

Research Article

Associations between Gun Violence Exposure, Gang Associations, and Youth Aggression: Implications for Prevention and Intervention Programs

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Using cross-sectional data collected from three middle schools in Southeast Los Angeles, we assessed the association of neighborhood violence exposure, gang associations, and social self-control with past week aggression in a sample of minority youth ($n = 164$). Results from Poisson and logistic regression models showed that direct exposure to gun violence, having friends in gangs, and low social self control were all positively associated with past week aggression. Among girls, having gang affiliated family members was positively associated with aggression, whereas among boys having friends in gangs was associated with past week aggression. Subjective expectations of engagement in future interpersonal violence were associated with being male, having friends in gangs, and fear of neighborhood gun violence. We recommend that youth violence prevention and intervention programs address the impact of family, peers, and gun violence on student coping and identify students with low social self-control who could benefit from social and emotional skills training.

1. Introduction

Every year over 600,000 teenagers are treated in emergency rooms for assault-related injuries and 20–40% of school age children are bullied on school property [1]. Perpetration statistics indicate that between 30–40% of boys and 16–30% of girls have committed a violent offense by the time they are 17 years old, 30% report having been in a physical fight within the last year, and between 700,000 and 1,000,000 youth have been identified as gang members [1, 2]. Data suggest that urban minority youth living in distressed communities are at significantly greater risk for violent victimization (e.g., being in fights, being injured in a fight, or being threatened with a weapon at school), violence perpetration, and gang affiliation than their non-Hispanic white peers [1, 3, 4]. Although these disparities are due in part to structural inequities they highlight the need for ongoing investigations to identify modifiable risk factors that can be addressed in prevention and intervention programs.

Empirical evidence from ecological investigations of risk behavior has established the link between community violence exposure, family processes, affiliations with delinquent peers, and a multitude of interpersonal and behavioral problems [5–8] including elevated levels of violence victimization and perpetration. These associations are especially relevant for youth residing in neighborhoods with elevated gang activity and gang related crime [9, 10]. Few studies have examined family and peer gang influences, specific aspects of neighborhood violence, and intrapersonal characteristics on current aggressive behavior among preadolescent community samples living in neighborhoods with concentrated gang activity. Theoretically, social learning models purport that the mechanism of behavioral transmission from individual to individual, or from generation to generation, is the adoption of observed behavior of important role models within the child's environment [11, 12]. The processes through which aggression is learned (i.e., observation, reinforcement, and expectancies) are influenced by the interactions that occur in, and across,

multiple contexts: the family, amongst peers, and the surrounding neighborhood. Personal and vicarious experiences with the behavior, and its rewards and punishments, all play a role in whether aggression will become a habitual response to the conflict and challenges that a child encounters [13].

Families are a primary socializing institution and children living in households with punitive, neglectful, or inconsistent parenting are more likely to adopt aggressive interpersonal relational styles than children in families with high levels of communication and parents who model nonaggressive conflict resolution and positive problem solving practices [14, 15]. Moreover, families with life course persistent criminal offenders tend to display more antisocial behavior that in turn can facilitate the development of more positive expectancies of aggression, or appraisals of the consequences of aggression as less severe by the child [16–18]. We assessed family gang association—groups that tend to proliferate in underserved urban communities and confer elevated risk of criminality and aggression to members [19, 20]—as an indicator that problematic social groups and behaviors are present in the familial environment of the child.

As youth enter adolescence peer relationships become progressively more important, serve as primary sources of information, and become increasingly influential in establishing social and behavioral norms [21, 22]. Friendship influences are complex although children with limited social skills are at highest risk for rejection by their more normatively oriented peers. This social exclusion often precedes bonding with youth more tolerant of antisocial behavior who may encourage, or even promote, the use of aggressive tactics in peer interactions [23]. Deviant peer groups are a robust predictor of current aggression and a critical component in the developmental trajectories of violent offenders [24–26]. We assessed the presence of risky peer relationships by measuring peers' gang association.

