ABSTRACT

Title of dissertation:	SCHOOL SECURITY PRACTICES: INVESTIGATING THEIR CONSEQUENCES ON STUDENT FEAR, BONDING AND SCHOOL CLIMATE
	Shannon Womer Phaneuf, Doctor of Philosophy, 2006
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Although millions of dollars are spent each year on improving school security, not much has been done to assess the influence of these strategies on violence or student fear. Critics of security practices in schools argue that potential negative consequences stemming from the use of security practices in schools may outweigh their benefits. This study tested ideas voiced by opponents of the use of security practices in schools and based on the concept of collective efficacy. The study examined the influence of school security practices on student fear, student bonding and school climate in a sample of 233 secondary schools. The study used principal, student and teacher survey data from the National Study of Delinquency Prevention in Schools and hierarchical linear modeling techniques. Results indicated that the use of selected security practices in schools did not influence levels of student fear or bonding. Several school- and community-level variables were better predictors of student fear and bonding than was the use of school security strategies. Among these variables were community poverty and disorganization, percentage teachers black, school auspices (public, private, Catholic), community gang

problems, and student enrollment. A discussion of the implications and limitations of this study, as well as suggestions for future research, are presented.

SCHOOL SECURITY PRACTICES: INVESTIGATING THEIR CONSEQUENCES
ON STUDENT FEAR, BONDING AND SCHOOL CLIMATE

by

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Dedication

To Mark, a constant source of love and encouragement.

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Chapter 1

INTRODUCTION

Victimization at school is a great concern for students, teachers, administrators and parents alike. Whether real or perceived, crime and violence in the school can have detrimental effects on the ability of students to learn and teachers to teach. Elliott and colleagues suggested that fear in school affects the entire school and every student by influencing:

> …teaching practices; children's readiness and capacity for learning; hiring and retention of teachers, administrators, and other school staff; the openness and accessibility of the campus; student rights to privacy; the physical building and grounds, and the quality of learning environment more generally (1998:9).

While violence in urban schools, particularly large schools, has almost come to be expected, the spate of school shootings in the late 1990s and early 21st century brought the fear of school violence into areas once considered safe havens for youth—American suburbs. Although such extreme acts of school violence are uncommon, even a single act of school violence that receives media attention can exacerbate feelings of vulnerability and fear among students, teachers and parents. These rare yet severe acts of violence can call attention to school violence and create an image that school violence and danger are more prevalent than they are (Lee and Croninger, 1996). As Lee and Croninger (1996) point out, there is an obvious difference between *actually being safe* at school and *feeling safe* at school. Regardless of whether a school is physically safe from violence, the extent to which students feel safe in that school no doubt impacts their ability to learn and develop.

School crime and violence has been a national concern for quite some time now. Almost 30 years ago, in 1978, the journal *Crime and Delinquency* devoted an entire

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special issue to the problem of school crime. In that same year, the National Institute of Education released the *Violent Schools--Safe Schools: The Safe School Study Report to Congress,* which provided statistics specifically regarding school violence. Despite this interest in violence, student fear of crime has garnered little attention in this literature. To the extent that student fear influences academic achievement, student absence, and possibly other correlates of delinquency, there is a need to understand the extent to which a variety of school-based fear reduction strategies are effective in reducing fear.

Over the years, concern about school crime and violence has led to a variety of responses to increase the safety and security of schools. These responses include the use of security and surveillance practices. Schools around the country use a wide variety of strategies to enhance physical security, ranging from fairly mild measures such as ID badges, procedures for visitors, and the use of phones or intercoms in the classrooms to more intense and intrusive measures such as metal detectors, security guards, drug-, gun- or bomb-sniffing dogs, and surveillance cameras. Despite the millions of dollars spent each year on improving school security, not much has been done to assess the efficacy of these strategies in reducing school violence or student fear of victimization.

Student fear of victimization is the primary focus of this study. Specifically, I examine the relationship between the use of security practices in schools and student fear. Fear has been shown to be an important contributor to student conduct and it is associated with student absence, cutting class, avoiding specific areas of the school, and most importantly, impeding the learning process (CDC, 1995; Devoe, 2004 et al.; Lowry et al., 1995). Other relationships of interest in this study are the relationships between the use of school security practices and student bonding and school climate. Student bonding

and school climate have been linked through research to a variety of problem behaviors and to school disorder.

Advocates of the use of security measures in schools suggest these strategies may not only reduce crime and disorder but also reduce student fear by sending a message that the school takes violence seriously and is actively doing something to curtail it. Opponents of the use of security practices argue that these strategies may actually increase student fear. This occurs, according to the opponents, by (a) sending a message that the school *expects* violence and (b) producing less positive school climate and lower levels of student-teacher bonding. Although these ideas are linked to the concept of collective efficacy (Sampson, Raudenbush and Earls, 1997), neither of these claims has been the subject of empirical research.

Testing the claims of these opponents of school security, this study makes several contributions to the field. First, it expands the literature on student fear, a topic that, to date, has received very little attention. Second, much of the literature on the negative consequences of school security has been qualitative and anecdotal in nature; the present study provides a quantitative test of hypotheses derived from this literature. Finally, this study explores the relationship between the use of security measures and school climate and how this relationship influences the levels of fear and bonding among students. No other study has attempted to link empirically the use of security practices to school climate or student bonding. This study will test three hypotheses.

1. The level of student fear is higher in schools that use security devices than in schools that do not use security devices.

2. The level of student bonding is lower in schools that use security devices than in schools that do not use security devices.

3. The effect of school security device use on student fear and student bonding is mediated by school climate.

The remainder of this report is organized as follows. Chapter 2 provides a review of the literature on the prevalence of school crime and student fear and the effects of student fear. Next, school security and surveillance practices are discussed, including information on the prevalence of these strategies in schools, goals and benefits of these practices, and a review of evaluations on their effectiveness in reducing school crime, disorder and fear. Possible unintended negative consequences of the use of security strategies and their implications for student fear, school climate, and student bonding are discussed. This is followed by a brief discussion of collective efficacy, the connections between this theory and the literature on the unintended consequences of school security, and an overview of the literature on school climate and student bonding. Chapter 2 concludes with a description of the present study including a statement of the problem, the research questions posed, and hypotheses to be tested.

Chapter 3 provides information about the sample used for this study including characteristics of the student and schools used as well as response rates. This chapter also describes the measures used in this study and presents descriptive statistics for each measure. The chapter concludes will a detailed description of the analysis strategy.

Chapter 4 presents results from the statistical analyses conducted to test the influence of security practices on student fear, bonding and school climate variables. This includes correlations between security use and fear and student bonding, and

hierarchical linear modeling analyses of the putative effects of the use of security measures. This chapter concludes with a discussion of sensitivity analyses.

Chapter 5 offers a summary and conclusion of this study, including the implications of this study's findings, limitations of the present study, and suggestions for future research on school security, student fear, bonding and school climate.

Chapter 2

LITERATURE REVIEW

Prevalence of School Crime and Student Fear

The mid-1980s to the early 1990s ushered in an era of dramatic growth in youth violence—an epidemic that was pervasive in both communities and schools. Between 1984 and 1994, the homicide rate for adolescents doubled while nonfatal victimizations increased nearly 20% (Elliott, Hamburg and Williams, 1998). This increase in juvenile homicides occurred during a period when homicide rates for most other ages were declining (Elliott et al., 1998). Between 1988 and 1991, juvenile arrests for non-lethal violent crimes such as assault, rape and robbery increased by 38% (Snyder and Sickmund, 1995). Rates of victimization at school were also rather high during this period. In 1991, 56% of juvenile victimizations occurred at school or on the school ground (Elliott et al., 1998).

More recently, however, data from the School Crime Supplement to the National Crime Victimization Survey has indicated that the prevalence of school crime, as well as violent crime, has substantially abated over the past decade (DeVoe et al., 2004). DeVoe and colleagues report that between 1992 and 2002 the victimization rate for students ages 12-18 declined, both at school and away from school. This finding held true for rates of thefts, violent crimes and serious violent crimes, as well as the total crime rate. Specifically, the violent victimization rate between 1992 and 2002 declined from 48 to 24 crimes per 1,000 students at school and 71 to 26 crimes per 1,000 students away from school (DeVoe et al., 2004). The prevalence of nonfatal victimization at school

decreased between 1995 and 2003. In 1995, 10% of students ages 12-18 reported being victims of nonfatal crimes at school compared with only 5% of students in 2003. In 1995, 7% of students reported theft and 3% reported a violent incident compared with 4% and 1% respectively in 2003 (DeVoe et al., 2004). Finally, the percentage of 9th-12th grade students who reported being in a physical fight on school property declined from 16% in 1993 to 13% in 2003 (DeVoe, et al., 2004).

Research indicates that *most* schools are not particularly dangerous places in terms of criminal victimization. Hanke's (1996) review of reported crime and violence in schools suggested that violent crime was not routine in most schools, violence in schools was not increasing, and that most high school seniors were not at risk of being victims of crime at school. Furthermore, between 1992 and 1998, the rate of violent crime remained rather stable while overall school crime rates decreased (Annual Report of School Safety, 2000). Despite these encouraging trends, many students continue to worry about their safety at school (Annual Report of School Safety, 2000). According to the Metlife Survey of the American Teacher (Metropolitan Life Insurance, 2002), 15% of secondary students expressed a high level of fear of physical violence in or near school. DeVoe et al. (2004) reported that students were more fearful of being attacked at school, or on the way to and from school, than in other places away from school in 1999, 2001 and 2003. It is important to keep in mind that fear of victimization is not equally distributed across the population of students. Larger percentages of black and Hispanic students reported a fear of being attacked at school or on the way to and from school than did white students. Additionally, students in urban schools were more likely than students in suburban or

rural schools to fear being attacked both at school or on the way to and from school and away from school (DeVoe et al., 2004).

Even when research shows particular types of crimes have decreased, fear of crime may not necessarily mirror this decrease. Perceived violence is consistently reported at higher levels than self-reports of violent incidents (Furlong and Morrison, 1994). Students' perceptions of their safety at school, regardless of their actual level of physical safety at school, can have a significant influence on their behavior, emotional well-being and ability to learn.

Effects of Student Fear

Student fear has been associated with student absence, cutting class, and avoiding certain areas of the school building or grounds. The National Educational Goals Panel study in 1993 found that 22% of students in grades three through twelve were less eager to attend school because of an occurrence or threat of violence and 16% of students reported that violence and/or the threat of violence negatively influenced their participation in class (Lowry et al., 1995). This study also found that 25% of students indicated that the levels of violence they experienced or witnessed had detrimental effects on the quality of their education. Additionally, 7% of eighth grade students reported they stayed home from school in the previous month because of fear (Lowry et al., 1995). A study conducted by the Centers for Disease Control and Prevention in the same year reported a similar, yet less pronounced, finding. According to this study, 4.4% of students reported they missed at least one day of school in the previous month because they felt unsafe either at school or traveling to school (CDC, 1995). Hispanic and black

students were significantly more likely than white students to miss school because they felt unsafe. Younger female students (9th-grade) were also significantly more likely to miss school for this reason than older female students (12th-grade) (CDC, 1995).

In addition to missing school due to fear of violence, students may begin to perceive certain areas of the school where crime often occurs (e.g., cafeteria, parking lots, etc.) as unsafe. In an attempt to ensure their own safety, they begin to avoid these places. Data from the School Crime Supplement to the National Crime Victimization Survey indicates that 4% of 12-18 year olds reported avoiding one or more places in their school during the previous six months (DeVoe, 2004). Students' reports, however, varied according to their race/ethnicity, grade level, location and sector of their school. More specifically, minorities, students in lower grades, in urban areas, and attending public schools were most likely to report avoiding specific places in school (DeVoe, 2004).

Student fear may also contribute to psychological and emotional instability at school. A cross-sectional survey conducted by Bowen and colleagues on a sample of 602 at-risk middle and high school students examined the effects of student perceptions of school danger and teacher support on their sense of school coherence. The researchers define "school coherence" as the extent to which (a) students perceive themselves as capable of handling demands and challenges they face at school, (b) feel understood by others at school, (c) are able to structure the demands from their environment; and (d) find school challenging and engaging (Bowen et al., 1998: 274). Controlling for demographic characteristics of the sample, results of an analysis of covariance indicated that students' perceptions of danger at school negatively influenced students' sense of psychological engagement in school and confidence in their ability to meet school-related

demands and challenges (Bowen et al., 1998).   In addition to their finding that students'
sense of school coherence decreased as perceptions of school danger increased, the study
also found students' sense of school coherence increased as perceptions of teacher
support increased--thus recognizing the importance of positive teacher-student relations
in fostering a sense of security at school and creating an environment where students can
focus on academic achievement. Caution should be used when interpreting the results of
this study, however. The sample was restricted to students who had been identified as "at
risk of school failure", thus results may not generalize to other adolescent populations.
Additionally, because of the cross-sectional nature of the study design, causal inferences
cannot be inferred nor can alternative explanations for the findings be ruled out.

It is clear that fear of victimization is tied to a school's ability to provide an
environment conducive to learning, but it may also play a key role in how effective a
school is in preventing crime in the first place. As student fear increases, confidence in
school administrators, teachers and other adults within the school diminishes, and
informal social controls against violence weaken. Devine (1995) notes that when
children don't feel safe at school, they adopt a "self-help" approach where they settle
disputes on their own or with the help of their friends--an undertaking that can have a
potentially dangerous outcome. Lockwood (1997) echoes this sentiment. He suggests
that when informal social controls weaken, students may resort to bringing weapons to
school for protection, or building a reputation for themselves by fighting or exhibiting a
tough attitude (Lockwood, 1997).   Kingery, Pruitt and Heuberger (1996) profiled
students who carried weapons to school based on a sample of randomly selected 8th and
10th grade students in central Texas. Using discriminant analysis and chi-square tests the

authors found 48% of students who reported carrying a gun to school within the past 12 months ($N = 85$) indicated they did so because they feared for their safety. Kingery et al. (1996) also found that students who were previously victimized at school were more likely to carry a weapon to school. The results of this study may not generalize to other populations as the majority of the sample consisted of white students in a rural area of Texas.

While perceptions of danger at school may have a detrimental impact on the academic achievement and well being of students, a positive school climate may help reduce students' level of fear. In a multi-level study using data from 5,486 high school students in 377 schools that participated in the 1988 National Educational Longitudinal Survey, Lee and Croninger (1996) examined students' perceptions of their own safety in school while accounting for student demographic characteristics, demographic and structural characteristics of the schools, and a measure of positive school climate. Based on hierarchical linear modeling analyses, Lee and Croninger (1996) found that students reported feeling safer in schools that had positive relations between students and teachers. These findings held true regardless of the school's location, sector, size or student composition. The ramifications of a positive school climate are far-reaching and will be discussed in further detail later in this chapter.

School Security and Surveillance

The use of security and surveillance programs and practices represent only one of the many strategies schools use to prevent crime and promote safety (for a detailed review of the different activities used to promote school safety and deter problem

behavior, see Gottfredson and Gottfredson, 2002; Gottfredson and Gottfredson, 2001; Gottfredson et al., 2000). Schools around the country use a wide variety of strategies to enhance physical security (Trump, 1998) including school-based security guards or police officers, metal detectors, surveillance cameras, locker searches, limiting access to the school building (e.g., locked doors, fences, etc.), increased lighting, duress alarms, student, staff and visitor ID badges, visitor sign-in/out procedures, and marking school property for inventory control, just to name a few.

The following section provides a description of three different studies that examined the prevalence of security activities in U.S. schools. These studies used different samples, sampling techniques, and survey items in their research and therefore are not comparable to one another. The information provided in this section is intended for general descriptive purposes to illustrate the various types of security activities used in schools and the various methods individual researchers have used to examine the levels and types of school security use; it is not meant for the cross-study comparison of percentages of specific security activities used by schools.

Prevalence of Security Measures in Schools. The National Study of Delinquency Prevention in Schools (Gottfredson et al., 2000) developed a comprehensive taxonomy and description of existing school-based prevention programs and practices and examined correlates of successful program implementation of these programs and practices. Gottfredson and colleagues administered surveys to a national probability sample of U.S. public, private and Catholic schools and gathered information on hundreds of prevention activities designed to prevent problem behaviors and promote school safety. Among the many programs and practices examined were security and surveillance strategies.

Gottfredson et al. reported that 55% of schools ($N = 874$) have specific security or surveillance programs. Table 1 provides information from a random sample of schools with such programs on the proportion of security and surveillance activities using specific procedures.[1] The most common types of security or surveillance programs included the following: procedures for visitors in the schools, telephones or intercoms in the classroom, confidential ways to report problems, physical surveillance of entrances, locking doors and identification badges or cards. More intense and intrusive security or surveillance programs were less common but included: inspection of book bags or purses, locker searches, school-based security or police personnel, locking doors with alarms and panic bars, drug, gun, or bomb-sniffing dogs, closed circuit cameras, metal detectors, removing doors from lockers and/or restrooms and drug tests. Gottfredson et al. (2000) found that many of these security and surveillance programs were used more often in middle schools than in either elementary or high schools. They also reported that the use of several of the security measures (e.g., identification badges or cards, locating police or security personnel in the school, dogs, metal detectors, and inspection of books bags or purses) differed by location. Rural schools were less likely to use these security measures. Among schools with security programs, urban schools were more likely to have security personnel (45% vs. 30% vs. 30%) or police (30% vs. 14% and 18%) in the school than were rural or suburban schools. Urban schools were also more likely to use metal detectors than were rural or suburban schools (14% vs. 10% and 5%). Rural schools were more likely to use dogs (38% vs. 14% and 10%) than were suburban and

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[1] Table 1 proportions are based on a random sample of all schools whose principal reported security and surveillance activities and represent the percentage of specific security activities in schools that reported using security activities.

urban schools. Finally, suburban schools were less likely to inspect students' book bags

or purses (28% vs. 45% and 43%) than were rural and urban schools.

