun Carrying

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abstract

OBJECTIVES: To examine the association between parental disengagement in childhood and adolescent gun carrying and determine whether this association is accounted for by externalizing problems and affiliation with delinquent peers during early adolescence.

METHODS: The sample included 503 boys (55.7% African American, 40.6% white, 3.7% other) recruited from first-grade classrooms in Pittsburgh public schools. Multi-informant assessments were conducted regularly (semiannually then annually) from approximately ages 7.5 to 20 years. Latent factors were constructed by using parent-reported parental disengagement (ie, poor parental involvement, poor parent-son communication, poor parent-son relationship quality) collected from ages 7.5 to 10 years, youth-reported peer delinquency from ages 10.5 to 13 years, and teacher-reported externalizing problems from ages 10.5 to 13 years. The outcome was youth-reported gun carrying from ages 14 to 20 years.

RESULTS: Twenty percent of individuals sampled reported carrying a gun during adolescence. Childhood parental disengagement was significantly associated with adolescent gun carrying ($\beta = .22$; 95% confidence interval: 0.08 to 0.36). Furthermore, the association between parental disengagement and gun carrying was partially mediated through peer delinquency and externalizing problems during early adolescence. The 2 indirect paths accounted for ~29% of the total effect of parental disengagement.

CONCLUSIONS: Boys exposed to poorer parental engagement during childhood are more likely to affiliate with delinquent peers and exhibit externalizing problems during early adolescence, which (in turn) increases their risk of carrying a firearm in later adolescence. This suggests that gun violence prevention efforts with children should work to enhance aspects of parental engagement.



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WHAT'S KNOWN ON THIS SUBJECT: Prior studies suggest that the predictors of adolescent gun carrying are likely similar to the predictors of other serious violence. However, little is actually known about the childhood risk factors that are associated with the onset of adolescent gun carrying.

WHAT THIS STUDY ADDS: Results support a developmental cascade-type model, wherein boys exposed to higher parental disengagement in childhood are more likely to affiliate with delinquent peers and exhibit externalizing problems during early adolescence, which (in turn) increase their risk for later gun carrying.

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Over 7000 youth were seriously injured or killed by firearms each year from 2012 to 2014 in the United States.¹ Firearm violence disproportionately affects nonwhite adolescent boys in impoverished urban neighborhoods.¹ It is suggested in research that the correlates of gun violence might be similar to the predictors of other serious violence, such as peer delinquency, early externalizing problems, and living in disadvantaged neighborhoods.²⁻⁴ However, the childhood risk factors associated with adolescent gun carrying, a likely prelude to gun violence, are not well established. Although dysfunctional parenting practices have been linked to the development of conduct problems and serious violence,⁵⁻⁸ the extent to which the early parenting environment is associated with adolescent gun carrying remains unclear. To overcome this limitation, in the current study, we examined the long-term association between parental disengagement during childhood and gun carrying during adolescence in an urban sample of boys. We also tested a developmental cascade model to see whether parental disengagement predicted the development of externalizing problems and delinquent peer group affiliation, which ultimately led to an increased risk for future gun carrying.

In studies, it has consistently been found that parental disengagement (eg, low warmth, involvement, communication) is a risk factor for developing adolescent conduct problems and engaging in serious violence.^{5,7,9} Consistent with routine activity and social disorganization perspectives, poor parental engagement might lead to these behaviors because children with disengaged parents may spend a significant amount of time with peers in unstructured settings.^{6,10-12} This is problematic because unstructured time with peers, particularly delinquent peers, is

a well-known risk factor for adolescent conduct problems.¹²

Although numerous longitudinal studies have been conducted to examine the link between parental disengagement and the emergence of delinquent behavior during adolescence, the effect of parental disengagement on gun carrying has been specifically examined in only a few studies (but see Vaughn et al,² Loeber et al,¹³ and Orpinas et al¹⁴). There is some evidence that components of the parent-child relationship are predictive of gun or other weapon carrying,^{2,13-16} but existing studies have mostly been cross-sectional and have primarily measured general weapon carrying as the outcome instead of focusing on gun carrying. Examining the specific predictors of gun carrying is necessary because it has been suggested in cross-sectional work that the risk factors for gun carrying are different than the risk factors for other weapon carrying.¹⁷

