A Retrospective Study of School Safety Conditions in High Schools Using the Virginia Threat Assessment Guidelines Versus Alternative Approaches

Dewey Cornell, Peter Sheras, Anne Gregory, and Xitao Fan
University of Virginia

Threat assessment has been widely recommended as a violence prevention approach for schools, but there are few empirical studies of its use. This nonexperimental study of 280 Virginia public high schools compared 95 high schools using the Virginia threat assessment guidelines (Cornell & Sheras, 2006), 131 following other (i.e., locally developed) threat assessment procedures, and 54 not using a threat assessment approach. A survey of 9th grade students in each school obtained measures of student victimization, willingness to seek help for bullying and threats of violence, and perceptions of the school climate as caring and supportive. Students in schools using the Virginia threat assessment guidelines reported less bullying, greater willingness to seek help, and more positive perceptions of the school climate than students in either of the other 2 groups of schools. In addition, schools using the Virginia guidelines had fewer long-term suspensions than schools using other threat assessment approaches. These group differences could not be attributed to school size, minority composition or socioeconomic status of the student body, neighborhood violent crime, or the extent of security measures in the schools. Implications for threat assessment practice and research are discussed.

Keywords: Student threat assessment, school violence, school safety, violence prevention

Since the 1999 shootings at Columbine High School, school administrators have been under pressure to assure the public that schools are safe and secure (Cornell, 2006). The shootings in 2005 at Red Lake High School in Minnesota, in 2006 at the Amish school in Pennsylvania, and in 2007 at Virginia Tech received worldwide attention and have kept the issue of school safety in the foreground of national concerns. The purpose of this study was to examine school climate conditions in a group of Virginia high schools that elected to implement a student threat assessment program designed to prevent acts of violence. This investigation was undertaken after a statewide survey indicated that 95 high schools had adopted the threat assessment guidelines developed by the University of Virginia (Cornell & Sheras, 2006), 54 indicated that they had no formal process, and 131 indicated that they had some other model. These three groups of schools were compared on existing sources of information regarding student perceptions of school climate and levels of bullying, as well as school records of disciplinary infractions for aggressive behavior.

Both FBI (O'Toole, 2000) and U.S. Secret Service (Vossekuil, Fein, Reddy, Borum, &

Modzeleski, 2002) studies remarked on the diverse backgrounds and circumstances of students who engaged in acts of targeted violence, and identified some general characteristics seen in many, but not all, of the student perpetrators. Many of the students were victims of bullying who had become angry and depressed, had family relationship problems, and were negatively influenced by peers. Over half displayed a preoccupation with violence through movies or video games. Both law enforcement agencies concluded that, because these characteristics can be found in so many students, it is not possible to develop a profile or checklist that could be used to pinpoint the small number of truly violent students among them. Any checklist of warning signs would falsely identify many students who were not dangerous.

Nevertheless, the FBI and Secret Service emphasized that almost all of these students communicated their intentions to attack through threats and warnings. In most cases, the threats were not communicated directly to the intended victims but to third parties such as their peers. Had these threats been reported to authorities and investigated, the shootings might have been prevented; the FBI identified a series of potential school shootings that were prevented because students reported a threat to authorities that was investigated and determined to be serious (O'Toole, 2000). On the basis of these observations, both the FBI and the Secret Service, in collaboration with the Department of Education, recommended that schools adopt a *threat assessment* approach to prevent targeted acts of violence (Fein et al., 2002; O'Toole, 2000). Similar recommendations were made for institutions of higher education following the Virginia Tech shootings (United States Department of Health and Human Services, 2007; Virginia Tech Review Panel, 2007).

What is threat assessment? Threat assessment is widely used by the Secret Service to deal with persons who threaten to attack public officials, and has evolved into a standard law enforcement approach to analyze a variety of dangerous situations, such as threats of workplace violence. Threat assessment is a process of evaluating a threat, and the circumstances surrounding the threat, to uncover any facts or evidence that indicate that the threat is likely to be carried out. Student threat assessment can be distinguished from profiling in part because the investigation is triggered by the student's own threatening behavior rather than some broader combination of student characteristics.

