

Perceived School and Neighborhood Safety, Neighborhood Violence and Academic Achievement in Urban School Children

A. J. Milam · C. D. M. Furr-Holden · P. J. Leaf

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Abstract Community and school violence continue to be a major public health problem, especially among urban children and adolescents. Little research has focused on the effect of school safety and neighborhood violence on academic performance. This study examines the effect of the school and neighborhood climate on academic achievement among a population of 3rd–5th grade students in an urban public school system. Community and school safety were assessed using the School Climate Survey, an annual City-wide assessment of student's perception of school and community safety. Community violence was measured using the Neighborhood Inventory for Environmental Typology, an objective observational assessment of neighborhood characteristics. Academic achievement was measured using the Maryland State Assessment (MSA), a standardized exam given to all Maryland 3rd–8th graders. School Climate Data and MSA data were aggregated by school and grade. Objective assessments of neighborhood environment and students' self-reported school and neighborhood safety were both strongly associated with academic performance. Increasing neighborhood violence was associated with statistically significant decreases from 4.2 to 8.7% in math and reading achievement; increasing perceived safety was associated with significant increases in achievement from 16 to 22%. These preliminary findings highlight the adverse impact of perceived safety and community violence exposure on primary school children's academic performance.

Keywords Environment · Neighborhood · Violence · Academic performance

A. J. Milam (✉) · C. D. M. Furr-Holden · P. J. Leaf
Department of Mental Health, Johns Hopkins University Bloomberg School of Public Health,
624 N. Broadway, 8th floor, Baltimore, MD 21205, USA
e-mail: amilam@jhsph.edu

C. D. M. Furr-Holden
e-mail: dholden@jhsph.edu

Introduction

Childhood exposure to violence continues to be a major public health problem that has implications relating to crime, physical and mental health problems during adolescence and later adulthood (Eitle and Turner 2002; Gorman-Smith and Tolan 1998; Jenkins and Bell 1994; Scheier et al. 1999; Wright et al. 2004). Youth in urban locales are not only exposed to violence through media; they are exposed to community violence and school violence. (Buka et al. 2001; Selner-O'Hagan et al. 1998; Schwab-Stone et al. 1995).

While research has focused on the effects of community violence on youth outcomes in adolescence or adulthood, little work has focused on the effect community violence and perceived safety on academics and school performance (Bowen and Bowen 1999). The studies that have focused on the effect of violence on school performance and academics have used subjective, self-report measures of violence exposures (Bowen and Bowen 1999; Coley and Hoffman 1996; Jenkins and Bell 1994). However, Coley and Hoffman (1996) used a sample of 3rd and 4th graders from a midwestern city to assess whether community violence moderated the relationship between parental supervision and childhood behavior and language acquisition. These researchers used objective measures of crime and found that community violence did moderate the relationship between parental supervision, language acquisition, and behavior.

Bowen and Bowen (1999) noted that research utilizing objective measures of neighborhood violence are lacking. Furr-Holden et al. (2008) developed the Neighborhood Inventory for Environmental Typology (NifETy) Method to objectively measure neighborhood-level exposure to violence, alcohol, and other drugs and its relationship to youth outcomes. The NifETy Method utilizes an observational approach implemented by trained field assessors to provide objective environmental data on indicators of violence, alcohol and other drugs in the built and social environment (Furr-Holden et al. 2008).

This study will utilize data obtained from the NifETy Method, child self-report data related to students' sense of safety, and standardized test scores to better understand the relationship between perceived community and school safety, neighborhood violence and school performance in 3rd–5th graders in a mid-Atlantic urban school system.

Methods

Objective environmental assessments of neighborhood violence were obtained using data from the NifETy Method. Data on perceived school and community safety were obtained from the Baltimore City Public School System's (BCPSS) annual School Climate Survey (SCS), which is given annually to students, parents, and staff. Academic performance is assessed using the Maryland School Assessment (MSA), a test of reading and math competency. The BCPSS is predominantly African–American (87.8%) and approximately 84% of all students receive free or reduced price lunch.

