

What Predicts Adolescent Violence in Better-Off Neighborhoods?

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Predictors of repeated violent delinquency across ages 13–19 were investigated in a longitudinal sample of 420 urban adolescent males living in high- compared to low-socioeconomic status (SES) neighborhoods. Adolescents in high-SES neighborhoods were significantly less likely than their counterparts in low-SES neighborhoods to engage in serious and violent delinquency. Results indicated that risk factors for later repeated violence among adolescents in high-SES neighborhoods, such as physical aggression, may be biologically based, whereas risk factors for later violence among adolescents in low-SES neighborhoods, such as poor parent–adolescent communication and early intercourse, appeared to be context-dependent. Having positive attitudes toward problem behavior and delinquent peers increased risk for later violence regardless of neighborhood SES type. Theoretical and practical implications of the findings are discussed.

KEY WORDS: violence; delinquency; neighborhood; adolescence; socioeconomic status.

INTRODUCTION

The designation “young, violent offender” generally evokes images of an adolescent male from a disadvantaged, urban neighborhood. This is not surprising because research has shown consistently that rates of offending are higher in such neighborhoods (e.g., Sampson & Groves, 1989), and theories most often used to explain delinquency implicate risk factors considered to be more prevalent in disadvantaged neighborhoods (Wilson, 1991a, 1991b). Recent tragedies in Littleton, Colorado, and other relatively advantaged communities around the country, however, have drawn attention to violence committed by youth growing up in more advantaged communities and have placed in high demand any information that may help predict such violence. This exploratory study responds to that demand by addressing important questions that have received little attention in the psychology and criminology

literatures; namely: What are the predictors of repeated violence among male adolescents living in advantaged neighborhoods? Are they the same as or different from predictors of repeated violence among those living in disadvantaged neighborhoods?

Identifying early adolescent predictors of later violent delinquency is a necessary first step toward developing theories of such violence, as well as effective preventive interventions for those who are most at risk. Ecological theory proposes that the relation between risk and behavioral outcomes may depend on the context in which those risks are experienced (Bronfenbrenner, 1986). Although neighborhoods have been identified as one of many important developmental contexts (see Leventhal & Brooks-Gunn, 2000, for a review), we know very little about whether or not predictors of violence may depend on the type of neighborhood in which an adolescent is raised (Wikström, 1998). If such predictors vary considerably across neighborhoods, differential theories of violence may be indicated, and the risks targeted by interventions should reflect such differences. To establish the background for this investigation, we will describe briefly empirical research linking neighborhood characteristics with serious and violent delinquency and then discuss findings on effects of specific individual, family, and peer characteristics.

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Neighborhoods and Violent Delinquency

Regional survey-based studies have shown that residing in a low-socioeconomic status (SES) neighborhood (defined using census-based indexes of socioeconomic disadvantage) is associated with more frequent and severe delinquent and criminal behavior among adolescents (Loeber & Wikström, 1993; Peeples & Loeber, 1994; Sampson, Raudenbush, & Earls, 1997). More recently, experimental data have been used to provide further empirical support for this link (Ludwig, Duncan, & Hirschfeld, 2001). In a unique study of predominately minority families who lived in Baltimore public housing projects, Ludwig and colleagues compared juvenile criminal offender records of adolescent males whose families were randomly assigned to three groups: one that received Section 8 vouchers and special assistance to move from low-income housing projects to low-poverty neighborhoods (the experimental group), one that received Section 8 vouchers to move into private housing of their choice, and another that did not receive vouchers and remained in public housing. They found that adolescent boys in the experimental and Section 8 only groups, whose families were much more likely to move to low-poverty (less than 10% below the poverty level) and middle-poverty (10–40% below the poverty level) neighborhoods, respectively, were significantly less likely to be arrested for violent crimes than their counterparts who stayed in public housing (where over 60% were below the poverty level).

Although these studies help us predict that adolescent males in advantaged neighborhoods will be at lower risk for violent delinquency than those in disadvantaged neighborhoods, they do not explain such delinquency among adolescents from advantaged neighborhoods. Prior research has shown that an adolescent is more likely to become delinquent to the extent that risk factors within him, his family, and his neighborhood are aggregated (Stouthamer-Loeber, Loeber, Wei, & Farrington, in press); however, it is also possible that effects of particular individual, family, and peer risk factors differ by type of neighborhood.

Predictors of Violent Delinquency in Adolescents

A large body of research supports relations between particular individual, family, and peer characteristics and serious delinquent behavior in adolescence. Antisocial behavior has considerable stability across time, making early conduct problems a strong predictor of later delinquency (Elliott, Huizinga, & Ageton, 1985; Loeber & Dishion, 1983). Hyperactivity, impulsivity, and inattention

problems in childhood, related to antisocial behavior through impaired cognitive processes (e.g., difficulty evaluating consequences of actions), have been shown to predict later convictions, independent of conduct disorder (Farrington, Loeber, & van Kammen, 1990). Risk factors reflecting less constraint by conventional norms and institutions (Hirschi, 1969), such as lower commitment to school (Cernkovich & Giordano, 1992) and positive attitudes toward deviance (Elliott, 1994; Zhang, Loeber, & Stouthamer-Loeber, 1997), have also been related to increased delinquency. In a meta-analysis of prospective longitudinal studies, Lipsey and Derzon (1998) found that early adolescent aggression, psychological condition (e.g., hyperactivity), and school attitude/performance were among the most predictive risk categories for later serious delinquency and violence. In addition to the individual risk factors reviewed here, we have included in this study early sexual intercourse (Farrington, 1989; Wei, Stouthamer-Loeber, & Loeber, 1999) and carrying a hidden weapon.