Table 1. Proportion of Security of Surveillance Activities Using Specific Procedures as Reported by the National Study of Delinquency Prevention in Schools.

Procedure	%
Procedures for visitors in the school	98
Telephones or intercoms in classrooms	85
Confidential ways to report problems	77
Physical surveillance of entrances	65
Locking doors, no alarms and panic bars	54
Identification badges or cards	47
Inspection of book bags or purses	40
Locker searches	39
Locating security personnel in school	35
Locking doors with use of alarms and panic bars	30
Drug, gun or bomb-sniffing dogs	23
Locating police personnel in school	20
Closed circuit cameras	18
Metal detectors	10
Removing lockers or restroom doors	10
Urine, hair, breath, or saliva testing for drugs	6

$N = 246\text{-}261$

Source: Gottfredson, G. D., Gottfredson, D. C., Czeh, E. R., Cantor, D., Crosse, S. B., and Hantman, I. (2000). *A National Study of Delinquency Prevention in Schools Final Report.* Ellicott City: Gottfredson Associates, Inc.

Using data from a recent survey of a national sample of public school principals,

Travis and Coon (2005) described the use of security technologies inside school

buildings, on school grounds and on school buses across the country. Travis and Coon

defined "security technologies" as "…products or tools that are designed to deter, detect,

or delay intentional acts against people or property" (2005:590) and include technologies

such as metal detectors, alarms, x-ray devices, surveillance cameras, etc. The researchers

developed a classification system for security technologies based on the amount of skill

and training of personnel required in order for the product to be used effectively. They created three categories of security technologies: (1) "Low level of complexity", which referred to physical/structural features used for security purposes such as gates, fences, automatic locks, and lighting; (2) "Moderate level of complexity" referred to technologies that required greater levels of attention by personnel and were more intricate than physical/structural features, such as security cameras, caller ID, alarms, etc., and (3) "High level of complexity" referred to technologies that required high levels of training, knowledge, and attention by personnel in order to be effective such as metal detectors and x-ray devices (2005: 595). Table 2 displays the percentage of security technologies used in schools during the 2000-2001 school year as reported by principals. Travis and Coon (2005) reported that the two most common technologies used by schools in this study were low complexity technologies. The majority of schools (81%) reported marking or otherwise identifying school property. Seventy-six percent of schools reportedly use lighting in an attempt to improve security; specifically, they reported having a well-lit campus at night. Other frequently reported security measures include: telephones or duress alarms in classrooms, burglar alarm system for the school, locked or monitored doors, posted signs regarding trespassing, and exterior doors that automatically lock from the outside. Security technologies that were rather complex and required highly trained or skilled personnel in order to be effective were the least likely to be used. Only 28% of schools reported using drug-sniffing dogs and only 11% reported the use of weapons-sniffing dogs. Metal detectors and x-ray devices were used even less frequently. Five percent of responding schools reported using random metal detector

checks on students, 2% reported daily metal detector checks of all students and 1% reported using x-ray devices on bookbags (Travis and Coon, 2005).

Table 2. Percentage of Schools Using Security Technologies During 2000-2001 by Level of Complexity as Reported by Travis and Coon (2005)

Technology	%
Low level of complexity	
▪ Mark/identify school property	81
▪ Lighting school grounds at night	76
▪ Posted signs regarding trespassing	52
▪ Exterior doors automatically lock from outside	40
▪ Fencing around school	34
Moderate level of complexity	
▪ Telephones or duress alarms in classrooms	68
▪ Burglar alarms for school building	63
▪ Locked or monitored doors	60
▪ Confidential ways to report problems	36
▪ Caller ID	29
▪ Security cameras inside of school	22
▪ Locked or monitored gates around school grounds	21
▪ Security cameras for outdoor areas	19
▪ Entry/exit alarms on exterior doors	18
▪ Random sweep for drugs (not including dog sniffs)	16
▪ Random sweep for weapons (not including dog sniffs)	11
▪ Alcohol detection devices	9
▪ Antigraffiti sealers on exterior/interior walls	8
▪ Drug testing for students	7
High level of complexity	
▪ Drug-sniffing dogs	28
▪ Weapons-sniffing dogs	11
▪ Random metal detector checks on students	5
▪ Daily metal detector checks on all students	2
▪ Metal detectors checks on visitors	1
▪ X-ray school bags	1

N = 1373

Source: Travis, L. F. and Coon, J. K. (2005). School safety and the use of security technology. In R. Muraskin and A. R. Roberts (Eds.), *Visions for Change: Crime and Justice in the Twenty-First Century, 4th ed.* Upper Saddle River, NJ: Prentice Hall).

Travis and Coon (2005) used a multivariate analysis to determine which school characteristics were significantly related to level of security technology adoption while controlling for other school characteristics. The results of this analysis indicated that high schools were more likely than elementary schools to report high levels of security technology use (p <.01).   Urban schools were also more likely to use security technologies (p<.01) as were schools in the South (p<.01).   Additionally, neighborhood crime level, total number of students, and crime in school were all positively related to amount of security technology used in school (Travis and Coon, 2005).

As well as collecting data on the incidence and frequency of many types of serious crimes, the National Center on Education Statistics' study of school violence, conducted by Heaviside, Rowand, Williams and Farris (1998), also collected data on the types of school security and other violence prevention measures in place in public schools during the 1996-97 school year. Among other things, the NCES survey asked principals to report the types of security measures in place at their school. Schools reported on whether or not they used seven specific security measures in their school and about the presence of police or other law enforcement at the school. Table 3 provides the percentages of schools using a particular security measure. The majority of schools required visitors to sign in (96%), had closed campuses for most students during lunch (80%), and had controlled access to the school building (54%) (Heaviside et al., 1998). Fewer schools reported more invasive security measures such as drug sweeps (19%), random metal detector checks (4%) and daily metal detector checks (1%). Schools reporting serious violent crimes were more likely to use metal detectors than schools

reporting less serious crime or no crime (4% compared with 1% or less) (Heaviside et al,

1998).

Table 3. Percentage of Schools Using a Specified Security Measure as Reported in the National Center for Education Statistics' *Violence and Discipline Problems in U.S. Public Schools: 1996-97*

Security Measure	%
Visitors sign in	96
Closed campus for most students during lunch	80
Controlled access to school building	53
Controlled access to school grounds	24
One or more drug sweeps (locker search, dog searches)	19
Random metal detector checks	4
Daily metal detector checks for all students	1

N = 1,234

Source: Heaviside, S., Rowman, C., Williams, C., and Farris, E. (1998). *Violence and Discipline Problems in U.S. Public Schools: 1996-97.* (NCES 98-030). Washington, D. C.: U.S. Department of Education, National Center for Education Statistics.

In addition to the security measures discussed above, Heaviside and colleagues

also collected data on the presence of police or other law enforcement officials in the

school. They report that only 6% of public schools had police or other law enforcement

representatives stationed 30 hours or more at the school, while the majority of schools

(78%) did not have any officials stationed at their school during the 1996-97 school year.

Twelve percent of schools reported they did not have officials stationed during a typical

week but were available if needed. The presence of law enforcement was more likely to

be found in middle schools (10%) and high schools (19%) than in elementary schools

(1%). This security measure was also more likely to be found in schools that were large

(1000+ students), located in a city, had 50% or more minority enrollment, had principals

who reported serious discipline problems, and had at least one serious crime reported in 1996-97 (Heaviside et al., 1998).

Heaviside et al. (1998) concluded that 2% of public schools had stringent security, which was defined as a full-time guard and daily or random metal detector checks. Eleven percent of schools had moderate security such as a full-time guard or a part-time guard with restricted access to the school, or metal detectors with no guards. The vast majority of schools (84%), however, reported having a low level of security, which included restricted access to schools but no guards or metal detectors. Three percent of schools reported that they did not use any of the security measures asked about in the survey (Heaviside et al., 1998).

It should be noted that the studies discussed above have limitations. All three studies relied on sample surveys that were completed by school principals. Because of this method of data collection, these studies may suffer from inaccurate reporting. For example, there may be problems due to recall (e.g., time frame of recall was too lengthy, memory decay, etc.), lack of honesty, or principals simply may not have reported information that they believed reflected badly on their schools or programs. Another potential problem for these studies may be non-response bias. For instance, in the National Study of Delinquency Prevention in Schools conducted by Gottfredson and colleagues (2000) only two-thirds of the schools invited to participate in the first phase of study participated[2]. Additionally, urban secondary schools participated at a lower rate than other schools. While statistical weighting was used in an attempt to correct this

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[2] The first phase of the study surveyed principals in a national probability sample of 1287 schools to identify activities used in their school to prevent or reduce delinquency, drug use, or other problem behavior or to promote a safe and orderly school environment. Principals also described features of their schools and reported on past experiences with the implementation of programs and on school staffing. Phase one surveys were conducted in the spring, summer, and early fall of 1997.

problem, differential participation may have biased the results. Similarly, in the study conducted by Travis and Coon (2005), fewer than half of the schools sampled responded to the survey. Travis and Coon compared their sample with the U. S. Department of Education's Common Core of Data to determine if the schools that participated in their survey were representative of the population of U.S. public schools. While their sample did not differ significantly on several measures, such as number of students, number of full-time classroom teachers, or pupil to teacher ratio, there were significant differences on critical variables. The responding schools for this study significantly differed on the proportion of white students, the proportion of students eligible for free lunch, school level, region, and location (e.g., urban, suburban, rural). Based on this finding, their results may not generalize to all public schools. An additional problem Travis and Coon cite with their study was that the survey contained no open-ended questions. If schools used security technologies that were not listed on the survey, they more than likely were not reported. The authors admit that because of this, it is likely that the data underestimate the overall use of security technologies used in schools.

Despite these limitations and notwithstanding the dissimilarities in methods across the three studies, the studies suggest that secondary schools and schools located in urban areas were more likely to use security activities than elementary schools and schools located in rural or suburban areas. Additionally, the studies suggest that the majority of security activities used by schools are unobtrusive measures such as having procedures for visitors, locking doors, and the presence of telephones or intercoms in the classrooms. Finally, all three studies indicated that more intrusive security activities such as metal detectors were rarely used in most schools.

Goals and Benefits of Security and Surveillance Strategies. According to Green
(1999), the primary goals of security devices in schools are to deter, detect, or delay
crime and disorder. While deterring crime and misbehavior before it occurs is the
ultimate goal of any security plan, it is rather lofty goal. Since schools cannot deter all
inappropriate behaviors, detection is a second goal of security strategies. A final goal of
security strategies is to delay perpetrators so that authorities have time to arrive at the
scene. Many security devices may serve several purposes such as deterrence and
detection as is the case with surveillance cameras, metal detectors, drug-sniffing dogs,
locker searches, school resource officers and lighting.

The greatest anticipated benefit of using security strategies in schools is that they
will improve school safety. If in fact these security mechanisms do deter, detect and
delay crime and other types of inappropriate behaviors, crime and violence may be
reduced in schools. Green (1999) suggests that security strategies may reduce crime and
misbehavior in schools by (1) reducing opportunities for infractions and (2) increasing
the likelihood that violators will be caught. Whether these security strategies actually
improve the safety of the school or not remains to be determined, however, they do send
an important message that the school takes the threat of violence seriously and is actively
doing something to combat it. Therefore, these strategies may have the added benefit of
depicting the school as a safe and secure institution where students and teachers can go
about their daily activities without the fear of victimization.

Another benefit to the use of security strategies is that they may have more
immediate effects than prevention programs that often take a significant amount of time
to work. While prevention programs aimed at reducing anti-social and delinquent

behavior are an important, and prevalent, component to schools' safety programs, they do not have immediate effects. As Green (1999:1) states "…security incidents are occurring in schools that must be dealt with now—perpetrators must be caught and consequences must be administered." Prevention curricula are unable to deal with this immediate threat to student and staff safety.

Unintended Consequences of Security and Surveillance Strategies. Opponents of the use of stringent security strategies (e.g., metal detectors, security guards or police presence in the schools, surveillance cameras, etc.) argue that the increasing reliance on security technology signifies a dramatic change in education that has altered the role and authority of teachers, normalized violence, increased student fear, and changed the physical and social environments in some schools.

The Changing Role and Authority of Teachers. An ethnographic study conducted by John Devine (1995) sent graduate students from New York University's School of Education to tutor "at-risk" adolescents in New York City public high schools serving the poorest and most violent communities. Based on the field notes gathered by graduate students, Devine (1995) suggested that the school system's decision to bestow more responsibility for discipline on school security guards and a greater reliance on security technologies signifies a reduction in the teacher's role and influence on students. In some school systems, the traditional role of the teacher as the authoritarian has now been assigned to school security guards or school resource officers who police the areas of the school outside of the classroom. The largest ramification of this practice involves a reduction in teachers informally connecting with students, which at one point in time was a relatively large part of their role. Devine (1995) explained that in the past, teachers

would gather in the halls, stairways, and the cafeteria with students and were able to influence their behavior through this interaction. Teachers would also bond with students outside of the classroom in a type of informal social camaraderie and could thereby influence their lives either by being a part of the youth culture or by challenging the youth culture as a respected adult. Nowadays, teachers retain most of their control and authority only in their classroom, while public places such as halls, stairways and the cafeteria are no longer thought to be within the control of teachers. For some students, it may be that their most significant student-adult relationships are interactions with guards rather with teachers (Devine, 1995).

Another force behind the physical withdrawal of teachers from interactions with students comes from unions and administrators constantly urging teachers to avoid any type of physical contact with students—both improper contact and during physical altercations between students (Devine, 1995). Intervening in student altercations has now become the province of the guards. In some schools, teachers who witness a fight or conflict between students will call the security guard or watch the incident resolve itself rather than intervene themselves. Students may interpret this withdrawal of teachers from public spaces within the school building as the teachers simply not caring about the welfare of students. This may contribute to students feeling apprehensive and fearful in areas of the school that are viewed as being outside the teacher's control and authority (Devine, 1995).

The "Normalization of Violence" and Increased Student Fear. According to Devine, the obvious message security guards and security technology send is that the school is concerned with violence and is taking steps to prevent it. The hidden message

is that the school *expects* violence. According to opponents, it is difficult to fathom that a school lobby filled with security guards, police officers and high-tech security equipment actually projects the image of a school that is safe. Rather, it may be more likely that these devices imply that the school is out of control. This "normalization of violence" may lead students to believe that teachers and administrators have lost control over the student body and that control has been given over to the technology and the personnel brought into the school to keep crime out (CBSSE, 2000:11).

> This total abandonment of the *in loco parentis* role by the teachers is the first social fact noted by incoming ninth graders…The school is perceived by them as a space totally lacking structure, one to which they must quickly adapt if they are to survive in an environment in which teachers attempt not to see disruptive student behaviors…and in which security guards and hall deans react only to the most outrageous activities…The youth culture, for its part, interprets this unwillingness to confront unacceptable behaviors as reflecting a society totally without boundaries, one that is fearful of challenging adolescents (Devine, 1995: 176, 178).

Devine noted that when students believe that their school is not safe, they adopted a "self-help" approach where they resolved conflicts on their own or with the help of their peers, the consequences of which can be profound. According to Devine:

> The resultant development of an autonomous culture of school violence replicating itself within a climate of fear means that every student is expected to conform to a code of 'toughness' and to incarnate the street demeanors, styles, attitudes, and values necessary for self-protection ('backup'), since the tacit…sociocultural assumption is that no overriding authority is—or can be—in control of the public space (1995: 189).

The Alteration of Physical and Social Environments of Schools. Some opponents argue that the increased reliance on security guards, police officers and other security technologies have made our schools too rigid (Colvin et al., 1993, Devine, 1995, Noguera, 1995). The excess structure and control in schools brought about by security strategies can be counterproductive and undesirable. Colvin, Kameenui and Sugai (1993)

argued that schools have become agents of control that often use coercive measures that interfere with learning and result in an atmosphere of mistrust and resentment. Noguera (1995) echoed this sentiment. He suggested that traditional methods of social control such as metal detectors, zero tolerance policies, police officers, security guards, etc., contributed to systemic violence and had adverse impacts on the school climate and educational experience of all students. Noguera (1995) viewed the existing philosophical framework of schools as a carryover of a turn-of-the-century asylum which focused on control of clients. He contended the use of such rigid control measures make the school resemble prison-like 'lock-down' facilities for students (Noguera, 1995: 190). Prisons have more surveillance cameras, metal detectors, and locked doors than any other place in America, however they are the least safe places to be. Psychiatrist James Gilligan conducted research on the emotional and physical safety of incarcerated prisoners. He suggested that prisoners' feelings of safety depend upon the extent to which they feel respected and treated fairly, and the degree to which they believe the authorities are in charge and care (Gilligan, 1996, 1997). The same goes for schools. Making schools more like prisons likely does very little for the emotional safety of students.

In conclusion, literature on the unintended consequences of the use of security technology in schools suggests that rigid security measures may potentially increase student fear and subsequently increase the level of violence within the school by creating a youth culture of violence imported from the streets and predicated on self-protection. Some critics propose that the focus on the surveillance, and often, coercive control of students has reshaped the physical and social environments in some schools. It is also alleged that these policies and practices may contribute to a negative school climate that

fosters fear, insecurity, intimidation, and alienation. In an attempt to create safer learning environments through the use of security practices, some schools have witnessed less positive teacher-student interactions; a trend that may have a grave impact on student bonding and that could influence both delinquency and academic achievement. If the opponents are accurate, it may very well be that school security and surveillance practices cultivate and create the very problems they are designed to eradicate.