Neighborhood Violence Exposure: The NifETy Method

The Neighborhood Inventory of Environmental Typology (NifETy) instrument provides neighborhood-level assessments of violence, alcohol, and other drugs (VAOD). The NifETy instrument includes 172 items operationalized within seven domains: physical layout, structures on the block, dwelling type, youth and adult activity, physical order and disorder, social order and disorder, and the presence of VAOD indicators (e.g. presence of alcohol bottles, obvious signs of drug selling, people fighting, etc.)

The NifETy assessments were conducted in the Summer 2005 by trained two-person team field raters who entered the environmental observations into handheld electronic devices independently. Environmental data were collected on a random selection of residential block faces within each of the 242 residential neighborhoods in Baltimore City, resulting in a total of 447 sampled residential block faces. For a more detailed description of the NifETy Instrument see Furr-Holden et al. (2008).

A neighborhood violence risk score measuring violence was created using seven variables from the NifETy instrument: blood in the street, the presence of shell casings, police tape, memorials, people yelling, people swearing, and people fighting. Each variable was binary and contributed equally to the total risk score.

Perceived School and Neighborhood Safety: The School Climate Survey

The Baltimore City Public School System (BCPSS) began conducting the School Climate Survey annually in the 2004–2005 school years. The survey assesses perceptions of safety in school, in the area surrounding the school, as well as perceived substance use among school peers. The survey also assesses the learning environment, educational values, school physical environment, school resources, and family involvement. Surveys are administered annually to parents, staff, and students at every public school. For this study, student responses to 6 perceived safety items, rated on a 5-point Likert scale, were used as primary predictors. The mean responses to each item were computed by grade for each elementary school using data from the 2005–2006 school years. 116 Baltimore City Public Elementary Schools were included in this study. One school only included data on 5th graders; two schools did not have any data on fifth graders, and one school did not have any data on 3rd graders. The sample size for each grade is included in Table 1. The included SCS items and their means are listed in Table One.

Academic Achievement: The Maryland School Assessment (MSA)

The Maryland School Assessment is a standardized test administered annually to 3rd–8th grade students in Maryland. The MSA includes two tests, one to assess achievement in mathematics and one to assess achievement in reading. The assessment fulfills the testing requirements of the Federal No Child Left Behind Act. The percentage of students at each school who scored proficient or advanced on

Table 1 Descriptive statistics of safety perceptions, community violence, and academic achievement

	School grade		
	3rd (<i>n</i> = 113)	4th (<i>n</i> = 115)	5th (<i>n</i> = 114)
I feel safe at school ^a	3.04	2.92	2.87
I feel safe going to and from school ^a	2.86	2.87	2.87
Student drug/alcohol abuse is a problem ^a	1.80	1.69	1.59
Student possession of weapons is a problem	1.97	1.91	1.75
A lot of broken windows, doors, or desks at this school ^a	1.85	1.76	1.79
Fighting among students is a problem at this school ^a	2.59	2.58	2.50
MSA reading -percent proficient/advanced	65.57	65.25	59.97
MSA Math-percent proficient/advanced	61.22	62.19	53.57
Free and reduced price lunch	82.14	83.56	83.84
Community violence risk score	0.37	0.37	0.35

^a Responses obtained from the School Climate Survey

the math and reading MSA in the 2005–2006 school years is used as the measure of academic achievement in this study.

Spatial Analysis

All spatial analyses were conducted using ArcGIS 9 (ArcMap 9.2). The 447 randomly selected block faces assessed using the NIFeTy instrument were mapped with their corresponding risk score. Similarly, the elementary schools were added as a separate map layer. Using a spatial join (a tool used to append data from one map layer to another map layer using geographic location), the NIFeTy block faces and schools were joined with a neighborhood map layer. An aggregated neighborhood violence risk score was created by taking the mean risk score of the NIFeTy block faces in the respective neighborhood. The elementary schools were assigned a risk score based on the neighborhood in which they were located. A total of 116 schools were mapped in 95 neighborhoods. Figure One displays a map of the elementary schools and neighborhoods based on their mean risk score (Fig. 1).

