IESP

Too Scared to Learn?

The Academic Consequences of Feeling Unsafe at School

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Johanna Lacoe
Price School of Public Policy
University of Southern California

NYU Steinhardt
Steinhardt School of Culture, Education, and Human Development

NYU Wagner
Robert F. Wagner Graduate School of Public Service

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ABSTRACT

A safe environment is a prerequisite for productive learning. This paper represents the first large-scale analysis of how feelings of safety at school affect educational outcomes. Using a unique longitudinal dataset of survey responses from New York City middle school students, the paper provides insight into the causal relationship between feelings of safety and academic achievement. The survey data include the reported feelings of safety for more than 340,000 students annually from 2007-2010 in over 700 middle schools. Findings show consistent negative effects of feeling unsafe on test scores. The paper explores the mechanisms through which feeling unsafe in the classroom may impact test scores, and multiple robustness checks support the validity of the causal claim.

Key Words: safety and fear; school environment; academic achievement; middle school

INTRODUCTION

Persistent racial and ethnic gaps in educational achievement have focused policy attention on school climate and safety as important elements of educational performance. In a special issue of *Educational Researcher* focused on safety and order in schools, Cornell and Mayer (2010) argue that school safety and school order are fundamental to studies of the achievement gap, teacher attrition, and student engagement. This paper represents the first large-scale analysis of how feelings of safety at school affect educational outcomes. If minority students feel differentially unsafe at school, school safety may be a primary factor contributing to racial and ethnic achievement gaps.

Academic achievement is a critical step toward future success in adult life, increasing employment and earnings and the probability of other stabilizing life events such as marriage. Studies show that early childhood test scores are positively correlated with future labor market outcomes (Currie and Thomas 1999). Yet, black and Hispanic students consistently underperform on standardized tests compared to white and Asian students (U.S. Department of Education 2004, 2008). These racial gaps persist even as test scores have risen for all students. Gaps in achievement extend to college enrollment and completion rates and as a result, white students are more than twice as likely to earn a bachelor's degree as black students (Western 2006). Educational gaps translate into differences in wealth accumulation over the life-course, differing rates of marriage (Schneider 2011), and disparities in future health outcomes (Freudenberg and Ruglis 2007; Fiscella and Kitzman 2009). Lower educational attainment is associated with an increased probability of arrest and incarceration: the risk of imprisonment is five times greater for black men with no college degree compared to white men with the same level of education (Lochner and Moretti 2004; Western 2006). Identifying the factors that contribute to these gaps is critical to narrowing disparities in later-life outcomes.

A safe environment is a prerequisite for productive learning (Maslow 1970; Piaget 1936). Feeling unsafe in the classroom may decrease concentration in class and performance on assessments, yet only a few studies have focused on the contribution of feelings of safety to educational achievement. Henrich and colleagues (2004) surveyed a sample of New Haven middle schools students and found that exposure to community violence is related to academic achievement and feelings of safety. However, the authors do not discuss the relationship between feeling unsafe and academic outcomes, and are unable to control for unobserved individual characteristics that might explain both feelings of safety and achievement. In his work on school discipline, Arum (2003) determines that feelings of safety are positively related to both behavioral and academic outcomes. He finds variation in the relationship between safety and academic outcomes by gender, with feelings of safety having larger positive association with test scores for females than males, and larger positive association with behavior (i.e. decreases in fighting) for males than females.

If students feel unsafe at school, one response may be to stay home. Therefore, increased school absences may be the primary path through which feeling unsafe affects academic outcomes. Although many studies assert that missing school affects students negatively, few studies have empirically investigated the impact of being absent on academic achievement. A notable contribution to the literature is Gottfried's (2010) work identifying the relationship between attendance and achievement in elementary and middle schools in Philadelphia. Using detailed student-level data and a school and classroom fixed effects approach, Gottfried finds that attendance and achievement are positively related.

A related body of research investigates the relationship between school and neighborhood crime and disorder that affect achievement. Exposure to neighborhood violence affects students' academic performance and that of their peers (Aizer 2008; Carrell and Hoekstra 2010; Delaney-Black et al. 2002; Gibson, Morris, and Beaver 2009; Ripski and Gregory 2009; Sharkey 2010). Studies relying on student or principal reports find that violence

within schools reduces school attendance, increases misbehavior, and reduces the likelihood of high school graduation and college attendance (Bowen and Bowen 1999; Chen 2007; Grogger 1997). Peer disorder, such as bullying, is negatively related to achievement and is also associated with more serious school violence (Arseneault et al. 2006; Buhs, Ladd, and Herald 2006; Glew et al. 2005; Schwartz, Gorman, Nakamoto and Toblin 2005; Skiba et al. 2004). In fact, these less serious incivilities are stronger predictors of feelings of safety than violent crimes or personal experiences of crime (Mayer 2010; Skiba, Simmons, Peterson, and Ford 2006).