Threat assessment is ultimately concerned with whether a student *poses* a threat, not whether he or she has *made* a threat (O'Toole, 2000; Randazzo et al., 2006). Any student can make a threat, but relatively few will engage in the planning and preparation necessary to carry out the threat. Threat assessment is concerned with determining whether a student has the intent and means to carry out the threat and includes efforts to prevent the threat from being carried out. Prevention efforts range from immediate security measures, such as notifying law enforcement and warning potential victims, to the development of an intervention plan designed to resolve the conflict or problem that precipitated the threat.

Although both the FBI and Secret Service reports (Fein et al., 2002; O'Toole, 2000) made a compelling case for student threat assessment, schools had no experience with this approach, and there were many questions concerning the practical procedures that should be followed. In response, researchers at the University of Virginia developed a set of guidelines for school administrators to use in responding to a reported student threat of violence. Threat assessment teams are trained in a 6-hr workshop that prepares them to use a 145-page threat assessment manual (Cornell & Sheras, 2006).

The Virginia model of threat assessment is an approach to violence prevention that emphasizes early attention to problems such as bullying, teasing, and other forms of student conflict before they escalate into violent behavior. School staff members are encouraged to adopt a flexible, problem-solving approach, as distinguished from a more punitive, zero-tolerance approach to student misbehavior. As a result of this training, the model is intended to generate broader changes in the nature of staff–student interactions around disciplinary matters and to encourage a more positive school climate in which students feel treated with fairness and respect.

A study of 351 school staff members who completed the Virginia workshop found that participants became less anxious about the possibility of a school homicide, more willing to use threat assessment methods to help students resolve conflicts, and less inclined to use a

zero-tolerance approach (Allen, Cornell, Lorek, & Sheras, 2008). Similar effects were found for principals, psychologists, counselors, social workers, and law enforcement officers.

The Virginia guidelines include a seven-step decision tree. In brief, the first three steps constitute a triage process in which the team leader (most often a school administrator such as the principal or assistant principal) investigates a reported threat and determines whether the threat can be readily resolved as a *transient* threat that is not a serious threat. Examples of transient threats are jokes or statements made in anger that are expressions of feeling or figures of speech rather than expressions of a genuine intent to harm someone.

Any threat that cannot be clearly identified and resolved as transient is treated as a *substantive* threat. Substantive threats always require protective action to prevent the threat from being carried out. The remaining four steps guide the team through more extensive assessment and response based on the seriousness of the threat. In the most serious cases, the team conducts a safety evaluation that includes both a law enforcement investigation and a mental health assessment of the student. The culmination of the threat assessment is the development of a safety plan that is designed to address the problem or conflict underlying the threat and prevent the act of violence from taking place. For both transient and substantive threats, there is an emphasis on helping students resolve conflicts and minimizing the use of zero-tolerance suspensions as a disciplinary response.

The Virginia threat assessment guidelines were field tested in 35 public schools, encompassing an enrollment of more than 16,000 students in Grades K–12 (Cornell et al., 2004). School-based teams evaluated 188 student threats that involved threats to hit, stab, shoot, or harm someone in some other way. Most of the threats (70%) were resolved as transient threats, and the remaining 30% were substantive threats that required more extensive assessment and protective action. The threat assessment teams placed special emphasis on understanding the context and meaning of the threat and developing a plan to address the underlying conflict or problem that stimulated the student to resort to threatening behavior. Use of this problem-solving approach meant that relatively few students received long-term suspensions or ex-

pulsions from school. Only 3 students were expelled from school, although half of the students ($n = 94$) received short-term suspensions (typically 1–3 days). Notably, follow-up interviews with the school principals found no cases in which the threats were carried out.

A second study examined the Virginia threat assessment model when used by a centralized team responding to 209 serious threat cases in Memphis City Schools (Strong & Cornell, 2008). There were 60 (29%) threats to hit or beat up someone, 48 (23%) threats to cut or stab, 32 (15%) threats to shoot, 30 (14%) threats to kill, 14 (7%) sexual threats, and 25 (12%) other threats (such as to blow up or burn down the school). This study found that all of the student threats were resolved without any detected act of violence. Almost all students were able to return to their school or an alternative school placement, with only five students receiving long-term suspensions without school services. Plans to assist each student included modifications to special education plans, the provision of academic and behavioral support services, and referrals to community-based mental health services. After the threat assessment, the number of disciplinary office referrals for these students declined by approximately 55% through the remainder of the school year.