Evaluations of School Security Strategies. Whether security activities actually reduce student fear and improve school safety or have the opposite effect has yet to be determined. Research on the effectiveness of security strategies in meeting their goals and resulting in safer schools is sparse. Only a handful of studies have attempted to evaluate the effects of security technology in reducing school crime or fear of crime. Ginsberg and Loffredo (1993) conducted a study of a representative sample of New York City public high school students in schools with and without hand-held metal detectors. Using self-report surveys, they found that students in schools with *and* without metal detectors were equally likely to report having been threatened or involved in a physical fight at or away from school. When examining the prevalence of weapons-carrying in school, differences did emerge between the two groups of students. Students in schools with metal detectors were half as likely to report carrying a weapon inside the school building (7.8% vs. 13.6%) or going to and from school (7.7% vs. 15.2%) as students in schools without metal detectors (Ginsberg and Loffredo, 1993). There were no differences, however, between the two groups in self-reported weapons-carrying in settings other than the school (Ginsberg and Loffredo, 1993). While this study was unable to comment on whether metal detectors actually reduce violence-related injuries

or deaths in schools, the reduction in weapon-carrying in fights at school should reduce the levels of injury and lethality of fights.

This study should be interpreted carefully due to its weak design and limitations. The authors provided virtually no details of the survey, analysis or sample. Additionally, no information was provided on demographic characteristics of the students or schools that participated in this study or differences in the response rates of treatment and control groups. Therefore, there is no way to ascertain if this study suffers from differential attrition. It may be that schools in the treatment condition are less violent schools than the control schools or that students most likely to bring weapons to school were either absent or chose not to participate in the survey. The researchers cannot adequately rule out alternative explanations for their findings. The analyses conducted for this study consisted simple of percentages and confidence intervals, which are unable to statistically control for other factors that may be related to the study's outcome. Finally, there were also no controls for other interventions that may have been implemented during time period of study.

Mayer and Leone (1999) reanalyze data from the 1995 School Crime Supplement to the National Crime Victimization Survey. They used interviews of 6,947 public school students in grades 7 through 12. Students were asked about school rules, personal experience with violence, accessibility of drugs, and fear of victimization. Results from structural equation modeling indicated that higher levels of disorder were associated with more efforts to control school premises in highly restrictive manners (e.g., metal detectors, locked doors, security guards, etc.). The model also indicated that students tended to engage in more acts of self-protection and reported higher levels of fear in

schools that had higher levels of disorder. Mayer and Leone (1999) also found that the better students understood school rules and consequences for infractions and the more consistently rules were enforced, the less disruption existed. The authors underscored the critical need for schools to focus efforts on communicating individual responsibility rather than control to establish legitimacy of a school's system of law with students.

This study should also be interpreted with caution. No information was provided regarding the characteristics of the subjects used in their sample other than age range (12-19 years) and the fact they attended a public school for at least five of the last six months prior to the survey. Mayer and Leone also made no mention of the use of statistical controls in their analyses which is a problem because of the cross-sectional nature of their data. Without appropriate control variables, no conclusion can be reached regarding the temporal ordering of the relationship between school security and school disorder. Although Mayer and Leone's study indicated a positive relationship between school security and school disorder, they were unable to determine the precise causal ordering of the relationship. In other words, it is just as likely that school security caused school disorder as it is that school disorder caused increased school security.

Much of the research on the unintended negative consequences of school security has been qualitative and anecdotal in nature. The most compelling piece of evidence to date is John Devine's ethnographic study of New York City high schools. The goal of the present study is to provide the first methodologically sound quantitative study testing the assumptions of this body of literature. Although still in its infancy, literature on the unintended consequences of the use of security technology in schools focuses primarily on three negative effects of using security practices in schools (i.e., the normalization of

violence, the changing role and authority of teachers, and altering the physical and social environments of schools). While this body of literature is not itself grounded in criminological scholarship per se, many of the ideas presented by this body can be linked to Robert Samson's concept of collective efficacy.

Collective Efficacy

Collective efficacy can be viewed as the "mutual trust among neighbors combined with the willingness to intervene on behalf of the common good, specifically to supervise children and maintain public order" (Sampson, Raudenbush, and Earls, 1998:1). Collective efficacy has been shown to be a significant factor in explaining levels of crime and disorder (Sampson and Raudenbush, 1997; 2001) as well as fear of victimization (Gibson et al., 2002; Markowitz et al., 2001). The focus of collective efficacy is on the effectiveness of informal social controls through which community residents maintain public order in their neighborhood. A neighborhood's willingness to prevent acts like truancy and loitering on street corners by teens, to monitor and supervise neighborhood children, and to confront individuals committing public incivilities illustrate examples of the informal social control communities can exert upon their residents. The key mechanism influencing opportunities for interpersonal crime in a neighborhood is the capacity of the residents to regulate the behavior of their own and to control visible signs of disorder (Sampson and Raudenbush, 1997).

The connection between the concept of collective efficacy and the literature on the consequences of school security use is the focus on the importance of interpersonal relations and a shared sense of community in controlling crime and disorder and

alleviating fear. Positive social relations and cohesion among neighborhood residents, as well as residents' willingness to exercise informal social control within their neighborhood, determine the level of collective efficacy that exists within that neighborhood. Consequently, neighborhoods with high levels of collective efficacy should also have high levels of informal social control which should lead to lower levels of fear, delinquency, and crime as these neighborhoods are better able to informally regulate the behavior of their residents (Gibson et al., 2002; Markowitz et al., 2001; Morenoff et al., 2001; Sampson and Raudenbush, 1997; Sampson et al., 1999). This same process can translate into the school environment by substituting the members of the school (e.g., teachers, students, administrators) for the neighborhood residents in the original theory. In this context, the school's residents are in charge of exercising informal social control within their school in order to control the conduct of the student body. Schools that have positive social relations and cohesion among students, teachers and administrators, in addition to teachers' and administrators', who are willing to exercise informal social control within the school, will have higher levels of collective efficacy in their school. This should result in lower levels of fear, disorder and crime.

The literature on school security, however, suggests that bringing security devices and personnel into the school hinders the development of collective efficacy. At the core of collective efficacy are group cohesion, strong informal relations among members of the community (which allows for the effective use of informal social controls) and common norms and goals. Opponents of school security argue that the reliance on such devices weakens a school's sense of community, reduces the amount of interpersonal bonding among school members, and ultimately weakens the level of informal social

controls present within the school. Devine (1995) and other critics outline the process through which this occurs. The withdrawal of teachers from common areas of the school (i.e., cafeteria, stairwells, hallways, etc.) due to the reliance on security technology damages teacher-student relations because students' perceive this withdrawal of teachers as (1) teachers' lack of concern for the well-being of students, and (2) teachers' inability to exert control in these common areas of the school. A consequence of this withdrawal by teachers is an increase in student fear in areas of the school building that are viewed as being beyond the control or concern of teachers. When social bonds between teachers and students weaken, the informal social controls within the school that helped regulate student conduct also weaken. The end result of such a process is a negative school climate in which teachers are unable to regulate the behavior of students, the absence of strong student bonds, and students who are fearful of their environment.

The implications of weak social bonds and negative school climate are far reaching. The following sections provide overviews of the research conducted in these areas.

School Climate

As mentioned above, it has been suggested that the reliance of schools on security and surveillance strategies may contribute to a negative school climate. "School climate" is a rather broad term that encompasses several different areas such as a school's culture, organizational structure, social milieu and ecological environment (Anderson, 1982; Stewart, 2003; Wilcox and Clayton, 2001; Welsh et al., 1999). A school's climate often refers to the unwritten beliefs, values, and attitudes of the school, and the interaction

between students, teachers and administrators as well as organizational characteristics of the school (Anderson, 1982; Welsh et al., 2001). In one of the first studies to examine how organizational characteristics of schools influence levels of victimization, Gottfredson and Gottfredson's (1985) reanalysis of the Safe School Study data combined 1970 census data with student, teacher and principal reports on the level of disorder and personal victimization in school. With a sample of over 600 secondary schools, these researchers found that numerous characteristics of school climate were related to increased levels of victimization. Specifically, they found inadequate resources for teachers, poor cooperation between teachers and administration, inactive administration, punitive teacher attitudes, inconsistent enforcement of rules and unfair rules predicted teacher victimization net of exogenous community and student demographic characteristics (Gottfredson and Gottfredson, 1985).

Although the number of empirical studies on the influence of school climate on school crime and disorder is small, it is growing. Recent research has focused on multi-level analyses to study the influence on school climate factors on delinquency, victimization and school disorder. This research has provided mixed results on the effects of school climate and various problem behaviors. For example, Felson, Liska, South, and McNulty (1994) found that school climate predicted various forms of crime and delinquency. Using hierarchical logistical modeling, this group of researchers found school norms regarding violence significantly predicted involvement in interpersonal violence, theft and vandalism and school delinquency. The percentage of black students was related to individual interpersonal violence even after controlling for individual demographics. These researchers also reported that the "culture of violence", "academic

values" and school SES were significantly related to delinquency (Felson et al., 1994). They concluded that schools' normative beliefs influence violence and aggressive behavior net of individual personal beliefs.

Lee and Croninger (1996) also found support for the influence of school climate in their multi-level study using data from 5,486 high school students in 377 schools participating in the 1988 National Educational Longitudinal Survey. Lee and Croninger (1996) examined students' perceptions of their own safety in school while accounting for student demographic characteristics, demographic and structural characteristics of the schools, and a measure of positive school climate (e.g., positive teacher-student relations). Based on hierarchical linear modeling analyses, Lee and Croninger (1996) found that students reported feeling safer in schools that had positive relations between students and teachers. This finding held true regardless of the school's location, sector, size or student composition.

Wilcox and Clayton (2001) used hierarchical logistical models to estimate individual- and school-level predictors of weapons carrying among more than 6,8000 students in 21 schools in Louisville, Kentucky. Although school-level factors were less predictive of weapons carrying than individual-level factors, both school- and individual-level factors did explain weapons carrying to some extent. School-level SES significantly predicted weapons carrying, however, this effect was mediated by "school capital" (a measure of protective factors for students) and "school deficits" (a measure of risk factors for students) (Wilcox and Clayton, 2001).

Finally, Gottfredson, Gottfredson, Payne, and Gottfredson (2005), examined the extent to which school crime was explained by structural characteristics, and the extent to

which school climate factors were related to school disorder while controlling for structural characteristics. School climate was measured by a variety of items and scales that include: student reported fairness and clarity of rules and teacher reports of organizational focus, morale, planning, and administrative leadership. The study found that schools with greater perceived fairness and clarity of rules had lower student delinquency and student victimization. Schools with more positive psychosocial climates reported lower rates of teacher victimization (Gottfredson et al., 2005).

Other research has *not* discovered the same positive effects of school climate on problem behaviors. Welsh, Greene and Jenkins (1999) examined the influence of individual, school and community factors on misconduct in 11 Philadelphia middle schools. Using census, school, and police data as well as school climate data from the Effective School Battery (Gottfredson, 1999), Welsh and colleagues examined multiple predictors of student misconduct including: community poverty/residential stability, community crime, school size, student perceptions of school climate (referred to as school attachment), individual student characteristics (e.g., age, race, gender, school involvement/effort, belief, and positive peer associations). This study found that individual-level factors explained more of the variance than either school- or community-level factors (16% vs. 4.1% and 4.5% respectively). Welsh et al. (1999) conclude that aggregate-level school attachment was not a significant predictor of student misconduct. However, this study used a relatively small number of schools and all of the participating schools came from the same urban school district which may have reduced the variability in the variables of interest.

Stewart (1993) also used multi-level analyses to examine individual- and school-level factors to explain variation in school misbehavior among a nationally representative sample of high school students. Stewart used two indicators of school climate: 1) "social problems" (based on administrator and student reports of a range of behavioral problems among students) and 2) "school cohesion" (based on teacher and student reports of the extent to which there is trust, shared norms and expectations and positive interactions among teachers, administrators, and students). The only school-level variables that significantly predicted school misbehavior were school size and location. Neither school problems nor school cohesion were significantly related to school crime and misbehavior (Stewart, 2003).

A small group of researchers have focused their attention on a particular aspect of school climate known as "communal school organization." The concept of communal school organization resembles Robert Sampson's concept of neighborhood collective efficacy which was previously defined as the "mutual trust among neighbors combined with the willingness to intervene on behalf of the common good, specifically to supervise children and maintain public order" (Sampson, Raudenbush, and Earls, 1998:1). Positive social relations and cohesion among neighborhood residents, as well as residents' willingness to exercise informal social control within their neighborhood, determine the level of collective efficacy that exists within that neighborhood. Consequently, neighborhoods with high levels of collective efficacy should also have high levels of informal social control which should lead to lower levels of delinquency and crime as these neighborhoods are better able to informally regulate the behavior of their residents (Morenoff et al., 2001; Sampson and Raudenbush, 1997; Sampson et al., 1999).

The concept of communal school organization also revolves around the ideas of group cohesion, strong informal social relations among its members, and common norms and experiences. Solomon and colleagues define communally organized schools as schools in which "…members know, care about, and support one another, have common goals and sense of shared purpose, and to which they actively contribute and feel personally committed" (Solomon et al., 1997:236). The process through which communal school organization reduces crime and delinquency is similar to the process through which neighborhood efficacy controls crime and delinquency. It is hypothesized that communally organized schools will have higher levels of informal social control and student bonding, which in turn will lead to lower levels of crime and delinquency among members of the school.

Several researchers have tested ideas based on the concept of communal school organization. For example, using a sample drawn from the national High School and Beyond study, Bryk and Driscoll (1988) examined school organization characteristics with relation to student behaviors. Bryk and Driscoll found that schools that maintained more positive school climates developed a sense of community within the school in which teachers and administrators genuinely care about the students, interact on a regular basis with the students, and relay norms and expectations for behavior. As a result, these schools displayed lower levels of problem behavior. The Bryk and Driscoll (1988) study discovered that communal organization significantly reduced all of the measured problem behaviors net of controls for school composition, school size, parental cooperation, and student selectivity. More specifically, these researchers found that communally organized schools displayed higher levels of teacher efficacy, work enjoyment and

morale and had lower rates of teacher absenteeism than schools that lacked this sense of community. Additionally, communally organized schools also reported lower levels of student misbehavior and school dropout and higher levels of math achievement and academic interest (Bryk and Driscoll, 1988).

In an analysis of communal school organization and various student outcomes based on a sample of 24 schools, Battistich and colleagues (1995) found that students' sense of school community was significantly related with student attachment to school, empathy, prosocial and academic motivation, self-esteem, conflict resolution, and altruistic behavior. A later study by two of these researchers, Battistich and Solomon (1997) found communal organization was significantly correlated with teacher satisfaction, work enjoyment and efficacy, more positive perceptions of principal effectiveness, parental supportiveness, and positive relations between students and teachers.

Finally, Payne, Gottfredson and Gottfredson (2003) used structural equation modeling and data from a nationally representative sample of 254 public secondary schools to examine the effects of communal school organization and student bonding on school disorder (e.g., teacher victimization, student victimization, and student delinquency). Their results suggested that communally organized schools predicted teacher victimization and student delinquency. The relationship between communal organization and student delinquency was mediated by student bonding (Payne et al., 2003).

In conclusion, empirical evidence suggests that schools with shared norms and values, supportive and caring relationships between students, teachers and administrators

are better able to generate feelings of community and are more likely to regulate student behavior, have students with more positive attitudes, and teachers with higher morale (Astor et al., 1999; Battistich et al., 1995; Bryk and Driscoll, 1988; Gottfredson and Gottfredson, 2002, Payne et al., 2003). Research has suggested that to reduce student misbehavior, schools should encourage cooperation between administrators and teachers, enforce fair and clear rules, and encourage caring, supportive interactions between teachers and students (Astor et al., 1999; Battistich et al., 1995; Bryk and Driscoll, 1988, Gottfredson and Gottfredson, 1985; Gottfredson et al., 2005; Payne et al., 2003). In all likelihood, the type of climate a school has and its level of communal organization influence school crime and delinquency via a mediating mechanism of student bonding. The study conducted by Payne et al. (2003) supported the existence of this mediating relationship. Based on this finding and the ideas expressed in the communal school organization literature of the influence of a school's sense of community on social bonds, it is relevant to discuss the implications that student bonding has on behavioral outcomes.

Student Bonding

According to Travis Hirschi's social control theory (1969), people commit crimes when their bond or tie to society is weak or broken. The social bond—the link between individuals and society created through the process of socialization—restrains people from committing because they value the bond and don't want to damage it. Therefore, youth with stronger social ties to traditional institutions such as family, school and peers, are less likely to engage in and maintain delinquent behavior than youth with weak or

broken social bonds to these same institutions. The social bond, as developed by Hirschi, consists of four elements: attachment, commitment, involvement and belief.

Attachment refers to the degree to which we care about the opinion of others. It is an emotional bond that represents a person's sensitivity to and interest in others. According to Hirschi, the most important attachments are those to parents, school and peers. The stronger a child's attachments to parents, schools and peers, the less likely it is they will commit delinquency. The second element of the social bond is commitment. Commitment is the rational component of the bond that refers to the amount of time, effort and energy invested in conventional activities and pursuits, such as getting a good education. Commitment controls juveniles because they know getting into trouble will hurt their chances of becoming successful. Involvement is the third element of the social bond and simply represents the amount of time spent in conventional activities. The more time a child spends doing conventional activities such as homework, athletics, clubs, after school programs, etc., the less time they will have to engage in delinquency. The final element of the social bond is belief, which refers to the acceptance of the norms and rules of conventional society. This element of the bond focuses on respect for the laws and rules of society and for the people and institutions responsible for upholding those laws and rules. According to Hirschi's theory, children who believe they should obey laws and rules are less likely to engage in delinquency and other deviant behaviors compared to children who do not believe in the validity and authority of the law and rules of society.