Statistical Analysis

SPSS 17.0 was used for multivariate statistical analyses. Linear regression models were used to estimate the relationship between perceived school and neighborhood safety and academic achievement. Each school was treated as a case. Linear regression models were also used to estimate the relationship between neighborhood violence and school achievement, controlling for students' self-report of safety going to and from school and the percent of students receiving free and reduced price lunch (as a proxy for poverty). Analyses were run separately for each grade due to the considerable variation in academic achievement in the same school by grade. For example, in one school, 17% of 5th graders scored average/proficient on

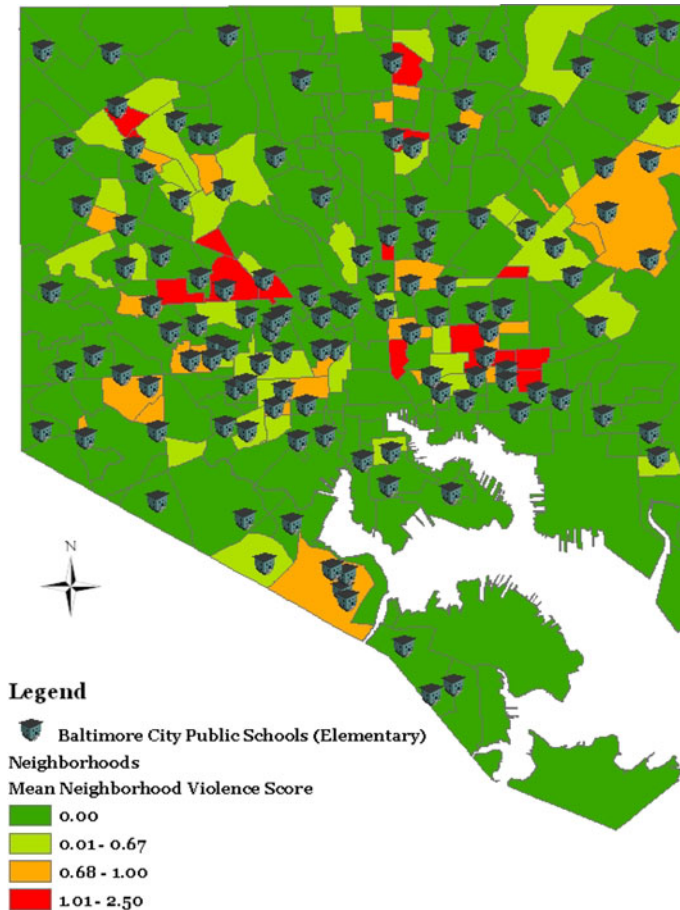


Fig. 1 Baltimore city public schools and neighborhood violence

the math MSA compared to 45% of 3rd graders. In addition to the variation in academic achievement, there are developmental differences by grade which would be lost by aggregating data to the school level.

Results

The percentage of 3rd–5th grade students performing at the proficient or advanced levels on the MSA in Baltimore City is below the state average. In the 2005–2006 school year 60% of BCPSS 3rd graders performed at the proficient or advanced levels on the MSA; fewer did so in 5th grade (~52%). Fifth grade students had lower agreement with feeling safe in the school compared to 3rd and 4th graders. All other survey measures were similar by grade. Neighborhood violence was slightly lower among 5th graders due to a higher proportion of fifth graders in

schools within lower violence neighborhoods. Descriptive statistics are provided in Table 1.

Linear Regression Models

Perceived School and Neighborhood Safety

Table 2 presents the results from the linear regression models using youth self-reported perceived safety from the School Climate Survey. Students' report of sense of safety within the school was associated with academic achievement on the reading and math MSA for each grade. The coefficients for these regressions ranged from 15.4 to 22.8%. Schools with higher self-reported safety going to and from school had a higher percentage of students passing the reading and math MSA. Student reports that there were a lot of broken windows, desks, and doors had lower academic achievement (β : -11.0% to -21.1%). Students reporting that weapon possession, drug and alcohol abuse were problems at their school performed worse on reading and math assessments. After controlling for the percent of students receiving free and reduced price lunch there were still strong associations between school climate and academic achievement with a few noteworthy exceptions. Self-reported safety on the walk to school was no longer associated with fifth grade math or reading MSA and became marginally significant (i.e. $p < 0.10$) among 3rd graders for both math and reading MSA after adjusting for poverty ($p = 0.057$ and $p = 0.060$, respectively). The school climate item: There are a lot of broken windows, desks, and doors became marginally significant for 4th grade math MSA ($p = 0.062$) and non-significant for 3rd grade math MSA in the adjusted model.

