

Facilitating Threat Assessment Implementation in Schools:

From Training to Outcomes

A Dissertation

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By

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Dissertation Abstract

Despite the widespread use of threat assessment in schools, there are important gaps in the research literature. First, there is limited research regarding how students can be introduced to the concept of threat assessment and encouraged to report threats. Second, there is little research on the process of training staff to conduct threat assessments. Finally, studies have yet to investigate the graduation rates for students who undergo a threat assessment. This three-paper dissertation explores threat assessment training and graduation rates for students who receive a threat assessment using the Comprehensive Student Threat Assessment Guidelines (CSTAG) model.

The first paper (Stohlman & Cornell, 2019) investigated an online educational program to increase student knowledge of threat assessment and willingness to report threats of violence in a sample of 2,338 students. There were two primary research questions: (1) How are student characteristics of gender, grade level, and ethnicity/race associated with student knowledge of threat assessment and willingness to report threats? (2) Does the program increase knowledge of threat assessment and willingness to report threats? Male students were less willing to report threats than female students at pretest, but these differences were no longer significant at posttest. Older students were less willing to report threats than younger students at pretest, and these differences remained at posttest. Post-program questions revealed that the program significantly increased knowledge and willingness to report threats.

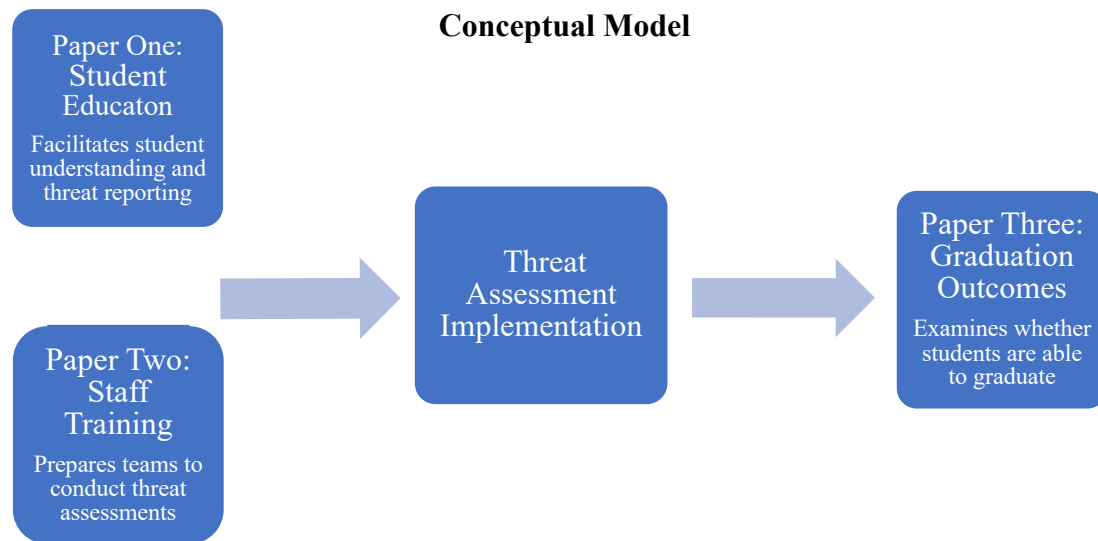
The second paper (Stohlman et al., 2020) investigated the effects of a day-long training workshop for school personnel on their knowledge of threat assessment and their attitudes towards using this approach to violence prevention in a sample of 4,666 participants across 100 workshops. There were four primary research questions: (1) How does the workshop affect

school personnel knowledge of threat assessment? (2) How are school personnel characteristics of gender, occupation, work experience, and prior threat assessment training and experience associated with knowledge of threat assessment, threat classification accuracy, and evaluations of the workshop? (3) Are workshop effects comparable across different trainers? (4) How do the environmental factors of seat location, seat comfort, and room temperature influence workshop experience? After workshop completion, all groups, across all trainers, showed significant gains in their knowledge of threat assessment and threat classification accuracy. Additionally, nearly all participants provided positive evaluations of the workshop. Regarding environmental influences, participant ratings of seat comfort were positively associated with participant workshop ratings.

The third paper examined the graduation rates of 146 students from two large school districts who underwent a threat assessment, and compared them to overall district graduation rates as well as to the rates of a sample of students with a documented disciplinary history. There were two primary research questions: (1) How do the graduation rates for students who undergo a threat assessment compare to those of their peers? (2) How are graduation rates related to the seriousness of the threat incident, suspensions from the threat incident, race/ethnicity, gender, economic disadvantage, and special education status? The graduation rate for these students was 86% in District A and 79% in District B. These graduation rates were somewhat lower than the district-wide rates, but comparable to the rates for students who received a school suspension. In one district, we found that students receiving special education services were significantly more likely to graduate compared to students in general education. Aside from this notable finding, there were no significant differences in graduation rates by threat seriousness, suspension from the threat, gender, race/ethnicity, economic disadvantage, or grade level. Overall, students who

made threats were usually able to complete high school and did not appear to be disadvantaged by the threat assessment process.

Taken together, the first two studies revealed that threat assessment training improves knowledge of threat assessment, encourages students to report threats, and bolsters staff attitudes towards this approach to violence prevention. The third study provides preliminary evidence that students who undergo a threat assessment tend to graduate high school at rates comparable to their peers.



Project Overview

Threat assessment is a systematic approach to violence prevention used by schools to investigate and respond to student threats of violence. Once a threat is reported, multidisciplinary teams convene to evaluate the seriousness of the threat; if the threat is deemed serious, the team will take appropriate steps to prevent violence and help the student resolve the underlying conflict that precipitated the threat (Cornell, 2018). This practice has been endorsed by authorities in law enforcement and education (American Psychological Association [APA], 2013; National Association of School Psychologists, 2015; National Threat Assessment Center, 2018). Several states have passed legislation regarding the establishment of school-based threat assessment teams (Erwin, 2019; Woitaszewski et al., 2018).