Family management practices and parent–child interactions have been associated consistently with later delinquency (Capaldi & Patterson, 1996; Loeber & Stouthamer-Loeber, 1986). Theory and research suggest that risk for delinquency and violence is higher among youth whose parents ignore misbehavior or fail to follow through with stated disciplinary actions because these youth do not learn associations between misbehavior and negative consequences (Patterson, Reid, & Dishion, 1992; Wells & Rankin, 1988). Similarly, youth who are less closely supervised, have poor communication with their parents, and are less involved in family activities are at risk for associating with delinquent peers, also raising the risk for delinquency and violence (Elliott et al., 1985; Patterson et al., 1992). Lipsey and Derzon's meta-analysis identified antisocial peers as one of the strongest early adolescent predictors of later violent or serious delinquency (Lipsey & Derzon, 1998).

The Bioecological Model

According to the *bioecological model* formulated by Bronfenbrenner and colleagues (Bronfenbrenner & Ceci, 1994; Bronfenbrenner & Morris, 1998), effects on developmental outcomes of particular organism–environment interactions, called proximal processes, are expected to vary as a function of environmental characteristics. The model predicts that for outcomes reflecting developmental dysfunction, such as violent delinquency, proximal processes and other environmental influences will have greater impact on youth growing up in disadvantaged contexts than on youth in advantaged contexts.

In contrast, genetic potential is expected to play more of a role for youth in advantaged environments, which offer a wider range of opportunities and increase the potential for genotype–environment correlations (Rowe, Almeida, & Jacobsen, 1999). Consistent with this model, Rowe et al. (1999) found that the heritability of aggression was higher in schools with higher average levels of family warmth, whereas shared and nonshared environmental influences were stronger in schools with lower average levels of family warmth.

This paper examines whether or not the importance of various risk variables for predicting delinquency differs by neighborhood context. To this end, we will examine differences in the prevalence of serious and violent delinquency in high-SES versus low-SES neighborhoods, identify risk factors for repeated violence among adolescent boys in high-SES neighborhoods, and examine the extent to which they differ from risk factors for repeated violence in low-SES neighborhoods. Prior research has shown that genetic influences play a larger role than environmental influences in both physical aggression in male youth (Eley, Lichtenstein, & Stevenson, 1999) and hyperactivity (Silberg et al., 1996). Therefore, we expect that these variables will raise the risk for later repeated violence among adolescents in high-SES neighborhoods, whereas for adolescents in low-SES neighborhoods, variables reflecting disrupted processes, such as poor parent–child communication, will raise the risk for repeated violence (Bronfenbrenner & Ceci, 1994; Bronfenbrenner & Morris, 1998).

Repeated violence was the outcome of choice for this study because research has shown that repeat offenders account for a disproportionately large number of offenses, and are therefore the most important targets for intervention (Loeber, Farrington, & Waschbusch, 1998). The majority of the analyses use an index of violence based on self-report; however, we also looked at cross-neighborhood differences in prevalence rates of official serious delinquency (based on juvenile court records) because it provides complementary information. Although self-reported delinquency includes instances that are not captured by official records, official delinquency is not subject to biases, such as poor memory, exaggeration, and concealment (Loeber, Farrington, & Waschbusch, 1998).

METHOD

Participants and Overview

The participants for this study were 420 (83%) of the 506 adolescent boys who comprise the oldest of three

samples (first, fourth, and seventh grades) in the Pittsburgh Youth Study, an ongoing longitudinal study focused on the development of delinquency in boys (Loeber, Farrington, Stouthamer-Loeber, & van Kammen, 1998). Boys were selected randomly from a name and address list provided by the Board of Public Education, and in the springs of 1987 and 1988 they participated in an initial screening. The overall participation rate was 84.7% for the combined samples, and 83.5% ($n = 850$) for the oldest sample. The screening assessments were reports on the boy's prosocial and antisocial behavior provided by the boy himself, his primary caretaker (most often his mother), and his teacher. Risk scores were calculated based on the number of antisocial or delinquent acts reported by the three respondents at screening. The final samples consisted of the 30% who received the highest risk scores ($n = 250$ per sample) and an approximately equal number of boys who were selected randomly from the remaining 70%.

The 420 participants in this study are those in the original oldest sample who (1) participated in at least six of the eight assessments subsequent to the first follow-up assessment, (2) lived at an address during the first follow-up assessment that permitted the determination of neighborhood membership, and (3) did not engage in repeated violence before the second follow-up assessment. Ten adolescents who had participated in less than six follow-up assessments were also included because they endorsed committing seriously violent acts during two or more of the follow-up assessments in which they participated, and they fulfilled the other two inclusion criteria. At the time of the initial screening the 420 boys were an average of 13 years old. Approximately 57% of the boys are African American. The participants included in these analyses were comparable to those who were excluded in terms of the proportion of African American boys ($\chi^2 = .01$, *ns*) and family SES, $t(497) = .27$, *ns* (Hollingshead, 1975).

Data used in this study were collected over 6.5 years up to age 19.5; that is, during the initial screening and nine subsequent follow-up assessments. The first five follow-up assessments were conducted every 6 months and the following four were conducted every 12 months.