In indirect evidence, it is suggested that youth with disengaged parents are at risk for engaging in adolescent gun carrying because they begin engaging in antisocial behaviors within the context of deviant peer groups. Given the expansive body of work on parenting, peers, and adolescent conduct problems (for reviews, see Pardini et al⁵ and Farrington⁶) and links being demonstrated in the existing literature between peer group affiliation, conduct problems, and gun carrying,^{13,17-22} it is possible that parenting in childhood initiates a developmental cascade that eventually leads to gun carrying. For example, children exposed to less-involved and emotionally distant parents might be more likely to affiliate with delinquent peers and display externalizing problems during early adolescence, which, in turn, may increase the probability of carrying a gun in later adolescence. This developmental cascade of events from parenting to peers to adolescent conduct problems has been observed for some types of antisocial behavior

and attitudes in adolescence^{11,23-25} (eg, parental control of peers → peer delinquency → adolescent delinquency²⁴) but has not been examined as a pathway to adolescent gun carrying.

In the current study, we included young boys who were assessed with multi-informant data from childhood (approximately age 7.5 years) through adolescence (approximately age 20 years). In the analyses, we examined whether parental disengagement in childhood (approximately ages 7.5-10 years) was associated with gun carrying in mid to late adolescence (approximately ages 14-20 years) and whether externalizing problems and/or peer delinquency during early adolescence (approximately ages 10.5-13 years) mediated any of this association.

METHODS

Participants and Procedures

In the sample, we included 503 boys from the youngest cohort of the Pittsburgh Youth Study (PYS²⁶). Youth were recruited for the PYS after a multi-informant (teacher, parent, youth report) screening that assessed early-onset conduct problems (eg, fighting, stealing, destruction of property). The screening was conducted on 849 boys who were randomly selected from a list of first-grade students enrolled in the Pittsburgh public schools. The screening score that came closest to identifying the upper third of the sample was used to delineate boys at "high risk" for exhibiting severe delinquency. A roughly equivalent number of boys in the high risk ($n = 256$) and non-high risk ($n = 247$) groups were then randomly selected for participation in the longitudinal study (total: $N = 503$). As a result, boys in the PYS were slightly oversampled for conduct problems, which makes the PYS ideal for studying a low base rate behavior, such as gun carrying.

The follow-up sample did not differ from the screening sample on socioeconomic factors such as race, family structure, parental education, and parental employment.²⁷ Boys were predominately African American (55.7%; $n = 280$) or white (40.6%; $n = 204$). Nineteen youth identified with another racial or ethnic group (eg, Asian American, Hispanic). At study onset, 62.5% of the boys were living with 1 or 0 biological parents, 42.7% were living with a single biological mother, and 47.7% were receiving welfare. PYS boys were intended to represent first-grade boys attending Pittsburgh public schools, which represented ~72% of boys in the city of Pittsburgh.^{27,28}

After screening, boys were interviewed every 6 months for 4 years, followed by 9 annual assessments (17 assessments total). Youth were ~7.5 years old ($SD = 0.55$) at Time 1 and ~20.1 years old ($SD = 0.61$) at the last interview (Time 17). Parents and teachers were interviewed every 6 months for 4 years, followed by 5 annual assessments. Approximately 95% of caretaker respondents were female (>90% were biological mothers). We used parent-reported data from Time 1 to Time 6 to assess parental disengagement, teacher-reported data from Time 7 to Time 10 to assess externalizing problems, youth-reported data from Time 7 to Time 10 to assess peer delinquency, and youth-reported data from Time 11 to Time 17 to assess gun carrying. The University of Pittsburgh Institutional Review Board reviewed and approved all data collection procedures. More information about PYS is available elsewhere.^{26,27}

Measures

Parental Disengagement (Age 7.5–10 Years)