Although threat assessment is a widely-used practice, it is still relatively new to schools. Most threat assessment research has understandably concentrated on the threat assessment process itself, what kinds of threats are identified, and how teams respond to them. Less attention has been given to other important aspects of threat assessment, such as the factors that precede the successful implementation of threat assessment and the

outcomes for students who receive a threat assessment. This three-paper dissertation fills a gap in the literature by investigating these important yet under-researched domains of threat assessment. Papers one and two focus on threat assessment training for students and school personnel, respectively. Paper three investigates how students fare following their threat assessment by looking at their graduation outcomes.

Paper one. In order for the threat assessment process to be initiated, threats must be reported. In 2008, a study by the Secret Service and the Department of Education identified student willingness to report threats as critical to the prevention of school shootings. The study found that students ranged widely in their willingness to share information regarding a peer's plan of violence and they called upon schools to undertake efforts to increase student willingness to report threats (Pollack et al., 2008). Reluctance to report threats is a barrier to the effective implementation of threat assessment; students are the most likely group to know about a peer's plan of impending violence (Cornell et al., 2016; Fein et al., 2004). One reason for this reluctance is that students often believe that reporting threats is tantamount to snitching (Brank et al., 2007). In addition, prior research has found that demographic factors are associated with willingness to report threats. Specifically, research has shown that boys are less willing than girls, older students are less willing than younger students, and minority students are less willing than White students, to report threats (Flanagan et al., 2005; Millspaugh et al., 2015; Syvertsen et al., 2009).

However, studies have not investigated whether this willingness can be changed. This is an important area of study; Daniels et al. (2007) found that the majority of averted acts of school violence were discovered because students reported threats. Recommendations from law enforcement authorities have suggested that educating students about threat assessment is needed

to increase both their knowledge of the threat assessment process as well as their willingness to report threats (Fein et al., 2004; O'Toole, 2000). Our research group developed a 15-minute online educational program to teach students about threat assessment and the need to report threats. The program educated students about the threat assessment process and discussed common misconceptions about school safety. It emphasized the critical message that reporting threats is not snitching and included a video vignette during which a student modeled appropriate threat-reporting behavior.

This study investigated the hypotheses that student knowledge of threat assessment and willingness to report threats of violence would improve after completing the program. Secondly, this study sought to understand whether there were demographic differences associated with threat assessment knowledge and willingness to report threats.

The analytic sample consisted of 2,338 students across six middle schools and three high schools. During the program, students answered 11 pre-post knowledge questions such as “Schools are required to notify parents/guardians if it is determined that the student poses a threat to harm someone,” with three response options (*yes, no, do not know*). Response options were subsequently dichotomized (1 = *correct*, 0 = *incorrect/do not know*), and summed to obtain an overall knowledge score. Students answered four pre-post willingness questions such as “If a student repeatedly picked on another student, I would tell one of the teachers or staff at school,” with one of five response options (0 = *strongly agree*, 1 = *agree*, 2 = *do not know*, 3 = *agree*, 4 = *strongly agree*). Response options were summed to obtain an overall willingness score.

Repeated measures ANCOVAs revealed that students had significantly higher threat assessment knowledge and increased willingness to report threats of violence after completing the online educational program. With regard to demographic variables, male students were less

willing to report than female students, and older students were less willing to report than younger students, at pretest. These differences by grade level remained at posttest, but were no longer present for gender. There were no significant knowledge differences between groups at pretest. However, Black and Hispanic students achieved lower knowledge scores than White students at posttest. This study found that the online program increased both student knowledge of threat assessment and willingness to report threats across groups. These findings suggest that educating students on threat assessment can facilitate threat reporting, which can ultimately prevent acts of violence from being carried out.

This paper, “An Online Educational Program to Increase Student Understanding of Threat Assessment,” was first presented as a poster at the American Psychological Association Annual Conference in August, 2017, and was published online in the *Journal of School Health* in September, 2019.

Paper two. As more states and localities adopt threat assessment, it is critical to develop evidence-based standards for training. Authorities in law enforcement have emphasized the need for high-quality threat assessment training (National Threat Assessment Center, 2018). Now that several states have laws regarding the establishment of school-based threat assessment teams and the STOP School Violence Act provides funding, the demand for threat assessment training is rapidly increasing (Erwin, 2019; Woitaszewski et al., 2018).

However, there is limited research on threat assessment training. Notably, there are some challenges to training school personnel in a threat assessment approach. Many school personnel overestimate the risk of a school shooting. In addition, many favor a zero-tolerance approach to discipline that is antithetical to threat assessment. Furthermore, because threat assessment is a multidisciplinary process, training must have an impact on diverse occupations (e.g.,

administration, teaching, mental health, law enforcement), and staff with varying levels of experience.

Prior research has found that threat assessment training can improve school personnel knowledge of threat assessment, motivation to use threat assessment principles, and decrease support for exclusionary disciplinary practices such as zero tolerance (Allen et al., 2008; Cornell et al., 2011). However, these studies have not accounted for potential effects of the threat assessment training environment on threat assessment knowledge and attitudes.

The second study investigated changes in school personnel knowledge and evaluations of threat assessment after completing a day-long CSTAG workshop, and looked at associations with gender, occupation, work experience, prior threat assessment experience, and trainer effects. Additionally, this study fills a gap in past training research by examining the influences of environmental factors on threat assessment training. Specifically, this study evaluated the potential influences of seat location, seat comfort, and room temperature on posttest threat assessment knowledge, threat classification accuracy, and workshop evaluations.