Measures and Constructs

Neighborhood SES

The determination of neighborhood SES was based on a principal components factor analysis of 1990 U.S. Census tract data in which 88 Pittsburgh neighborhoods formed the basic units of analysis (see Wikström & Loeber,

2000, for a more detailed description). The strongest factor, labeled SES, explained 58% of the variance between tracts. The census-based indicators loading on the SES factor were percent families with children headed by single parents, median household income, percent families below the poverty level, percent households on public assistance, percent unemployed, and percent African American. For the purposes of this paper, the distribution of SES factor scores was split at the median. Neighborhoods with corresponding factor scores that fell in the bottom half of the distribution were considered *high-SES neighborhoods*, and those with factor scores that fell in the top half of the distribution were considered *low-SES neighborhoods*. The factor score distribution was split at the median so that there would be comparable levels of heterogeneity among residents in each neighborhood type. Each boy was matched with a neighborhood type (i.e., high- or low-SES) based on his address during the first follow-up assessment (1987 and 1988). Examples of Pittsburgh neighborhoods that were considered low-SES are Garfield, Homewood North, and Manchester. Examples of high-SES neighborhoods are Squirrel Hill South, Shadyside, and Point Breeze (see Wikström & Loeber, 2000).

Demographic, Individual, Family and Peer Predictors

The 19 predictors of repeated violence used in this study were based on data collected at the initial screening (when the boys were approximately 13) or first follow-up (when they were around 13.5) or both. The predictors are organized into four domains: demographic, individual, peer, and family. With the exception of family SES, higher scores reflect higher risk for all constructs.

The boy's *age* at the first follow-up assessment was centered on the mean age for all boys in the sample. Boys were coded positive for the *race* construct if they were identified by their primary caregivers as African American, Hispanic ($n = 1$), or more than one race ($n = 9$); the two Asian boys were classified as White. *Single parent status* was coded positive if the primary caretakers reported during the first follow-up assessment that they were not married. The *family SES* scores were computed using the Hollingshead (1975) index of social status by multiplying the scale value for occupational prestige by a weight of 5 and the scale value for educational level by a weight of 3. For two-parent families, the highest score was used.

As summarized in Table I, multiple questionnaire items administered to parents, teachers, and the adolescents themselves were used to assess each of the following individual, family, and peer constructs: (a) physical aggression, (b) hyperactivity-impulsivity-attention (HIA)

problems, (c) low academic achievement, (d) low school motivation, (e) positive attitude toward problem behavior, (f) lack of guilt, (g) had sex, (h) carried a hidden weapon, (i) poor parent-adolescent communication, (j) boy not involved (in family activities), (k) discipline not persistent, (l) low parental supervision, (m) peer delinquency, (n) nonconventional peers, and (o) bad friends. The items that comprised the *physical aggression*, *HIA problems*, *low academic achievement*, *low school motivation*, and *lack of guilt constructs* came primarily from the Child Behavior Checklist (Achenbach & Edelbrock, 1983) and the Teacher Report Form (TRF; Achenbach & Edelbrock, 1986). The *attitude toward problem behavior* items came from the Perception of Antisocial Behavior Scale (Elliott et al., 1985). The items that made up the *had sex*, *bad friends*, and *nonconventional peers* constructs were adapted from forms created by the Institute of Behavioral Science, Boulder, CO. The *carried a hidden weapon* item came from the Self-Reported Delinquency Scale (SRD; Elliott et al., 1985). The *poor parent-adolescent communication* construct came from a measure expanded from a form developed by Barnes and Olson (1982), the Family Environment Scale (Moos & Moos, 1975), and the Family Assessment Measure (Skinner, Steinhauer, & Santa-Barbara, 1983). *Boy not involved*, *discipline not persistent*, and *low supervision* measures were adapted from forms created by the Oregon Social Learning Center. The *peer delinquency* items came from a scale developed by the Denver High Risk Delinquency Survey. Detailed descriptions of all constructs, as well as information about construct validity, are provided by Loeber, Farrington, Stouthamer-Loeber, et al. (1998).

See Table II for the means (or for the dichotomous variables, proportions positive), standard deviations, and ranges for all of the predictors. The descriptive statistics presented in Table II demonstrate that for each variable a wide range of scores is represented in the sample.

Violent Delinquency

Four items from the SRD (Elliott et al., 1985) and one item from the TRF (Achenbach & Edelbrock, 1986) formed the basis for the violent delinquency measures. The four items from the SRD asked if the youth had (1) attacked another with a weapon or with the intent to seriously hurt or kill; (2) used a weapon, force, or strong-arm method to get something from someone; (3) physically hurt or threatened to hurt someone to get them to have sex; and (4) had sex with someone against their will during the time period since the last assessment (i.e., the past 6 months or the past 12 months). The item from the TRF

Table I. Constructs and Measures

Domains and constructs	Informants	Areas assessed/ items	Phases/ timeframe	Example item (response scale)	α
Individual					
Physical aggression	PT	7/29	S, FU/lifetime	Starts physical fights (never, sometimes/often)	.65
HIA problems	PT	14/28	S, FU/12 mo	Inattentive, easily distracted (never, sometimes/often)	.85
Low academic achievement	PT	7 _p ,4 _T /22	S, FU/12 mo	Math achievement (rating)	.97
Low school motivation	T	1	FU/6 mo	Academic effort (rating)	na
Positive attitude toward problem behavior	Y	18	FU/6 mo	Is it all right for you to have friends your parents do not approve of? (rating)	
Lack of guilt	PT	1/4	S, FU/12 mo	Does not feel guilty (rating)	.58
Had sex ^a	Y	1	FU/lifetime	Have you ever had sexual intercourse with a girl or woman? (yes/no)	na
Carried a hidden weapon ^a	Y	1/2	S, FU/lifetime	Have you ever carried a hidden weapon? (yes/no)	na
Family					
Poor parent-adolescent communication	P	30	FU/in general	Are you very satisfied with how you and your son talk together? (rating)	.90
Boy not involved	P	4	FU/6 mo	Does your son like to get involved in family activities? (rating)	.65
Discipline not persistent	P	4	FU/in general	Do you let your son get away with things? (rating)	.59
Low supervision	P	4	FU/6 mo	Do you know who your son's companions are when he is not at home? (rating)	.66
Peer					
Peer delinquency ^a	Y	8	FU/6 mo	How many of your friends have skipped school without an excuse? (rating)	.86
Nonconventional peers	Y	8	FU/6 mo	How many of your friends have been involved in community activities, such as the YMCA or youth clubs? (rating)	.82
Bad friends	P	5	FU/6 mo	Were there any children among your child's friends that you disapproved of? (yes/no)	.85