The substantial literature linking residence in a disadvantaged neighborhoods and exposure to community crime with adolescent externalizing behavior has yet to clarify the relationship between specific exposure types (direct victimization, witnessing violent perpetration of others) and aggressive outcomes among early adolescent boys and girls [6, 27, 28]. Maladaptive coping, chronic stress, and peer influences account for some of the variance in youth aggression in high crime areas; however if youth living in criminogenic environments are sufficiently rewarded for using aggressive tactics, they may perceive socially aggressive strategies as valuable, preferable, and even pleasurable [18, 29]. We investigated four facets of exposure to past-year community and their association with the frequency of past-week aggression: (1) having a relative or friend who was violently attacked, (2) being a direct witness to gun violence, (3) being afraid to go outside due to violence or gang activity, and (4) having to hide due to gun violence in the neighborhood.

Traditionally, youth violence research has focused on the cognitions and behaviors influential in boys' aggression, yet there has been a notable increase in law enforcement exposure among girls. Since 1990, arrests for simple assault have increased by 24% [4] and now account for 30% of juvenile arrests [2]. Recent gang studies also reveal that 30% of

youth gang members in the US—and 38% in California—are girls [30, 31]. Studies investigating the relationship between gender and adolescent aggression indicate several distinct differences in (a) the expression of aggression, (b) causal mechanisms, (c) duration, and (d) the experience of short and long-term consequences [32–34]. During early to mid adolescence boys' aggressive behavior tends to take a physical form (pushing, shoving, and kicking) intended to intimidate or overpower their peers, whereas girls' aggression is more commonly expressed through deliberate social or relational injury—exclusion, harmful gossip, and so forth [35, 36]. The roots of aggressive behavior may also be distinct in that girls' aggression has been linked to trauma, maltreatment, or abuse in close relationships [37] while boys' aggression—which also tends to be related to such factors—can be more purposeful and associated with reduced levels of empathy or intended to establish dominance amongst peers [38, 39]. The duration and consequences of aggression may also vary in that boys' aggressive behavior tends to peak during adolescence and decline over a 4- to 5-year period, while more aggressive girls experience a multitude of health-compromising outcomes across several domains (e.g., unexpected pregnancy, mental health problems, and substance use) that can extend well into adulthood [40].

Low self-control is a significant risk for a host of intra- and interpersonal problems and a primary causal mechanism in the etiology of aggression [41, 42]. Social disinhibition, or the inability to regulate speech and actions in social situations, can lead to more antagonistic interpersonal relationships and may be a specific dimension of self-control. The failure to adhere to acceptable forms of interaction could be particularly risky in violent neighborhoods where codified behavioral norms may function as informal social controls that reduce the prevalence of spontaneous violent incidents. Therefore, the social self-control measure used in the present study assesses the degree to which an individual exhibits problematic social behaviors and may be a useful and relevant construct for prevention purposes.

We hypothesized that (1) all facets of community violence exposure would be positively associated with aggression, (2) having friends in gangs or family members in gangs would be positively associated with aggression, and (3) lower social self-control would be associated with more episodes of aggressive behavior. We also explored whether these relationships varied by gender but made no *a priori* predictions about possible gender differences. Lastly, we investigated students' subjective perceptions of their own perceived likelihood to be involved in aggressive interactions in their future.

2. Methods and Materials

2.1. Study Participants. The study population was comprised of 7th and 8th graders attending middle schools in south Los Angeles, California. Of the initial 179 students invited to participate, 15 did not provide parental consent. The final study sample was comprised of 87 male and 77 female students ($n = 164$).

2.2. *Procedures.* Data were collected from students attending three schools in Southeast Los Angeles. This community is predominantly Hispanic (57%) and African American (41%) with law enforcement data indicating high levels of violent crime. In 2010, this area of Southeast Los Angeles had an estimated per capita income of \$13,092 and a median household income of \$44,000, approximately \$14,000 less than the median income of California. This region reported violent crimes against person rate of 185 per 10,000 and a homicide rate of 26 per 100,000—three times that of Los Angeles city [43]. All data collection was conducted in compliance with the protocol approved by the Institutional Review Board (IRB) of the university. Prior to implementing a pilot program and administering surveys, approval was obtained from school principals and administrators. Schools were selected on the basis of teachers' willingness to allow prevention curricula to be pilot tested in the classroom. Students filled out a paper and pencil questionnaire about demographics, substance use, family and peer gang associations, social self-control, self-reported aggression, and neighborhood violence exposure.