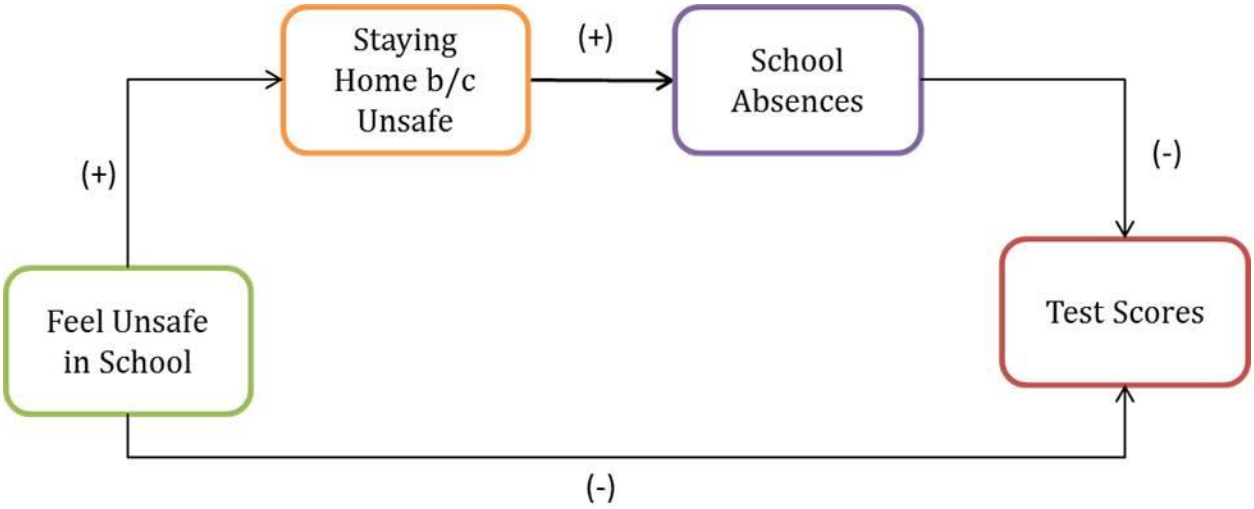
Research about racial and ethnic test score gaps identifies school and neighborhood contexts as sources of differences in test scores, but few studies have been able to adequately measure these contextual factors (Fryer and Levitt 2004). Research in progress provides evidence that black and Hispanic students are more likely to report feeling unsafe at school than white or Asian peers who attend the same schools and share the same classrooms (Author 2012). Factors related to these racial gaps in safety include disciplinary fairness, school disorder, and racial tension. Research has also documented racial disparities in the use of school discipline, with higher rates of office referral, suspension, and expulsion for black students (Skiba et al. 2002), and in perceptions of disciplinary fairness (Arum 2003; Kupchik and Ellis 2008). Racial gaps in discipline may be directly linked to achievement gaps, because suspensions decrease academic performance for black middle and high schools students and contribute to late graduation and dropout (Davis and Jordan 1994; Raffaele Mendez 2003). Differences in disciplinary environments across schools may contribute to racial gaps in achievement, with black high school students achieving higher test scores in schools with more discipline (Arum and Velez 2010). Although there is a growing body of evidence about how exposure to violence and disorder affects students, and about racial and ethnic disparities in school discipline, we know less about the mechanisms that connect these phenomena to academic achievement. Feeling unsafe at school is one way that these factors may affect student performance.

This paper improves upon the previous literature in two important ways. First, I exploit a large, longitudinal data set of information about students, including their feelings of safety and perceptions of violence and disorder at school, linked to administrative academic records. The dataset represents a sample size that is many times larger than previous studies. Second, I provide insight into the causal relationship between feeling unsafe and academic performance through a variety of econometric methods and multiple robustness checks.

PURPOSE AND HYPOTHESES

The central question addressed in this paper is: Does feeling unsafe in the classroom affect student academic performance? Based on Maslow's hierarchy of needs which places safety above only breathing, food, and water (Maslow 1970) and evidence that neighborhood conditions such as community violence affect children's cognitive ability (i.e. Sharkey 2010), I hypothesize that feeling unsafe in the classroom will negatively affect student performance on standardized assessments. There may be both a direct effect of feeling unsafe on test scores, and an indirect effect (see Figure 1). Feeling unsafe in the classroom may directly affect test scores if it inhibits learning or distracts students as they take exams. However, feeling unsafe may also affect academic achievement indirectly through increased absences, if feeling unsafe increases the likelihood that a student stays home out of fear. I test both the direct and indirect effects of reported feelings of safety on test scores to identify whether the impact of feeling unsafe operates solely through increased absences, or whether feeling unsafe exerts a unique effect on achievement in addition to any effect on absences.

Figure 1: Theoretical Relationship between Safety, Absences, and Test Scores



METHOD

Data

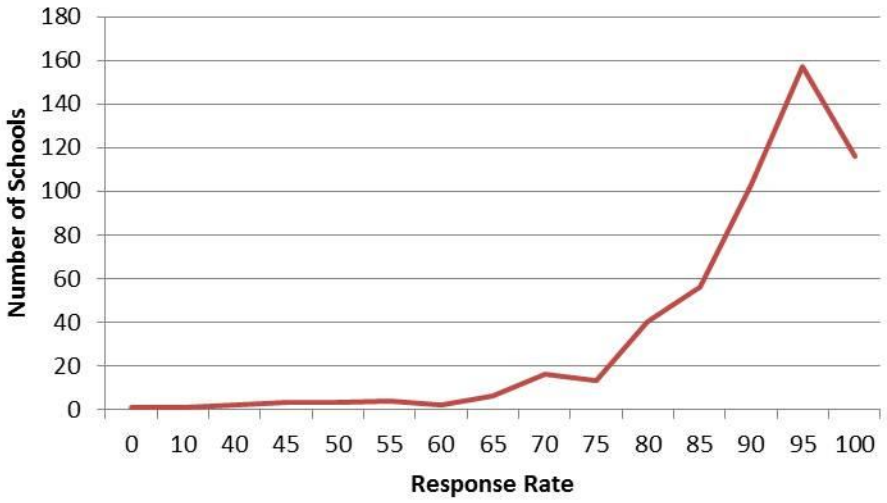
Student surveys are the primary source of information for researchers and policymakers about violence and safety in the nation's schools (Skiba et al. 2006). In 2007, the New York City Department of Education implemented a school environment survey for all students in sixth grade and above. The annual survey asks a series of questions about student engagement, school climate, and safety. This analysis is based upon student-level survey data for the 2006-7 through 2009-10 school years. Over 80 percent of the middle school student in the district responded to the survey in more than 700 public schools and 10,000 homerooms. The survey data is matched to individual administrative education records from the Department of Education, providing a rich set of covariate and outcome measures, including the number of absences per year and standardized test scores.

Response Rates and Survey Reliability

The quality of research based on anonymous survey data rests on the validity and reliability of the reported information. Due to the high coverage of the student population in

grades six and above, the results of this study are generalizable to the population of surveyed students in New York City. While response rates vary across schools (Figure 2), the overall response rate is very high (above 80 percent). Descriptive analyses indicate that there are differences between students who take the survey and those who do not. Although these respondents and non-respondents are comparable in many ways, non-respondents have lower test scores on average than respondents.[1] These differences are potentially problematic if the students who do not respond to the survey have systematically different feelings of safety than respondents. Non-response could bias the results in either direction depending on whether non-respondents feel more or less safe than respondents.