Note. mo. – months; P – parent; T – teacher; Y – youth; p – areas assessed by parent; T – areas assessed by teacher; S – assessed at screening; FU – assessed at first follow-up.

^aDichotomous variables; boys were coded positive for peer delinquency construct if their scores fell in the most delinquent 25% of the highly skewed distribution.

asked if the boy had used force or strong-arm methods to get something from another student. A boy was considered to have engaged in *violent delinquency* if he or his teacher had endorsed positively any of the five items described earlier on one or more of the eight assessment occasions subsequent to the first follow-up. He was considered to have engaged in *repeated violence* if one of the items described earlier was endorsed positively during two or more of the eight phases. The SRD has been shown to have concurrent and predictive validity for boys in this sample when compared to juvenile court petitions (Farrington, Loeber, Stouthamer-Loeber, van Kammen, & Schmidt, 1996). A boy was considered to have engaged in *official serious delinquency* if searches of the Juvenile Court Records in Allegheny County revealed that he had been charged with homicide, rape, robbery, aggravated assault, or carjacking between ages 13.5 and 17.5. Coding of the offense committed was based on the behavioral description found in the police contact form or petition or both.

Analysis Plan

Differences in rates of violent delinquency by neighborhood were examined by comparing the prevalence rates of violent delinquency, repeated violence, and official serious delinquency in high- versus low-SES neighborhoods. Risk factors for repeated violence by neighborhood SES type were identified first by examining bivariate relations between risk factors and repeated violence among boys living in each type of neighborhood. Each risk variable was regressed onto repeated violence to generate odds ratios (ORs), which represent the increased likelihood of repeated violence associated with the presence of a particular risk factor. Risk factors were also identified by generating two multivariate logistic regression models: one that included only boys living in high-SES neighborhoods and one that included only boys living in low-SES neighborhoods. All analyses were weighted to account for the oversampling of boys who scored the highest on the antisocial behavior screening instruments.

Table II. Descriptive Statistics^a

Domains and risk factors	Mean	SD	Range	Maximum range
Demographic				
Age	13.80	0.76	12.5–16	
Race/Ethnicity ^b (<i>n</i> = 419)	0.58		0–1	0–1
Single parent status ^b (<i>n</i> = 419)	0.58		0–1	0–1
Family SES (<i>n</i> = 416)	36.72	13.25	6–66	6–66
Individual				
Physical aggression (<i>n</i> = 415)	2.94	1.69	0–7	0–7
HIA problems	10.62	3.33	0–14	0–14
Low academic achievement	2.22	0.64	1–4	1–4
Low school motivation (<i>n</i> = 386)	4.90	1.59	1–7	1–7
Pos. attitude to problem behavior (<i>n</i> = 419)	25.52	4.88	18–45	18–54
Lack of guilt (<i>n</i> = 416)	2.24	1.92	0–8	0–8
Had sex ^b (<i>n</i> = 418)	0.44		0–1	0–1
Carried a hidden weapon ^b (<i>n</i> = 413)	0.25		0–1	0–1
Family				
Poor communication (<i>n</i> = 415)	46.97	9.06	30–74	30–90
Boy not involved (<i>n</i> = 415)	7.11	1.92	4–12	4–12
Discipline not persistent (<i>n</i> = 415)	6.41	1.52	4–12	4–12
Low supervision (<i>n</i> = 414)	5.24	1.52	4–11	4–12
Peer				
Peer delinquency ^b (<i>n</i> = 419)	0.22		0–1	0–1
Nonconventional peers (<i>n</i> = 407)	24.83	5.36	9–40	8–40
Bad friends (<i>n</i> = 412)	2.22	1.92	0–5	0–5

Note. Pos. = Positive.

^a*N* = 420 unless noted otherwise.

^bDichotomous variables; values in means column are proportions coded positive for presence of risk factor.

RESULTS

Prevalence of Violent Delinquency, Repeated Violence, and Official Serious Delinquency in High- and Low-SES Neighborhoods

The prevalence rates for violent delinquency, repeated violence, and official serious delinquency for the whole sample and by neighborhood SES type are presented in Table III. The overall prevalence of violent delinquency (committing a seriously violent act across one or more of the eight assessment phases between the ages of 13.5 and 19.5) was approximately 31.1%. Adolescent males who lived in high-SES neighborhoods (*n* = 159) were about half as likely as males who lived in low-SES neighborhoods (*n* = 261) to commit at least one act of violent delinquency during the 6-year period investigated (20.8 vs. 37.2%; $\chi^2 = 12.86, p < .001$).⁴ The

overall prevalence of *repeated* violence (committing a seriously violent act across two or more of the eight assessment phases between the ages of 13.5 and 19.5) was approximately 14.1%. Adolescents who lived in high-SES neighborhoods were a little more than half as likely as adolescents who lived in low-SES neighborhoods to commit at least two acts of violent delinquency during the time period investigated (9.8 vs. 16.8%; $\chi^2 = 3.99, p < .05$). It is interesting to note that about half of the youths who reported committing one act of violent delinquency did not commit another seriously violent act in this timeframe.