Observational Assessment of Neighborhood Violence

Table 3 presents the results of the linear regression models using the risk score from the NifETY instrument. Schools in neighborhoods with higher violence ratings consistently showed a decrease on MSA performance; each unit increase in the violence risk score was associated with a 4.2% decrease in the percentage of 3rd grade students performing proficient or advanced on the reading MSA ($\beta = -4.2$, $p = 0.111$). Among 4th graders MSA reading performance decreased by 4.6% ($p = 0.070$), the greatest decrease (-8.7%) was seen among 5th graders ($\beta = -8.7$, $p < 0.001$). The SCS item "I feel safe going to and from school," a proxy for neighborhood safety, and the percentage of students receiving free or reduced price lunch were added to the adjusted linear regression models. After controlling for these variables, the violence risk score was only associated with reading achievement for 5th graders and marginally associated with math achievement among 5th graders.

Discussion

Youth perceived safety in school and on the way to school was associated with academic achievement among 3rd–5th graders in an urban public school system

Table 2 Results of linear regression analysis of school climate and academic achievement by grade

Grade	School climate question	Academic Achievement							
		Reading MSA				Math MSA			
		Unadjusted		Adjusted*		Unadjusted		Adjusted*	
		β	<i>p</i> -value	β	<i>p</i> -value	β	<i>p</i> -value	β	<i>p</i> -value
3rd	I feel safe at school	19.9	<0.001	16.4	<0.001	21.9	<0.001	18.7	<0.001
	I feel safe going to and from school	13.4	0.005	9.1	0.057	14.0	0.007	9.8	0.060
	Student drug/alcohol abuse is a problem	-9.1	<0.001	-8.7	<0.001	-8.8	<0.001	-8.4	<0.001
	Student possession of weapons is a problem	-8.8	<0.001	-8.1	<0.001	-8.7	<0.001	-8.1	<0.001
	A lot of broken windows, doors, or desks at this school	-16.1	0.001	-13.4	0.005	-11.0	0.046	-8.3	0.124
	Fighting among students is a problem at this school	-11.9	<0.001	-10.5	<0.001	-11.6	<0.001	-10.2	<0.001
4th	I feel safe at school	15.4	<0.001	13.5	<0.001	19.5	<0.001	17.9	<0.001
	I feel safe going to and from school	10.8	0.010	7.9	0.041	15.6	0.04	13.2	0.012
	Student drug/alcohol abuse is a problem	-13.7	<0.001	-12.5	<0.001	-16.0	<0.001	-14.9	<0.001
	Student possession of weapons is a problem	-13.9	<0.001	-12.2	<0.001	-16.5	<0.001	-15.1	<0.001
	A lot of broken windows, doors, or desks at this school	-14.1	0.002	-10.7	0.012	-14.0	0.02	-11.0	0.062
	Fighting among students is a problem at this school	-14.5	<0.001	-13.3	<0.001	-16.6	<0.001	-15.6	<0.001
5th	I feel safe at school	16.7	<0.001	14.3	<0.001	22.8	<0.001	21.3	<0.001
	I feel safe going to and from school	15.6	0.003	6.2	0.234	16.7	0.015	11.0	0.133
	Student drug/alcohol abuse is a problem	-12.9	<0.001	-11.3	<0.001	-18.2	<0.001	-17.1	<0.001
	Student possession of weapons is a problem	-11.9	<0.001	-10.2	<0.001	-15.8	<0.001	-14.7	<0.001
	A lot of broken windows, doors, or desks at this school	-19.4	<0.001	-16.2	<0.001	-21.1	<0.001	-19.0	0.001
	Fighting among students is a problem at this school	-13.3	<0.001	-9.8	0.001	-19.5	<0.001	-17.7	<0.001