Figure 2: Distribution of Response Rates across Schools (2010)



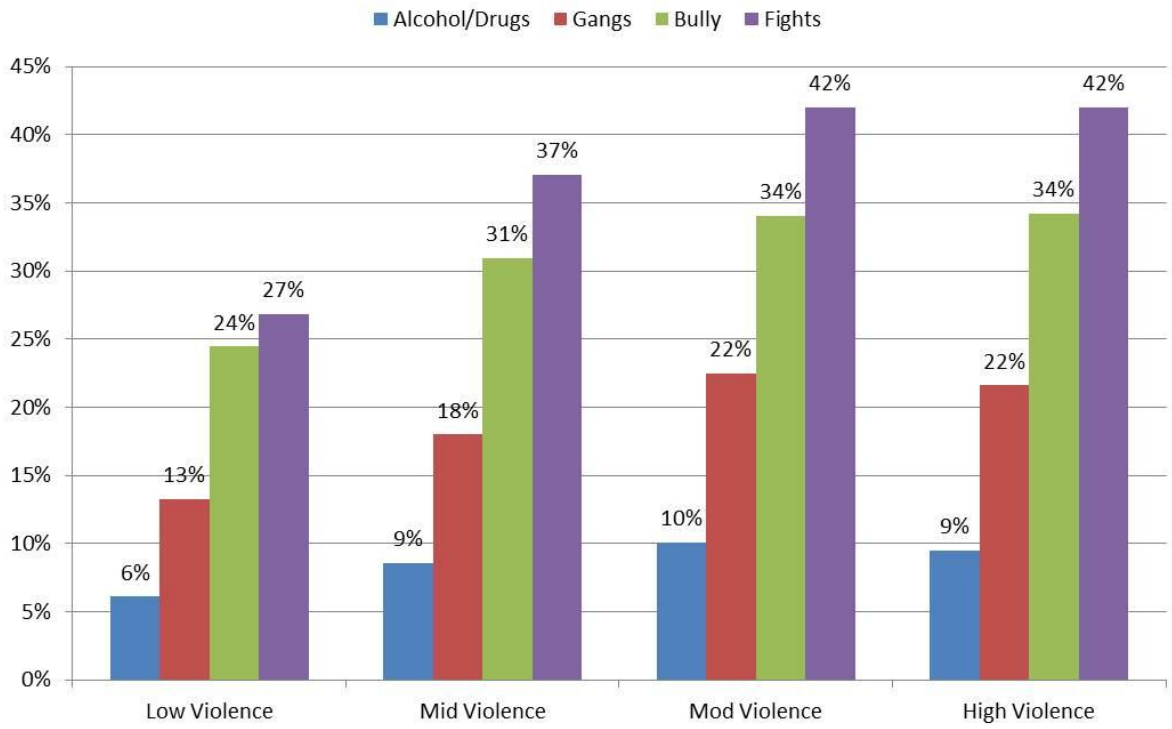
I conduct two tests of the construct validity of the safety measures used in this study. First, for respondents, there is a strong correlation between reporting frequently staying home because of feeling unsafe at school and actual school absences recorded by the school, indicating that safety has important implications for attendance rates.[2] Students who feel the least safe may have more absences which make them more likely miss school when the survey

[1] Percentages of students who are female, enrolled in ESL, native born, and receiving free or reduced price lunch are comparable between respondents and non-respondents. Black and Hispanic students make up larger percentages of the non-respondent group than the respondent group. (Contact author for table).
[2] Students who stay home because they feel unsafe have 2.6 more absences on average, than students who do not.

or the standardized test is administered. As a result, the findings presented here may be underestimates of the true impact of feeling unsafe at school on test scores.

As a second test, student perceptions of social disorder are compared to school-level administrative measures of school violence reported on an annual basis through the New York State Violent and Disruptive Incident Reporting (VADIR) system.[3] Figure 3 shows that student-reported violence and disorder varies in the expected direction with the level of school violence reported through the VADIR, indicating that students in the most violent schools report higher levels of disorder.

Figure 3: Perceived Disorder by Level of School Violence



Issues of reporting accuracy, particularly under-reporting or over-reporting on sensitive topics, could be a concern for research about feelings of safety. For instance, social pressures may make it likely for middle school students, particularly boys, to under-report feeing unsafe at

[3] Schools are categorized by quartiles based on the number of incidents that occur in a given year: "Low" = 25th percentile and below; "Mid" = between 25th and 50th percentiles; "Mod" = between 50th and 75th percentiles; "High" = 75th percentile and above.

school. In this case, significant effects of feeling unsafe on academic outcomes would be conservative estimates. Even with the likelihood of under-reporting, the survey data show that among middle school students in New York City, boys are more likely to report that they feel unsafe than girls.

Sample

The sample is restricted to students in the 6, 7, and 8 grades for three primary reasons. First, survey response rates are highest for students in these grades (compared to high school grades), ensuring better coverage of the population of middle school students. Second, feelings of safety in the classroom vary by grade level: the share of student that feels unsafe peaks in the 7th and 8th grades and declines as students enter high school. Therefore, safety may affect test scores for the largest number of students in the middle grades. Third, high school students do not take the state standardized exams and instead take a series of subject-area exams throughout their high school tenure, making it difficult to model test score changes between middle and high school. To ensure sufficient variation within schools and classrooms, schools with fewer than 10 respondents, and classrooms with fewer than 4 respondents are omitted from the analysis. The final sample includes survey responses for more than 340,000 individual students, over multiple years.

Measures

The main focus of this paper is safety in the classroom, given the direct link to academic performance. Responses to the four-response scaled survey item “I am safe in my classes” are re-coded as binary, taking a value of one if the student “disagrees” or “strongly disagrees” with the statement. Whether a student feels safe or unsafe is more salient for this analysis than the marginal difference between students who “disagree” or “strongly disagree” with the statement,

which would require strong assumptions about individual interpretations of these categories.[4] Using the same approach, I also construct measures of reported feelings of safety in the hallways, bathrooms, and locker rooms, and safety outside the school on school grounds. The final safety measure captures the frequency with which a student chooses to stay home because he or she feels unsafe at school. Students respond to the statement "I stay home because I don't feel safe at school" with the frequency response options "never", "some of the time," "most of the time," and "all of the time." This measure is coded as a binary variable taking the value of one if the student stays home out of fear "most" or "all" of the time.

The primary outcome measure, academic achievement, is parameterized by scores on an annual state math exam, standardized as z-scores by year and grade. To ensure temporal precedence, impacts are only estimated for math exam scores, because the math exams were administered after the student survey. During most of the study period, the English exams were administered prior to the school survey. The measure of school absences is the natural log of the number of full days absent in the past year. Some models also include individual student characteristics, including special education status, free or reduced price lunch status, whether the student speaks a language at home other than English, gender, race, and ethnicity. These indicator variables take the value of one if the characteristic is present for the student.