2.3. Measures

2.3.1. *Demographics.* Gender was measured using a single self-report item coded as 0 = *boys* and 1 = *girls*. For ease of presentation we present the odds ratio associated with the highest risk group. The interaction term peer gang association*male gender was coded male = 1 and female = 0. Ethnicity was assessed by asking participants to choose one "racial/ethnic group" that best described them from a list of six categories and included a write-in section if no category was deemed appropriate. Any specification of Hispanic/Latino or Hispanic-mixed was considered Hispanic/Latino.

2.3.2. *Social Self-Control (Cronbach's Alpha = 0.76).* The *social self-control* measure used in the present study is a psychosocial measure designed to assess an individual's insensitivity to the feelings of others, inability to refrain from uttering socially damaging statements, and a need for immediate gratification in social situations [44]. Social self-control was measured by summing self-reported frequencies of ten items regarding perceived participant control of expressions/actions. Examples of statements include "I express all my feelings," "I say things I regret later," and "I do things just to get attention." Each statement was measured on a four-point scale from (1) *Never* to (4) *Always* and reverse coded. Lower summed scores indicated lower levels of social control.

2.3.3. *Family in Gangs.* Family gang association was assessed by one item [45]: "Some people in my family belong to a gang." Response options were 1 = *true for me* or 0 = *not true for me*.

2.3.4. *Friends in Gangs.* Peer-group gang affiliation was assessed with a single item question [45] that asked whether a participant's friends at school belonged to a gang. Possible responses were 1 = *true for me* or 0 = *not true for me*.

2.3.5. *Violence Exposure.* Violence exposure was assessed with the adjusted version of the "Stressful Urban Life Events Scale" developed by Attar et al. [46]. Four questions measured specific forms of past year violence exposure: (1) having a family member or friend who was physically attacked, (2) witness to gun violence, (3) fear of going outside due to neighborhood violence, and (4) having to hide due to gun violence in the neighborhood. Response options were coded 1 = *yes* and 0 = *no*.

2.3.6. *Interpersonal Aggression (Cronbach's Alpha = 0.87).* Self-reported aggression was assessed using an eleven-item questionnaire developed by Orpinas [47]. Participants reported how many times in the prior week they felt angry or engaged in the following behaviors: physical fighting, slapping or kicking another student, calling students names, or threatening physical harm. Responses were summed with higher values representing more incidents of past week aggression.

2.3.7. *Perceived Likelihood of Future Interpersonal Aggression (Cronbach's Alpha = 0.89).* This five-item measure is a short version of Flewelling et al. [48] scale. Questions gauged respondents' personal perception of the likelihood of getting into a physical fight, carrying a gun, getting injured in a fight, and injuring someone in a fight. Likert scale responses ranged from (1) *Not at all likely* to (4) *Very likely* to assess cognitive susceptibility.

2.4. *Analytic Strategy.* Univariate analyses were conducted to describe demographic characteristics, determine distributions of variables, and compare distributions of predictors by gender. Due to possible clustering effects by school we used a random effects model in preliminary analyses. There was no evidence of significant clustering effect by school ($P = 0.56$); therefore, we did not include school as a random effect in the regression models.

A Poisson regression model was used to test the hypotheses that aggressive episodes would be associated with neighborhood violence, family gang association, peer gang association, and social self-control. To assess gender differences interaction terms were calculated (gender*social self-control, gender*peers in gangs, gender*violence exposure, and gender*family gang association) and included in our model. We present incident rate ratios (IRRs) with 95% confidence intervals (95% CI). A logistic regression model was used to calculate odds ratios (ORs) and 95% confidence intervals (95% CI) for students' own predicted likelihood of future violence by transforming Likert scale responses into a binary variable coded 0 = *not at all likely* and 1 = *somewhat likely, likely, and very likely*. A logistic regression model was utilized because approximately 45% of respondents reported that they were "not at all likely" to be engaged in interpersonal violence in the next 30 days and the substantive differences between "somewhat likely" and "very likely" would be difficult to interpret. This method of assessing susceptibility (i.e., susceptibility indicates the lack of a firm commitment *not* to engage in the behavior) has been validated with risk behaviors

TABLE 1: Demographic information and variables included in the analysis.