The CSTAG workshops were designed to enhance school personnel knowledge of threat assessment through interactive, content-focused training. Each trainer provided information on school safety, and dispelled common school violence myths (e.g., clarifying that violence in schools is not increasing). Participants were taught how to triage threats to identify them as not serious (i.e., “transient”) or serious (i.e., “substantive”).

The analytic sample consisted of 4,666 school personnel across 100 CSTAG workshops. During the workshop, participants answered 13 pre-post knowledge questions based on a content analysis of the CSTAG manual. The questions were designed to reflect key concepts covered in the workshop. Participants answered questions such as, “About two-thirds of threats are transient

and one-third are substantive,” with one of three response options (*true/agree, false/disagree, or don't know*). Response options were then recoded as dichotomous (1 = *correct*, 0 = *incorrect/don't know*). In addition, participants were asked four posttest questions that required them to classify four common threat situations with one of four response options (*no threat, transient, serious substantive, very serious substantive*). For workshop evaluations, participants were asked to answer five posttest questions regarding their understanding of threat assessment, their motivation to use threat assessment, their understanding of student violence, and their perceptions of workshop usefulness, with one of four response options (*strongly disagree, disagree, agree, strongly agree*). Their answers were summed to achieve an overall workshop evaluation score. For the training environment, participants were asked to indicate their workshop seat comfort (*very uncomfortable, uncomfortable, neither uncomfortable or comfortable, comfortable, or very comfortable*), seat location (*front third of room, middle third of room, or back third of room*), and room temperature (*too hot, too cold, or just right*).

A repeated measures ANCOVA revealed that school personnel across trainers obtained significantly higher threat assessment knowledge scores after workshop completion regardless of their gender, occupation, work experience, and prior threat assessment experience. All groups, across all trainers, achieved high levels of threat classification accuracy. Individuals who had more work experience had lower classification accuracy than those with less work experience. Almost all individuals provided positive evaluations of the workshop and endorsed high levels of motivation to use threat assessment. Individuals in law enforcement provided the lowest evaluations of the workshop while individuals in teaching and mental health provided the highest ratings. Environmental factors were only related to participant evaluations of the workshop. There was a positive association between seat comfort and participant ratings of the workshop.

Ultimately, this study found that after completing a day-long workshop, multidisciplinary school personnel with varying levels of experience had substantial gains in their threat assessment knowledge and were motivated to use principles of threat assessment. Further, this program helped bridge knowledge gaps between groups. There is a heightened demand for high-quality threat assessment training that can be implemented on a large scale. Therefore, it is notable that this workshop effectively transmitted knowledge across groups. Taken together, the results of this study provide support for the use of a CSTAG training workshop for multidisciplinary school personnel.

This paper, “Evaluation of Threat Assessment Training for School Personnel,” was presented as a poster at the American Psychological Association Annual Conference in August, 2019. It was published online in *Journal of Threat Assessment and Management* in July, 2020.

Paper three. To this point, studies have focused on the factors that precede the effective implementation of threat assessment (e.g., Papers one and two), or the immediate outcomes of the threat assessment itself. Although these studies provide promising evidence that students are almost always able to return to school immediately following their threat assessment (Cornell et al., 2012; Strong & Cornell, 2008), studies have yet to investigate how these students fare after they receive a threat assessment. There is a heightened demand for this research because there are concerns that receiving a threat assessment could lead to adverse outcomes and that students could end up in the school-to-prison pipeline (Elbe & Rogers, 2019; Jordan, 2020). Examining graduation rates for students who undergo a threat assessment is a logical first step in this process; however, there are some notable challenges in assessing graduation rates for these students.

First, threat assessment is a relatively new process for many school districts. In 2013, Virginia became the first state to mandate the establishment of school-based threat assessment teams (§ 22.1-79.4). In subsequent years, several states have passed similar legislation (Erwin, 2019; Woitaszewski et al., 2018). Therefore, many school districts have not been using threat assessment for long enough to have established graduation records for students who received a threat assessment.

Second, students who are referred for threat assessments are not representative of the general student population. These students often have documented disciplinary histories (Burnette et al., 2019; Strong & Cornell, 2008). Further, male students, economically disadvantaged students, students receiving special education services, and minority students are often referred for threat assessment at disproportionately high rates (Burnette et al., 2018; Cornell et al., 2018; Kaplan & Cornell, 2005). These same characteristics are associated with increased risk for school dropout (McFarland et al., 2019). Therefore, these factors should be accounted for when examining these graduation rates. It is also important to determine whether threat assessment puts these groups at an additional risk for school dropout.

The third study investigated the graduation rates for students who received a threat assessment across two, large, suburban, school districts from the same state that have been using CSTAG for many years. These districts varied in their record-keeping and were thus analyzed separately. The first district (“District A”) was able to provide data on all threat types, while the second district (“District B”) was only able to provide data on substantive threats.

These students were then compared to overall graduation rates for students in their same district and to a comparison group of students with a documented disciplinary history. The research questions were as follows: (1) How do the graduation rates for students who undergo a

threat assessment compare to those of their peers? (2) How are graduation rates related to the seriousness of the initial threat incident, suspension following the initial threat incident, race/ethnicity, gender, economic disadvantage, GPA, and special education status?

From the threat assessment group, the total analytic sample consisted of 146 students (73 from District A, 73 from District B) across 42 schools. The following variables were extracted from student files: graduation outcome (1 = graduate, 0 = dropout), threat type, suspension resulting from the threat incident (District A only), gender, special education status, economic disadvantage (District B only), GPA at the end of the year that the threat assessment occurred, and grade level at the time of the initial threat incident. The graduation rates for students who made threats were descriptively compared to two groups: (1) state records of completion rates for all students in the same district (approximately 27,000 students in District A, and 99,000 students in District B) and (2) completion rates for students in the same district who received one or more out-of-school suspensions (District B only; 3,163 students).