Hirschi's social bonding theory is one of the most tested theories in criminology (Stitt and Giacopassi, 1992). Dozens of studies of delinquency have shown support for

the theory (for reviews of empirical research see Kempf, 1993 and Krohn, 2000). Generally, studies have found that delinquency is lower among children who: feel closer to their parents, like their teachers, value schooling, take part in school activities and believe in the conventional rules of society. Since the focus of the current study is school-related behaviors, the remaining discussion of Hirschi's theory will be limited to the effects of school bonding. Hirschi (1969) tested his theory within the context of the school using a sample of 4000 junior and senior high school students in California. Delinquency was higher among students with weaker attachment to school (as indicated by self-reported measures that they did not like school and did not care about teachers' opinions of them). Similarly students who had low commitment to school and low belief in school rules were more likely to be delinquent (Hirschi, 1969).

Other research also supports the negative relationship between school bonding and delinquency. For instance, Jenkins (1997) studied the effects of school bonding on school crime. Using a 14-item scale of various delinquent behaviors, Jenkins found that having a strong social bond to the school environment and personnel resulted in less delinquent acts committed at school. Specifically she found an inverse relationship between school crime and commitment to school, belief in school rules, and attachment to teachers (Jenkins, 1997).

Cernkovich and Giordano (1992) also tested Hirschi's theory in the school domain. Results from their research indicated that attachment and commitment to school and teachers is negatively associated with self-reported delinquency for both black and white youth. This relationship remained even after controlling for race, gender, parental communication, perceptions of opportunity, and socioeconomic status. The researchers

concluded that school bonding was moderately associated with delinquency and was as important as parental and peer attachments (Cernkovich and Giordano, 1992). Examining levels of victimization in schools, Gottfredson and Gottfredson (1985) found that schools with higher levels of student attachment to school and belief in rules had lower levels of both student and teacher victimizations.

Examining the influence of individual, institutional and community factors on school misconduct, Welsh et al. (1999) reported findings consistent with previous research on the negative associations between school bonds and school disorder (Gottfredson and Gottfredson, 1985) and student misbehavior (Jenkins, 1997). Welsh and colleagues (1999) reported the strongest predictor of student misconduct was school effort (a measure of commitment), however, belief in rules and positive peer associations (a measure of attachment) were also significantly related to lower levels of student misconduct. A significant positive relationship was found for involvement and student misconduct—a similar finding to that reported by Jenkins (1997) and Paternoster et al. (1983).

More recently, a study conducted by Stewart (2003) using multilevel modeling techniques on a nationally representative sample of 10th grade students concluded that school social bonds played a considerable role in reducing school misbehavior, net of school and individual controls. Specifically, he found that belief in school rules was the strongest predictor, followed by attachment and school commitment respectively. Stewart's study did not find a significant relationship between school involvement and school misbehavior, however.

While the negative relationship between school bonding and delinquency has been well established by research (Cernkovich and Giordano, 1992; Gottfredson et al., 2002; Jenkins, 1997; Krohn and Massey, 1980; Liska and Reed, 1985; Stewart, 2003; Welsh et al., 1999), research specifically linking the level of school bonding experienced by students to school climate is sparse. However, the research that does exist on the relationship between student bonding and school climate supports the notion that schools with more positive school climates and greater communal organization experience greater levels of student bonding (Battistich et al., 1995; Payne et al., 2003; Solomon et al., 1992). As the climate of the school becomes warmer, students' feelings of attachment to the school as well as to the teachers and administrators increase, they become more committed to the school and their belief in the validity of school norms and rules increase (Payne et al., 2003).

Statement of the Problem

Despite the fact that millions of dollars are spent each year on improving school security, not much has been done in the way of evaluating the efficacy of these strategies in terms of their ability to reduce violence. The studies that have been conducted on this topic have been criticized for methodological limitations. Even fewer evaluations exist on the capacity of security and surveillance strategies to reduce student fear of school violence, an important contributor to student conduct and associated with student absence, cutting class, avoiding specific areas of the school, and most importantly, impeding the learning process. The literature that does examine this relationship suggests that the use of highly restrictive security practices may actually increase school disorder

(Mayer and Leone, 1999). Many are skeptical of the use of security and surveillance practices in schools and argue that the potential negative consequences stemming from the use of these devices greatly outweighs any benefit they may have. Of particular concern is the possible negative influence security measures may have on the level of school disorder, student fear, the school's climate and the level of student bonding to the school and school-related adults. The current study seeks answers to important questions pertaining to the use of school security and surveillance measures. Specifically, do students feel safer in schools with security and surveillance measures than students in schools without these devices? Additionally, are schools that use security and surveillance measures more likely to experience a less positive school climate and lower levels of student bonding than schools that do not use these devices?

The Present Study

The present study uses data from the National Study of Delinquency Prevention in Schools to examine the relationship between the use of school security and surveillance measures and the level of student fear. This study also explores the possible negative consequences of the use of these devices on school climate and school student bonding.

This study contributes to the field of criminological research in several ways. First, it expands the literature on student fear, a topic that, to date, has received very little attention. Second, much of the literature on the negative consequences of school security has been qualitative and anecdotal in nature; the present study provides a quantitative test of hypotheses derived from this literature and linked to the concept of collective efficacy. Finally, this study will explore the relationship between the use of security measures and

school climate and how this relationship influences the levels of fear and bonding among students. No other study has attempted to empirically link the use of security practices to school climate or student bonding.

The reliance on security technology has caused the withdrawal of teachers from common areas of the school resulting in a weakening of the informal bonds between student and teachers brought about by fewer social interactions and student perceptions of teachers' lack of concern and control. The weakening of these bonds coupled with the intimidating and controlling nature of some security devices culminates in increased levels of student fear and a negative school climate. Literature on school climate, however, suggests that positive school climates and communally organized schools may mediate the effects of student fear and bonding (Lee and Croninger, 1996; Payne et al., 2003). Specifically, this research suggests that positive school climates can lessen student fear and increase student bonding. Based on these suppositions, this study will test three hypotheses:

1. The level of student fear is higher in schools that use security activities than in schools that do not use security activities.

2. The level of student bonding is lower in schools that use security activities than in schools that do not use security activities.

3. The effect of school security activities use on student fear and student bonding is mediated by school climate.

Figure 1 shows the models based on these hypotheses tested in this study.

Figure 1. Hypothesis-Based Models

Hypothesis 1

School
Security   +   Student
Activities   ─────────────────────▶   Fear

Hypothesis 2

School
Security   -   Student
Activities   ─────────────────────▶   Bonding

Hypothesis 3

School   Student
Security   -   Positive   -   Fear
Activities ────────▶   School   ◟
                           Climate   ◝
                                           +   Student
                                                           Bonding
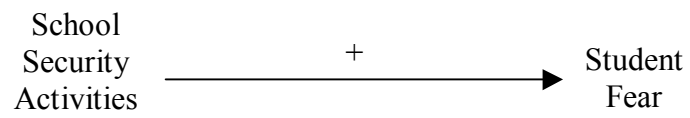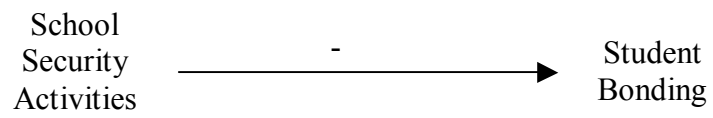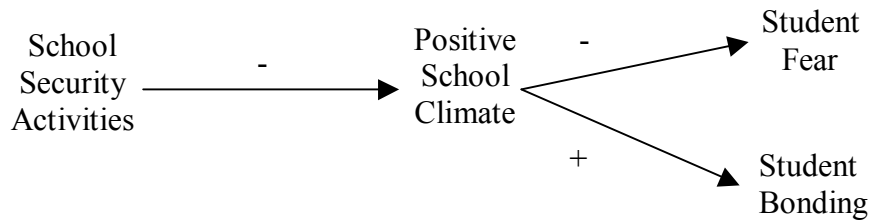
Chapter 3

METHODS

Sample

The National Study of Delinquency Prevention in Schools (Gottfredson and Gottfredson, 2002; Gottfredson and Gottfredson, 2001; Gottfredson et al., 2000) was designed to classify and describe existing school-based prevention programs and activities and to examine factors related to successful implementation of these programs and practices. It also provided national estimates of the amount of crime and violence occurring in and around U.S. schools by school level and location. For that reason a sample of public, private, and Catholic schools, stratified by location (urban, suburban, and rural) and level (elementary, middle, and high) was drawn from the most comprehensive list of schools available—a mailing list maintained by Market Data Retrieval, a commercial mailing list vendor. A probability sample of 1287 schools (143 for each cell in the sample design) was selected with the expectation that if a response rate of 70% could be achieved, there would be 300 schools responding at each level and 300 schools responding from each location (about 100 per cell, or 900 schools overall). The first principal survey was administered during the spring, summer, and early fall of 1997. The second principal survey, as well as student and teacher surveys, was administered in the spring of 1998. Only secondary schools are used in this analysis ($N =$ 847) since student surveys (on which most of this study's measures are based) were not administered in elementary schools.

Schools Used in this Analysis. Additional schools were eliminated from this study due to various forms of non-response. Many schools were excluded from the study

due to non-response to the student questionnaire. Of the 847 secondary schools in the sample, 37% ($N = 310$) participated in student questionnaires. Additionally, some schools ($N = 34$) were excluded because of principal non-response to the question regarding security from the first principal questionnaire—the primary variable of interest in this study[1]. Therefore, the final sample for this study consists of 276 secondary schools that participated in the student survey and had a valid response to the use of security/surveillance activities question from the first principal survey. The final sample contains 246 public schools, 9 Catholic schools and 21 private schools. Thirty-two of the schools in this sample are alternative schools for disruptive youth. Preliminary analyses indicated no significant differences between public, private, parochial, or alternative schools on the variables of interest in this study (e.g., student fear, bonding, school climate). Correlation analyses also indicated that the direction of the associations with key study variables was similar in these subsets of schools. Despite this finding, the final analyses will be conducted with and without alternative, private, and parochial schools to determine if their inclusion alters the final results of the analyses.

Response Rates. Most of the measures in this study are based on student questionnaires. In most instances, a sufficient number of students were sampled to produce an estimated 50 respondents per school. When a student roster containing student gender was available, students were systematically sampled within gender. Otherwise, students were stratified by grade level for sampling. In this final sample, the within-school response rate for the student survey ranged from 14% to 100% with a mean of 74%.

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[1] A sensitivity analysis was done including imputed data for schools with non-response on this item to ensure that the exclusion of these schools did not bias the results.

Item Non-Response. Some schools were also eliminated from the study due to item non-response. Schools were omitted using listwise deletion if they did not respond to specific survey items used as variables in this study. For example, schools that did not provide information regarding the level of crime present in their community (a control variable in the present study) were dropped from the final sample. The final analysis sample therefore consists of 233 schools for models testing student fear and 247 schools for models testing student bonding.

When comparing the final sample of schools used in the current analysis with the full sample of 847 secondary schools on various school and community characteristics, several differences appeared. Table 4 displays the results of this comparison. The final sample was less likely to be located in urban areas and contained a smaller percent of private schools. The grade levels included in the schools also differed with 42% of the final sample and 49% of the full sample being high schools. Also 12% of students in the final and 15% of students in the full sample were African American. While several other characteristics of the schools and communities were significantly correlated with participation in the survey, the magnitude of these differences were rather small. For example, 25% of community residents in the final sample were college educated compared to 27% in the full sample. There were no significant differences between the final sample and the full sample on the following school and community variables: % teachers African American, percentage students male, school enrollment, level of poverty and disorganization, residential crowding, welfare, male unemployment and female-headed households.

The literature on fear of school crime suggests that minorities experience higher levels of fear than do whites (DeVoe et al., 2004). The current sample may under-represent this population. This same literature on fear of school crime also suggests that younger students (e.g., middle school children) report higher levels of fear, as do those attending public schools. Both of these groups were slightly over-represented in my sample compared to the larger full sample. These findings may have some implications for the generalizability of the results of this study and are discussed further in the limitations section of this study. Final analyses statistically control these variables.

Table 4. Comparison of Full Sample and Study Sample on Relevant School and Community Characteristics

	Full Sample		Final Sample	
	Mean	**SD**	**Mean**	**SD**
% Teachers African American	7.46	16.44	6.09	14.05
% Students African American*	15.42	23.14	12.02	19.38
% Students Male	48.61	10.23	49.00	10.51
Proportion College Educated*	.27	.15	.25	.14
Proportion Owner Occupied Housing**	.66	.17	.69	.14
Proportion Urban**	.61	.46	.54	.46
School Enrollment	696.86	556.22	673.94	537.63
Male Unemployment	.06	.04	.06	.04
Welfare	.08	.06	.07	.06
Female-Headed Households	.30	.46	.26	.28
Level of Poverty and Disorganization	-.02	.98	-.08	.79
Residential Crowding	.05	.92	.03	.93

	%		**%**	
Grade Level**				
– Middle/Junior High	51		58	
– High/Vocational	49		42	
School Auspices**				
– Public	84		89	
– Private	12		7	
– Parochial	4		4	

Note. Ns for the full sample range from 624-847. Final sample $N = 233$.
*$p < .05$; **$p < .01$

Measures

Items and scales created from principal, student and teacher questionnaires are described below. Some reliability coefficients are taken from Gottfredson et al., 2000. Appendices A-G contain items and reliability coefficients for each scale and items and factor loadings for scales based on census data indicators.

Level-1 (Within-School) Measures.

Dependent Variables. *Student fear* is a 3-item scale from the student questionnaire (adapted from the Effective School Battery [ESB], G. D. Gottfredson, 1999) measuring students' feelings of safety in school and on the way to and from school. Items include "How often do you feel safe while in your school building", "How often are you afraid that someone will hurt or bother you at school", and "How often are you afraid that someone will hurt or bother you on the way to or from school". Responses were "almost always", "sometimes", and "almost never". This variable was negatively skewed with the majority of students reporting a low level of fear at school. A transformation to reduce skew was done by adding a value of one to the scale and then taking the natural log. The overall scale score is the mean of the individual item scores with high values indicating higher levels of fear. The individual-level alpha for this scale is .60. Appendix A provides more information on the items used in this scale.

Student bonding is an individual's average score across three bonding variables (e.g., attachment, commitment, and belief) based on Hirschi's social bonding theory. The decision to combine attachment, commitment and belief into one variable that represented student bonding was based on the finding that the three measures were highly

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correlated at the individual level. Pearson's correlations ranged from .58 to .60; all of the correlations were statistically significant ($p < .01$). The individual measures of attachment, commitment and belief are further discussed below.

Attachment is a 13-item scale from the student questionnaire (adapted from What About You [WAY], Form DC, Gottfredson and Gottfredson, 1999) measuring students' emotional bonds to teachers and the school in general, as well as students' feelings of belonging. Examples of items include "I care what teachers think about me," "I am usually happy when I am in school," "I like school," and "Teachers care about the students." Responses to items were "mostly true," and "mostly false". Several scale items were recoded so that higher scale values indicate stronger levels of student attachment. The scale score represents students' mean scores across all items. The individual-level alpha for this scale is .82. Appendix B provides more information on the items used in this scale.

Belief is a 23-item scale from the student questionnaire (adapted from WAY, Form DC, Gottfredson and Gottfredson, 1999) dealing with students' feelings about breaking rules and the legitimacy of norms. Examples of items include "I want to be a person of good character," "You have to break some rules if you want to be popular," "Sometimes you have to be a bully to get respect," and "Sometimes a lie helps to stay out of trouble with the teacher." Responses to most items were "yes," and "no" or "mostly true," or "mostly false". Six items asking students how wrong it was to engage in various behaviors were based on a four-point Likert scale. These responses were combined into two categories "very wrong," or "not wrong". When necessary, scale items were recoded so that higher scores indicated stronger levels of belief in school rules. The scale score

indicates the average score across all items. The individual-level alpha for this scale is .86. Appendix C provides more information on the items used in this scale.

Commitment is a 14-item scale from the student questionnaire (adapted from WAY, Form DC, Gottfredson and Gottfredson, 1999) measuring the effort and value students place on their schoolwork, grades, and homework. Examples of items include "I am proud of my school work," "I usually quit when my school work is too hard," "The grades I get in school are important to me," and " It is important to me to complete all my assignments." Responses for 11 of the items were "mostly true," or "mostly false". The three remaining items included Likert-scale responses. These responses were combined together resulting in two response categories—one indicative of higher levels of commitment and one of lower levels of commitment. When necessary, scale items were recoded so that higher scores indicated stronger levels of commitment. The scale score represents students' mean scores across all items. The individual-level alpha for this scale is .83. The average of these three scales was used to create the dependent variable student bonding. Appendix D provides more information on the items used in this scale.

Exogenous Variables. *Sex* is a binary variable taken from the student questionnaire indicating whether a student was male (1) or female (0).

Race[2] is a binary variable also taken from the student questionnaire. A value of one (1) was given to white non-Hispanic students. Students of other races or ethnicities received a value of zero (0).

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[2] The decision to use a binary race variable of white non-Hispanics rather than including all racial and ethnic groups was reached after examination of the data indicated that many schools did not have students of different races and ethnicities. Seventy-six schools contained no African Americans, 141 schools had no Asian students and 166 schools did not report any American Indian students. Only four schools reported the absence of white students. The statistical applications used in this study would view the race variable in schools without minority students as a "constant" and would thereby drop these schools from the analyses.