Variables in the study	Whole sample (<i>n</i> = 164) <i>f</i> (%)	Male (<i>n</i> = 87) <i>f</i> (%)	Female (<i>n</i> = 77) <i>f</i> (%)
African American	15 (9%)	6 (7%)	9 (12%)
Hispanic	147 (90%)	81 (93%)	66 (86%)
Other	2 (1%)	0	2 (3%)
Family gang association	75 (45%)	37 (42%)	38 (49%)
Peer gang association	70 (43%)	39 (45%)	31 (40%)
Family/friend being attacked	75 (46%)	42 (48%)	33 (42%)
Witnessing gun violence	32 (20%)	17 (20%)	15 (19%)
Fear of neighborhood violence	53 (32%)	26 (30%)	27 (35%)
Hiding due to gun violence	38 (23%)	23 (26%)	15 (19%)
	M (SD)	M (SD)	M (SD)
Social self-control	17.88 (5.58)	17.01 (5.25)	18.90 (5.83)
Aggression	11.06 (12.82)	12.25 (13.56)	9.70 (11.85)

Note: *f* = frequency, % = percent, M = mean, and SD = standard deviation.

such as tobacco use and has been positively associated with future use [49].

3. Results

Means, standard deviations, and frequencies of predictors and outcome are presented in Table 1. Nine percent of our sample was African American with the majority (90%) identifying as Hispanic and 1% as Asian/Pacific Islander. Forty-five percent of students acknowledged having family members that were gang affiliated and 43% reported having friends in gangs. Approximately 46% of the sample reported that someone close to them had been beaten or attacked, 20% had witnessed gun violence, 32% feared neighborhood violence, and 23% reported having to hide due to gun activity in the neighborhood.

3.1. Past Week Aggression. Table 2 presents results of Poisson regression model testing our hypotheses that interpersonal aggression would be associated with social self-control, family and friend gang affiliation, and specific aspects of neighborhood violence exposure (goodness of fit statistic Chi-square = 160, $P = 0.234$). After controlling for other variables in the model, there was an inverse association between being female, higher social self-control, and past week aggression. The number of weekly aggressive episodes for girls was nearly 40% less than that of males. Social self-control was inversely associated with aggression; for every one-unit increase in a student's social self-control score, the number of aggressive episodes decreases by approximately 11%. Conversely, peer gang association was a risk factor for

TABLE 2: Poisson regression model assessing correlates of past week aggression.

Variable	IRR	SE	95% CI
Female	.61***	.03	.55, .68
Family gang association	1.07	.06	.95, 1.22
Peer gang association	1.91***	.18	1.69, 2.15
Social self-control	.89**	.01	.89, .90
Family/friend being attacked	.95	.03	.92, 1.021
Witnessing gun violence	1.36***	.08	1.20, 1.54
Fear of neighborhood violence	1.01	.06	.98, 1.21
Hiding due to gun violence in the neighborhood	1.10	.07	.97, 1.25
Family gang association* female	1.46**	.04	1.26, 2.31
Peer gang association* male	3.25***	.38	2.51, 4.11

Note: all significant findings are in bold. * $P \leq 0.05$, ** $P \leq 0.01$, and *** $P \leq 0.01$. ORs for highest risk group are presented with interaction terms.

aggression ($P < 0.001$) such that students with friends in gangs had a 91% increase in the number of aggressive episodes compared to students with no friends in gangs. Although having family members that were gang affiliated was not significant for the aggregate sample, family gang affiliation was positively associated with girls' aggression ($P = 0.004$). Girls with family gang affiliation reported a 46% increase in the number aggressive episodes as compared to girls with no family member gang association. We assessed the independent relationships between having a family member or friend physically attacked, witnessing gun violence, fear of going outside due to violence, and having to hide due to gun violence on recent aggression. Of these, witnessing gun violence was positively associated with aggression in that students who reported direct exposure had an estimated 36% increase in the number of past week aggressive episodes ($P < 0.05$). We did not find significant differences in gender responses to any aspect of community violence.