Three parent-reported scales were used to assess parental disengagement: (1) poor parental

involvement, (2) poor parent-son communication, and (3) poor parent-son relationship quality (Time 1 to Time 6). Parental involvement was a 6-item scale in which we assessed the parent's participation in daily activities with the child (eg, doing things together at home).^{28,29} Parents rated each item on a scale ranging from 1 ("hardly ever") to 3 ("often"). Parent-son communication (eg, discussing problems together) was a 17-item scale from the Revised Parent-Adolescent Communication Form. Parents rated each item on a scale ranging from 1 ("almost never") to 3 ("almost always"). Parent-son relationship quality (eg, do you enjoy being your son's parent) was a 16-item scale from the Child's Relationship with Parent Scale.^{28,30} Parents rated each item using a scale ranging from 0 ("almost never") to 2 ("often"). Items on each scale were summed with higher scores representing poorer parental involvement (α range: .832–.892), poorer parent-son communication (α range: .778–.970), and poorer parent-son relationship quality (α range: .832–.892).

Indicated in the average measure of intraclass correlation coefficients (ICCs) was that the temporal stability of each parenting scale was high across the 6 assessments (parental involvement $ICC = 0.879$; parent-son communication $ICC = 0.928$; parent-son relationship quality $ICC = 0.918$). An overall index of each parenting scale across the first 6 assessments was created by calculating the mean. The 3 mean scores were used as indicators of a latent parental disengagement factor across childhood.

Peer Delinquency (Age 10.5–13 Years)

Youth-reported peer delinquency was assessed by using 3 subscales from the Peer Delinquency Scale²⁸: peer violence, peer theft, and peer drug dealing (Time 7 to Time 10). Youth reported the number of friends who

had engaged in delinquent acts in the past year using a scale ranging from 0 ("none") to 4 ("all"). Peer violence included 3 behaviors (eg, attacking or hitting with the intent to hurt another person), and peer theft included 5 behaviors (eg, stealing something worth >\$100). Internal consistencies were moderate across the 4 time points for peer violence (average $\alpha = .642$) and peer theft (average $\alpha = .793$) scales. Peer drug dealing was measured by using 1 item at each interview that asked for the number of friends who had sold "hard drugs such as heroin, cocaine, or LSD" in the past year. Because of low prevalence and skew, the upper 4 categories were combined (0 = no peer drug dealing; 1 = few or half or most or all friends dealt drugs).

Mean scores for peer violence and peer theft were created by averaging scores from Time 7 to Time 10. Peer drug dealing was positive (= 1) if any friends dealt drugs from Time 7 to Time 10. Peer violence, peer theft, and peer drug dealing were used as indicators of a latent peer delinquency factor during early adolescence.

Externalizing Problems (Age 10.5–13 Years)

Early adolescent externalizing problems were measured with the aggressive and delinquent behavior problem scales from the Teacher Report Form (Time 7 to Time 10).³¹ At each time point, teachers read statements and used a scale ranging from 0 ("not true") to 2 ("very true") to rate how well each item described the boy. The aggressive behavior scale is a sum of 25 items and included items such as whether the boy is cruel or a bully or mean to others (α range: .970–.974). The delinquent behavior problem scale is a sum of 9 items and included items such as whether the boy steals (α range: .802–.828).

Aggregate indices of aggressive behavior and delinquent behavior

TABLE 1 Descriptive Statistics for Study Predictors

	Time Point									
	1	2	3	4	5	6	7	8	9	10
Age in y, mean (SD)	7.5 (0.6)	8.0 (0.5)	8.5 (0.6)	9.0 (0.6)	9.5 (0.5)	10.0 (0.6)	10.5 (0.6)	11.0 (0.6)	12.0 (0.6)	13.0 (0.6)
Parental disengagement, P, mean (SD)										
Involvement	8.3 (1.9)	8.3 (2.0)	8.5 (1.8)	8.7 (1.9)	8.4 (1.8)	8.6 (1.9)	—	—	—	—
Communication	25.1 (4.7)	24.7 (4.8)	24.8 (5.0)	24.8 (4.9)	24.5 (5.1)	24.8 (5.2)	—	—	—	—
Relationship quality	6.8 (4.9)	6.2 (4.7)	6.4 (4.9)	6.5 (5.2)	6.2 (5.0)	6.6 (5.5)	—	—	—	—
Externalizing problems, T, mean (SD)										
Aggressive behavior	—	—	—	—	—	—	11.0 (12.8)	13.3 (13.7)	13.5 (13.4)	12.4 (13.1)
Delinquency	—	—	—	—	—	—	2.3 (3.0)	2.9 (3.3)	2.9 (3.4)	3.1 (3.6)
Peer delinquency, Y										
Peer violence, mean (SD)	—	—	—	—	—	—	1.1 (1.6)	1.1 (1.9)	1.3 (2.0)	1.3 (2.3)
Peer theft, mean (SD)	—	—	—	—	—	—	1.0 (1.9)	1.0 (2.2)	1.4 (2.7)	1.7 (3.3)
Peer drug dealing, % (n)	—	—	—	—	—	—	4.2 (21)	3.8 (19)	6.6 (33)	10.7 (54)