Hispanic/Spanish Origin was a binary variable taken from the student questionnaire indicating whether a student was Hispanic/Spanish (1) or not of Hispanic/Spanish origin (0).

Grade and *Age* are continuous variables also taken from the student questionnaire indicating the student's actual grade and age in years respectively.

Level-2 (Between-School) Measures.

Independent Variable. S*ecurity Activities* is a binary variable taken from the first principal questionnaire indicating whether or not a school uses security/surveillance activities to promote school safety and prevent problem behavior.[3] Principals were asked to respond "yes," or "no" to using security or surveillance activities in their school. Security or surveillance activities were defined as the "application of procedures to make

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Therefore, more schools were able to be included in the final analyses with white non-Hispanic as the race variable.

[3] It seems likely that some security activities (i.e., metal detectors, security guards, surveillance cameras, etc.) would have a greater effect on student fear than others (i.e., id badges, locking exterior doors, telephones in the classrooms, etc.). Based on this supposition it may be likely that a binary variable simply indicating whether a school uses *any* type of security activity may not bet the best way operationalize the use of security activities when investigating levels of fear. It was possible to examine this possibility using a subset of schools (N = 128) that responded to a more detailed set of questions about their security programs. This subset of schools reported which types of security measures were used in the school. For this subset, a dichotomous variable was created to capture whether a school used intrusive security activities (1) or more benign security activities (0). Intrusive security activities included the use of security and/or police personnel, close circuit cameras, drug testing, drug-, bomb-, or weapon-sniffing dogs, metal detectors, locker searches, inspection of bookbags/purses, and the removal of restroom/locker doors. Analyses conducted on this subset of schools indicated that 93% of the schools sampled that reported using security activities used at least one activity from the intrusive category. Correlations indicated that the relationship between intrusive security activities and student fear in the subset of schools (N =128) was not statistically significant (r = .06, p<.53) nor as strong as the correlation between the original binary measure of security activities and student fear (r = .13, p<.03) in the full sample of schools (N = 276). Furthermore, information pertaining to the individual types of security activities used was taken from a questionnaire that was randomly administered to only a subset of schools that indicated they used security activities (N =128). Because of this sampling technique, using a measure of security activities taken from this data would mean reducing the sample of schools that indicated using *any* type of security activity from 193 schools in the full sample of 276 schools to 128 schools in the subset of schools that provided additional information regarding the types of security activities used. For these reasons, the decision was made to use the more simplistic binary variable for security indicating whether the school used any type of security activity regardless of its level of intrusiveness.

it difficult for intruders to enter the school, watching entrances, hallways and school grounds; making it easier to report problem behavior; searching for weapons or drugs; removing barriers to observation or inspection; action to avert potential unsafe events."

Mediating Variable. *Communal School Organization (CSO)* is a measure of school climate and is based on the Morale scale from the teacher questionnaire (adapted from the ESB, Gottfredson, 1999) and the Organizational Focus scale, also from the teacher questionnaire (adapted from the Organizational Focus Questionnaire, Gottfredson, 2000). CSO is a 15-item scale measuring the level of support experienced by teachers, the degree of collaboration between and among teachers and administrators, and commonality of the goals and normative behaviors of the school. Examples of items include: "The administration is supportive of teachers," "I feel my ideas are listened to and used in this school," "The goals of this school are clear," "My school has a clear focus," and "Rules and operating procedures are clear and explicit in school." Responses to five of the scale items were "true" and "false" while responses for the remaining 10 items were "false," "mostly false," "mostly true," and "true". The Likert-type items were condensed into two categories; "false," and "mostly false" were combined into one response ("false") and "mostly true" and "true" were combined into another response ("true"). Higher scores indicate a more communally organized school. A school's score is the mean across teachers of the proportion of items endorsed. The individual level alpha for the scale is .92. Appendix E provides more information on the items used in this scale.

Exogenous Variables. *Percentage students African American* is based on data from the student questionnaire.

Percentage teachers African American is based on data from the teacher questionnaire.

Percentage student male is based on the self-reported gender of students who completed the student questionnaire.

Grade level is a binary variable indicating whether the school is a middle/junior high school (0) or a vocational/senior high school (1).

Student enrollment is based on principal reports of the number of students enrolled in the school from the first principal questionnaire. These principal reports were compared with data from the Common Core of Data and Market Data Retrieval. Clarification from the schools was sought when substantial discrepancies occurred. The natural log of the enrollment was taken to reduce skew. One school is an outlier on this measure. Analyses will be conducted with and without this school to determine if its presence in the sample alters the final results.

Student-teacher ratio is calculated based on principal reports of the number of students currently enrolled in the school divided by the number of full time teachers for the current school year.

Number of different students taught is calculated from a question in the teacher questionnaire. Teachers were asked to report how many different students they taught within an average week; responses were "Fewer than 35," "35 to 70," "71 to 100," and "More than 100." Responses were then coded as follows: "Fewer than 35" was coded as 17.5, "35 to 70" was coded as 52.5, "71 to 100" was coded as 85.5, and "More than 100" was coded as 120.

Poverty and Disorganization is a factor score based on measures obtained from the 1990 Census for the zip code areas in which the school is located. The following census variables are markers for the factor: welfare (the average household public assistance income), female-headed household (the rate of single females with children under 18 to married couples with children under 18), median income (the proportion of households with income below $27,499), poverty (rate of persons below the 1.24 poverty level to persons above), divorce rate (the rate of persons older than 15 years who are married to those who are separated, divorced, or have spouse absent), and male and female unemployment (proportion of unemployed males/females in the labor force). Three schools are outliers on this measure. Analyses will be conducted with and without these schools to determine if their presence in the sample alters the final results. Appendix G provides more information on the items and factor loadings for this measure.

Residential Crowding is a factor score from the 1990 Census. Marker variables for the factor are the ratio of households with five or more people to other households and the proportion households not English speaking. Four schools are outliers on this measure. Analyses will be conducted with and without these schools to determine if their presence in the sample alters the final results. Appendix G provides more information on the items and factor loadings for this measure.

Urbanicity is a factor score based on 1990 Census data for the school's zip code area. The following variables are markers for the factor: population size (total population), urbanicity (the proportion of people living within an urban area), and an

ordinal variable measuring city level[4] (e.g., rural, suburban, urban). Appendix G provides more information on the items and factor loadings for this measure.

Community Crime is based on a question in the second principal questionnaire. Principals were asked to report how much of a problem are vandalism, personal attacks and theft in the neighborhood surrounding their school; responses were "None or almost none," "A little," "Some," "Fairly much," and "Very much". Responses were coded from 1 through 5 with higher values indicate greater levels of community crime.

Community gang problems is a binary variable taken from the second principal questionnaire indicating whether gangs are a problem in the community in which the school is located.

School auspices is a binary variable based on information provided by Market Data Retrieval indicating whether a school is private or parochial (0) or public (1).

Table 5 shows the means, standard deviations, range, and *N*s for all of the variables described above.

Analysis Strategy

To test the multi-level models of individual- and school-level effects in this study, hierarchical linear modeling (HLM) techniques were used. HLM allows for simultaneous investigations of relationships within a particular hierarchical level, and between different hierarchical levels (Raudenbush and Bryk, 2002) while controlling for covariates. In an attempt to refine the models that would be included in HLM analyses, Pearson's correlations were first run to examine bivariate associations of level-one and level-two variables to determine which control variables to include in subsequent analyses as well

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[4] High values on this measure represent rural areas while low values represent urban areas.

Table 5. Means, Standard Deviations, Range and *N* for Study Variables

Variable	Mean	Standard Deviation	Range	*N*
Level 1 Measures				
Dependent Variables				
Student Fear	1.21	.25	1.00-2.00	11099
Student Fear (natural log)	.17	.19	0.00-0.69	11099
Student Bonding	.67	.20	0.00-1.00	10960
Exogenous Variables				
Gender	.49	.50	0.00-1.00	11124
White Non-Hispanic	.67	.47	0.00-1.00	11070
Hispanic/Spanish Origin	.14	.35	0.00-1.00	11028
Grade	8.24	1.80	6.00-12.00	11107
Age	14.05	1.90	9.00-18.00	11107
Level 2 Measures				
Independent Variable				
Use of Security Activities	.68	.47	0.00-1.00	233
Mediating Variable				
Communal School Organization	1.63	.30	0.75-2.33	233
Exogenous Variables				
Percentage Students African-American	12.80	20.95	0.00-100.00	233
Percentage Teachers African-American	6.09	14.05	0.00-86.00	233
Percentage Students Male	49.00	10.51	0.00-100.00	233
Grade Level	8.35	1.53	6.00-12.00	233
Student Enrollment	693.35	532.83	6.00-4482.00	233
Student Enrollment (natural log)	6.21	.96	1.79-8.41	233
Student-Teacher Ratio	16.62	5.36	3.00-49.00	233
Number of Different Students Taught	83.19	22.56	17.50-120.00	233
Poverty and Disorganization	-.08	.79	-1.31-5.74	233
Residential Crowding	.03	.93	-1.79-5.25	233
Urbanicity	-.22	.94	-2.13-2.39	233
Community Crime	2.26	1.04	1.00-5.00	233
Community Gang Problems	.39	.49	0.00-1.00	233
School Auspices	.89	.31	0.00-1.00	233

*Note. N*s represent the number of students and schools in student fear models. Student bonding models included an additional 14 schools.

as to check for multicollinearity among control variables. Only those control variables significantly correlated to the outcome variable of interest (e.g., fear, bonding, school climate) were included in subsequent HLM models. In the event that control variables were highly correlated with each other, a decision was made as to which variable to retain for analysis. Additional details regarding this process are provided in the following chapter.

The HLM6 Hierarchical Linear and Nonlinear Modeling Program (version 6.00 for Windows; Raudenbush, Bryk, and Congdon, 2004) was then used to model the effects of security practices and exogenous variables on student fear, bonding, and school climate. The development and testing of these models occurred in several stages. Figure 2 displays the estimated models used in this study. The first step involved modeling a one-way random-effects ANOVA, otherwise known as a "fully unconditional model" (Raudenbush and Bryk, 2002: 36). This model, which included no predictors or control variables, predicted the outcome within each level-1 unit with just one level-2 parameter, the intercept (see Figure 2, equation 1). In this case, the intercept was the mean outcome (e.g., student fear or bonding depending on the model) for the jth unit (where j represented a particular school).

The next step involved building level-1 models using individual-level predictors (see Figure 2, equation 2). These models indicate whether a predictor was significantly related to a particular outcome, and if this relationship varied across level-2 units. Models were built for both student fear and bonding and included the level-1 control variables that were correlated with each of these outcome measures. In these analyses, all level-1 predictors were group mean centered and slopes were allowed to vary in order to

Figure 2. HLM Level-1 and Level-2 Models

Level-1 (Within-School) Models

$Y_{ij} = \beta_{0j} + r_{ij}$ and $\qquad$ [1]

$Y_{ij} = \beta_{0j} + \beta_{1j}(X_{ij} - \overline{X}_{1\cdot j}) + \beta_{2j}(X_{ij} - \overline{X}_{2\cdot j}) + \beta_{3j}(X_{ij} - \overline{X}_{3\cdot j}) + \beta_{4j}(X_{ij} - \overline{X}_{4\cdot j}) +$

$\beta_{5j}(X_{ij} - \overline{X}_{5\cdot j}) + r_{ij} \qquad$ [2]

$Y_{ij} = \beta_{0j} + \beta_{1j}(X_{ij} - \overline{X}_{1\cdot\cdot}) + \beta_{2j}(X_{ij} - \overline{X}_{2\cdot\cdot}) + \beta_{3j}(X_{ij} - \overline{X}_{3\cdot\cdot}) + \beta_{4j}(X_{ij} - \overline{X}_{4\cdot\cdot}) +$

$\beta_{5j}(X_{ij} - \overline{X}_{5\cdot\cdot}) + r_{ij}$ where, $\qquad$ [3]

I	= person "i",
J	= school "j",
Y_{ij}	= the fear/bonding score for an individual,
β_{0j}	= the intercept for each jth school,
β_{1j} through β_{5j}	= the slopes for each jth school,
$(X_{ij} - \overline{X}_{1\cdot j})$ through $(X_{ij} - \overline{X}_{5\cdot j})$ (equation 2)	= each individual's score on the level-1 control variables after subtracting the *group* mean,
$(X_{ij} - \overline{X}_{1\cdot\cdot})$ through $(X_{ij} - \overline{X}_{5\cdot\cdot})$ (equation 3)	= each individual's score on the level-1 control variables after subtracting the *grand* mean,
r_{ij}	= the residual, unexplained portion of Y

Level-2 (Between-School) Models

$\beta_{0j} = \Upsilon_{00} + u_{0j} \qquad$ [4]

$\beta_{0j} = \Upsilon_{00} + \Upsilon_{01}W_{1j} + \Upsilon_{02}W_{2j} + \Upsilon_{03}W_{3j} + \Upsilon_{04}W_{4j} + \Upsilon_{05}W_{5j} + \Upsilon_{06}W_{6j} + \Upsilon_{07}W_{7j} + \Upsilon_{08}W_{8j}$
$+ \Upsilon_{09}W_{9j} + \Upsilon_{010}W_{10j} + \Upsilon_{011}W_{11j} + \Upsilon_{012}W_{12j} + u_{0j} \qquad$ [5]

$\beta_{0j} = \Upsilon_{00} + \Upsilon_{01}W_{1j} + \Upsilon_{02}W_{2j} + \Upsilon_{03}W_{3j} + \Upsilon_{04}W_{4j} + \Upsilon_{05}W_{5j} + \Upsilon_{06}W_{6j} + \Upsilon_{07}W_{7j} + \Upsilon_{08}W_{8j}$
$+ \Upsilon_{09}W_{9j} + \Upsilon_{010}W_{10j} + \Upsilon_{011}W_{11j} + \Upsilon_{012}W_{12j} + \Upsilon_{013}W_{13j} + u_{0j} \qquad$ [6]

β_{0j}	= the Y intercept for each jth school,
Υ_{00}	= the grand mean of fear/bonding score across all schools,
Υ_{01} through Υ_{013}	= regression coefficients to be estimated,
W_{1j}	= group-level predictor (e.g., use of school security devices)
W_{2j} through W_{12j} (equation 2)	= level-2 control variables,
W_{13j} (equation 3)	= school climate variable,
u_{0j}	= between-unit error or a unique effect of school j on mean school fear/bonding

determine whether to proceed using fixed or random effects models as recommended by Raudenbush and Bryk (2002) (Equation 2). Once this determination was made, all remaining analyses had level-1 variables centered around the grand mean (also done in accordance with recommendations by Raudenbush and Bryk, 2002) producing a model that functioned very similarly to the classic ANCOVA model in which the intercept could be interpreted as an adjusted mean for group j (Equation 3).

The Level-2 (between school) model used the intercept from the level-1 analysis as a dependent variable and estimated the effects of security practices and level-2 control variables on both student fear and bonding while also controlling for level-1 exogenous variables. Slopes of level-1 controls were freed or fixed depending on the results previous analyses detailed above. Level-2 predictors were uncentered as Raudenbush and Bryk indicate that the centering of level-2 variables is not really critical: "All of the γ coefficients can be easily interpreted whatever choice of metric (or nonchoice) is made for level-2 predictors." (2002:35).

If it were to be determined on the basis of the previous analyses that security practices significantly influenced either student fear or bonding, school climate variables (e.g., school-level bonding and communal school organization) would be added to the model to determine if the effect of school security devices remains or disappears with its addition.

Chapter 4

RESULTS

This chapter presents results from the various statistical applications used to analyze the relationship between the use of school security devices and student fear, bonding and school climate. The first section of this chapter describes the results of Pearson's correlations that were run to examine the direction and magnitude of relationships between the use of security activities, the study's outcome measures (fear, bonding and school climate), and level-1 and level-2 control variables. The rationale for deciding which control variables to include in subsequent analyses is also described in this section. Following this section, a detailed explanation of each stage of the hierarchical linear modeling (HLM) analyses conducted is summarized along with the results of each stage of analysis. This chapter concludes with sensitivity analyses that were conducted to determine if the results of these HLM analyses would change based on the omission of outliers, private, and parochial schools and the use of statistical weights to adjust for non-response and sampling design.

Correlation Analyses

Level-1 Variables. Table 6 presents the correlations among level-1 study variables. These correlations were used to determine which student-level control variables were related to the dependent variables (e.g., student fear and student bonding), as well as to determine if collinearity was an issue among any of the control variables. All of the level-1 control variables were significantly related to student fear. Positive zero-order correlations were present for sex and two of the three race variables. Males,

black non-Hispanics, and Hispanics were more fearful than their counterparts. Negative zero-order correlations were found for age, grade, and whites indicating that older students and whites were less fearful.

Many of these relationships are consistent with past research conducted on student fear. For instance, Devoe and colleagues (2004) found non-Hispanic black students, Hispanic students, and younger students reported higher levels of fear and their counterparts. These researchers also found that female students experienced greater fear both at school and away from school, a finding not supported by the correlations presented in this study. The relationship between gender and fear may be less straightforward than the relationship between fear and other variables such as age and race, however. A study conducted by Alvarez and Bachman (1997) found that gender did not have a significant effect on students' perceived level of fear while at school.

Table 6. Correlations Among Level-1 Variables

Variables	1	2	3	4
1 Student Fear (natural log)	1.000			
2 Student Bonding	-.187**	1.000		
3 Sex	.066**	-.179**	1.000	
4 Age	-.130**	-.112**	.017	1.000
5 Grade	-.153**	-.083**	-.013	.904**
6 White Non-Hispanic	-.093**	.047**	-.011	-.022**
7 Black Non-Hispanic	.050**	-.004	-.015	.008
8 Hispanic	.060**	-.057**	-.016	-.001

Table 6 Continued.