Baseline Model

The impact of feeling unsafe on academic achievement is estimated using a series of regression models. The first specification (equation 1) presents the baseline model of the relationship between feeling unsafe in the classroom ($UnsafeClass_{it}$) and math test scores ($TestScore_{it}$),

[4] Models disaggregating the "disagree" and "strongly disagree" responses are presented as a robustness check.

(1) $TestScore_{it} = \beta_0 + \beta_1 UnsafeClass_{it} + \gamma grade * year_t + \varepsilon_{it}$,

where *grade*year*$_t$ is a set of dummy variables controlling for annual time trends at the grade level. However, individual student characteristics may explain both feeling unsafe in the classroom and achievement. The second specification (equation 2) includes a vector of observed student characteristics (*IndChars*$_{it}$),

(2) $TestScore_{it} = \beta_0 + \beta_1 UnsafeClass_{it} + \delta\, IndChars_{it} + \gamma grade * year_t + \varepsilon_{it}$,

that includes special education status, free or reduced price lunch status, language spoken at home other than English, gender, and race and ethnicity. These models also include annual school enrollment to control for the effect of attending a larger school.

Strengthening the Baseline Model

There are several methodological challenges to isolating the impact of feeling unsafe on academic achievement. A main concern is omitted variable bias which could occur because school or classroom characteristics, such as the school environment or a particular teacher, affect both feelings of safety and academic achievement. If important variables are omitted from the model, changes in academic outcomes may be inaccurately attributed to students' feelings of safety. As shown earlier, a larger share of students who attend more violent schools report feeling unsafe, compared to students who attend less violent schools. To strengthen the model, school fixed effects are added to control for characteristics of the school environment, such as violence and disorder, which may affect feelings of safety.

However, within-school tracking into different classrooms may result in exposure to different classroom environments, even within the same school. Therefore, the next model includes homeroom fixed effects, controlling for unobserved, time-invariant characteristics of homerooms that likely affect safety and achievement.

Still, unobserved *individual* factors may be explaining student feelings of safety and academic achievement among students in the same homerooms. To strengthen the individual controls in the model, two approaches are taken. First, a value-added model is estimated in which the individual student's test score from the previous year is added to the homeroom fixed effects model. In a value-added model, an individual's achievement in a given year is a function of all previous years of schooling and experience. The value-added model estimates the effect of feeling unsafe in the classroom on the gain in test scores over the prior year alone, removing differences between students that have accumulated over years of schooling. [5]

Although it is an improvement over the previous model, the value-added model does not control for all time-invariant characteristics of an individual student that may be related to safety. Student fixed effects estimators are widely used in the literature about value-added models of education to achieve causal estimates of the impact of a policy change on student achievement (Gentile and Imberman 2011). Therefore, the second approach is to control for unobserved student characteristics that remain constant over time in a student fixed effects model. This model also includes controls for school-level annual time trends to capture the influence of shocks to the entire school – such as a new principal, or adoption of a new academic policy – that might affect both student safety and test scores.

Prior research has documented differences in feelings of safety at school between black and white students, Hispanic and white students, and boys and girls (e.g., Alvarez and Bachman,1997; Arum, 2003; Hong and Eamon 2011; Schreck and Miller 2003). To investigate whether the impact of feeling unsafe in the classroom on academic outcomes differs by these characteristics, the student fixed effect model includes interactions between feeling unsafe in the classroom and race, ethnicity, and gender indicators.

[5] There is no clear standard in the literature about specification of value-added models. Most researchers use a cumulative model which estimates the impact of inputs on the level test score controlling for prior scores, or a gain score model which uses the change in test score from the previous year as the dependent variable (Gentile and Imberman 2011; Harris and Sass 2006; Rockoff 2004; Rothstein 2009; Wiswall 2011). Another approach is to measure the contemporaneous effect of inputs on test scores using the student fixed effect alone to capture prior performance (Harris and Sass 2006; Wiswall 2011). Value-added models are inconsistent when estimated using a random effects estimator, therefore a fixed effects estimator is used (Harris and Sass 2006).

To test the direct and indirect effects of feeling unsafe in the classroom, I add a measure of whether a student reports staying home from school because of feeling unsafe and a measure of the number of absences that occurred in the given year to test the moderating effect of absenteeism.

Validity Tests

Despite the strategies described above, there may remain a concern that systematic, time-varying individual or classroom characteristics not included in these models are driving both feelings of safety and academic achievement. Potential sources of omitted variable bias include changes in the home lives of individual students or general school or classroom "disorder" that might both cause students to feel unsafe and affect test scores independently. To isolate the impact of feeling unsafe on achievement from the other ways in which school disorder may affect test scores, I test the impact of alternative measures of safety at school that are less directly related to academic performance. If these measures of safety are also significant predictors of achievement, it is more likely that an omitted variable is causing students to feel unsafe across all contexts and their academic achievement to decline. However, if these measures are not significant predictors of test scores, any omitted variable that would threaten the validity of the causal inference would need to operate solely through feelings of safety in the classroom.

In addition to omitted variable bias, another threat to the validity of the causal inference is reverse causality – an inability to determine the direction of causality between feeling unsafe at school and having poor academic performance. This can result in correlation between the independent variables in the model (i.e. feeling unsafe) and the error term, violating a condition of unbiased OLS estimation. The econometric models presented thus far have been based on prior research that finds exposure to violence negatively affects the academic achievement of students and their peers (Carrell and Hoekstra 2010; Sharkey 2010). If students exposed to

violence become fearful, they may misbehave in class and disturb their own learning and that of their peers, or they may stop coming to school altogether. If this is the case, one would expect the relationship to operate from feelings of safety to academic outcomes. However, one could tell a different, but plausible, story. Students who are falling behind in school may fear disappointing their teachers or being embarrassed in front of classmates, and may feel that the classroom is not a safe or comfortable place. In this case, poor academic performance may drive feelings of safety at school. On the other end of the spectrum, strong academic performance may be associated with feeling unsafe at school if high-performing students are targeted for bullying. To address the simultaneity concern, the analysis is restricted to standardized tests that are given *after* the survey is administered, and I conduct a falsification test of the impact of feeling unsafe in future years on current test scores.

After isolating the relationship between classroom safety and academic performance and determining the direction of causality, I explore variation in the impact estimate across schools with different levels of school violence.