The most notable limitation to previous studies of the Virginia threat assessment model is the absence of a comparison group. To address this need, the present study examined the use of the Virginia threat assessment model in the statewide population of Virginia high schools. The 95 high schools using the Virginia model were compared with 131 schools using a locally developed threat assessment model and 54 schools not using a threat assessment approach. This was a retrospective comparison conducted after the school principals had responded to a question on an annual school safety audit survey about their approach to threat assessment.

We expected that schools using the Virginia model of threat assessment would create a more positive and supportive school climate that encouraged students to come forward to obtain help in response to bullying and threats of violence, and that this in turn would give staff more opportunities to prevent or reduce student bullying and other forms of victimization. We expected that schools using the Virginia model to resolve student conflicts would be less likely to

use school exclusion as a response to disciplinary infractions.

Data on student victimization and perceptions of school climate were available from the Virginia High School Safety Study (Cornell & Gregory, 2008), a statewide examination of school climate and safety conditions in Virginia public high schools using data collected from school principals, students, teachers, and school records. The purpose of the study was to identify school safety practices that were associated with more positive school climates and lower levels of crime and violence. Most relevant to the present study, the Virginia High School Safety Study included a statewide survey of ninth grade students. Ninth grade students were surveyed because the first year of high school is considered a pivotal year for student adjustment and achievement (Donegan, 2008), ninth grade students in Virginia have an especially high rate of discipline violations (Virginia Department of Education, 2007), and nationally, ninth grade students experience a high rate of bully victimization (Nansel et al., 2001), probably because they are youngest students in the school. This study did not collect case data on student threats, so schools were compared on the basis of more general outcomes that could be expected from the adoption of a threat assessment approach.

Consequently, we hypothesized that schools using the Virginia model would have lower rates of long-term suspensions and fewer disciplinary violations involving aggressive behavior. We further hypothesized that there would be less student bullying and victimization, and that students would have a positive view of the school climate if the school adopted a problem-solving approach, rather than the more punitive, zero-tolerance approach that is widely adopted in Virginia schools. Finally, we hypothesized that students would be more willing to seek help from school staff for bullying and other threats of violence, and that they would have a more positive perception of school staff as treating them with fairness and respect.

Method

Participants

Schools

All 314 Virginia high schools were eligible for inclusion in the Virginia High School Safety Study, which was the source of data for this report. Virginia law requires every public school principal to complete an annual online school safety audit. The principal survey for the 2006–2007 school year asked whether they used "a formal threat assessment process to respond to student threats of violence." In response, 95 principals checked the answer "Yes, we follow the guidelines developed by the University of Virginia (UVA)," 54 indicated that they had no formal process, and 131 indicated that they had some other process. In response to a follow-up question about the source of their guidelines, these principals wrote that they were developed by some combination of in-house administrative staff (52 schools), by district-level staff (48 schools), or a combination of school staff and local professionals in law enforcement or mental health (6 schools). Two principals reported that they did not know the source of their guidelines, 1 school reported use of a private consultant, and 1 reported that they used state department of education guidelines (although such guidelines do not exist). The remaining 34 schools did not provide a response and could not be included in the study.

The 280 participating schools ranged in size from 33 to 2,881 students, with an average of 1,199 students. All 280 schools participated in the Virginia High School Safety Study (described below). There were 50 urban, 110 suburban, and 120 rural schools. The percentage of minority students in the schools ranged from 0% to 100%, with an average of 34% ($SD = 26$). The percentage of students eligible for reduced price meals ranged from 0% to 100%, with an average of 31% ($SD = 16$). The number of school resource officers at the schools ranged from none to three, including 36 schools with no officer, 232 with one officer, 10 with two officers, and 2 with three officers.

Students

As part of the Virginia High School Safety Study (Cornell & Gregory, 2008), school principals selected approximately 25 ninth grade students per school by matching a series of random numbers to alphabetized student rolls. (Schools with fewer than 25 ninth grade students selected all available ninth grade students.) Principals were instructed to send a standard letter to parents explaining that their son or

daughter had been chosen to complete an anonymous online survey as part of the state's school safety audit program and advising them to contact the school if they did not wish their child to participate. Students who were unwilling or unavailable to complete the survey were replaced with the next available student on the list.

Principals reported that approximately 27% of the students initially identified by the sampling procedure did not participate in the study. The reasons for nonparticipation included student declined to participate (16% of those who did not participate), parent declined (6%), student absent due to illness (32%), student suspended from school (5%), student moved or transferred (7%), student language barrier (3%), or some other reason (this could range from a severe disability to attending a field trip; 30%).