P, parent report; T, teacher report; Y, youth self-report; —, not applicable.

were created by averaging participants' subscale scores from Time 7 to Time 10. Aggressive behavior and delinquent behavior mean scores were used as manifest indicators of a latent externalizing problems factor across early adolescence.

Gun Carrying (Age 14–20.1 Years)

Gun carrying during mid to late adolescence was measured by using items from the Self-Report Delinquency Scale (Time 11 to Time 17).³² At each interview, participants stated whether they had carried a hidden weapon in the past year, and if so, they selected the most dangerous weapon they had carried (forced-choice options, with a gun being the most dangerous). A binary variable was created, indicating whether youth carried a gun at least once from Time 11 to Time 17.

Model Covariates

Model covariates for the primary model included race (African American = 1; white or other = 0) and a parent-reported indicator of socioeconomic status using the parents' occupation status and income at Time 1, according to the Hollingshead index (higher scores equal higher socioeconomic status).²⁷ In additional supplemental analyses, we also controlled for a parent-reported binary variable indicating whether the family was receiving

welfare at Time 1 and a parent-reported binary variable indicating whether the boy was living in a broken home at Time 1 (ie, living with 1 or 0 biological parents = 1; living with both biological parents = 0).

Plan of Analysis

Analyses were conducted within a structural equation modeling framework by using latent factors, which eliminated measurement error and consolidated information from multiple scales.³³ First, an unconditional model with the latent factors (parental disengagement, peer delinquency, externalizing problems) was estimated. Next, the conditional model was specified as follows: gun carrying was regressed on the 3 latent factors; peer delinquency and externalizing problems were regressed on parental disengagement; peer delinquency and externalizing problems residuals were correlated; all variables were regressed on race and socioeconomic status (socioeconomic status was also regressed on race). In our indirect effects analysis, we examined the extent to which any effect of parental disengagement on gun carrying was mediated through peer delinquency or externalizing problems. In supplemental analyses, we repeated the primary analyses while controlling for alternative indicators

of socioeconomic status (welfare, broken home).

Direct effects were calculated by using maximum likelihood estimation with Monte Carlo numerical integration (10 000 integration points) and robust SEs to accommodate departures from normality. Consistent with recommendations, maximum likelihood estimation with bootstrapping (500 bootstrap samples) was used to generate parameter estimates and nonsymmetric confidence intervals for indirect effects.³⁴ Overall model fit was assessed by using the comparative fit index (CFI), the Tucker-Lewis index (TLI), and the root mean square error of approximation (RMSEA).^{35–37} Because maximum likelihood estimation with robust SEs and numerical integration does not produce traditional fit indices, these fit statistics were generated by rerunning the primary model using a robust weighted least squares estimator. All analyses were conducted in MPlus 8.0.³⁸

Missing Data

Sample retention was high, averaging 90% for the youth assessments, 95% for the parent assessments, and 87% for the teacher assessments. A total of 314 (62.4%) boys participated in all 17 interviews, and 72 (14.3%) boys

TABLE 2 Summary of All Estimated Direct and Indirect Effects in the Primary Model (*N* = 502)