Linear probability modeling showed that, in District A only, students who received special education services were more likely to graduate from high school than students in general education. There were no other statistically significant differences across gender, grade level, economic disadvantage, threat seriousness, GPA, or suspension as a result of the threat incident. Most students (86% in District A, 79% in District B) went on to graduate from high school. These graduation rates were lower than the district-wide rates, but comparable to the rates for students who received a school suspension. These findings were not surprising because our threat assessment sample was disproportionately comprised of students who had pre-existing demographic and disciplinary risk factors for school dropout. In this context, it was expected that students who received a threat assessment would have lower graduation rates than overall district

rates because these groups were not directly comparable. It is notable that students who received a threat assessment demonstrated slightly higher graduation rates in comparison to a more similar peer group of students who had a documented disciplinary history. Further, threat seriousness, and receiving a suspension as a result of the threat incident did not contribute to increased likelihood of school dropout. Overall, this study showed that students who received a threat assessment graduated at comparable rates to their peers and threat assessment did not appear to put students at an increased risk for school dropout.

Implications and Future Directions

Threat assessment is becoming a standard school safety practice and this three-paper dissertation examines three critical, yet under-researched domains of threat assessment. The first paper showed that an online educational program can promote school safety by increasing both student knowledge of threat assessment and willingness to report threats. Students are often hesitant to report threats of violence, and are less likely to report if they believe that they will be labeled a snitch or if they believe the threat is not serious (Brank et al., 2007; Nekvasil & Cornell, 2012). This program addressed these barriers by educating students on the threat assessment process. Schools are able to use this program to educate their students and facilitate threat reporting, which promotes school safety.

The second paper found that a day-long workshop for school personnel can increase threat assessment knowledge and motivation to use principles of threat assessment in school. These findings demonstrate the importance of training staff to improve their knowledge of threat assessment and their threat classification accuracy, which are integral to the effective implementation of threat assessment. In alignment with recommendations from authorities in threat assessment (National Threat Assessment Center, 2018; O'Toole, 2000), this workshop

provided training to relevant stakeholders and emphasized the respective roles of these multidisciplinary team members. Moreover, all groups demonstrated gains in their threat assessment knowledge and over 95% felt that this training contained practical information. Additionally, this program improved staff attitudes towards threat assessment and motivation to use this approach in schools. This increases the likelihood that they will implement the principles they learned in the workshop.

While the first two papers focus on the factors that precede the implementation of threat assessment, the third paper provides an analysis of the graduation rates for students after they have received a threat assessment in two large school districts that have been using CSTAG for many years. The findings from this paper suggest that students who receive a threat assessment are not at an increased risk for incurring negative graduation outcomes. These findings are notable in light of recent concerns that threat assessment could contribute to increased rates of school dropout and lead to negative outcomes for at-risk groups such as students with disabilities and minority students (Elbe & Rogers, 2019; Jordan, 2020).

Although these three papers contribute meaningful information regarding threat assessment, there are limitations that should be noted. In the first two papers, post-training evaluations were completed immediately after the training occurred. Therefore, it is unclear whether these gains persisted over time. Future studies should consider conducting a follow-up evaluation to see whether trainees retained their knowledge of threat assessment and implemented the principles that they learned in training. The third paper was limited in sample size and was archival in nature. Additionally, these districts varied in their recordkeeping practices. Therefore, we had to conduct separate analyses for these school districts. States should consider establishing uniform standards for maintaining threat assessment records to monitor

these students as they complete their schooling. This would greatly facilitate a more in-depth study of the long-term outcomes for students who receive a threat assessment.

Despite these limitations, this three-paper dissertation provides important information on the factors that facilitate the implementation of threat assessment, and a first look into the graduation rates for students that receive a threat assessment. Future studies should look into the interventions that are implemented as a result of threat assessment, and how these influence graduation rates. Additionally, this data should be integrated into threat assessment training to help teams identify helpful interventions to promote student success.

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Abstracts

Manuscript One: An Online Educational Program to Increase Student Understanding of Threat Assessment

Threat assessment is a widely recommended practice used by schools to investigate and respond to student threats of violence; however, students are often reluctant to disclose threats. We developed an online educational program for students to increase their understanding of threat assessment and the need to report serious threats. This study investigated two research questions: (1) How are student characteristics of gender, grade level, and ethnicity/race associated with student knowledge of threat assessment and willingness to report threats? (2) Does the program increase knowledge of threat assessment and willingness to report threats? The sample consisted of 2,338 students from six middle schools and three high schools. Prior to program completion, boys were less willing than girls, and older students were less willing than younger students, to report threats. Post-program questions revealed that the program significantly increased knowledge and willingness to report threats across student groups, with effect sizes (Cohen's *d*) ranging from small (.30) to large (1.43). This program promotes school safety by teaching students about threat assessment and increasing willingness to report threats. The program is available online for other schools to use.

Manuscript Two: Evaluation of Threat Assessment Training for School Personnel

Despite the widespread use of threat assessment in schools, there is a dearth of research investigating the staff training process. We evaluated the effectiveness of day-long training on the Comprehensive Student Threat Assessment Guidelines (CSTAG) in a sample of 4,666 multidisciplinary school personnel from administration, law enforcement, mental health, teaching, and other groups. Across 100 workshops conducted by 9 trainers, all discipline groups showed large and statistically significant increases in their knowledge of threat assessment from pretest to posttest. On average, participants achieved threat classification accuracy scores of 75% after completing the workshop. Over 95% of participants provided positive evaluations of the workshop, and highly endorsed motivation to implement threat assessment in their schools. Overall, these findings support the use of workshop training to prepare multidisciplinary school-based threat assessment teams.