The student participants consisted of 7,318 ninth grade students (49% female) with an average age of 14.8 years and a range of 12 to 17 years (87% were ages 14 or 15). The self-reported racial/ethnic distribution of the sample was 63% White/Caucasian, 23% Black/African American, 5% Latino/Hispanic, 3% Asian American, 1% American Indian, and 5% other.

Measures

Disciplinary Records

High school principals in Virginia report student suspensions and other disciplinary actions to the Virginia Department of Education using a standard set of reporting conventions and 113 categories of disciplinary infractions. State records for the 2006–2007 school year provided the number of long-term suspensions (>5 days) and short-term suspensions (<5 days) for each high school. The category of long-term suspensions also included expulsions because there were too few expulsions ($Mdn = 0$) to justify separate analyses. In addition, the numbers of disciplinary referrals for aggressive behavior (all forms of assault and physical altercation, fighting, bullying, possession of a weapon) were summed into a total score. On the school safety audit survey, school principals reported the number of school resource officers employed at the school on a daily basis.

Neighborhood Violent Crime

To measure the extent of violent crime in the neighborhoods comprising the high school attendance zones, we mapped annual records obtained from the Virginia Department of State Police and local law enforcement agencies onto school attendance zones. The total numbers of violent crimes using standard FBI definitions of violent crime were identified. Crimes occurring at school were not included in the count.

Student Survey

Ninth grade students completed a school climate survey as part of the Virginia High School Safety Study in the spring of 2007. The survey was completed anonymously online at computer stations in classrooms. Student responses at each school were aggregated into school-level scores.

Student perceptions of school security were measured by a nine-item Security Measures Index derived from the School Crime Supplement to the National Crime Victimization Survey (National Center for Education Statistics, 2005). Students were asked whether their school had each of nine security measures in place (responding *yes*, *no*, *don't know*), such as "security guards or assigned police officers," "metal detectors," and "one or more security cameras to monitor the school." The average number of security measures identified by the students at each school was used as an index of school security efforts.

The survey included a Victimization Index from the Effective School Battery (Gottfredson, 1999). Students were asked (true or false) whether each of seven forms of criminal victimization had happened to them in school. Items ranged from theft of personal property to being physically attacked. Internal consistency (Cronbach's alpha) of this index was .68 in the sample for the Virginia High School Safety Study.

Two measures of bullying were included in the high school survey. Both measures were taken from the School Climate Bullying Survey (Cornell & Sheras, 2003) and have been used in other studies of bullying (Branson & Cornell, in press; Cornell & Brockenbrough, 2004; Thunfors & Cornell, 2008; Williams & Cornell, 2006). The Bullying Climate Scale consisted of

seven items describing the extent of teasing and bullying that students observed taking place at school. Students were asked how much they agree (*strongly disagree, disagree, agree*, or *strongly agree*) with statements such as, "Students here often get teased about their clothing or physical appearance," and "Bullying is a problem at this school." The scale had an internal consistency of .68 in this study. This level of internal consistency is acceptable for sets of items that can be regarded as an index of behaviors rather than a homogeneous scale (Streiner, 2003).

The Bullying Victimization Index consisted of four questions asking students whether they had been victims of bullying, physical bullying, verbal bullying, or social bullying in the past month. Students were given a standard definition of bullying: "Bullying is defined as the use of one's strength or status to injure, threaten, or embarrass another person. Bullying can be physical, verbal, or social. It is not bullying when two students of about the same strength argue or fight." There were four response categories (*never, once or twice, about once per week*, and *several times per week*). Internal consistency was .82.

The Help-Seeking Scale is an eight-item scale from the School Climate Bullying Survey (Cornell & Sheras, 2003) that was designed to measure student willingness to seek help from school staff members for bullying and threats of violence. The scale has been used in previous research on student willingness to seek help (Bandyopadhyay, Cornell, & Konold, 2008; Williams & Cornell, 2006) and asked students to agree (*strongly disagree, disagree, agree,* or *strongly agree*) with statements such as, "If another student was bullying me, I would tell

one of the teachers or staff at school," and "If another student talked about killing someone, I would tell one of the teachers or staff at school." Internal consistency was .78.