Variables	5	6	7	8
1 Student Fear (natural log)				
2 Student Bonding				
3 Sex				
4 Age				
5 Grade	1.000			
6 White Non-Hispanic	-.020*	1.000		
7 Black Non-Hispanic	-.001	-.500**	1.000	
8 Hispanic	-.001	-.577**	-.144**	1.000

*N*s range from 10716-11124
**$p<.01$; *$p<.05$

All but one of the level-1 control variables was significantly correlated with student bonding. Negative zero-order correlations were found for sex, age, grade, and Hispanic suggesting that females, younger students and non-Hispanics reported higher levels of student bonding than other groups. A significant positive correlation was found for white non-Hispanics indicating that this group also displayed higher levels of student bonding.

These findings are consistent with previous research that found females, whites and younger students tend to be more bonded (Agnew, 1985; Jenkins, 1995; Krohn and Massey, 1980; Rosenbaum and Lasley, 1990). However, not all research has reached these conclusions. For instance, several studies have concluded that no differences in the level of bonding exist between various racial categories (Cernkovich and Giordano, 1992; Junger and Marshall, 1997).

Several strong correlations between control variables suggested multicollinearity. For instance the zero-order correlation between age and grade was .90. Because grade had a slightly higher correlation with fear (the primary variable of interest in this study) than did age (-.15 vs. -.13), the decision was made to use grade rather than age in subsequent HLM analyses. Similarly, several of the race variables were highly correlated with each other. The decision to use the white non-Hispanic race variable as the racial control in subsequent analyses was made based on the finding that the white non-Hispanic category had the highest correlation with student fear (-.09 compared to .05 for Black non-Hispanic and .06 for Hispanic/Spanish) and was the only racial category to have a negative correlation with student fear, indicating white non-Hispanics were less fearful than both black non-Hispanics and Hispanics. The decision to use these same level-1 controls for student bonding models was for the sake of consistency.

Level-2 Variables. Table 7 displays correlations among level-2 variables. The table suggests support for one of the hypotheses. There is a positive correlation between the use of school security practices and student fear suggesting that as the use of security increases the level of student fear also increases. Eight of the school-level control variables show significant and positive zero-order correlations with student fear: percentage students black, poverty and disorganization, residential crowding, percentage teachers black, community gang problems, community crime, school auspices, and student-teacher ratio. Grade had the only significant negative zero-order correlation with fear.

Research conducted by Alvarez and Bachman (1997) supported several of these findings. Using a nationally representative sample of over 10,000 junior and senior high school students, Alavarez and Bachman (1997) found higher levels of fear among younger students, those who attended public schools and those that had lower family incomes. Students also reported higher levels of fear in schools where gangs were noticeably present. Alvarez and Bachman (1997) did not find that school location significantly influenced fear--a finding also found by the present study. However, DeVoe and colleagues (2004) reported that students in urban schools are almost twice as likely as students in suburban or rural schools to experience fear of attack at school or while going to or from school in 2003.

Bonding and communal school organization were not significantly correlated with the use of security practices in schools. However, these outcome measures were significantly correlated with numerous school-level control variables. Percentage of students male, community gang problems, community crime, grade, and school auspices had significant negative zero-order correlations with bonding. Significant positive correlations were found between student enrollment and the number of different students taught and student bonding. Communal school organization had negative zero-order correlations with only three school-level variables: student enrollment, the number of different students taught, and school auspices.

Table 7. Correlations Among Level-2 Variables

Variables	1	2	3	4	5	6	7	8
1 Fear (natural log)	1.000							
2 Bonding	-.198**	1.000						
3 Communal School Organization	-.188**	.120	1.000					
4 Security Practices	.173**	-.092	-.030	1.000				
5 % Students Black	.307**	.036	-.139	.125	1.000			
6 Poverty & Disorganization	.263**	.009	-.039	.069	.528**	1.000		
7 Urbanicity	-.012	.097	.007	.237**	.018	-.144*	1.000	
8 Residential Crowding	.182**	-.074	-.097	.107	-.038	.054	.003	1.000
9 Student Enrollment (natural log)	.109	.186*	-.239**	.303**	.022	-.014	.292**	.126
10 % Students Male	-.048	-.145*	-.037	.040	-.061	.060	-.085	-.037
11 % Teachers Black	.324**	-.011	-.122	.141*	.836**	.459**	.001	.038
12 Community Gang Problems	.254**	-.126	.044	.213**	.068	.113	.352**	.241**
13 Community Crime	.276**	-.167*	-.077	.153*	.226**	.299**	.051	.211**
14 Number of Different Students Taught	.087	.165*	-.113*	.152*	.103	-.190**	.061	.038
15 Grade	-.383**	-.248**	-.048	-.057	-.126	.098	-.009	.016
16 School Auspices	.368**	-.180**	-.282**	.177**	.069	-.083	-.128	.039
17 Student-Teacher Ratio	.134**	-.073	-.059	.157*	.060	.013	.188**	-.011

Table 7 Continued.

Variables	9	10	11	12	13	14	15	16
1 Fear								
2 Bonding								
3 Communal School Organization								
4 Security Practices								
5 % Students Black								
6 Poverty & Disorganization								
7 Urbanicity								
8 Residential Crowding								
9 Student Enrollment (natural log)	1.000							
10 % Students Male	-.024	1.000						
11 % Teachers Black	-.013	.045	1.000					
12 Community Gang Problems	.051	.020	.061	1.000				
13 Community Crime	.038	.018	.189**	.436**	1.000			
14 Number of Different Students Taught	.650**	-.019	-.123	-.084	-.037	1.000		
15 Grade	-.131*	-.108	-.070	.108	.085	-.339**	1.000	
16 School Auspices	.416**	.136*	.050	-.064	.072	.428**	-.165**	1.000
17 Student-Teacher Ratio	.317**	-.015	.095	.161*	.084	.200*	-.065	.138*

$N = 233$

**p<.01, *p<.05

Prior research on school climate and communal school organization supports the finding of a negative relationship between a positive school climate and school size. Bryk and Driscoll (1988), for example, reported a negative relation between school community and school size among a large sample of high schools. Welsh and colleagues (2000) also found a negative relationship between school size and their measure of school climate.

Once again, several of the school-level exogenous variables were highly correlated with one another. For example, the correlation between percentage of students black and percentage of teachers black was .84 while the zero-order correlation between student enrollment and the number of different students taught was .65. Therefore, several criteria were used to determine which school-level control variables to include in subsequent HLM analyses. Only exogenous variables that had a significant zero-order correlation with a relevant dependent variable (i.e., student fear and bonding) were included in the statistical model. If level-2 control variables were highly correlated with each other (as was the case with percentage students and teachers black) the variable with a stronger correlation to the relevant outcome measure was included in the models for that outcome measure. If these correlations were similar in magnitude, the decision was then based on the amount of missing data for each of the control variables. The control variable with the least amount of missing data was included in the model. Therefore, different control variables were used when modeling the influence of the use of security practices on student fear than in the models estimating the influence of security practices on student bonding.

Multilevel Analyses

Table 8 shows the unconditional, random effects analysis of variance (ANOVA) HLM model, which includes no predictors or control variables. The purpose of the unconditional model is two-fold. First, it provides a base model for comparison with subsequent models. Secondly, it provides an estimate of the amount of variance in the dependent variables that is within schools (level-1) compared to the amount of the variance that is between schools (level-2). If little between-school variance is found at this stage there would be little point in proceeding to the next step of examining school level predictors.

One-way ANOVA models were estimated to determine the amount of variation in the outcomes that lies within and between schools. The results of these models (see Table 8) indicated that student fear and student bonding varied significantly between schools. The grand mean for student fear was .168 and was statistically significant ($p<.01$); this was the average score of student fear across schools. The intra-class correlation, which provides the proportion of variance in student fear between schools, was calculated using the following formula: ICC $= \rho = \tau_{00}/ (\tau_{00} + \sigma^2)$. The ICC for the student fear model was approximately 7%. This means that approximately 7% of the variance in student fear can be attributed to differences between schools while the remaining 93% of the variance was due to within school variations. The chi-square value for between-school variance in student fear was significant ($\chi^2 = 1202.19$, $p <.01$), which allowed for the rejection of the null hypothesis that there was no difference in student fear across schools.

Table 8. Unconditional HLM Models for Student Fear and Student Bonding.

Student Fear Fully Unconditional Model

Fixed Effects

	Coeff.	SE	T-Ratio	P-Value
Intercept, γ_{00}	.168	.003	49.60	.000

Random Effects	Var.	SD	χ^2	P-Value
Level 2, u_{0j}	.002	.048	1202.19	.000
Intraclass Correlation = .066				

Student Bonding Fully Unconditional Model

Fixed Effects

	Coeff.	SE	T-Ratio	P-Value
Intercept, γ_{00}	.671	.004	188.23	.000

Random Effects	Var.	SD	χ^2	P-Value
Level 2, u_{0j}	.003	.051	1088.24	.000
Intraclass Correlation = .063				

Note. $N = 233$ for student fear models and 247 for student bonding models. The unconditional model is a one-way ANOVA with random effects.

The grand mean for student bonding was .671 and was statistically significant ($p<.01$); this was the average score of student bonding across schools. The ICC for student bonding was calculated using the same formula as described for student fear and was approximately 6%. Although most of the variance in student bonding (94%) was attributed to within-school variance, the between-schools variance was significant and large enough to model. The chi-square value for between-school variance in student bonding was significant ($\chi^2 = 1088.24$, $p <.01$). This finding allowed for the rejection of the null hypothesis that there was no difference in student bonding across schools.

Level-1 (Within-School Analyses)

The next step in the multilevel analyses was to build level-1 models using individual-level predictors. Based on these models, it may be determined whether a

predictor was significantly related to the outcome, and if the relationship between the predictor and the outcome varied across level-2 units. A level-1 model was built for each of the two outcome measures and had three predictors—sex, grade and white non-Hispanic. In these analyses slopes were allowed to vary to determine if their relationships with student fear and bonding varied across schools. All of the level-1 predictors were centered around their group mean. Table 9 displays the results of these analyses.

All level-1 predictors for were significantly related to student fear. Males (β = .022), middle school students (β = -.017) and minorities (β = -.017) reported higher levels of fear. All level-1 predictors were also significantly related to student bonding. Females (β = -.070), middle school students (β = -.013), and whites (β = .030) reported higher levels of bonding.

None of the slopes varied significantly across schools for the outcome variable of student fear. This means that the nature and the magnitude of relationships between individual predictors and student fear were the same in all 233 schools. Due to this finding, the slopes of these predictors were fixed, or not allowed to vary across schools in subsequent analyses. When examining the model for student bonding, it was observed that all of the slopes varied significantly across schools. This means that the relationships between these level-1 predictors and student bonding varied across schools. For example, the magnitude of the association of gender with bonding varied across schools. Based on this finding, these slopes were allowed to vary across schools in subsequent analyses.

Table 9. HLM Level-1 Random Coefficient Models for Student Fear and Student Bonding

Fixed Effects	Student Fear Natural Log				Student Bonding			
	Coeff.	SE	T-Ratio	P-Value	Coeff.	SE	T-Ratio	P-Value
Intercept, β_{0j}	.168	.003	49.21	.000	.671	.004	188.46	.000
Sex (1 = Male), β_{1j}	.022	.003	6.23	.000	-.070	.004	-18.13	.000
Grade, β_{2j}	-.017	.002	-9.34	.000	-.013	.003	-4.93	.000
White Non-Hispanic (1= Yes), β_{3j}	-.017	.004	-3.69	.000	.030	.006	5.36	.000
Random Effects	Var.	SD	χ^2	P-Value	Var.	SD	χ^2	P-Value
Intercept, u_{0j}	.002	.049	1110.38	.000	.003	.051	1069.73	.000
Sex (1 = Male)	.000	.020	289.26	.088	.001	.027	308.98	.016
Grade	.000	.009	294.22	.060	.001	.029	489.89	.000
White Non-Hispanic (1=Yes)	.000	.019	258.70	.476	.002	.046	393.57	.000

Note. $N = 233$ for student fear models and 247 for student bonding models. Final estimation of fixed effects with robust standard errors are presented. Level-1 predictors were group mean centered.

Level-2 (Between-Schools Analyses)

The between-schools models estimating the effects of the use of security activities and level-2 control variables on student fear and bonding are summarized in Tables 10 and 11. In the level-2 analyses, the combined effects of the level-1 and level-2 predictors of student fear and bonding were examined. The three level-1 covariates shown in Table 9 were controlled in the level-2 analyses.

Model 1 in Table 10 indicates that the use of security activities had a significant positive effect on student fear ($p<.05$) suggesting that as the use of security activities increased, student fear increased. No school-level controls were used in this model, however.

Nine level-2 variables were then entered into the student fear model. Table 10, Model 2 shows that four of these variables were statistically significant: poverty/disorganization, percent teachers black, school auspices, and community gang problems. Higher levels of poverty/disorganization and community gang problems, as well as larger percentages of teachers who were black, were related to higher levels of student fear. Additionally, students in public schools reported higher levels of student fear than students in private or parochial schools. The use of security activities was not significantly related to student fear and thereby failed to support this study's first hypothesis that students in schools that use security activities would report higher levels of fear than students in school that did not use such activities. Also not significant were residential crowding, community crime, grade level, and student-teacher ratio.

Comparison across variables based on the reported coefficients is difficult. The different metrics used for the study variables render the coefficients virtually meaningless. However, standardized coefficients were calculated which allow for meaningful comparisons across variables. A standardized coefficient represents the amount of standard deviation change in the dependent variable for a one standard deviation change in the independent variable. The standardized coefficients presented in Table 10 suggest that the level of community poverty and disorganization had the largest influence on student fear ($\beta = .067$), followed closely by school auspices ($\beta = .065$). Security activities ($\beta = .001$) and grade level ($\beta = -.002$) had the smallest effects on student fear.

Although there was a significant positive correlation between student fear and the use of security activities (as presented in Table 7) as well as significant effects found in

Model 1 of Table 10, statistical controls which may influence the relationship between fear and security device use were not used in these analyses. Once these exogenous variables were statistically controlled in the HLM analyses, the significant relationship between fear and security use disappeared.

Table 10. HLM Intercepts-as-Outcomes Student Fear Models

MODEL 1					
Fixed Effects	**Stand. Coeff.**	**Coeff.**	**SE**	**T-Ratio**	**P-Value**
Intercept, γ_{00}		.160	.004	35.78	.000
Security Activities (1= Yes), γ_{01}	.032	.013	.006	2.19	.029
Random Effects		**Var.**	**SD**	X^2	**P-Value**
Intercept, u_{0j}		.001	.030	826.10	.000
MODEL 2					
Fixed Effects	**Stand. Coeff.**	**Coeff.**	**SE**	**T-Ratio**	**P-Value**
Intercept, γ_{00}		.091	.026	3.46	.001
Security Activities (1= Yes), γ_{01}	.001	.000	.005	0.08	.940
Poverty/Disorganization, γ_{02}	.067	.016	.005	3.11	.003
Residential Crowding, γ_{03}	.010	.002	.003	0.87	.383
Percent Teachers Black, γ_{04}	.030	.000	.000	1.97	.049
School Auspices (1= public, 0 = other), γ_{05}	.065	.065	.009	7.55	.000
Community Gang Problems, γ_{06}	.054	.021	.006	3.44	.001
Community Crime, γ_{07}	.022	.004	.003	1.24	.215
Grade Level (1=High School/Vocational School, 0 = Middle School/Junior High), γ_{08}	-.002	-.000	.003	-0.07	.944
Student-Teacher Ratio	.009	.000	.001	0.63	.528
Random Effects		**Var.**	**SD**	X^2	**P-Value**
Intercept, u_{0j}		.001	.030	501.22	.000

Note. $N = 233$. The final estimation of fixed effects with robust standard errors is shown. Level-1 predictors were grand mean centered. Level-2 predictors were uncentered.

Although numerous school- and individual-level covariates were controlled for, student fear continued to vary significantly between schools ($\chi^2 = 501.22$, $p < .01$). This model accounts for 50% of the school-level variance in student fear[5]. Keeping in mind that that only seven percent of the total variance can be accounted for at this level, it can be assumed that there was considerable variance in student fear that was unexplained.

Model 1 in Table 11 indicates that the use of security activities did not have a significant effect on student bonding ($p<.43$) suggesting that the use of security activities does not influence the level of student bonding. No school-level controls were used in this model, however.