As would be expected, the prevalence of being petitioned for a seriously violent crime between the ages of 13.5 and 17.5 (7.3% overall) was lower than the prevalence based on self- and teacher-reports for committing such a crime during a slightly longer time period. However, the same effect of neighborhood SES was observed for official

⁴Examination of the types of violence committed indicated the difference across neighborhoods in rates of violent delinquency was due to the lower prevalence of attacking with a weapon or intent to hurt or kill someone in high- versus low-SES neighborhoods (12.5 vs. 26.8%; $\chi^2 = 12.11, p < .001$). No differences across neighborhoods in the

prevalence of using force to steal something, or hurting, or threatening to hurt someone to get them to have sex were found. Interestingly, although it was a low-base rate behavior, the prevalence of having sex with another against their will was significantly higher among adolescents in high- compared to low-SES neighborhoods (3.1 vs. .004%; $\chi^2 = 5.39, p < .05$).

Table III. Prevalence Rates of Violent Delinquency, Repeated Violence, and Official Serious Delinquency for Whole Sample and by Neighborhood SES Type

Outcome	Whole sample (%)	Neighborhood SES (%)	
		High ^a	Low ^b
Violent delinquency	31.1	20.8	37.2
Repeated violent delinquency	14.1	9.8	16.8
Official serious delinquency	7.3	2.9	9.9

^a*n* = 159.

^b*n* = 261.

serious delinquency. Of the boys living in high-SES neighborhoods, 2.9% were petitioned for a seriously delinquent crime, whereas 9.9% of those in low-SES neighborhoods were petitioned ($\chi^2 = 6.67, p < .01$). In conclusion, adolescent males residing in high-SES neighborhoods are significantly less likely than their counterparts in low-SES neighborhoods to engage in serious and violent delin-

quency, regardless of how this behavior is indexed. The remainder of the analyses focus on the prediction of repeated violence as reported by the youths and their teachers.

Bivariate Relations Between Risk Factors and Repeated Violence in High- Compared to Low-SES Neighborhoods

The bivariate relations between various demographic, individual, family, and peer factors and repeated violence in high- and low-SES neighborhoods are shown in Table IV. Odds ratios corresponding to continuous predictor variables represent the change in risk for repeated violence associated with a one standard deviation increase in the predictor. Because of the high number of statistical tests, only effects that are significant, using a maximum alpha-level of .01, are flagged in the table and described in the text. The following sections summarize the results by domain.

Table IV. Bivariate Predictors of Repeated Violence by Neighborhood SES

Domains and risk factors	Neighborhood SES			
	High ^a		Low ^b	
	OR	(95% CI)	OR	(95% CI)
Demographic				
Age/Older	0.97	(0.46, 2.06)	1.88**	(1.24, 2.84)
Race/Ethnicity ^c	2.14	(0.69, 6.63)	1.92	(0.74, 5.04)
Single parent status ^c	1.00	(0.35, 2.89)	1.41	(0.71, 2.84)
Family SES	0.94	(0.90, 0.97)	0.74	(0.72, 0.76)
Individual				
Physical aggression	3.09***	(2.09, 4.56)	1.49	(1.22, 1.82)
HIA problems	4.68**	(3.40, 6.44)	1.61**	(1.43, 1.81)
Low academic achievement	1.75	(0.79, 3.89)	1.47	(0.85, 2.54)
Low school motivation	2.03	(1.37, 3.02)	1.98***	(1.53, 2.56)
Pos. attitude to problem beh.	2.19**	(1.97, 2.44)	1.89***	(1.77, 2.03)
Lack of guilt	2.33**	(1.74, 3.12)	1.80***	(1.53, 2.12)
Had sex ^c	3.70**	(1.26, 10.88)	5.69***	(2.47, 13.12)
Carried hidden weapon ^c	2.42	(0.82, 7.13)	3.77***	(1.83, 7.78)
Family				
Low communication	1.16	(1.09, 1.22)	1.72**	(1.66, 1.79)
Boy not involved	1.72	(1.30, 2.28)	1.56**	(1.32, 1.86)
Discipline not persistent	1.10	(0.75, 1.62)	1.05	(0.86, 1.28)
Poor supervision	0.90	(0.58, 1.39)	1.43**	(1.17, 1.73)
Peer				
Peer delinquency ^c	4.43**	(1.42, 13.81)	2.94**	(1.48, 5.85)
Nonconventional peers	0.80	(0.73, 0.88)	1.03	(0.97, 1.10)
Bad friends	1.41	(1.06, 1.86)	1.58**	(1.32, 1.88)

Note. Pos. – Positive; beh. – behavior. All odds ratios corresponding to continuous variables represent change in risk associated with a 1 SD change in the predictor.

^a*n* = 159.

^b*n* = 261.

^cDichotomous variables.

** *p* < .01. *** *p* < .001, two-tailed.

Demographic Risk Factors

None of the demographic risk factors, including the adolescent's age, his ethnicity, single parent status and family SES, predicted repeated violence among the adolescents in either type of neighborhoods. However, being older than one's peers in the seventh grade raised risk for later repeated violence among those in low-SES neighborhoods.