To measure perceptions of school staff as treating them with fairness and respect, students completed the Learning Environment Scale from the California Healthy Kids Survey (Austin & Duerr, 2005). The scale consisted of eight items asking students how much they agree (*strongly disagree, disagree, agree, strongly agree*) that the adults in their school "really care about all students," "treat all students fairly" and show respect and support for students in other ways. Internal consistency was .92.

Results

Table 1 presents descriptive statistics for six school demographic characteristics identified as potential confounding variables in our comparison of three groups of schools: total enrollment, proportion of minority students, proportion of students eligible for reduced price meals, annual number of neighborhood violent crimes, number of school resource officers employed at the school, and student perceptions of school security.

Study hypotheses were tested with multivariate analysis of covariance (MANCOVA) that controlled for the six demographic variables and compared the three groups of schools on eight outcome variables: victimization, bullying victimization, bullying climate, help seeking, learning environment, short-term suspensions, long-term suspensions, and aggressive discipline violations. The test for overall group differences was statistically significant, Wilks's $\Lambda = .85$, $F(16, 528) = 2.83$, $p < .001$. As

Table 1
Descriptive Statistics for Demographic and School Security Measures

Variable	Virginia model ($n = 95$)		No model ($n = 54$)		Other model ($n = 131$)	
	M	SD	M	SD	M	SD
School enrollment	1,129	594	1,142	687	1,273	729
Proportion minority students	.35	.29	.31	.23	.35	.25
Proportion free/reduced price meals	.32	.18	.32	.15	.29	.15
Number of violent crimes	328	469	231	385	332	412
Number of school resource officers	.88	.48	.93	.43	.95	.40
Number of security measures	4.86	.72	4.84	.84	4.84	.72

discussed in quantitative methodology literature (e.g., Stevens, 2001), Wilks's $\Lambda = .85$ from the MANOVA can be approximately converted to $\eta^2 = .15$ as an effect size measure ($\eta^2 = 1 - \Lambda$). Using Cohen's (1988) guidelines, $\eta^2 = .15$ is considered a medium effect size.

Table 2 presents the descriptive statistics for the three groups on the eight outcome variables, group comparison statistical tests, and the effect sizes for two group comparisons (Virginia model vs. each of the other two groups). Seven of the eight outcome variables showed a statistically significant univariate ANOVA. Follow-up Dunnett post hoc tests indicated no statistically significant differences between the group of Virginia model schools and either one of the other two groups of schools on short-term suspensions or aggressive discipline violations. However, schools using the Virginia model of threat assessment had lower levels of long-term suspensions than the other two groups of schools. Furthermore, students in schools using the Virginia model reported less bullying and teasing in the school, a more favorable learning environment, and greater willingness to seek help from adults in the school than students in

the other two groups of schools. Finally, students in the schools using the Virginia model reported lower levels of student victimization and bullying victimization than students in the schools using no form of threat assessment, The statistically significant effect sizes ranged from 0.27 to 0.40, which fall into the range of small to medium effect sizes, using Cohen's d of 0.20 and 0.50 as benchmarks for small and medium effects, respectively.

Discussion

This is the first report of a study comparing schools using or not using a threat assessment approach. This study was retrospective rather then experimental in design, and examined school safety conditions in schools that had previously adopted or not adopted the Virginia threat assessment guidelines. Previous studies have reported on the implementation of threat assessment, but have not compared schools using threat assessment with other groups of schools (Cornell et al., 2004; Strong & Cornell, in press; Van Dyke & Schroeder, 2006). In our sample of 95 schools using the Virginia guide-

Table 2
Statistical Tests and Effect Sizes for Group Comparisons on School Climate Measures

Variable	(1) Virginia model ($n = 95$)		(2) No model ($n = 54$)		(3) Other model ($n = 131$)		Group comparison effect size[a] and statistical test result	
	M[b]	SD	M	SD	M	SD	1 vs. 2	1 vs. 3
Student victimization[c]	1.27	0.33	1.33	0.31	1.41	0.37	−0.19	−0.40*
Bullying victimization[c]	1.21	0.49	1.29	0.48	1.40	0.51	−0.16	−0.38*
Bullying climate[c]	16.48	1.13	16.96	0.96	16.83	0.92	−0.45*	−0.35*
Help seeking[c,d]	22.58	1.74	21.87	1.80	22.14	1.55	0.40*	0.27*
Learning Environment[c,d]	27.75	2.16	26.79	2.55	27.08	2.18	0.42*	0.31*
Short-term suspensions[c]	364.65	470.62	455.47	423.14	309.79	334.19	−0.20	0.14
Long-term suspensions[c]	10.50	12.71	15.28	20.78	15.71	20.24	−0.30*	−0.30*
Aggressive discipline violations	40.79	26.96	39.96	22.08	37.46	23.69	0.03	0.13