RESULTS

Students who report feeling unsafe in the classroom experience a consistent, negative effect on test scores. The finding is robust to school, homeroom, and student fixed effects models. Robustness and validity checks support this central finding.

Descriptive Statistics

Fifteen percent of all middle school students report feeling unsafe in the classroom.[6] Students who report feeling unsafe have different average characteristics than students who report feeling safe in the classroom (Table 1). Although the majority of students qualifies for free or reduced price lunch, a proxy for poverty, students who report feeling unsafe are more likely to

[6] Share of students by response to statement "I feel safe in the classroom": Strongly agree (37%), Agree (43%), Disagree (10%), Strongly Disagree (5%), No response (6%).

be poor.[7] Males make up a larger share of students who report feeling unsafe in the classroom than females, and a larger share of black students report feeling unsafe than white, Asian, and Hispanic students. Students who feel unsafe in the classroom are more likely to qualify for special education services, compared to students who feel safe.

Table 1: Mean Characteristics of New York City public middle school students, by question response

		"I am safe in my classes."		
Mean Student and School Characteristics	**Total**	**Safe**	**Unsafe**	**No Response**
Observations	658,122	527,122	93,418	37,576
Free/Reduced Lunch	0.66	0.65	0.69	0.70
Female	0.51	0.52	0.47	0.44
Home Language not English	0.56	0.56	0.53	0.59
Special Education	0.12	0.11	0.13	0.17
Black	0.30	0.28	0.37	0.39
White	0.15	0.16	0.11	0.11
Asian	0.16	0.17	0.14	0.10
Hispanic	0.39	0.39	0.38	0.40
Days Absent	11.8	11.4	13.3	14.1
Took Math test (%)	0.97	0.97	0.97	0.96
ELA Z score	0.052	0.111	-0.159	-0.267
Math Z score	0.073	0.143	-0.167	-0.316
Total Enrollment ('000s)	692	697	682	647
Peers Same Race (%)	0.52	0.51	0.53	0.53
Peer Social Disorder (%)	0.09	0.08	0.11	0.10
Unsafe in Halls (%)	0.28	0.19	0.80	0.39
Unsafe Outside (%)	0.34	0.26	0.77	0.43
Stays Home Most or All of the time (%)	0.05	0.03	0.15	0.09

Students who report feeling unsafe in the classroom have higher mean absences and lower scores on the math and English language arts standardized tests. The share of students who take standardized tests is high across all response categories (97 percent), tempering any concerns about systematic differences in test taking. While the average student across both safety responses is in a school that is majority same race or ethnicity, students who report

[7] Unsafe includes the responses “disagree” or “strongly disagree” to the statement “I feel safe in the classroom.”

feeling unsafe in the classroom go to schools where a larger share of peers report that social disorder –bullying, fighting, and gang activity – is a problem in the school.

Reporting feeling unsafe in the classroom is correlated with reported feelings of safety in other areas of the school. Approximately 80 percent of students who feel unsafe in the classroom also feel unsafe in the hallways, bathrooms, and locker rooms, and outside the school on school grounds, compared to 19 percent of students who feel safe in the classroom but unsafe in the halls, and 26 percent of students who feel safe in the classroom but unsafe outside the school. Most notably, 15 percent of students who feel unsafe in the classroom also report that they stay home most or all of the time because they feel unsafe at school. Only 3 percent of students who feel safe in the classroom report staying home out of fear at similar levels.

Overall, students who respond to the survey but do *not* answer the safety questions appear to be similar to the least safe students. Compared to students who responded, larger shares of non-respondents are poor (70 percent), speak a language at home other than English (59 percent), and are enrolled in special education (17 percent). A larger share of the students who did not respond is black (39 percent). The mean number of absences and the mean reading and math scores for students who did not answer the safety questions are on par with or lower than students who report feeling the least safe. These statistics indicate that students who did not answer the classroom safety question are most similar to those students who feel the least safe at school, therefore the estimates of the impact of feeling unsafe on test scores may be underestimates.

How safe students feel changes over time (Table 2). Of the students who reported feeling the least safe in the classroom in a prior year (strongly disagree), 38 percent continue to feel unsafe in the following year, while 57 percent report feeling safe in the classroom in the following year (and 5 percent are missing responses to the safety question). Of the students who feel the least safe in the current year, 25 percent changed their response from “strongly

agree" in the previous year, 37 percent changed their response from "agree" from the previous year, 20 percent changed their response from "disagree" in the previous year, and 18 percent did not change their response. There does not seem to be a pattern of non-response linked to prior year response – if anything, of the students missing responses to the survey in the current year, over 80 percent reported feeling safe in the classroom in the prior year.

Table 2. Within-Student Changes in Reported Feelings of Safety in the Classroom

Statement: "I am safe in my classes."		*Current Year*				
		Strong Agree	Agree	Disagree	Strong Disagree	Missing
Previous Year	Strong Agree	0.51	0.37	0.05	0.03	0.04
	Agree	0.27	0.56	0.10	0.04	0.04
	Disagree	0.18	0.48	0.20	0.09	0.05
	Strong Disagree	0.21	0.36	0.19	0.19	0.05

Regression Results

The baseline specifications presented in Table 3 show consistent evidence that feeling unsafe in the classroom decreases test scores. This finding is robust to the addition of individual covariates, school and homeroom fixed effects, and inclusion of the prior year test score. The raw correlation between reporting feeling unsafe and test scores is a 0.32 standard deviation decrease in scores. The effect size is reduced significantly with the addition of individual covariates (0.23), school fixed effects (0.13), and homeroom fixed effects (0.09). The value-added specification (column 5) shows that reporting feeling unsafe in the classroom decreases math test scores by 0.06 standard deviations, controlling for prior test scores, homeroom effects, and grade level time trends. This effect size is larger than the independent effect of being poor on test scores (0.02). In column 6, the effects of "strongly disagreeing" and "disagreeing" are estimated separately, with the expected pattern of a stronger expression of feeling unsafe related to a larger decrease in test scores (0.07).