Post hoc analyses investigating the effect of having family members and peers with gang affiliations suggest that having both (family and peers) was significantly associated with recent aggression. This finding warrants further investigation and may have important implications for prevention work. First, it is possible that there is an overlap between family and friends (i.e., cousins, stepsisters, or stepbrothers). Second, students whose family and friendship networks include gang affiliates are at especially high risk for behaviors that undermine social integration with less aggressive peers. Third, there is an association between the number of contexts in which a student interacts with gang members and recent episodes of aggression.

3.2. Subjective Expectations of Engagement in Interpersonal Violence. The logistic regression model assessing students' perception of their own likelihood to engage in future violence yielded significant results (Table 3). The Hosmer and Lemeshow omnibus goodness of fit test suggests our model fit

TABLE 3: Odds ratios for factors associated with perceptions of future engagement of interpersonal violence.

Variable	OR	95% CI
Female	.17***	.07, .43
Social self-control	.28**	.12, .93
Family gang association	2.09	.84, 5.19
Peer gang association	4.04**	1.65, 9.84
Family/friend being attacked	.73	.30, 1.79
Witnessing gun violence	1.84	.59, 4.7
Fear of neighborhood violence	3.77**	1.45, 9.76
Hiding due to neighborhood gun violence	.74	.26, 2.42

Note: all significant findings are in bold. ** $P < .01$, and *** $P < .001$. OR: odds ratio; 95% CI: 95% confidence interval for the odds ratio.

the data well, correctly predicting 84% of cases ($\chi^2 = 11.49$, $P = 0.18$). Cognitive expectancies of future engagement in violence were positively correlated with past week aggression ($r = .53$, $P < 0.01$) indicating that students already engaged in aggressive behavior are likely to predict future involvement in interpersonal violence.

Girls (OR = .17, 95% CI = .07, .43) and students with higher social self-control (OR = .28, 95% CI = .12, .93) had lower odds of perceiving themselves to be involved in future episodes of interpersonal violence than boys or students with low social self-control. Students with friends in gangs had higher odds of perceiving themselves to be involved in interpersonal violence than those who did not report having friends in gangs (OR = 4.04, 95% CI = 1.65, 9.84). Students that reported being afraid of violence in the neighborhood had higher odds of perceiving themselves to be engaged in interpersonal violence than those who did not report being afraid of violence in their neighborhood (OR = 3.77, 95% CI = 1.45, 9.76).

4. Discussion

The research literature has repeatedly documented that individual, family, and community factors are associated with aggression and interpersonal violence. The current study provides preliminary evidence that social self-control can be protective for boys and girls, that boy's and girl's aggressive behavior response to community violence may not be significantly different, and that family and peer factors may have differential effects on boys and girls. Girl's behavioral responses to community conditions and the influence of social self-control were similar to boys'; however the effects of deviant family contexts appear to be particularly detrimental for girls. This finding is consistent with recent work highlighting the crucial role of familial attachment and close relationships in female aggression [50] and underscores the need for continued research on the effectiveness of gender specific programs. Because recruitment and retention of family members in prevention and intervention programs has been challenging, evaluations of school-based programs that provide cognitive and emotional skills training for youth

living in deviant family contexts are important areas of future prevention research [51].

Boys' aggression, on the other hand, was associated with low levels of social self-control and having friends with gang affiliations. Prior investigations into boys' violent behavior trajectories have documented significant facilitation effects—above and beyond selection effects—of delinquent peers on aggression [52–54]. Our findings are not able to parse out peer selection effects (i.e., adolescents seeking out friends whose level of violence they wish to emulate) from facilitation effects (i.e., adolescents becoming more violent as a result of interacting with violent peers) although the role of social self-control in these processes is a noteworthy area for future research and prevention programming. The gender differences observed in the current study suggest that gender specific interventions may be more effective than universal programs. Possible intervention programs for boys should provide cognitive and affective tools that can encourage awareness and understanding of the influence of community settings on social behavior, decision-making, and the development of perceptions that encourage the adoption of aggressive and violent behaviors to effect lasting behavior change.