Six level-2 variables were then entered into the student bonding Model 2 as shown in Table 11. The use of security activities continued to remain unrelated to the outcome measure of interest which lead to the rejection of the second hypothesis that students in schools with security activities would report lower levels of student bonding than students in schools without security activities. Three covariates, however, were significantly related to student bonding: student enrollment, school auspices, and grade level. As school size increased so did students' scores on student bonding measures. Additionally, students at public schools and in high schools reported lower levels of student bonding than did students attending private or parochial schools or in middle or junior high schools. Of these three covariates, school auspices had the largest effect on bonding ($\beta = -.119$) followed by student enrollment ($\beta = .106$). Similar to the use of security activities, community crime, and student-teacher ratio were not significantly

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[5] The percentage reduction in conditional error variance at the school-level was calculated using the following formula: (Between-school variance from ANOVA model – Between-school variance from level-2 model) / Between-school variance from ANOVA model.

related to student bonding at the $p < .05$ level. Security activities had the smallest effect

on student bonding ($\beta = -.024$) followed by student-teacher ratio ($\beta = -.027$)

Table 11. HLM Intercepts-as-Outcomes Student Bonding Models

MODEL 1

Fixed Effects	Stand. Coeff.	Coeff.	SE	T-Ratio	P-Value
Intercept, γ_{00}		.663	.007	98.53	.000
Security Activities (1= Yes), γ_{01}	-.014	-.006	.008	-0.79	.434

Random Effects		Var.	SD	X^2	P-Value
Intercept, u_{0j}		.002	.047	581.10	.000

MODEL 2

Fixed Effects	Stand. Coeff.	Coeff.	SE	T-Ratio	P-Value
Intercept, γ_{00}		.692	.046	15.19	.000
Security Activities (1= Yes), γ_{01}	-.024	-.010	.008	-1.23	.225
Student Enrollment (natural log), γ_{02}	.106	.022	.005	4.50	.000
School Auspices (1 = public, 0 = other), γ_{03}	-.119	-.077	.015	-5.20	.000
Community Crime, γ_{04}	-.031	-.006	.004	-1.44	.152
Grade Level (1=High School/Vocational School, 0 = Middle School/Junior High) γ_{05}	-.054	-.007	.003	-2.07	.039
Student-Teacher Ratio	-.027	-.001	.001	-1.66	.098

Random Effects		Var.	SD	X^2	P-Value
Intercept, u_{0j}		.002	.042	489.72	.000

Note. $N = 247$. The final estimation of fixed effects with robust standard errors is shown. Level-1 predictors were grand mean centered. Level-2 predictors were uncentered.

Despite the use of various school- and individual-level covariates, levels of

student bonding continued to vary significantly between schools ($\chi^2 = 489.72$, $p<.01$).

As previously mentioned, only six percent of the total variance between-schools can be

explained, the present model accounts for only 33% of this school-level variance in

student bonding. This finding suggests that there is substantial variance in student bonding that is unexplained.

Because no support was found for the first or second hypotheses, the third and final hypothesis of the current study was not modeled. The third hypothesis stated that the effect of school security device use on student fear and student bonding would be mediated by school climate. Since the use of security activities did not significantly predict either student fear or bonding, school climate could not possibly mediate these effects, as there were no effects to mediate. However, the influence of school climate on student fear and bonding is still a relationship of interest, therefore analyses were conducted using school climate (as measured by communal school organization) as the independent variable rather than a mediating variable as originally planned. Table 12 presents the final results from the multi-level HLM analyses for student fear.

Model 1 in Table 12 indicates a significant negative relationship between student fear and communal school organization ($p<.01$) suggesting that schools with higher levels of communal school organization have lower levels of student fear. Once again, no level-2 controls were used in this model. However, the addition of eight level-2 control variables (as seen in Model 2 of Table 12) did *not* change the significant effect of communal school organization on student fear. Communal school organization continued to have a significant negative effect ($p<01$) on student fear despite the addition of numerous school and community controls, once again indicating that schools having a stronger sense of community among their members reported lower levels of student fear. However, school auspices ($\beta = .093$), community poverty and disorganization ($\beta = .066$),

and community gang problems (β = .059) had larger effects on student fear than did communal school organization (β = -.046).

Table 12. HLM Intercepts-as Outcomes Student Fear Models With School Climate

MODEL 1

Fixed Effects	Stand. Coeff.	Coeff.	SE	T-Ratio	P-Value
Intercept, γ_{00}		.241	.015	15.94	.000
Communal School Organization, γ_{01}	-.071	-.045	.001	-4.89	.000

Random Effects		Var.	SD	X^2	P-Value
Intercept, u_{0j}		.001	.036	755.36	.000

MODEL 2

Fixed Effects	Stand. Coeff.	Coeff.	SE	T-Ratio	P-Value
Intercept, γ_{00}		.153	.032	4.74	.000
Communal School Organization, γ_{01}	-.046	-.029	.009	-3.15	.002
Poverty/Disorganization, γ_{02}	.066	.016	.005	3.12	.002
Residential Crowding, γ_{03}	.010	.002	.002	0.63	.528
Percent Teachers Black, γ_{04}	.025	.000	.000	1.68	.095
School Auspices (1= public, 0 = other), γ_{05}	.093	.057	.008	6.74	.000
Community Gang Problems, γ_{06}	.059	.023	.006	3.89	.000
Community Crime, γ_{07}	.016	.003	.003	1.22	.225
Grade Level (1=High School/Vocational School, 0 = Middle School/Junior High), γ_{08}	-.008	-.001	.003	-0.41	.684
Student-Teacher Ratio	.008	.000	.000	0.63	.531

Random Effects		Var.	SD	X^2	P-Value
Intercept, u_{0j}		.001	.030	473.55	.000

Note. N = 233. The final estimation of fixed effects with robust standard errors is shown. Level-1 predictors were grand mean centered. Level-2 predictors were uncentered.

Table 13 displays the final results from the multi-level HLM analyses for student bonding. Model 1 in Table 13 indicates a significant positive relationship between student bonding and communal school organization ($p<.05$) suggesting that schools with

Table 13. HLM Intercepts-as Outcomes Student Bonding Models With School Climate

MODEL 1					
Fixed Effects	**Stand. Coeff.**	**Coeff.**	**SE**	**T-Ratio**	**P-Value**
Intercept, γ_{00}		.606	.021	28.26	.000
Communal School Organization, γ_{01}	.051	.034	.013	2.54	.012
Random Effects		**Var.**	**SD**	X^2	**P-Value**
Intercept, u_{0j}		.002	.04	616.47	.000
MODEL 2					
Fixed Effects	**Stand. Coeff.**	**Coeff.**	**SE**	**T-Ratio**	**P-Value**
Intercept, γ_{00}		.653	.049	13.31	.000
Communal School Organization, γ_{01}	.030	.020	.013	1.57	.119
Student Enrollment (natural log), γ_{02}	.082	.017	.005	3.621	.001
School Auspices (1 = public, 0 = other), γ_{03}	-.107	-.069	.014	-4.99	.000
Community Crime, γ_{04}	-.036	-.007	.004	-1.92	.056
Grade Level (1=High School/Vocational School, 0 = Middle School/Junior High) γ_{05}	-.038	-.005	.003	-1.54	.124
Student-Teacher Ratio	-.027	-.001	.001	-1.87	.063
Random Effects		**Var.**	**SD**	X^2	**P-Value**
Intercept, u_{0j}		.002	.042	518.88	.000

Note. $N = 247$. The final estimation of fixed effects with robust standard errors is shown. Level-1 predictors were grand mean centered. Level-2 predictors were uncentered.

higher levels of communal school organization also have higher levels of student bonding. However once level-2 control variables were added to the model (as seen in Model 2 of Table 13), the significant relationship between communal school organization and student bonding disappeared, suggesting the previously observed significant relationship was more likely due to the influence of exogenous variables such as the size

of the school (β = .082), and school auspices (β = -.107) than to the influence of communal school organization (β = .030).

Because tests of significance do not provide any indication of the size or magnitude of observed effects, odds ratios were computed for dichotomous versions of the dependent variables. The dichotomous variable for student fear indicated whether students reported no fear (0) or some fear (1) while the dichotomous variable for student bonding indicated whether a student was below the mean score of bonding (0) or at the mean or above (1). Odds ratios and 95% confidence intervals for student fear and bonding models are displayed in Table 14. All of the observed effects are rather small for all four of the models shown. The odds ratio measuring the influence of school security use on student fear (Model 1) suggests that the odds of being fearful in schools with security activities is 1.04 times higher than the odds of being fearful in schools without security activities. However, because the confidence interval included the value of 1.00, the possibility that the odds ratio is equal to 1.00, suggesting that the odds of being fearful in schools with and without security activities are the same, cannot be ruled out. This analysis supported the previous HLM findings that community poverty and disorganization, percentage teachers Black, school auspices, and community gang problems were significantly related to student fear.

Results from the student bonding model indicated that there was no difference in the odds of being bonded in schools with and without security activities. This analysis also provided support for the previous HLM findings that student enrollment and school auspices were related to bonding. However, the previous significant relationship between

student bonding and grade level as shown in Table 11, was no longer significant in the

odds ratio analysis.

Table 14. Odds Ratios and Confidence Intervals For Student Fear and Bonding Models

Student Fear Models

	Model 1		Model 2	
	Odds Ratio	Confidence Interval	Odds Ratio	Confidence Interval
Intercept	0.43	0.24, 0.77	0.90	0.44, 1.86
Security Activities	1.04	0.92, 1.18	--	--
Communal School Organization	--	--	0.71	0.58, 0.88
Poverty/Disorganization	1.15	1.02, 1.29	1.15	1.02, 1.30
Residential Crowding	1.04	0.98, 1.10	1.03	0.98, 1.08
Percent Teachers Black	1.01	1.00, 1.01	1.01	1.00, 1.01
School Auspices	2.16	1.71, 2.71	1.99	1.59, 2.49
Community Gang Problems	1.27	1.10, 1.46	1.30	1.14, 1.48
Community Crime	1.05	0.99, 1.12	1.05	0.99, 1.12
Grade Level	1.01	0.95, 1.07	1.00	0.95, 1.06
Student-Teacher Ratio	0.99	0.99, 1.01	1.00	0.99, 1.01

Student Bonding Models

	Model 1		Model 2	
	Odds Ratio	Confidence Interval	Odds Ratio	Confidence Interval
Intercept	1.05	0.51, 2.20	0.63	0.26, 1.49
Security Activities	0.92	0.80, 1.06	--	--
Communal School Organization	--	--	1.25	1.01, 1.56
Student Enrollment (nat. log)	1.20	1.10, 1.31	1.20	1.10, 1.30
School Auspices	0.56	0.43, 0.72	0.59	0.45, 0.77
Community Crime	0.94	0.87, 1.00	0.93	0.87, 1.00
Grade Level	0.99	0.93, 1.05	0.99	0.93, 1.05
Student-Teacher Ratio	0.99	0.98, 1.00	0.99	0.98, 1.00

Note. Model 1 independent variable is security activities. Model 2 independent variable is communal school organization. $N = 233$ for student fear models and 247 for student bonding models. Population-average model with robust standard errors shown.

Results for the influence of communal school organization on both student fear and bonding supported the previous HLM findings for these models. The odds of being fearful were .71 times higher in schools with less communal school organization than the odds of being fearful in schools with greater communal school organization. The odds of being bonded were 1.25 times higher in schools with greater communal school organization than the odds of being bonded in schools less communal school organization.

Sensitivity Analyses

Several sensitivity analyses were conducted in order to determine if the results of the previously described HLM analyses would change based on the exclusion of outliers, the use of only public schools, and the use of statistical weights to adjust for sampling design and non-response. Two additional sensitivity analyses were conducted on two different measures of student fear to determine if the way this variable was constructed accounted for the null findings.

Outliers Omitted. Numerous schools were outliers on several of the level-2 measures such as student enrollment, poverty/disorganization, residential crowding, etc. A total of ten schools were omitted based on the presence of outliers. Table 15 displays the differences in sample sizes among the various samples used.

Table 15. Sample Size Comparisons

Sample	Student Fear Models		Student Bonding Models	
	Individuals	**Schools**	**Individuals**	**Schools**
Original	11285	233	11658	247
Outliers Omitted	10794	223	11189	234
Public Schools	8913	178	214	10411
Weighted Data	14850	288	15381	302
Dichotomous Fear Scale	11281	233	--	--
Two-Item Fear Scale	11281	233	--	--

Public School Sample. Although preliminary analyses indicated that associations between key study variables were similar among different types of schools (e.g., public, private, parochial, etc.), HLM analyses were conducted on a sample containing only public schools to see if the exclusion of private, parochial and alternative schools for students with behavioral problems altered the final results of the analyses.

Weighted Data Analyses. Several different weights are available in the National Study of Delinquency Prevention in Schools data. These weights adjusted for sampling probability and non-response at the individual- and school-level. Sampling probability weights addressed complexities involved in using a stratified sampling design rather than a simple random sample. The inverse of sampling probabilities were used to compute weights applied to make the sample as representative as possible of the nation's schools. Non-response adjustments gave more weight to the items provided by respondents who were similar to non-respondents in terms of available demographic characteristics (e.g., location, school level, etc.). HLM analyses using weighted data were conducted on a sample larger than the original sample due to imputing missing values for the security activities measure, which allowed for the retrieval of additional schools.

Dichotomous Fear Variable. The distribution for the dependent variable student fear was skewed with a high proportion of zeros (46%). The HLM analyses previously reported may be sensitive to the distribution of student fear. To ensure that the findings are robust to different measurement strategies for this skewed variable, a dichotomous measure of student fear was created. This measure of student fear was created by recoding the original measure so that a value of zero was assigned for students who indicated no fear at school at all while a value of one was assigned for students who indicated any level of fear at school. A Bernoulli distribution was selected for the HLM analyses to indicate that the dependent variable was a dichotomous variable.

Two-Item Fear Variable. A two-item scale variable for student fear was created by omitting one of the original scale items—"How often are you afraid that someone will hurt or bother you on the way to or from school". The rationale behind this decision was that perhaps this particular item was more a measure of fear of victimization in the community surrounding the school rather than fear of victimization in the actual school. The two-item fear scale measurws students' feelings of safety in school. Items include "How often do you feel safe while in your school building" and "How often are you afraid that someone will hurt or bother you at school". Responses were "almost always", "sometimes", and "almost never". The overall scale score was the mean of individual item scores. High values on the scale were indicative of higher levels of fear. The individual level alpha for this measure was .40.

Procedures. Sensitivity analyses were conducted using the same procedures in the previously described analyses. As with the previous analyses, correlations were first used to determine which covariates were related to the outcome measures and to check for

collinearity problems among control variables. The same criteria were used to determine which exogenous variables to include in subsequent HLM analyses for sensitivity analyses as was used in the original analyses. Level-1 and level-2 models were also built and analyses in the same fashion as the original analyses.

Findings. Unconditional models showed that student fear and/or bonding varied significantly across schools in all of samples which allowed for the rejection of the null hypotheses that there was no difference in student fear or bonding between schools. Intraclass correlations ranged from five percent to approximately seven percent.

The final results of the between-schools multilevel models estimating the effects of the use of security activities and level-2 control variables on student fear and bonding showed no dramatic difference from the original analyses. While a few differences emerged with respect to the relationships between various level-2 covariates and the outcome variables, removing outliers, examining only public schools, and weighting the data for sampling design and non-response did not change the effect of security activities on student fear or bonding. Additionally, altering the way in which student fear was measured also did not change the effect of security activities on student fear. In short, the use of security activities was not significantly related to either student fear or bonding in any of the sensitivity analyses, a finding consistent with the original analyses.

Post-Hoc Examination of the Quality of Implementation of Security Activities

In an attempt to better understand the null findings of the current study, a post-hoc examination was conducted on the quality of implementation of security activities used by some schools in the sample. Previous research has reported that the quality of

implementation of school-based prevention practices in the average school is relatively low (Gottfredson and Gottfredson, 2002). If this were the case with the present study, perhaps significant effects would have been observed if the security activities had been better implemented.

A total of 126 schools used in this study (*N*=276) provided detailed information describing the extent of the use of security activities in their school. Only 52% of the schools reported that one or more persons conducted the security activity *on a regular basis*. The majority of schools (64%) indicated that the typical student was exposed to security activities on a daily basis and that security activities operated throughout the entire school year (87%). When examining the *typical* use of three of the more intrusive types of security activities (i.e. metal detectors, locker searches and drug testing), it becomes evident that (1) not many of the schools in the sample used these three intrusive security practices, and (2) these activities were not used on a regular basis for all students. Table 16 displays the typical use of these security activities.

Table 16. Typical Use of Metal Detectors, Locker Searches and Drug Testing

Level of Use	Metal Detectors (*N*=26)	Locker Searches (*N*=96)	Drug Testing (*N*=22)
	%	%	%
Have but do not use	19	--	--
Conduct random checks with hand-held metal detectors	42	--	--
Check those under suspicion	23	--	--
Most persons entering school pass through	4	--	--
Everyone entering school passes through	12	--	--
Only when probable cause is present[a]	--	52	55
Only when reasonable suspicion is present[b]	--	39	32
Random searches/tests with student consent	--	1	9
Random searches/tests	--	8	5

[a] Probable cause was defined as grounds for belief that a crime has occurred.
[b] Reasonable suspicion was defined as having little evidence or no proof of a violation.

Past research has suggested that security and surveillance activities tend to be better implemented than other types of school-based prevention activities (Gottfredson and Gottfredson, 2002) which is reassuring, however, the current analysis indicates that there is still room for improvement in the level of implementation for security activities. Barley half of the responding schools indicated security activities were conducted on a regular basis. Furthermore, 46% of the schools reported that the typical student is not exposed to these activities on a daily basis. Finally, most schools that reported using metal detectors, drug testing or locker searches indicated a low level of the deployment of these activities.

The present post-hoc examination was meant to provide merely a description of the general level of implementation of security activities and certainly not to be taken as a robust empirical test of the level of program implementation. The data used in this examination was restricted to a small subset of schools that provided detailed information regarding their security activities and examined only a few variables related to implementation thereby limiting the applicability of these results. An ideal study would be able to measure the strength and fidelity of implementation thoroughly for a large sample of schools using a variety of security devices that include some of the more intrusive activities.

Chapter 5

DISCUSSION AND CONCLUSION

Discussion

This study used hierarchical linear modeling techniques to examine the relationship between the use of school security practices and levels of student fear and social bonding in a national sample of schools. Specifically, it tested the hypotheses that (1) the level of student fear is higher in schools that use security devices than in schools that do not use security devices and (2) the level of student bonding is lower in schools that use security devices than in schools that do not use security devices. No support was found for either hypothesis.