Predictor	Mediator(s)	Outcome	β	95% CI	<i>P</i>
Direct effects					
Parental disengagement →	—	Peer delinquency	.14 ^a	0.04 to 0.24 ^a	.005 ^a
Parental disengagement →	—	Externalizing problems	.27 ^a	0.16 to 0.37 ^a	<.001 ^a
Parental disengagement →	—	Gun carrying	.22 ^a	0.08 to 0.36 ^a	.002 ^a
Peer delinquency →	—	Gun carrying	.23 ^a	0.09 to 0.37 ^a	.001 ^a
Externalizing problems →	—	Gun carrying	.20 ^a	0.08 to 0.33 ^a	.001 ^a
Race →	—	Parental disengagement	.14 ^a	0.04 to 0.24 ^a	.006 ^a
Race →	—	Peer delinquency	.29 ^a	0.20 to 0.38 ^a	<.001 ^a
Race →	—	Externalizing problems	.24 ^a	0.16 to 0.33 ^a	<.001 ^a
Race →	—	Gun carrying	.08	−0.06 to 0.21	.255
Race →	—	Socioeconomic status	−.24 ^a	−0.32 to −0.16 ^a	<.001 ^a
Socioeconomic status →	—	Parental disengagement	−.29 ^a	−0.39 to −0.19 ^a	<.001 ^a
Socioeconomic status →	—	Peer delinquency	−.02	−0.12 to 0.09	.746
Socioeconomic status →	—	Externalizing problems	−.10	−0.20 to 0.01	.056
Socioeconomic status →	—	Gun carrying	−.14 ^a	−0.25 to −0.02 ^a	.024 ^a
Indirect effects					
Parental disengagement →	Peer delinquency →	Gun carrying	.03 ^a	0.01 to 0.07 ^a	.028 ^a
Parental disengagement →	Externalizing problems →	Gun carrying	.05 ^a	0.02 to 0.10 ^a	.004 ^a

Parameter estimates and nonsymmetric confidence intervals (CIs) for the indirect effects were calculated by using maximum likelihood estimation with 500 bootstrap samples. β , standardized regression coefficient; —, not applicable.

^a Statistically significant based on 95% CIs.

only missed 1 interview. Individuals who missed any interviews (*n* = 189) were more likely to be African American ($\beta = .184$, $P < .001$) and had slightly higher scores on the externalizing factor ($\beta = .164$, $P = .020$), the peer factor ($\beta = .162$, $P = .007$), and gun carrying ($\beta = .183$, $P < .001$), but the magnitude of these effects was small. Having missing data was not associated with the parenting factor ($\beta = .062$, $P = .256$). No variables were significantly associated with missingness when all model variables were controlled for.

Models were estimated with full information maximum likelihood estimation, which uses all available data and provides unbiased, efficient estimates under the assumption that data are missing at random.³⁹

RESULTS

Descriptive Statistics

One hundred and one boys carried a gun during the study (20.1%), with ~4% to 7% carrying each year. See Table 1 for additional descriptive statistics.

Direct and Indirect Associations Between Parental Disengagement in Childhood and Adolescent Gun Carrying

An unconditional 3-factor model with parental disengagement, peer delinquency, and externalizing problems fit the data well (RMSEA = 0.04; CFI = 0.99; TLI = 0.98), and all indicators had high standardized loadings (0.64–0.93).

The final conditional model also fit the data well (RMSEA = 0.06; CFI = 0.96; TLI = 0.93). Higher parental disengagement during childhood was associated with significantly greater odds of carrying a gun in adolescence. This direct effect was partially mediated through peer delinquency and externalizing problems during early adolescence. Specifically, boys exposed to higher parental disengagement were more likely to affiliate with delinquent peers and display externalizing problems during early adolescence, and peer delinquency and externalizing problems were both associated with a greater likelihood of carrying a gun during later adolescence. The combined indirect paths accounted for ~29% of the total

effect of parental disengagement (18% for externalizing problems and 11% for peer delinquency). See Table 2 and Fig 1.

Supplemental Analyses

Direct and indirect paths in the primary model remained significant if we controlled for alternative indicators of socioeconomic status (see Supplemental Table 3).