The considerable variability in victimization and perpetration among youth living in high risk settings suggests that some children have greater internal and external sources of resilience that promote the adoption of behavioral patterns that facilitate greater adaptability in distressed neighborhood contexts [55]. Because lower social self-control was associated with both girls' and boys' aggression, promoting social self-regulation to mitigate the risk of personal injury in neighborhood contexts that challenge inter- and intrapersonal development requires further investigation. If students are taught to appropriately interpret and respond to social cues, reduce reactivity to perceived slights, and regulate their social behavior, prevention programs could potentially reduce the prevalence of interpersonal aggression and delay or prevent selection into more deviant peer groups.

The direct association between witnessing gun violence and past week aggression, when controlling for peer and family factors, suggests that firsthand gun violence exposure may have a unique, independent influence on an adolescent's externalizing behaviors. This association has important implications given that recent work highlighted the intersection of these factors (exposure to community violence, gang membership, and aggressive or violent behavior) and elevated risk of youth gun carrying for either offensive or defensive purposes [56]. Fear of gun violence was also associated with subjective perceptions of future involvement in interpersonal violence. School programs that can effectively address the trauma associated with neighborhood gun violence and provide students skills to improve social cohesion and resilience may be important considerations in efforts to reduce the frequency of aggressive behavior on and off campus.

4.1. Limitations. Several limitations to this study should be noted. First, our findings are based upon a small, convenience sample of predominantly Hispanic, middle school students. Therefore, no cause and effect assumptions can be drawn

from our results as the temporal ordering of family, peer associations, and social self-control are not accounted for. Moreover, our analyses cannot clearly discern bidirectional influences. Second, data were gathered from self-report surveys and interpretations of self-report data should be taken with some caution as responses were not corroborated or verified. While under- or overreporting may be a function of recall and attribution bias, studies that rely on self-reports have generally yielded reliable results [57, 58]. Third, data were collected in a relatively homogenous school district and our findings are limited to the neighborhood contexts of students participating in our study. Third, although we investigate the possible overlap and effects of having both peers and family members with gang affiliations we did not develop any *a priori* hypotheses about the nature or direction of this association. Lastly, assessing family and peer gang associations has been problematic in studies and these findings should be cautiously interpreted. We did not ask respondents to specify which family members were affiliated so our conclusions are speculative. However, future use of qualitative methods to explore the effects of family gang associations will contribute to our understanding of aggression in an urban context.

5. Conclusion

Despite these limitations, this study yielded several findings that are promising areas for violence prevention and intervention program design. The challenges to social and behavioral development as a result of violence exposure may be most perceptible in the social functioning of children in the school environment [59]. Therefore, school based programs may be a critical point of access in disrupting the progression of long term maladaptive behavioral patterns provided their implementation at the appropriate stage of problem behavior development and expression. Educators and public health practitioners could substantially improve the effectiveness of violence prevention programs by addressing the behavioral and emotional consequences of exposure to local neighborhood conditions, that is, gang activity and gun violence. If schools situated in communities with high crime and gang activity can address the specific needs of their students, by teaching techniques that reduce tension or frustration in social situations, they might substantially improve successful participation in prosocial interactions [60–62], reduce susceptibility to negative peer influences [63], and discourage future gang involvement of their students. Although interpersonal violence is attributed to a confluence of factors, prevention and intervention approaches that provide youth an opportunity to openly address their feelings and reactions to family and community context could bolster resilience and social support among children exposed to multiple risk factors.

Conflict of Interests

The authors declare that there is no conflict of interests regarding the publication of this paper.

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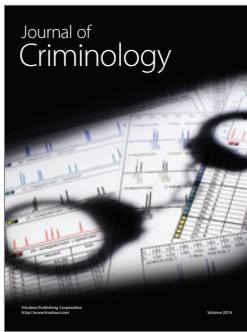
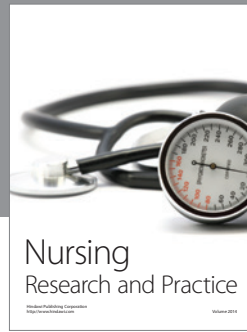
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