Table 3: Baseline Relationship between Feeling Unsafe and Math Z Scores

MATH Z SCORE	(1) *Raw*	(2) *Covariates*	(3) *School FE*	(4) *Homeroom FE*	(5) *Value-Added*	(6) *Categories*
Unsafe in Class	-0.316***	-0.226***	-0.134***	-0.0894***	-0.0557***	
	(0.0178)	(0.0104)	(0.00289)	(0.00270)	(0.00210)	
Safe in Class: *Disagree*						-0.0374***
						(0.00242)
Safe in Class: *Strongly Disagree*						-0.0696***
						(0.00345)
White		0.615***	0.329***	0.226***	0.0873***	0.0886***
		(0.0336)	(0.00442)	(0.00415)	(0.00328)	(0.00319)
Hispanic		0.0714***	0.0482***	0.0397***	0.00289	0.00535*
		(0.0186)	(0.00319)	(0.00300)	(0.00231)	(0.00225)
Asian		0.949***	0.699***	0.539***	0.251***	0.253***
		(0.0405)	(0.00456)	(0.00423)	(0.00336)	(0.00328)
Female		0.00578	-0.00419*	-0.0264***	0.0139***	0.0152***
		(0.00421)	(0.00211)	(0.00195)	(0.00155)	(0.00150)
Home Lang. not English		0.0207	0.0454***	0.0816***	0.0549***	0.0533***
		(0.0165)	(0.00288)	(0.00274)	(0.00217)	(0.00212)
Free/Reduced Lunch		-0.197***	-0.112***	-0.0450***	-0.0193***	-0.0190***
		(0.0162)	(0.00257)	(0.00329)	(0.00260)	(0.00252)
Special Education		-0.663***	-0.620***	-0.491***	-0.218***	-0.220***
		(0.0125)	(0.00330)	(0.00332)	(0.00265)	(0.00258)
Enrollment ('000s)		0.0749*	-0.0493***	-0.0288	-0.0442**	-0.0382**
		(0.0338)	(0.0144)	(0.0173)	(0.0136)	(0.0132)
Math Z Score (t-1)					0.593***	0.594***
					(0.00139)	(0.00135)
Constant	0.178***	0.00912	0.0665***	0.00369	-0.0329**	-0.0466***
	(0.0318)	(0.0313)	(0.0104)	(0.0157)	(0.0127)	(0.0122)
Observations	586553	586553	586553	586553	586553	620828
R-squared	0.014	0.236	0.339	0.475	0.671	0.672
Year*Grade FE	Yes	Yes	Yes	Yes	Yes	Yes
School FE	No	No	Yes	No	No	No
Homeroom FE	No	No	No	Yes	Yes	Yes

Clustered standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Still, individual level omitted variables may explain the relationship between feeling unsafe and achievement. Controlling for time-invariant student characteristics further reduces the size of the effect of feeling unsafe (Table 4). The first student fixed effects model shows that

feeling unsafe in the classroom results in a 0.04 standard deviation decrease in test scores. The specification in column 2 includes annual school trends to control for school-wide changes that might affect test scores and safety (such as a new principal, or change in disciplinary or security policy). With these controls, on average, a student who reports feeling unsafe in the classroom experiences a 0.03 standard deviation decrease in math test scores.[8]

Table 4: Student Fixed Effect Models

	(1)	(2)	(3)
MATH Z SCORE	*Student FE*	*School*Year FE*	*Categories*
Unsafe in Class	-0.0353***	-0.0290***	
	(0.00529)	(0.00482)	
Category of Unsafe in Class			-0.0147***
			(0.00240)
Enrollment ('000s)	-0.0929**	-0.0905	-0.0792
	(0.0284)	(0.0533)	(0.0483)
Grade 7		-0.165***	-0.175***
		(0.0315)	(0.0320)
Grade8		-0.373***	-0.384***
		(0.0591)	(0.0601)
Absences			-0.00619***
			(0.000294)
Observations	586553	586553	586510
R-squared	0.908	0.914	0.915
Year*Grade FE	Yes	No	No
Student FE	Yes	Yes	Yes
School*Year FE	No	Yes	Yes

Although the descriptive statistics show that a greater share of black and Hispanic students feel unsafe in the classroom compared to white and Asian students, interaction models show no differences in the rate at which reporting feeling unsafe affects test scores by student

[8] The third specification estimates the effect of a change in response to a more "unsafe" category over time, regardless of whether it is a change from very safe to safe or from unsafe to very unsafe, and finds that overall, each decrease in reported feelings of safety results in a 0.02 standard deviation decrease in test scores.

race and ethnicity (contact author for table). One might assume that boys entering middle school are more likely to become involved in delinquent behavior, making them feel more fearful and also negatively influencing their academic achievement. On the contrary, the results show no differential effect of changes in feelings of safety in the classroom on test scores between boys and girls.

Staying home from school because of fear is one mechanism through which feeling unsafe in the classroom may affect test scores. On average, students who indicate that they stay home because they feel unsafe at school should have a higher number of absences. As a validity check of this measure of safety, Table 5 presents the relationship in a regression framework. There is a strong association between staying at home because of feeling unsafe and the log of full day absences. The association persists with the inclusion of individual student characteristics, school and classroom fixed effects, and student fixed effects. Within the same classrooms, students who report staying home because they feel unsafe have 15 percent more absences, on average, than students who do not (specification 4).

The results in Table 6 show that holding reported feelings of safety in the classroom constant, students who indicate that they stay home because they feel unsafe at school experience a larger decrease in test scores (an additional 0.03 standard deviation decrease).[9] Each additional absence from school also decreases test scores. In fact, there is no independent effect of staying home because of feeling unsafe at school when an interaction term between staying home and absences is included in the model (column 3). The point estimate on classroom safety is largely unaffected by the inclusion of these additional measures, indicating that there is both a direct effect of feeling unsafe on academic achievement and an indirect effect through increased absences.

[9] The measure includes students who said that they "most" or "all" of the time stay home because of feeling unsafe.