Individual Risk Factors

HIA problems, positive attitude toward problem behavior, lack of guilt, and early intercourse raised risk for later repeated violence among adolescents in both neighborhood types. However, HIA problems were much more strongly related to later repeated violence among those in high- compared to low-SES neighborhoods (ORs = 4.68 vs. 1.61) and early sexual intercourse more strongly related to later repeated violence among those in low- compared to high-SES neighborhoods (ORs = 5.69 vs. 3.70). Among adolescents in high-SES neighborhoods only, physical aggression increased risk for later repeated violence. Low school motivation and having carried a hidden weapon increased risk for later violence among adolescents in low-SES neighborhoods only.

Family and Peer Risk Factors

None of the family risk factors predicted repeated violence among adolescents in both neighborhood SES

types. Poor parent-adolescent communication, low adolescent involvement in family activities, and low supervision significantly increased risk for later repeated violence among adolescents in low-SES neighborhoods only. Peer delinquency was the only peer risk factor that increased risk for repeated violence regardless of neighborhood SES type. Parent's perceptions of negative peer influence increased risk for later repeated violence in low-SES neighborhoods.

Multivariate Relations Between Risk Factors and Repeated Violence in High- and Low-SES Neighborhoods

The next set of analyses addressed the combination of risks that best predicted repeated violence among those in high- versus low-SES neighborhoods. Collinearity among the risk factors was not a problem, that is, all correlations between predictors were below .57 and 95% were below .40. Both multivariate logistic regression models were generated using a forward stepwise (maximum likelihood) estimation procedure. First, all variables that were significantly related to repeated violence ($p < .05$) in the bivariate analyses were included in four within-domain models (i.e., demographic, individual, family, and peer). Next, the variables that significantly predicted repeated violence in the within-domain models were entered into one model. The results reported in Table V correspond to the final best-fitting models for the multivariate analyses.

After accounting for the substantial effect of physical aggression by age 13.5, no additional risk variables

Table V. Multiple Logistic Regression Coefficients Estimating the Effects of Individual and Family Factors on Repeated Violence

Risk factor	Neighborhood SES					
	High ^a			Low ^b		
	<i>B</i>	<i>SE</i>	OR	<i>B</i>	<i>SE</i>	OR
Physical aggression	0.67***	.20	3.09			
Lack of guilt				0.22**	.09	1.53
Had sex				1.37**	.45	3.94
Carried a hidden weapon				0.92**	.40	2.50
Poor parent-adolescent communication				0.05**	.02	1.57
Intercept	-2.48	.34		-2.89	.41	
Model χ^2	13.93***			40.11***		
R^2_L	16.35			20.79		
Area under ROC curve	0.75			0.79		

Note. OR – Odds ratio; All odds ratios corresponding to continuous predictor variables represent the change in risk for committing repeated violent delinquency associated with a 1 SD change in the predictor.

^a $n = 156$.

^b $n = 251$.

** $p < .01$. *** $p < .001$, two-tailed.

were predictive of later violence among boys in high-SES neighborhoods. The best multivariate predictors of repeated violence among adolescents in low-SES neighborhoods were early sexual intercourse, lack of guilt, poor parent-adolescent communication, and having carried a hidden weapon by the age of 13.5. Figure 1 illustrates the higher predictive power of early adolescent physical aggression in high-SES neighborhoods and the higher predictive power of parent-adolescent communication in low-SES neighborhoods. Adolescents above the medians for physical aggression and parent-adolescent communication were considered to have high physical aggression and poor communication with their parents and those below the medians were considered to have low physical aggression and good communication.

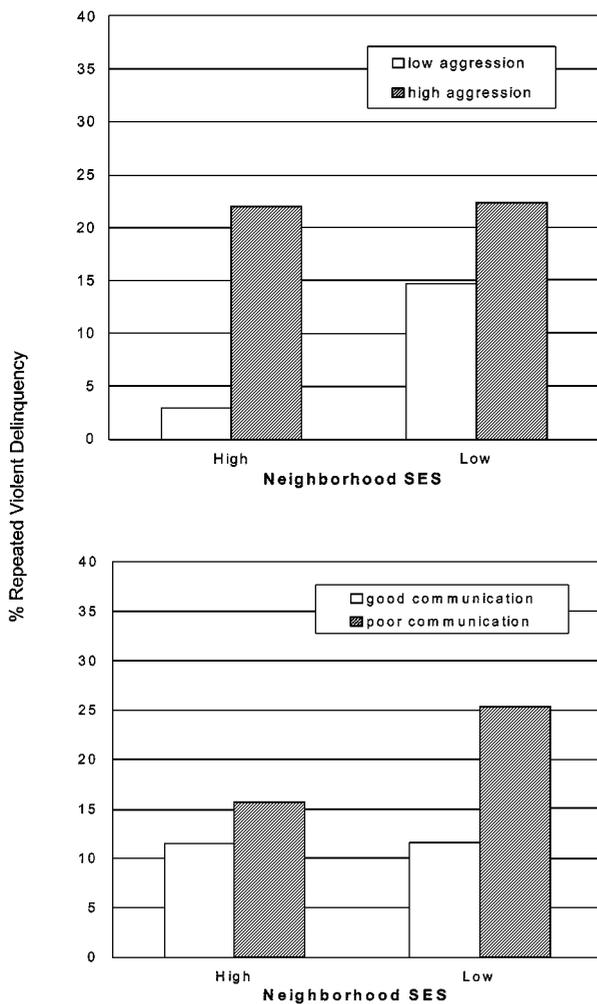


Fig. 1. Effects of early adolescent physical aggression and parent-adolescent communication on later repeated violence by neighborhood SES.