DISCUSSION

In this study, we found that parental disengagement in childhood was directly associated with adolescent gun carrying. Furthermore, we found that some of this effect was due to the impact of parental disengagement on peer delinquency and conduct problems during early adolescence. Indeed, parental disengagement was associated with higher peer delinquency and conduct problems during early adolescence, and these risk factors during early adolescence, in turn, were associated with a greater likelihood of adolescent gun carrying.

Disengaged parents might be less likely to effectively monitor their

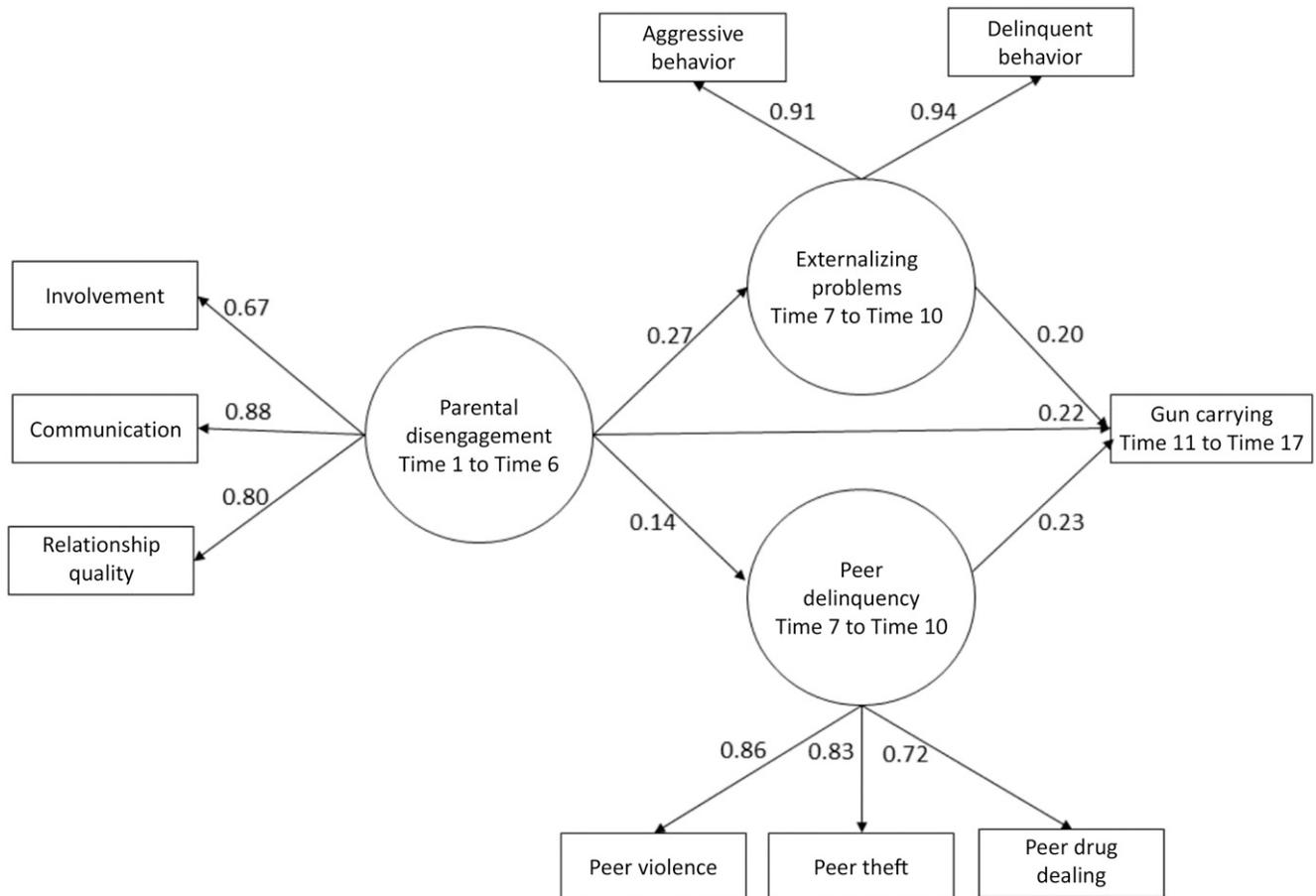


FIGURE 1

The direct and indirect influence of parental disengagement in childhood on adolescent gun carrying ($N = 503$). Standardized parameter estimates (β) are shown. All direct paths shown are statistically significant ($P < .05$). In indirect effects analysis, it was indicated that the association between parental disengagement in childhood and adolescent gun carrying was partially mediated through externalizing problems and peer delinquency in early adolescence ($P < .05$). Covariance between peer delinquency and externalizing was significant but not shown to emphasize primary findings. See Table 2 for significant indirect effects, all confidence intervals, and associations between the covariates (race, socioeconomic status) and the study variables.