Table 5: Relationship between Staying Home because of Feeling Unsafe and School Absences

DV: log(Absences)	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Raw	Covariates	School FE	Homeroom FE	Student FE	Student FE and School Trend
Stay Home b/c Feel Unsafe at School	0.242***	0.203***	0.166***	0.145***	0.0485***	0.0401***
	(0.00897)	(0.00729)	(0.00662)	(0.00582)	(0.00930)	(0.0086)
Black		-0.0349	-0.138***	-0.193***		
		(0.0284)	(0.0198)	(0.00606)		
Hispanic		0.141***	0.0303*	-0.0161***		
		(0.0262)	(0.0171)	(0.00534)		
Asian		-0.536***	-0.531***	-0.503***		
		(0.0382)	(0.0269)	(0.00670)		
Female		-0.0301***	-0.0225***	-0.0154***		
		(0.00420)	(0.00373)	(0.00261)		
Free/Reduced Lunch		0.171***	0.133***	0.0684***		
		(0.0132)	(0.00804)	(0.00470)		
Home Lang. not English		-0.236***	-0.222***	-0.228***		
		(0.0146)	(0.00880)	(0.00400)		
Special Education		0.204***	0.184***	0.120***		
		(0.00833)	(0.00624)	(0.00448)		
Enrollment ('000s)		-0.0245	0.118***	0.0739**	0.0183	0.1296
		(0.0324)	(0.0424)	(0.0312)	(0.0370)	(0.0680)
Constant	2.067***	2.183***	2.181***	2.405***	1.901***	
	(0.0174)	(0.0358)	(0.0308)	(0.0263)	(0.0394)	
Observations	542,765	542,765	542,765	542,765	542,765	542,765
R-squared	0.003	0.099	0.162	0.227	0.868	0.876
Grade*Year FE	Yes	Yes	Yes	Yes	Yes	No
Covariates	No	Yes	Yes	Yes	No	No
School FE	No	No	Yes	No	No	No
Homeroom FE	No	No	No	Yes	No	No
Student FE	No	No	No	No	Yes	Yes
School*Year FE	No	No	No	No	No	Yes

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 6: Mechanisms

VARIABLES	(1) Student FE	(2) Mediators	(3) Interaction
Unsafe in Class	-0.0294***	-0.0243***	-0.0242***
	(0.00493)	(0.00503)	(0.00503)
Stay Home b/c Unsafe		-0.0329***	-0.0176
		(0.00699)	(0.0103)
Log(Absences)		-0.00617***	-0.00608***
		(0.000301)	(0.000300)
Stay Home*log(Absences)			-0.00114*
			(0.000560)
Enrollment ('000s)	-0.103	-0.0973	-0.0980
	(0.0548)	(0.0551)	(0.0552)
Observations	575,286	575,286	575,286
R-squared	0.915	0.915	0.915
Student FE	Yes	Yes	Yes
Grade FE	Yes	Yes	Yes
School*Year FE	Yes	Yes	Yes

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Validity Tests

It is possible that unobserved, time-varying student characteristics may explain both feelings of safety and test scores, or that potential simultaneity prevents the identification of a causal relationship. Although there is no surefire way to alleviate this concern in the quasi-experimental context, several validity tests provide support that the estimates are causal.

For the first validity test, I estimate a model including alternative measures of feelings of safety in school that are less closely related to academic performance. If feeling unsafe in all contexts affects test scores, it is more likely that an omitted variable that is affecting safety and achievement is present and causing bias in the results. For instance, the victimization of a family member through domestic violence may influence both feelings of safety and performance in school. However, one would expect that this type of violence exposure would make students feel unsafe in all contexts, not just in the classroom. Table 7 provides the results

from variants of the student fixed effect model that include feeling unsafe in the hallways, bathrooms, and locker rooms at school, and feeling unsafe outside the school on school grounds. There is no relationship between these measures of safety and test scores when controlling for safety in the classroom, and the magnitude and significance of the effect of feeling unsafe in the classroom is unchanged. Any remaining problematic omitted variable affecting test scores must be related to feelings of safety in the classroom only.

Table 7: Validity Test #1, Impact of Other Safety Measures on Math Z Scores

	(1)	(2)
	Unsafe in Halls	Unsafe Outside
VARIABLES	DV: Math Z Score	DV: Math Z Score
Unsafe in Class	-0.0228***	-0.0224***
	(0.00539)	(0.00537)
Unsafe in Halls	-0.00293	
	(0.00444)	
Unsafe Outside		-0.00499
		(0.00392)
Stay Home b/c Unsafe	-0.0327***	-0.0325***
	(0.00730)	(0.00728)
Absences	-0.00618***	-0.00618***
	(0.000301)	(0.000301)
Enrollment ('000s)	-0.0794	-0.0796
	(0.0520)	(0.0520)
Observations	560355	560355
R-squared	0.917	0.917
Student FE	Yes	Yes
Grade FE	Yes	Yes
School*Year FE	Yes	Yes

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Second, as a falsification check, I test whether feelings of safety in the *following* year predict test scores in the current year (Table 8). No relationship is found between future safety and current test scores, and the coefficient on the current year safety measure is unchanged. Future reported feelings of safety do not affect test scores in the previous year, suggesting that changes in reported feelings of safety are driving decreases in test scores, not the reverse.

Table 8: Validity Test #2, Falsification Test

Falsification Test	(1)	(2)
	Reference	Falsification Test
VARIABLES	DV: Math Z Score	DV: Math Z Score
Unsafe in Class	-0.0253***	-0.0245**
	(0.00704)	(0.00776)
Unsafe in Class (t+1)		0.00202
		(0.00777)
Enrollment ('000s)	-0.0562	-0.0565
	(0.0745)	(0.0745)
Observations	332138	332138
R-squared	0.929	0.929
Student FE	Yes	Yes
Grade FE	Yes	Yes
School*Year FE	Yes	Yes

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The findings are also robust to estimation on a smaller, balanced panel of students who respond to the survey for all three years of middle school (Table 9). The coefficient on feeling unsafe in the classroom maintains significance and the point estimate from the balanced panel model is larger than the estimates achieved using the unbalanced panel. As a final robustness test, I estimate variations on the value-added model, including a model with a lagged test score but no student fixed effects (as employed by Gottfried 2010), a student fixed effect model with level scores and then with lagged scores, and a model of the change in test score as the dependent variable (Table 10). The point estimate and significance of the variable of interest is larger for the first specification, indicating that a value-added approach alone is no substitute for a student fixed effect estimator. Across the student fixed effect models, the estimates for feeling unsafe in the classroom are robust to estimation with just the level math score and no lagged score, and estimation on the change in math score.