The goodness-of-fit of the multivariate models was evaluated by calculating R_L^2 , an analogue to the linear regression R^2 , which indicates the proportion of the log likelihood reduced by the inclusion of the independent variables in the model (Hosner & Lemeshow, 1989; Menard, 1995). According to this index, the high-SES model explained slightly less of the variance in violence than did the low-SES model ($R_L^2 = 16.35$ and 20.79 , respectively). The predictive utility of each of the models was assessed by calculating the area under the ROC (receiver operating characteristic) curve for each model. The area under the ROC curve reflects the utility of a continuous score for predicting a dichotomous outcome, taking into account sensitivity and specificity. In this case, the predicted probabilities of committing repeated violence estimated using each of three models was the continuous “score” being evaluated. The area under the ROC curve ranges from .50 to 1.00, with an area of .50 corresponding to prediction based on chance and an area of 1.00 corresponding to perfect prediction. The areas under the ROC for the high- and low-SES neighborhood models were similar (.75 and .79, respectively). In summary, both models fit the data well and demonstrated high predictive utility, with the low-SES model performing slightly better.

To summarize, the results suggest that among adolescents in high-SES neighborhoods, problem behaviors at age 13.5 that may be biologically based, such as physical aggression and hyperactivity, impulsivity, and inattention, are associated with an increased risk for later repeated violence, whereas among adolescents in low-SES neighborhoods, risks that may be thought of as context-dependent, such as early intercourse and carrying a hidden weapon, as well as family factors, are associated with an increased risk for later repeated violence. Finally, attitudinal problems and peer influences at age 13.5 appear to be associated with increased risk for later violence regardless of neighborhood type.

DISCUSSION

Psychology and criminology researchers have made substantial progress in understanding individual-level crime and delinquency by considering an individual’s community context (e.g., Sampson et al., 1997; Sampson & Groves, 1989; Wikström, 1998); however, little is known about what predicts serious delinquency in more advantaged neighborhoods. To begin addressing this gap in the literature, this study investigated differences in the prevalence and prediction of serious and violent delinquency among male adolescents reared in more and less advantaged neighborhoods. We found some similarities

across neighborhood contexts in the prediction of repeated violence; however, we also found some interesting differences.

Before discussing the results of this study, we acknowledge that they must be interpreted in light of several limitations. First, the census-based variables that were used to index neighborhood disadvantage enabled us to link structural aspects of neighborhoods to predictors of adolescent violence. However, because we did not include direct measures of the community processes that have been linked theoretically to such outcomes, we cannot comment on mechanisms (Furstenberg & Hughes, 1997; see Wikström, 1998, for discussion of possible mechanisms). Second, exploratory investigations such as this inflate the probability of making Type I errors (finding spurious effects), and therefore the interpretation of effects must be done with caution. Third, the lower number of adolescents in high-SES neighborhoods ($n = 159$) than in low-SES neighborhoods ($n = 261$) in our sample means that we had less power to detect effects on repeated violence among adolescents in high-SES neighborhoods. Therefore, between-neighborhood comparisons in the strength of particular bivariate relations should be interpreted with caution.⁵ Lastly, although we found evidence that predictors of repeated violence may differ by level of neighborhood disadvantage, the predictors included in the models did not explain a large proportion of the variance in repeated violence among adolescents in our sample. It may be the case that the same unmeasured variables are related to repeated violence in both types of neighborhoods, providing support for a common mechanism involved in the development of delinquency across different types of neighborhoods (see Sampson et al., 1997). Or it may be the case that different additional variables in each kind of neighborhood would improve prediction. Despite these limitations, this study has important implications for theory and development of effective interventions.

Is a Neighborhood-Specific Theory of Violent Delinquency Needed?

Consistent with other studies of the relation between neighborhood and delinquency rates (e.g., Sampson et al., 1997), this study indicates that adolescent boys living in high-SES neighborhoods are less likely to commit acts of

violent delinquency than their counterparts in low-SES neighborhoods. Adolescents living in high-SES neighborhoods are significantly less likely to commit violent delinquency between the ages 13.5 and 19.5, and they are significantly less likely to be charged with a violent crime. It is important to note, however, that even in neighborhoods where there are relatively lower levels of disadvantage, a substantial proportion of adolescent boys reported committing violence across more than one measurement occasion. Thus, living in a more advantaged neighborhood is not a safeguard for repeated violence.

A difference between neighborhood types in rates of violent delinquency in itself, however, does not require different (neighborhood-specific) theories for violent delinquency. For that, variations across settings in the predictive power of risk factors would constitute better reasons. According to the bivariate results, there were several risk factors that significantly predicted repeated violence regardless of neighborhood SES, namely HIA problems, having a positive attitude toward problem behavior, lack of guilt, early intercourse, and peer delinquency. However, HIA problems predicted later violence much more strongly among adolescents in high-SES neighborhoods than among those in low-SES neighborhoods, and early intercourse predicted later violence more strongly in low-SES than in high-SES neighborhoods. Moreover, when considering the bivariate and multivariate results together, we see that in general, risks that may be biologically based were stronger predictors of repeated violence among those in high-SES neighborhoods, whereas process-oriented and context-dependent risks were stronger predictors among those in low-SES neighborhoods.