[a] The effect size is Cohen's d:

$$d = \frac{\bar{X}_{\text{Virginia model group}} - \check{S}\bar{X}_{\text{other group}}}{S_{\text{pooled}}},$$

where S_{pooled} is the pooled standard deviation across the two comparison groups. [b] These are adjusted group means obtained from MANCOVA after adjusting for the six school background variables. [c] Statistically significant group differences ($\alpha = .05$) on this outcome variable in the follow-up univariate ANCOVA. [d] This is a positive outcome for which a higher value is desirable; all others are negative outcomes for which lower values are desirable.
* Dunnett group comparison (Virginia Model group vs. each of the other two groups) is statistically significant at $\alpha = .05$.

lines for threat assessment, students reported a more positive school climate characterized by less teasing and bullying than students in schools using no form of threat assessment. They were more likely to report that school staff cared about all students and treated them with respect, and they expressed more willingness to seek help for problems such as bullying and threats of violence. Also, school records showed fewer long-term suspensions in schools using the Virginia model. These effects were close to medium in size (Cohen's d ranging from 0.30 to 0.45). An effect size of 0.40 means that the average high school using the Virginia guidelines would stand at the 66th percentile of high schools not using the guidelines.

Although this study did not test for causal effects through an experimental design, one possible explanation for these findings is that the Virginia model places an emphasis on encouraging students to seek help for bullying and other threats of violence and on resolving peer conflicts and disputes before they rise to the level of serious problems. For example, the threat training program specifically recommends that school staff teach students the difference between snitching and seeking help. Moreover, two previous studies have reported that all cases were resolved without the threatened act of violence being carried out (Cornell et al., 2004; Strong & Cornell, in press). It would be useful to gather additional information about the way in which the threat assessment model was implemented and how it influenced student–staff interactions.

It is surprising that there were even more pronounced differences between schools using the Virginia model and schools using an alternative approach to threat assessment. The Virginia model schools were superior to this comparison group on six of eight outcome measures, with effect sizes ranging from 0.27 to 0.40. Students attending high schools using the Virginia model reported that they observed less teasing and bullying among their peers and they were less likely to report being the victim of bullying or other forms of aggressive behavior, such as being threatened or assaulted. They were more likely to report that school staff treated them with respect, and they expressed more willingness to seek help from school staff. Perhaps most notably, schools using the Virginia model had fewer long-term suspensions

(although not short-term suspensions) than schools using an alternative model. The consistency between student report and administrative records suggests that there is a reliable difference between the two groups of schools.

Explanations for Study Findings

How can the consistent differences between the Virginia model group and the other two groups be explained? The Virginia model was designed to carry out the recommendations of school safety reports by the FBI (O'Toole, 2000) and Secret Service (Vossekuil et al., 2002). The Virginia procedures were developed in consultation with a team of experienced school administrators, school resource officers, and mental health professionals (Cornell & Sheras, 2006), and the process was field tested for 1 year in 35 schools (Cornell et al., 2004). The procedures are described in detail in a 145-page manual and school teams are trained in a 6-hr workshop. In contrast, it is unlikely that in-house administrative school staff would have had the time and resources to develop comparable procedures for their schools.

In addition, the Virginia model places a strong emphasis on resolving student conflicts and intervening in cases of bullying before such problems escalate into violence. The model offers alternatives to disciplinary actions and recommends minimal use of long-term suspensions. Previous studies reported low rates of long-term suspensions (Cornell et al., 2004; Strong & Cornell, 2008). A study of school staff attending the workshop found that participants demonstrated an increased willingness to take a problem-solving approach to student threats of violence and decreased interest in a zero-tolerance approach (Allen et al., 2008). The change in attitudes toward zero tolerance is especially noteworthy because zero-tolerance discipline policies are widely employed in Virginia schools.

To detect potentially confounding factors in the school population that would explain study findings, we compared the three groups on school size, proportion of minority students, and proportion of students eligible for a reduced price meal. Although there was substantial variation across high schools, there were no statistically significant differences between groups.