*Adjusted for percent of students receiving free and reduced price meals

even after controlling for poverty. Observational assessments of neighborhood violence exposure were also associated with decreased academic achievement in the unadjusted model. After controlling for potential confounders (self-reported safety

Table 3 Results of linear regression analysis of neighborhood violence and academic performance

	Reading MSA				Math MSA			
	β	<i>p</i> -value	Adjusted* β	<i>p</i> -value	β	<i>p</i> -value	Adjusted* β	<i>p</i> -value
Violence Risk Score								
3rd graders	−4.2	0.111	−2.2	0.387	−4.9	0.086	−3.0	0.284
4th graders	−4.6	0.070	−2.5	0.280	−6.8	0.038	−5.1	0.101
5th graders	−8.7	>0.001	−6.2	0.006	−7.5	0.021	−5.7	0.077

* Adjusted for climate school survey item, “I feel safe going to and from school” and percent of students receiving free and reduced meals

walking to and from school and percent of students receiving free and reduced price lunch), neighborhood violence was no longer associated with academic achievement. This finding suggests that poverty may be a more important predictor of academic achievement than neighborhood violence. These findings are consistent with previous research that examined the relationship between violence, fear, and academic performance (Bowen and Bowen 1999). We suspect that when students are fearful and constantly worried about their safety, focus on academics is compromised. This theory would be consistent ecologically with the data from Baltimore City, which has the highest homicide rate in the state and the lowest academic performance in the state. Similarly, neighborhood violence may simply be a proxy for neighborhood disadvantage or poverty.

Limitations

A few limitations of this research merit mention before further discussion of these results. The student response rate on the BCPSS School Climate survey is 87%. The response rate for parents is even lower (~31.4%), as the parental surveys are sent home while students complete the survey in school, therefore parental reports are not included in this study. Second, this study relies on youth self-report of perceived safety and we have no data on non-responders and are unable to gauge if they are more or less likely to feel unsafe on the walk to school. This limitation is mitigated by the use of an objective measure of the environment which also showed a strong association with school performance. Third, this study uses mean school scores of perceived safety versus individual student reports. This approach was used because the school climate study data is collected anonymously and cannot be linked to individual student reports. In the current analysis, the school means for students fear on the walk to school and their fear in school were strongly correlated and no significant differences between their occurrences were detected. Future investigations will explore the relationship between violence exposure, perceived safety, poverty, and academic performance at an individual-level by surveying a subsample of children using the SCS and linking those individual students reports with academic performance. This will allow us to test whether there is an interaction between students fear on the walk to school and their fear in school, subsequent

academic performance and the mediating or moderating role of neighborhood environment. It will also allow us to control for individual measures of poverty. Lastly, mean violence scores were used to assess neighborhood violence. This raises two main concerns, all neighborhoods are not homogenous, but this analysis treats the neighborhood as a homogenous environment. The second concern is the possible confounding effect of the neighborhood. The factors that generate neighborhood violence may be the same factors that account for poor academic achievement (Garbarino and Kostelny 1997). While this study uses a proxy for poverty other factors such as abuse, neglect, unemployment, and lack of social support are not available and thus not controlled for in this study.

Strengths of the Study

Despite these limitations, this investigation has two major strengths. First, it used a self-report measure of safety and violence exposure, coupled with an objective measure of the neighborhood environment to assess the relationship between violence exposure and academic achievement. Second, this investigation showed that exposure to violence in elementary school has an adverse impact on academic achievement. This study also highlighted the importance of students' sense of safety on the walk to school and found that the relationship between neighborhood violence and academic achievement was confounded by neighborhood poverty; hence the school system may have a stake in improving the neighboring community (e.g. decreasing violence exposure, improving employment, etc.) as a means of improving student performance in school. This work is a first step in better understanding how perceived safety and violence exposure affects academic achievement.

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