Prior research has shown that genetic influences play a larger role than environmental influences in physical aggression in male youth (Eley et al., 1999) and hyperactivity (Silberg et al., 1996). Consistent with the bioecological model formulated by Bronfenbrenner and colleagues (Bronfenbrenner & Ceci, 1994; Bronfenbrenner & Morris, 1998), among those reared in high-SES neighborhoods, physical aggression exhibited up until early adolescence was the strongest predictor of later repeated violence, followed by HIA problems. In contrast, among those reared in low-SES neighborhoods, predictors reflecting disrupted family processes, such as poor parent-adolescent communication, and predictors that may be seen as context-dependent, such as carrying a hidden weapon, were stronger risks for later repeated violence. Also in line with this pattern is the finding that early heterosexual intercourse (before age 13.5) was one of the strongest predictors of violence among adolescents in low-SES neighborhoods. Paikoff (1995) has suggested that early intercourse is a function of low parental supervision and that

⁵To increase our confidence in interpretations of between-neighborhood comparisons in the predictiveness of particular risk factors, supplementary analyses were run on a random selection of 159 participants in low-SES neighborhoods. As would be expected, fewer effects were statistically significant in these analyses, and a couple of different additional effects were found; however, the general pattern of results was the same.

supervision is particularly challenging in disadvantaged, urban neighborhoods where parents are more often highly stressed and lacking support. As Rowe et al. (1999) suggested, it appears that “a greater genetic effect is required for the expression of aggression in more benign environments” (p. 280), whereas in more disadvantaged neighborhoods disrupted family processes and context-dependent risks may promote aggressive behavior even among individuals without a genetic predisposition.

In conclusion, although we found some similarities across neighborhood type in the prediction of repeated violence, the results also provide some support for a differential theory of violent delinquency. The implications, however, must be interpreted in light of the following question: Is there enough consistent evidence of such differences to sacrifice the parsimony of having one theory of violent delinquency? We believe that replication of these findings, as well as research that tests explicitly competing theories about process, are warranted before there is enough evidence to sacrifice the parsimony of a single theory of violent delinquency.

A better alternative may be a theory that accounts for both common and different risks across settings; that is, one that accounts for risk relations not affected by neighborhood context as well as risk relations affected by neighborhood context. An alternative theory of violent delinquency should take into account how particular aspects of neighborhoods (e.g., the use of neighborhood space, the extent of friendship ties among neighbors) may moderate the relation between family factors and violent outcomes, as well as how particular child- and family-level risk factors may mediate relations between neighborhood factors and violent outcomes. Lastly, an alternative theory may also account for relations of particular competencies or protective factors to violent delinquency in each setting (Wikström & Loeber, 2000).

Implications for Intervention

Theories are not just explanatory networks of, in this case, violence in different settings; they have the potential to inform about where and when to intervene to prevent or reduce violence (Loeber & Farrington, 1998). What are the suggested targets for intervention in this study? In both settings, having positive attitudes toward problem behavior, lack of guilt, and peer delinquency were important. We are not aware of effective programs to change deviant attitudes. However, parents can be taught that evidence of deviant attitudes, such as expressed admiration for someone who started a fistfight at school or lack of contrition for antisocial behavior, are warning signs for possible later violence, and therefore, worthy of addressing

through communication with the adolescent or appropriate disciplinary action. Increased parent–adolescent communication, which has been linked to increased parental monitoring (Kerr & Stattin, 2000), may also decrease association with deviant peers, thus suggesting that family-based interventions for adolescents may be indicated. Association with delinquent peers has been addressed indirectly in primary prevention programs by including social skills or conflict resolution components or both (e.g., Bosworth, Espelage, DuBay, Dahlberg, & Daytner, 1996), which theoretically reduce the likelihood of befriending antisocial peers.

The patterns of risk factors that appear specific to each setting suggest that different treatment components may be indicated for different populations. For example, physical aggression was the strongest predictor of repeated violence in high-SES neighborhoods only. Such emphasis on aggression is not new (Lipsey & Derzon, 1998; Loeber & Dishion, 1983), and has been successfully applied in many different forms of interventions (Wasserman & Miller, 1998). The current findings do, however, highlight the particular importance of addressing early physical aggression exhibited by those reared in high-SES neighborhoods, as this may reflect greater genetic potential for aggression and a higher risk for later violence.

Early sexual intercourse emerged as the strongest risk factor for later repeated violence among adolescents in low-SES neighborhoods. This finding is of particular concern because of the high prevalence of intercourse before age 13.5 in this part of the sample (44%). The relation between early intercourse and low parental supervision⁶ (Paikoff, 1995), and the findings that several family factors, particularly parent–adolescent communication, were identified as significant risks for later repeated violence among those in low-SES neighborhoods, indicate that family-based programs enhancing parent–adolescent relations and parental monitoring and supervision skills may be particularly important with this population.

Future Research and Conclusions

The most important aspect of this study may be that it draws attention to repeated violence committed by male adolescents in relatively advantaged neighborhoods. Although there is evidence that violence among youth in advantaged neighborhoods may be more biologically based than violence among youth in disadvantaged

⁶In this sample, adolescents whose parents reported lower levels of supervision were at significantly higher risk for early sexual intercourse (OR = 1.26, $p < .001$)

neighborhoods, the expression of such aggression is not inevitable. It would be of great benefit for future research to identify stressors that may be specific to raising children and being an adolescent in advantaged neighborhoods, as well as delinquent outcomes that may be more prevalent among advantaged youth. In sum, future research should address serious and violent delinquency in this population, as it is apparent that growing up in a relatively advantaged neighborhood is not a safeguard against becoming seriously violent in adolescence.

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