Manuscript Three: High School Graduation Outcomes of Student Threat Assessment

School threat assessment has become increasingly widespread over the past 20 years; however, there is a lack of research on the graduation rates for students who undergo a threat assessment. The primary purpose of this study was to evaluate the graduation/dropout rates for 146 students who received a threat assessment in two large school districts. The graduation rate for these students was 86% in District A and 79% in District B. In District A, but not District B, linear probability modeling showed that students receiving SPED services had an increased likelihood of graduating. Race/ethnicity was not associated with graduation, indicating that receiving a threat assessment did not place minority students at an additional disadvantage for adverse graduation outcomes. Students who made more serious threats were not at a significantly

increased risk of failing to graduate. There were no significant associations across gender, GPA, grade level, FRPM, or race/ethnicity. Overall, this study showed that most students who received a threat assessment went on to graduate from high school at comparable rates to their peers.

Manuscript One

An Online Educational Program to

Increase Student Understanding of Threat Assessment

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Abstract

Threat assessment is a widely recommended practice used by schools to investigate and respond to student threats of violence; however, students are often reluctant to disclose threats. We developed an online educational program for students to increase their understanding of threat assessment and the need to report serious threats. This study investigated two research questions: (1) How are student characteristics of gender, grade level, and ethnicity/race associated with student knowledge of threat assessment and willingness to report threats? (2) Does the program increase knowledge of threat assessment and willingness to report threats? The sample consisted of 2,338 students from six middle schools and three high schools. Prior to program completion, boys were less willing than girls, and older students were less willing than younger students, to report threats. Post-program questions revealed that the program significantly increased knowledge and willingness to report threats across student groups, with effect sizes (Cohen's *d*) ranging from small (.30) to large (1.43). This program promotes school safety by teaching students about threat assessment and increasing willingness to report threats. The program is available online for other schools to use.

Keywords: Threat assessment; school safety; violence prevention program.

An Online Educational Program to Increase Student Understanding of Threat Assessment

Student violence is an important health concern in schools. According to the National Center for Education Statistics, there were approximately 486,400 violent victimizations in schools during the 2013-2014 academic year (Zhang, Musu-Gillette, & Oudekerk, 2016). Sixty-five percent of public schools reported at least one incident of violence and 13% reported one or more serious acts of violence (Zhang et al., 2016).

School shootings are the most severe and feared form of school violence, but they are statistically rare events: The average school can expect a student homicide once every 6,000 years (Borum, Cornell, Modzeleski, & Jimerson, 2010). Highly publicized shootings perpetuate the notion that schools are unsafe. As a result, authorities have devoted their limited resources to increased security measures and zero tolerance disciplinary practices (Borum et al., 2010), despite a lack of evidence that they effectively increase school safety (Moran, Salomon, Plotkin, & Cohen, 2014).

The Federal Bureau of Investigation (FBI) published a report on school shootings which concluded that threats often signal potential violent incidents (O'Toole, 2000). In their reports on school shootings and school safety, the United States Secret Service and the FBI recommended that schools implement a threat assessment approach (Fein et al., 2004; O'Toole, 2000). Further, threat assessment has been endorsed in reports by the American Psychological Association and the National Association of School Psychologists. (American Psychological Association, 2013; National Association of School Psychologists, 2015).

Threat assessment is a prevention strategy used by schools to investigate and respond to student threats of violence. Student threats encompass any forms of communication or behavior that express an intent to harm someone (Cornell et al., 2016). After a threat is reported, threat

assessment teams determine whether an individual poses a threat and intervene with individualized plans.

Schools implementing threat assessment have found that it is a valuable approach to violence prevention. Threat assessment, and the Virginia Student Threat Assessment Guidelines (VSTAG) in particular, are ways to resolve threats while avoiding exclusionary discipline (Cornell & Sheras, 2006). Cornell et al. (2004) examined the outcomes of 188 student threat cases from 35 schools. The threat assessment teams evaluated the seriousness of each threat to take appropriate steps to prevent violence. Ultimately, none of the 188 threats were carried out. Strong and Cornell (2008) examined the outcomes of 204 cases in Memphis City Schools. For each case, the threat assessment team made recommendations to students, parents, and teachers to promote school safety and address the threat. In most of these cases, students were able to return to their school and none of the threats were carried out.

Cornell, Allen, and Fan (2012) conducted a year-long randomized controlled study of 40 schools with 20 randomly selected to receive VSTAG training and 20 in a wait-list control group. Across all schools, 201 students made threats and of those, only seven students attempted to carry them out. There were significant differences in how schools responded to the threats. Students who made threats in schools using VSTAG were less likely to receive long-term suspensions or an alternative school placement, and more likely to receive counseling services. This study highlights an important aspect of the VSTAG model: It guides school authorities to take a less punitive and more constructive, problem-solving approach to student threats.

Cornell, Sheras, Gregory and Fan (2009) compared the VSTAG model to other threat assessment approaches. They found that students in high schools using VSTAG were more willing to seek help for bullying and threats of violence, observed less bullying, and reported

more positive school climate than students in schools using alternative approaches (Cornell et al., 2009). Nekvasil and Cornell (2015) conducted a quasi-experimental study that extended the Cornell et al. (2009) findings to middle schools. They found that middle schools using VSTAG reported more positive school climate and less bullying (Nekvasil & Cornell, 2015).

One important benefit of threat assessment is that it helps schools to avoid over-reacting to student threats that are not serious. For example, there are widespread reports of students being suspended from school for relatively minor misbehavior, such as pointing a finger like a gun (George, 2013). Studies have found that schools using threat assessment see decreases in out-of-school suspension (Cornell, Gregory, & Fan, 2011). A statewide sample of cases found that only 47% received a school suspension and fewer than 0.9% were expelled (Cornell, Maeng, Huang, Shukla, & Konold, 2016).