children's whereabouts, less emotionally connected to their children, or less likely to model and reinforce prosocial behaviors. Any of these features could contribute to greater affiliation with delinquent peers and/or promote the development of youth externalizing problems. These results are consistent with previous studies in which researchers have found that poor relationships with parents increase children's affiliations with delinquent peers⁴⁰ as well as risk for delinquency and other conduct problems.^{5,6} Our results are also consistent with studies in which researchers have found indirect effects of parenting on

adolescent behavior via peer group affiliation.^{11,23,24}

The indirect paths in the current study were of modest magnitude, and the direct effect of parental disengagement remained significant in the final model. Indeed, an early parenting environment characterized by low involvement, poor communication, and poor relationship quality was a unique risk factor for later gun carrying. Given the magnitude of the direct effect, authors of future research should examine other potential explanatory factors, such as harsh or inconsistent parenting and parental antisocial attitudes and behaviors.^{5,7}

Limitations

This study had limitations. First, the sample was a slightly higher-risk sample of urban boys, and results might not generalize to other demographic groups. Second, gun carrying was measured from ~1995 to 2001, which was right after the peak in juvenile violent crime,⁴¹ the crack-cocaine epidemic of the 1980s,⁴² and the enactment of the Brady Handgun Violence Prevention Act of 1993 (federal law requiring background checks on firearm purchases). Although changing laws and social climates might influence the prevalence of gun carrying, it is unlikely that the childhood risk

factors for gun carrying would also systematically change over time.

Third, in this study, we focused on the long-term effect of parental disengagement in childhood, and authors of future research should include more proximal measures of the parent-child relationship and other factors during adolescence that may drive gun carrying (eg, victimization, attitudes, accessibility, parental delinquency). Fourth, it is possible that gun carrying was underreported because boys did not perceive a gun to be the most dangerous weapon they carried. It is also possible that boys with disengaged parents were systematically more likely to report gun carrying, whether true or not. Unfortunately, we have no way of knowing whether gun carrying was over- or underreported as a function of individual or familial risk factors.

Furthermore, the minimum age is 18 years to purchase or own a firearm and 21 years to carry a hidden or loaded firearm in the site of the current study.⁴³ As such, this site has looser gun control laws and

likely more favorable or permissive attitudes toward gun use than other states, which could lead to a higher prevalence of gun carrying. Finally, we examined gun carrying, and authors of future research should examine the extent to which gun carrying is a developmental precursor to gun violence. Although it has been found in previous studies that gun and other weapon carrying is a risk factor for serious violence, including homicide,^{44,45} the proportion of gun carriers who go on to actually shoot at others is unknown.

Clinical Implications

With the findings from this study, we suggest that the parenting environment in childhood is an important window of opportunity for gun violence prevention. Interventions in childhood designed to improve parental engagement may help prevent youth from carrying guns in the first place. Pediatricians and school counselors could screen young boys and refer high-risk parent-son dyads to targeted interventions because

parenting interventions are effective at reducing some adolescent problem behaviors, especially in combination with adolescent behavior-focused interventions.^{46–50} Additionally, community support networks and physical resources for parents of high-risk youth, such as financial support to offer parents more time and energy to monitor their children and/or direct assistance with the supervision and care of children, may help prevent adolescent gun use.

CONCLUSIONS

Pediatricians and others who regularly encounter children and their parents are in a pivotal position to prevent gun violence.

ABBREVIATIONS

CFI: comparative fit index
ICC: intraclass correlation coefficient
PYS: Pittsburgh Youth Study
RMSEA: root mean square error of approximation
TLI: Tucker-Lewis index

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