Table 9: Robust Test #1, Balanced Panel

Balanced Panel	(1)	(2)
	Unbalanced	Balanced
VARIABLES	DV: Math Z Score	DV: Math Z Score
Unsafe in Class	-0.0294***	-0.0323***
	(0.00493)	(0.00517)
Enrollment ('000s)	-0.103	-0.0559
	(0.0548)	(0.0593)
Observations	575286	204731
R-squared	0.915	0.862
Student FE	Yes	Yes
Grade FE	Yes	Yes
School*Year FE	Yes	Yes

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 10: Robust Test #2, Value-Added Specifications

Value-Added	(1)	(2)	(3)	(4)
	Lag Score	Level	Lag, FE	Change
VARIABLES	DV: Math Z Score	DV: Math Z Score	DV: Math Z Score	DV: Math Z Score
Unsafe in Class	-0.0583***	-0.0290***	-0.0274***	-0.0348***
	(0.00213)	(0.00482)	(0.00480)	(0.00759)
Math Z Score (t-1)	0.626***		-0.269***	
	(0.00137)		(0.00719)	
Enrollment (‘000s)	-0.0405**	-0.0905	-0.0829	-0.107
	(0.0138)	(0.0533)	(0.0548)	(0.0776)
Observations	586553	586553	586553	586553
R-squared	0.661	0.914	0.922	0.505
Classroom FE	Yes	No	No	No
Student FE	No	Yes	Yes	Yes
Grade*Year FE	Yes	No	No	No
Grade FE	No	Yes	Yes	Yes
School*Year FE	No	Yes	Yes	Yes

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Variation in the Impact Estimates

Finally, I investigate the variation in the impact estimates by levels of school violence to learn whether the impact of feeling unsafe on test scores is larger for students who are exposed to more school-based violence. Descriptively, it appears that the average student in a school with high violence feels less safe than the average student in a low violence school. Differences in the violent incident rate in the school may result in larger impacts of feeling unsafe in the classroom on academic outcomes. Table 11 presents the student fixed effect models stratified by quartiles of school violent and disruptive incident rates in 2007 (the baseline year of the survey).[10] Column 1 estimates the impact of feeling unsafe in the classroom on math scores for students who attend schools that had the lowest incident rates in the city in 2007, and column 4 presents the impact estimate for students attending schools that had the highest incident rates. The models also control for the change in the incident rate between 2007 and 2010, and total enrollment in the school, as well as grade and year fixed effects. Results show that feeling unsafe in the classroom has no statistically significant effect on test scores for students in the lowest violence schools, but as students are exposed to greater in-school violence and disruption the impact estimates grow larger and become statistically significant. For students in schools with the highest violent and disruptive incident rates, the impact of feeling unsafe in the classroom is a -0.033 standard deviation decrease in math performance.

[10] School-based violent and disruptive event rates are based on the statewide Violent and Disruptive Incident Report (VADIR).

Table 11: Impact of Feeling Unsafe in the Classroom on Math Z Scores, by Rate of in School-based Violent and Disruptive Incidents (2007)

Impact Estimate Variation	(1) Low Violence (Q1: Rate < -30)	(2) Moderate Violence (Q2: -30 < Rate < 22)	(3) Medium Violence (Q3: 22 < Rate < 121)	(4) High Violence (Q4: Rate > 121)
Unsafe in Class	-0.0307	-0.0219*	-0.0306**	-0.0325***
	(0.0237)	(0.0103)	(0.0104)	(0.00791)
Change in Violent Incident Rate (2007-2010)	-0.0000198	-0.000647	-0.000207	-0.000148
	(0.000270)	(0.000823)	(0.00111)	(0.00202)
Enrollment ('000s)	0.0395	0.0429	-0.0302	-0.0948
	(0.142)	(0.0828)	(0.0869)	(0.0711)
Observations	50447	113070	184815	201415
R-squared	0.915	0.914	0.916	0.919
Student FE	Yes	Yes	Yes	Yes
School*Year FE	Yes	Yes	Yes	Yes
Grade FE	Yes	Yes	Yes	Yes

DISCUSSION

This study provides the first large-scale estimate of the impact of feeling unsafe in the classroom on academic achievement, and indicates that the effect is non-trivial – a 0.03 standard deviation decrease in math test scores in the most controlled, student fixed effects model. To put this estimate in context, the achievement gap between black students and white students widens by about 0.10 standard deviations a year (Fryer and Levitt 2004), and in New York City, the gap between black and white students is estimated to be 0.12 standard deviations for 8th grade students, and the Hispanic-white gap is 0.17 standard deviations (Stiefel et al. 2006).

Prior work has found that black and Hispanic students systematically report feeling less safe in the classroom than their white and Asian peers, even when they share the same schools

and homerooms (Author 2012). Based on the estimates from this analysis, differential feelings of safety in the classroom may contribute to between a quarter and a third of the gap in test scores between minority and white students. It is clear that ensuring that each student feels safe in the classroom is a critical first step in improving educational achievement and reducing racial and ethnic achievement gaps. These findings also suggest that one place to start would be in schools that consistently report the highest violent and disruptive incident rates, where students experience the largest decline in test scores as a result of feeling unsafe in the classroom.

District, school, and classroom based strategies can contribute to improving student safety. For instance, at the district level in New York City, School Report Card grades account for school safety ratings and a “safe environment” is a category of evaluation during site visits for the Quality Reviews of all city schools. This research suggests that the student safety measures should carry larger weight in the Report Card grades and Quality Reviews, highlighting schools where students feel particularly unsafe. Further, attention should be paid to classroom safety and preventing absences due to safety issues. To identify successful school and classroom level interventions, more research is needed to investigate contextual factors that mediate and/or moderate the impact of feelings of safety on academic outcomes, and to highlight schools that promote safety among students who are exposed to dangerous or disorderly environments, allowing them to excel academically.

This analysis provides a strong case for the identification of a causal relationship, although some limitations remain. The effect of feeling unsafe on academic outcomes may be particularly salient for acute events, such as exposure to violent crime that causes a direct, but a potentially short-lived effect on both safety and academic performance. Acute effects are difficult to detect in this model due to the annual observation of feelings of safety, therefore these results likely reflect the cumulative effect of feeling unsafe at school over time. Also, the school survey data provide detailed information about student perceptions of their environment that researchers generally do not have access to, but the questions about safety do not distinguish

between physical safety and other types of safety, such as intellectual or emotional safety. The effect of safety on academic achievement may differ by type of safety, but in this study I am unable to distinguish between these different types of safety in the student responses.

Finally, most research focused on a single city or a sample of students suffers from limited external validity. In this case, high coverage of the student population makes it possible to generalize from the results to all New York City middle school students. The sheer size and diversity of the New York City public school system provides ample variation in race, ethnicity, immigrant status, and other student factors, making lessons from New York relevant for other large urban schools systems. However, factors influencing safety may differ across other municipal contexts, and comparative work would benefit the field.

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