Threat assessment is a relatively new and unfamiliar approach in schools. In order for threat assessment to be effective, school teams must be taught to identify threats and resolve conflicts that may have stimulated threats. Two studies have examined the effects of threat assessment training on school personnel. Cornell, Gregory, and Fan (2011) conducted a study investigating changes in threat assessment knowledge after staff training. Pre-post evaluations showed that knowledge of threat assessment principles significantly increased. A study by Allen, Cornell, Lorek, and Sheras (2008) also examined changes in knowledge and attitudes following staff training. Pre-post surveys revealed that after training, school personnel had decreased concerns regarding school homicide, decreased support for zero tolerance approaches, and increased knowledge of threat assessment principles and concepts. These studies show that threat assessment training can modify staff attitudes regarding school safety and increase threat assessment knowledge; however, there are no studies evaluating threat assessment training

programs for students. This is an important research gap because students are both the most common targets of threats and the most likely to know about threats (Fein et al., 2004; Cornell et al., 2016) A needs assessment conducted in Virginia public schools found that school authorities wanted help educating their students about threat assessment (Cornell & Maeng, 2017)

Need for Student Understanding of Threat Assessment

Although serious acts of violence in schools are infrequent, student threats of violence are relatively common (Singer & Flannery, 2000; Vossekul et al. 2002). According to the National Center for Education Statistics (NCES), in 2013, 47% of public schools reported one or more threats without a weapon, and nine percent of public schools reported one or more threats with a weapon (Gray & Lewis, 2015).

There have been several incidents where serious acts of violence were prevented when students reported threats. Daniels et al. (2007) investigated averted acts of school violence in 30 schools across 21 states. They found that in the majority of cases, plots were discovered because students came forward and alerted school personnel to the threat. These student reports often initiate the threat assessment process; there are numerous news reports of potential school shootings that were averted because students came forward to report threats. For example, in 2017, two students in a Florida middle school planned a mass school shooting (Hanna & Ansari, 2017). They took steps to carry out their plan; for example, they devised a signal to open fire and set a date for the shooting. Students heard rumors about their plot and reported the threat. Police officers searched the students' homes and retrieved firearms. A similar incident occurred in a California high school; students overheard four classmates discussing a plan to kill other students and notified school personnel (Rowland, 2015). Authorities arrested the students, and found plans detailing where, when, and how the students would carry out a mass shooting.

Threat Reporting

Reports by both the FBI and Secret Service cautioned that students are often unwilling to report threats to school authorities (Fein et al., 2004; O'Toole, 2000). Research suggests that many factors can influence this reluctance. Williams and Cornell (2006) surveyed 542 students regarding their willingness to report threats of violence. Students were less inclined to make a report if they perceived their teachers as tolerant of bullying or threatening behavior. Other studies have found that students are less willing to report threats if they do not perceive the threat as serious, and if they expect that reporting a threat will lead to being labeled a snitch (Brank et al., 2007; Nekvasil & Cornell, 2012). Although these studies identify reasons why students are unwilling to report threats, there is a paucity of research investigating whether this reluctance can be changed.

Previous studies have shown that the demographic characteristics of gender, grade level, and race/ethnicity are correlated with student willingness to report threats. Syvertsen et al (2009) asked 1,933 middle school and high school students how they would respond to a hypothetical scenario about a peer's dangerous plan. Female students expressed greater willingness than male students to tell an adult. Additionally, they found that middle school students were more willing to report threats than high school students. Other studies have found that older students are less likely to report threats than younger students (Flanagan, Galay & Elek, 2005; Williams & Cornell, 2006).

Millspaugh, Cornell, Huang, and Datta (2015) investigated racial/ethnic factors associated with student willingness to report threats. They found that, in comparison to other racial groups, Black students were the least likely group to report a threat. With the exception of Asian students, minority students were less willing to report threats than White students.

Nekvasil and Cornell (2012) investigated student threats in a sample of 3,756 secondary school students. The students reported how many times they were threatened by peers in the past 30 days, whether they reported the threat to anyone, and whether the threat was carried out. Twelve percent of students reported that a classmate had threatened to harm them in the past 30 days, but only 26% of these threats were reported to school authorities. Most threats (91%) were not carried out. Of the threats that were later carried out, only 31% of students had reported the threat to school authorities. Students cited several reasons for not reporting threats including not perceiving the threat as serious, not wanting or needing help, and fearing retaliation.

Current Study

Previous studies have investigated student threat reporting; however, none have attempted to educate students about threat assessment and increase their willingness to report threats of violence. O'Toole (2000) suggested that in order to increase student threat reporting, educators should teach students about threat assessment and explain how to report threats and how threats are handled after they are reported. O'Toole (2000) specifically recommended that school authorities address the common misperception that reporting threats is snitching.

In 2013, Virginia passed legislation (§ 22.1-79.4) mandating the establishment of threat assessment teams in all public schools. As part of a federally-funded project to improve the implementation of threat assessment in Virginia schools, our research team developed an online educational program to inform students about threat assessment and increase their willingness to report threats.

The first research question was, "How are student characteristics of gender, grade level, and ethnicity/race associated with student knowledge of threat assessment and willingness to report threats?" Based on prior research, it was hypothesized that male students would be less

willing to report threats than female students and that high school students would be less willing to report threats than middle school students. We also hypothesized that Black and Hispanic students would be less willing to report threats than White students. The second research question was, “Does the online educational program increase student knowledge of threat assessment and willingness to report threats?” It was hypothesized that student knowledge and willingness would improve after completing the educational program.

Methods

Participants

We recruited six middle schools and three high schools to participate in this study. The principals determined how students would be invited to complete the program. Five schools invited all students, two schools invited all students in a certain class (e.g., health/PE), and two schools invited all students in a specific grade.