An additional concern was that schools might differ in the level of violent crime in the surrounding community or in the presence of school resource officers and other security measures in the school. However, group comparisons showed no differences among the three groups in the annual number of violent crimes recorded by police for the high school attendance zone, in the number of school resource officers at the school, or in student perceptions of the extent of security measures (metal detectors, video cameras, locked doors, etc.) used by the school.

Despite these efforts to show that the group differences could not be attributed to school demographics or security measures, it is still conceivable that uncontrolled self-selection factors could have contributed to study findings. It is conceivable that schools that already had lower rates of bullying and more positive climates chose to adopt the Virginia model, whereas schools with less positive school climates were more inclined to develop their own model or not use a threat assessment approach. Only a randomized controlled study can fully address this limitation. It should be noted, however, that the decision to adopt the Virginia model was not made by individual high schools, which lessens the possibility of selection bias at the school level. Typically, the decision to undertake training in the Virginia threat assessment model was made at the central administrative level rather than the school level. Typically, the superintendent's office contracted with the University of Virginia to provide division-wide training for all schools in the county or city. Moreover, high school staff members were not always favorably inclined to adopt a threat assessment model and did not consistently hold attitudes that were congruent with this approach. For example, the training stressed that students who threatened to kill someone did not need to be given a long-term suspension, and that almost all students who made such threats could continue in school, provided that the threat assessment procedures were followed. A study of workshop participants showed large improvements in staff attitudes toward threat assessment principles and decreased endorsement of zero-tolerance approaches after training (Allen et al., 2008).

Directions for Future Research

An important direction for future research is to obtain independent verification that the principals implemented the threat assessment strategy that they reported on the school safety audit survey. Furthermore, no information was available on the extent to which the school staff carried out the threat assessment model with integrity. These limitations make it desirable to conduct a more extensive study of how schools carry out threat assessment procedures.

The effect sizes in this study were close to medium effect size, with an overall $\eta^2 = .15$ for the multivariate comparison of the three groups. The multivariate effect size indicates that approximately 15% of the variance on the outcome measures could be attributed to group status. There are several possible explanations for these results. First, because there was no way to determine how completely and consistently the school staff implemented the threat assessment model, it is possible that the intervention effects were diminished by the presence of schools that were not fully compliant with the model. In a review of school-based violence prevention programs, Wilson, Lipsey, and Derzon (2003) noted that effect sizes are typically much higher when a program is conducted on a demonstration basis and monitored by researchers than when the program is implemented on a routine basis without benefit of researcher support. It would be useful to obtain measures of model compliance that could be correlated with these outcomes.

Second, the outcome measures used in this study were distal from the threat assessment intervention. Case data on students who made threats would provide a more direct assessment than samples of ninth grade students reporting on general climate conditions. It is noteworthy that an intervention model designed to deal with students making threats of violence seems to have produced generalized effects on the school climate. It is possible that the resolution of student threats had a ripple effect on student interactions in general, such as reducing incidents of bullying because a student who was bullying others was identified in the course of a threat assessment. Another possibility is that the problem-solving approach of threat assessment had a salutary effect on staff responses to other student misbehavior.

Beyond student report, there was also a small effect on long-term suspensions. After statistically adjusting for six covariates in the MANCOVA, Virginia model schools recorded an average of 10.5 long-term suspensions, no-model schools recorded 15.28 long-term suspensions, and schools using an alternative model of threat assessment recorded 15.27 long-term suspensions. These variations could be attributable to differences in how schools deal with student threats. Cornell et al. (2004) found that the high schools in their field-test study conducted approximately 10 threat assessments per year. If no-model schools and alternative-model schools used a zero-tolerance policy for such cases, it could produce a similar difference in long-term suspensions. However, it is less likely that disciplinary outcomes for threat assessments could produce differences in short-term suspensions or disciplinary violations for physical aggression, which were not statistically significant in this study. The rates for short-term suspensions ($M = 355$ per school) and aggressive disciplinary violations ($M = 39$) are much higher than the typical number of threats that would come to the attention of high school authorities for a threat assessment.

Although a randomized controlled study is needed, these findings support the conclusion that the Virginia model appears to be a promising approach for responding to student threats of violence that has a beneficial effect on school safety conditions. The Virginia threat assessment model is intended to orient school staff toward a problem-solving approach to student threats that may have a generalized effect on other student conflicts and on student willingness to seek help for threatening situations.

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