The lack of support for the tested hypotheses refutes the suppositions posited by opponents of the use of security devices in schools who argue that such devices foster a culture of fear and coercion that has a detrimental impact on the relations between students and teachers as well as the school's overall climate. Conversely, this study also did not find support for advocates' contention that the use of security measures sends a message to students that the school takes the threat of violence seriously and is actively doing something to prevent it, thus alleviating student fears of victimization.

The present study did find significant relationships between student fear and social bonding and several exogenous variables. At the individual level it was found that males, middle school students and minorities experienced higher levels of fear than did females, high school students and whites. With the exception of males, these findings are consistent with prior research on student fear (Alvarez and Bachman, 1997; Devoe et al., 2004). Also at the individual level, it was found that females, middle school students and

whites scored higher on social bonding measures than males, high school students, and minorities. These too are consistent with previous literature on social bonds (Agnew, 1985; Krohn and Massey, 1980; Jenkins, 1995; Rosenbaum and Lasley, 1990).

At the school level, higher levels of student fear were reported among those living in areas with greater concentrations of poverty, disorganization, and community gang problems, in public schools and schools with a higher percentage of teachers who were black. Alvarez and Bachman (1997) also found greater levels of student fear among those with lower socio-economic status, in public schools and at schools where gangs were visible. Also at the school-level, lower levels of social bonding were found among public school students and high school students. An unexpected finding was the relationship between school enrollment and social bonding. The present study found that students in *larger* schools displayed higher levels of social bonds. This finding may be attributable to the way these schools are organized. For instance, if these schools were organized in a such a way as to decrease class size and increase the numbers of teachers to students, it could be possible that student bonding may be higher in these schools.

Because neither of the first two hypotheses was supported, a third hypothesis that stated the effect of school security device use on student fear and student bonding is mediated by school climate was not fully tested. Since there was no effect of security use on student fear or bonding, school climate could not mediate effects. However, a basic assumption of this hypothesis was that school climate influenced student fear and bonding. Statistical analyses found support for this hypothesis with respect to student fear but not for bonding. Results of HLM analyses indicated a significant negative association between school climate (as measured by communal school organization) and

student fear. This finding held true even after numerous school- and community-level controls were added to the model. A significant positive association was found between communal school organization and student bonding, however, this finding disappeared once level-2 controls were entered into the model indicating that the observed relationship between school climate and student bonding was actually due to the influence of these exogenous variables.

Limitations

The most important limitation of this study is the cross-sectional nature of the data. Because all of the data were collected at one point in time, the true causal direction of the associations found in this study is unable to be determined. For example, the negative association between communal school organization and student fear could indicate that schools with a strong sense of community among its members leads to lower levels of student fear, as is suggested in this study. However, this association could also indicate that lower levels of student fear lead to higher levels of communal school organization or that the relationship between communal school organization and student fear is non-recursive, meaning that the two constructs influence each other simultaneously. Also, in cross-sectional analyses, it is impossible to rule out the possibility that any observed association might be explainable by extraneous variables that influence both the independent and dependent variables of interest. Attempts were made in the present study to control factors that may influence both the use of school security devices and the study outcomes such as community crime and gang crime in an attempt to increase interpretations of causality. As noted, the inclusion of these variables

did reduce the observed association between the use of security devices and student fear to non-significance. However, future studies should use longitudinal designs in order to properly model the temporal ordering of the relationship that was not found to be spurious between security activities and student fear.

An important limitation of the present study is the low response rate of some types of schools and the relationship between survey participation and community characteristics. Schools in urban areas, with students who were Black, and with fewer college-educated households were less likely to participate in this study. Therefore, the findings of this study may not generalize well to schools with these characteristics located in communities with these characteristics.

Another limitation is the measurement of school security device use. The present study used a dichotomous variable to simply indicate whether a school uses security activities, regardless of the type of security activities. It seems likely that some security activities (i.e., metal detectors, security guards, surveillance cameras, etc.) would have a greater effect on student fear than others (i.e., id badges, locking exterior doors, telephones in the classrooms, etc.). The exploratory analyses described in Chapter 3 (see footnote 3) suggested the vast majority (93%) of schools used at least one "intrusive" security measure. Furthermore, correlations indicated that the relationship between intrusive security activities and student fear (r = .06, *p<.53*) was *not* statistically significant nor as strong as the correlation between the original binary measure of security activities and student fear (r = .13, *p<.03).* These findings prompted the decision to retain the binary measure used in the present study. Future studies, however, should attempt to capture the level of intrusiveness of security measures and perhaps

focus primarily on security measures most visible and invasive to students such as metal detectors, police dogs, removing locker and lavatory doors, etc. Additionally, these studies should also examine the level of implementation of these security measures.

Another limitation lies with the construct of student fear. The present study used a three-item scale that measured how frightened students were that someone would hurt or bother them at school or on the way to or from school, and how safe they felt in the school building. It is difficult to determine if this was the best way to operationalize student fear. Much of the previous research on fear of crime indicates that there is a lack of consensus on what fear of crime actually represents. This lack of consensus is evidenced by the multitude of different operational measures used in these studies (for a review of fear and crime studies and the operational measures used see Ferraro and LaGrange, 1987). Future research should attempt to determine what exactly the measure of student fear encompasses. Are we measuring actual fear or anticipated fear? Research conducted by Roundtree and Land (1996) suggests there are at least two distinct constructs that tap into fear: (1) perceived risk which is a general, cognitive assessment of safety and (2) fear of crime which is an emotionally based concern about crime. James Garofalo also suggested that fear of crime is based on an *emotional* response "characterized by a sense of danger and anxiety…produced by the threat of *physical* harm" (1981:840). Based on these findings, it seems likely that the measure of student fear used in the present study failed to disentangle these two distinct constructs. Future researchers should be careful in choosing which measures to use as it is likely the factors that explain perceived risk of victimization are different than the factors that explain actual (emotionally-based) fear. Since previous research has indicated that student fear

contributes to a wide array of student behaviors (e.g., absenteeism, cutting class, avoiding certain areas of the school building) it seems likely that student fear is an emotional response stemming from the concern of physical harm. If this is the case, future studies examining the influence of school security activities on student fear should operationalize fear in such a way as to measure emotionally based concern of physical harm rather than the cognitive perception of risk.

Implications for Theory

This study provides support for the importance of collective efficacy in controlling levels of fear. Communal school organization is akin to collective efficacy in that both concepts focus on group cohesion, strong informal social relations among school/community members and the ability of the group to regulate the conduct of its members. Previous research on collective efficacy at the neighborhood level has found that levels of collective efficacy are related to levels of resident fear (Gibson et al., 2002, Markowitz et al., 2001). The present study found support for this association at the school-level with the significant negative association between communal school organization and student fear. To the extent that schools can increase the level of communal school organization, thereby increasing the strength of the social relations among its members, the more likely students are to feel safer and more secure within the school and more confident that teachers and administrators are able and willing to protect them as they witness a system of informal controls in place to regulate conduct within the school.

This study corroborated previous research that found females, younger students, and whites have stronger social bonds. Tests of social bonding theory have shown that attachment and commitment to school, as well, as belief in school rules can affect delinquency. Schools and parents need to find ways in which to increase the level of bonding among males, minorities and older students, who tend to score lower on these measures, in an attempt to insulate them from delinquency. This is particularly important in light of the evidence that these are the same groups that tend have higher arrest rates than their counterparts.

Implications for Practice/Policy

If future studies on the use of school security continue to find these devices have no effect on student behavior, whether positive or negative, it may become necessary for policy makers and educators to reassess their priorities with respect to school safety plans. Millions of dollars are spent each year on security practices in the absence of any strong empirical evidence that these activities actually reduce crime and disorder or make students feel safer while at school. If future studies cannot corroborate the validity of the positive benefits of security activities proclaimed by advocates, perhaps resources should be directed towards school-based activities that have been shown to reduce crime and delinquency such as programs aimed at building school capacity, programs aimed at clarifying and communicating norms about behaviors and comprehensive instructional programs that focus on a range of social competency skills (for a thorough review of what works in school-based prevention see Gottfredson, 1997).

The negative association found between communal school organization and student fear provides valuable information to school-based prevention programs. If this association holds up in future longitudinal studies, the result would imply that programs that are able to increase the level of communal organization within a school may also be able to reduce levels of student fear resulting in reductions in student absenteeism, class cutting, and other negative behaviors that impede the learning process and promote delinquency. By creating a warm and cohesive community, schools may be able to reduce student fear thereby reducing negative behaviors associated with fear and create an environment that is conducive to achieving their educational goals.

Recommendations for Future Research

As previously discussed, future research examining the relationships between security activities, student fear, bonding, and school climate should use longitudinal data rather than cross-sectional data in order to properly establish the temporal sequence of the relationships.

Future research should investigate the interaction between various demographic characteristics (e.g., race, gender, age, etc.) and levels of bonding. Existing research suggests that certain groups of individuals have stronger social bonds than others. The present study found that the influence of these demographic variables on student bonding varied significantly across schools. Specifically, this study found that the magnitude of the effects of gender, grade and race on bonding varied across schools. While beyond the scope of this study, it would be interesting to see if the use of security devices in schools influences bonding differently among various demographic groups and to model the

slopes of these demographic variables on bonding. These variables should be included as moderating variables in future analyses.

Future research on the use of school security measures should examine the deployment of these measures. For example, a metal detector that is not plugged in or one that students and visitors to the school can easily circumvent is likely to have a different impact on behavior in terms of both school violence/disorder and student fear, than a metal detector that is working properly and through which all students and visitors must pass every time they enter the school building. Future studies should compare schools with good deployment of security measures to schools with bad deployment on relevant outcome measures of interest.

Finally, further research should be conducted on the use of school security devices in order to determine their utility in reducing school violence and disorder and to continue the investigation on their influence on student fear with other samples. This research should be a randomized experimental design in which schools are randomly assigned the use of security devices. Additionally, a longitudinal design would allow for the investigation of whether initial effects of security use decay over time. It may be that security devices influence student fear, bonding and crime at first but as students become acclimated to these devices that the effects wear off.

Conclusion

Although this study did not find support for the predicted relationships between school security and student fear, bonding and school climate, it still provided a valuable contribution. At the very least this study added to the literature on the correlates of

student fear and social bonding and provided support for the idea that student fear is related to school climate. Furthermore, it provided one of the only quantitative, methodologically sound tests of the relationship between school security and student fear and bonding to date. Additionally, this study explored a topic—student fear—that has received very little empirical attention. With the exception of a handful of scholars, the field of criminology has largely ignored the importance of fear in influencing behavior. Even fewer researchers specifically examine the impact of fear in the school setting. Yet, the little research that has been done suggests that student fear influences numerous behavioral outcomes from cutting class and skipping school, to reducing classroom participation and acts of violence as a means of self protection. More research should be devoted to the study of student fear in order to gain a better understanding of the causal processes that operate in causing fear and addressing the ramifications as a result of it.

Item Content of Student Fear Scale

How often do you feel safe while in your school building? (+)

How often are you afraid that someone will hurt or bother you at school? (-)

How often are you afraid that someone will hurt you <u>on the way</u> to or from school? (-)

Notes. Responses to these items were "almost always," "sometimes," and "almost never." Scoring direction is indicated in parentheses at the end of each line. Adapted from the *Effective School Battery* copyright © 1984, 1999 by Gary D. Gottfredson, Ph.D. Reproduced by special permission of the publisher, Gottfredson Associates, Inc., Ellicott City, Maryland 21042. Not to be further reproduced without written permission of the publisher.

Item Content of Student Attachment to School Scale

Most of the time, I do not want to go to school. (-)

I like the classes I am taking. (+)

I usually enjoy the work I do in class. (+)

I like school. (+)

I like the principal. (+)

Sometimes I wish I did not have to go to school. (-)

I feel like I belong in this school. (+)

I have lots of respect for most of my teachers. (+)

Teachers here care about the students. (+)

In classes, I am learning the things I need to know. (+)

I care what teachers think about me. (+)

I am usually happy when I am in school. (+)

I often feel like quitting at school. (-)

Notes. Responses were "mostly true," or "mostly false." Scoring direction is indicated in parentheses at the end of each line. Adapted from *What About You?* copyright © 1990 by Gary D. Gottfredson, Ph.D.

Item Content of Student Belief in Conventional Rules Scale

How wrong is it for someone your age to do each of the following things? (Only the item response "very wrong" is scored as student belief in conventional rules.)

Cheat on school tests (+)

Purposely damage or destroy property that does not belong to you (+)

Steal something worth less than $5 (+)

Hit or threaten to hit someone (+)

Break into a vehicle or building to steal something (+)

Steal something worth more than $50 (+)

If your friends got into trouble with the police, would you lie to protect them? (-)

If you found that your group of friends was leading you into trouble, would you still spend time with them? (-)

If your friends wanted to go out and your parents wanted you to stay home for the evening, would you stay home? (+)

If a friend asked to copy your homework, would you let the friend copy it even though it might get you in trouble with the teacher? (-)

It is important to tell the truth to your parents (+)

I have a duty to conduct myself as a good citizen (+)

I want to be a person of good character (+)

Being honest is more important than being popular (+)

I admit it when I have done something wrong (+)

I want to do the right thing whenever I can (+)

It is all right to get around the law if you can (-)

If you find someone's purse, it is OK to keep it (-)

Sometimes you have to cheat in order to win (-)

It is OK to take advantage of a person who isn't careful (-)

Sometimes you have to be a bully to get respect (-)

You have to be willing to break some rules if you want to be popular with your friends (-)

Sometimes a lie helps to stay our out of trouble with the teacher (-)

Notes. For the first six items, possible responses were "not wrong at all," "a little bit wrong," "wrong," and "very wrong." For the next four items responses were "yes," or "no." Responses for the last items were "mostly true," or "mostly false." Scoring direction is indicated in parentheses at the end of each line. Adapted from *What About You?* copyright © 1990 by Gary D. Gottfredson, Ph.D.

Item Content of Student Commitment to Education Scale

Do you think you will get a college degree? (+)

Do you expect to complete high school? (+)

Some students think it is important to work hard in school and others don't. How important do you think it is to work hard in school? (+)

Compared to other students, how hard do you work in school? (+)

The grades I get in school are important to me. (+)

I turn my homework in on time. (+)

If a teacher gives a lot of homework, I try to finish all of it. (+)

I am satisfied with the way I am doing in school. (+)

My grades at a school are good. (+)

I am proud of my school work. (+)

I won't let anything get in the way of my school work. (+)

I usually quit when my school work is too hard. (-)

I try to do my best at school work. (+)

It is important to me to complete assignments given by teachers. (+)

Notes. Responses for the first item were "yes," "not sure," and " no." Responses for the second item were " I am certain to finish high school," " I probably will finish high school," and "I probably will <u>not</u> finish high school." Responses for the third item were "very important," "important," "not important," and "not important at all." Responses for the rest of the items were "mostly true," or "mostly false." Scoring direction is indicated in parentheses at the end of each line. Adapted from *What About You?* copyright © 1990 by Gary D. Gottfredson, Ph.D.

Item Content of Communal School Organization Scale

The administration is supportive of teachers. (+)

Administrators and teachers collaborate. (+)

There is little administrator-teacher tension in this school. (+)

I feel my ideas are listened to and used in this school. (+)

Teachers feel free to communicate with the principal. (+)

This school clearly signals to faculty and staff what performance is expected of them. (+)

Rules and operating procedures are clear and explicit in this school. (+)

It is difficult to determine what is expected of a person in this school. (-)

The goals of this school are clear. (+)

Everyone understands what behavior will be rewarded in this school. (+)

People are often confused about what objective they should go for in this school. (-)

In this school people know what to do and when to do it. (+)

People have often said that it is difficult to decide what aims to work towards in this school. (-)

My school has a clear focus. (+)

Rules and procedures are often ignored in this school. (-)

Notes. Responses of the first five items were "true" or "false". Responses for the remaining items were "false," "mostly false," "mostly true," and "true". Scoring direction is indicated in parentheses at the end of each line. The first five items were adapted from the *Effective School Battery* copyright ©1984, 1999 by Gary D. Gottfredson, Ph.D. Reproduced by special permission of the publisher, Gottfredson Associates, Inc., Ellicott City, Maryland 21042. Not to be further reproduced without written permission of the publisher. The remaining items were adapted from the *Organizational Focus Questionnaire* copyright © 1996 by Gary D. Gottfredson and John L. Holland. Not to be further reproduced without written permission of the authors.

Individual-Level Reliabilities for Study Scales

Scale	N items	α
Student Fear	3	.60
Student Bonding		
Attachment	13	.82
Belief	23	.86
Commitment	14	.83
Communal School Organization	15	.92

Note. α = Cronbach's alpha coefficient.

Factor Analysis Varimax Rotated Three-Factor Solution, Census Indicators of Community Characteristics

Community Characteristics and Census Indicators	Factor Loading
Concentrated Poverty and Disorganization	
Average household public assistance income.	.894
Ratio of households with children which are female-headed to households with children which have husband and wife present.	.814
Proportion of households below median income.	.827
Ratio of persons below 1.24 times the poverty income level to persons above that level.	.876
Ratio of divorced or separated persons to married persons with spouse present.	.777
Male unemployment rate.	.855
Female unemployment rate.	.825
Proportion owner occupied housing units.	-.544
Urbanicity	
Proportion of population living in an urbanized area.	.885
Population size.	.704
City type (e.g., rural, suburban, urban).	-.845
Immigration and Crowding	
Ratio of households with five or more persons to other households.	.894
Proportion English language households.	-.779

Note. The three factors together account for 76% of the variance in the original variables. *N* = 1287

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