All students were eligible to participate, except for those with a limited ability to understand and read English. The sample consisted of 2,338 students: 690 (29.5%) 6th graders, 455 (19.5%) 7th graders, 421 (18%) 8th graders, 366 (15.7%) 9th graders, 211 (9%) 10th graders, 135 (5.8%) 11th graders, and 60 (2.6%) 12th graders. There were 1,179 (50.4%) girls and 1,159 (49.6%) boys. The racial/ethnic breakdown was 56.2% White, 6.8% Black, 12.6% Hispanic or Latino, and 24.4% Other.

Procedure

The educational program was based on a statewide needs assessment and input from a panel of threat assessment experts. Using this information, our research group developed the content for the program, sent drafts to both a research and a practice advisory board, and synthesized their feedback to create the program. It consisted of slides and narration by a male

and a female student that educated students about the threat assessment process. First, the narrators emphasized that schools are overall very safe places and the likelihood of a serious violent incident is very low. They went on to talk about the importance of violence prevention efforts, highlighting the fact that many violent events have been averted because a student came forward to report the threat.

The narrators described the purpose of a threat assessment team and how and when to report threats to school authorities, emphasizing the importance of threat reporting. A critical message was that reporting threats is not snitching. The educational program included a video vignette in which a student learned that a classmate was planning to shoot someone at school. The student confided to a friend that he was hesitant to report the threat because he felt that he would be snitching. The friend explained that seeking help to prevent violence is not snitching and encouraged him to report the threat to school authorities. The student modeled appropriate threat-reporting by telling a school administrator about the threat.

Prior to completing the program, students were provided with instructions and informed that their responses would be anonymous. During the program, students answered a series of pre-post questions to evaluate their understanding of threat assessment and the need to report threats.

Instrumentation

Student knowledge. Eleven pre/post questions (see Table 1) assessed threat assessment knowledge with statements such as, “Schools are required to notify parents/guardians if it is determined that the student poses a threat to harm someone” and “A student who says he or she is going to kill someone could be charged with a crime,” with three response options (*yes, no, or don't know*). Response options were dichotomized (e.g., 1 = *correct* vs. 0 = *incorrect/don't know*). Cronbach's alpha was .68 at pretest and .66 at posttest.

Student willingness to report threats. Four pre/post questions (see Table 2) assessed student willingness to report threats such as, “If a student repeatedly picked on another student, I would tell one of the teachers or staff at school,” and “If you report a threat, you are snitching,” with five response options (0 = *strongly disagree*, 1 = *disagree*, 2 = *don't know*, 3 = *agree*, 4 = *strongly agree*). Cronbach's alpha was .66 at pretest and .74 at posttest.

Demographic information. Students answered four questions regarding gender, grade level, and race/ethnicity.

Data Analysis

Studies have shown that using validity screening items improves the quality of adolescent survey data (Cornell, Klein, Konold, & Huang, 2012; Cornell, Lovegrove, & Baly, 2014). Student responses were screened based on a validity item, “How many questions did you answer truthfully on this survey?” Students chose one of five response options (*all of them, all but 1 or 2 of them, most of them, some of them, only a few or none of them*). Students who responded *some of them* or *only a few or none of them* were excluded from data analysis. The program was designed to be completed in less than fifteen minutes, and on average, students completed the program in 12 minutes. Students were excluded from the sample if they completed the program in less than 4 minutes, because mock participants found that they could not complete the program in less than 4 minutes without skipping much of the content. Of the initial sample of 2,661, 323 (12.1%) were excluded (25 < 4 minutes and 298 failed the screening item).

The 2,338 participants in the analytic sample were compared to 323 participants who failed to complete the program, using simple t-tests for grade and chi-square tests for gender and race. The non-completers were more like to be male (55% versus 45%), to be older (mean grade

8.32 versus 7.84) and identify as a race other than white (53% versus 48%), with all differences statistically significant ($p < .05$).

To investigate the first research question, four linear regressions examined the associations of gender, race/ethnicity, and grade level with student knowledge and willingness scores before and after completing the program. Follow-up linear regressions examined whether significant differences at pre-test remained at post-test. To address the second research question, separate repeated measures fixed-effects ANCOVAs examined pre-post changes in knowledge and willingness scores. To control for student-level characteristics, gender, and race/ethnicity were included as interaction terms and grade was included as a covariate. Nesting of students within schools was controlled for in the linear regressions and repeated measures ANCOVAs by coding each school as a covariate.

Results

Two linear regressions examined the associations between student-level characteristics and both knowledge and willingness pre-test scores. There were no significant differences in knowledge, but for willingness, boys were significantly less willing to report threats than girls ($\beta = -.69, p < .001$) and older students were significantly less willing than younger students ($\beta = -.13, p = .04$).

Controlling for pretest knowledge, Black students ($\beta = -.34, p = .03$) and Hispanic students ($\beta = -.34, p < .005$) had significant posttest differences in their knowledge compared to White students. Controlling for prior willingness levels, older students ($\beta = -.12, p = .01$) were still less willing than younger students at post-test. Table 3 includes demographic characteristics and the pre-post means for knowledge and willingness.

The first repeated measures ANCOVA revealed statistically significant increases in knowledge scores from pretest ($M = 5.50$) to posttest ($M = 8.65$), $F(1, 2,324) = 45.40, p < .001$. Cohen's d was 1.43, indicating a large effect size (Cohen, 1988). The second repeated measures ANCOVA revealed statistically significant increases in willingness to report threats from pretest ($M = 13.16$) to posttest ($M = 13.86$), $F(1, 2,324) = 20.64, p < .001$. Cohen's d was .30, demonstrating a small effect size (Cohen, 1988). There were no statistically significant interactions, indicating comparable gains across student groups. Follow-up analyses examined potential differences in knowledge and willingness pre-post changes based on student selection methods. Controlling for student-level factors, there were no significant differences when students were invited by grade, or by class, in comparison to inviting all students to participate (all $ps > .05$).

Discussion

This program increased both student knowledge of threat assessment and willingness to report threats. These findings support recommendations from education and law enforcement authorities which encourage students to report threats (International Association of Chiefs of Police, 2009). The program promotes school safety by providing schools with a way to educate students about threat assessment and threat reporting. Educating students and involving them in the threat assessment process can encourage students to report threats and prevent acts of violence.

Consistent with prior research, older students were significantly less willing to report threats than younger students (Flanagan et al., 2005), and boys were significantly less willing to report than girls (Syvertsen, Flanagan, & Stout, 2009) One possible explanation is that male students are less likely to perceive threats as serious. A study by Reniers et al. (2016) found that

males perceived risk-taking behaviors as less risky than females. Other studies have suggested that as students become more independent and autonomous they are less willing to seek help from adults. A study by Syvertsen et al. (2009) found that high school students were more likely to directly intervene, but less likely to tell an adult about a peer's plan to do something dangerous.

Educators must be prepared to encounter more resistance to threat reporting from older students and male students, perhaps because they are more independent or resistant to adult authority. The educational program attempted to overcome this resistance by using student narrators and by presenting a scenario in which one student explained to another why threats should be reported.

When working with less-willing groups, school personnel may want to address student reservations about threat reporting and distinguish seeking help from snitching. Schools using VSTAG are less likely to overreact to threats, and emphasizing this to students can encourage reluctant students to come forward.

There were no demographic differences between student groups in pretest knowledge of threat assessment, but after program completion White students scored significantly higher than Black students and Hispanic students. Contrary to prior research, we did not find initial differences in willingness to report threats related to race/ethnicity. The program purposely included narrators and cast members of diverse backgrounds to engage all students. After completing the program, school personnel may want to follow-up with a class discussion to answer questions and reinforce key messages to help all students understand the basics of threat assessment.

Student knowledge is important to encourage threat reporting; even if students are willing to report threats, they benefit from knowing that their school has a threat assessment team. Prior to program completion, only 32% of students knew that their school had a threat assessment team. This is concerning, because all public schools in Virginia are required to have a threat assessment team, yet less than one third of students knew about their school's team. After program completion, 83% of students understood that their school had a threat assessment team. Although there was a significant increase in the number of students understanding that their school has a threat assessment team, there is still room for improvement. Knowledge how their school uses threat assessment to resolve problems and help students with conflicts may encourage students to come forward.

Other studies have found that online educational programs can help prevent student aggression. For example, Timmons-Mitchell et al. (2016) found that an online bullying education program led to lower bullying perpetration, victimization, and bystander passivity. Educating students about threat assessment includes them in the process and may motivate them to take action when they learn about a threat of violence.

Threat assessment offers schools a viable alternative to zero tolerance approaches. Zero tolerance discipline was initiated in the 1990s to deter students from bringing firearms to school, but over time evolved into a general disciplinary philosophy of using school exclusion (suspension or expulsion) as an automatic response to a wide variety of disciplinary infractions (American Psychological Association [APA] Zero Tolerance Task Force, 2008). Zero tolerance has been widely criticized as ineffective and potentially harmful. Notably, it does not improve student behavior and has been implicated in generating an increase in suspension rates (APA Zero Tolerance Task Force, 2008). Higher suspension rates have been associated with increased

risk of academic failure and dropout, as well as involvement in the juvenile justice system, even after controlling for demographic characteristics and student attitudes toward school (APA Zero Tolerance Task Force, 2008; Fabelo et al., 2011; Lee, Cornell, Gregory, Fan, 2011; Moran, Salomon, Plotkin, & Cohen, 2014).

Limitations and Future Directions

This study has several limitations. First, although the student sample was demographically diverse, it was drawn from a convenience sample of secondary schools and schools varied in how they selected students. Students who completed the program might not be representative of the general school population.

A design limitation is that the posttest questions were asked immediately following the completion of the online program. A future study could examine longer-term effects of the program through the use of delayed posttest questions and records of increased threat reporting.

Another limitation is that students endorsed high levels of willingness to report threats at pretest, leaving little room for improvement at posttest. The high endorsement of reporting might reflect social desirability. Future studies could investigate whether schools using the program see improvements in actual student reporting of serious threats.

Conclusion

In conclusion, this study provides new information about the use of an online program to increase understanding of threat assessment and willingness to report threats. There were increases in both student knowledge and willingness to report threats of violence after viewing the program. This program allows school personnel to educate students and promote school safety. By completing this program, students should learn how to identify and report threats.

Implications for School Health

Overall, the results from this study have practical implications for school health. Threats in schools are relatively common and students are the most likely group to have knowledge of a threat. Many schools have threat assessment teams that could make use of this program. A public link to a program excerpt is available on Youtube:

<https://www.youtube.com/watch?v=H7wI20-TN2w>. The program has been revised to omit references to Virginia and make it more applicable to all schools. Access to the complete program is available from Jennifer Maeng¹ at no charge upon request.

Human Subjects Approval Statement

This study was approved by the University of Virginia institutional review board.

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Table 1

Student Knowledge Scale

Questions	Pretest Percent Answering Correctly	Posttest Percent Answering Correctly
All Virginia public schools are required to have a threat assessment team. ¹	38.0	91.0
My school has a threat assessment team.	32.0	82.6
Threat assessment teams include administrators, counselors, teachers, and law enforcement officers.	62.2	95.0
Threat assessment teams investigate threatening statements or actions by students.	68.9	93.5
A threat assessment team will automatically suspend a student for making a threat. (False)	22.5	72.1
Students who make threats will most likely be arrested. (False)	34.9	66.3
Most threats are not serious.	21.3	55.6
A student who says he or she is going to kill someone could be charged with a crime.	62.1	70.4
A student who sends a text threatening to kill someone could be charged with a crime.	65.6	75.7
Schools are required to notify a student's parents/guardians if it is determined that the student poses a threat to harm someone.	81.7	89.7
A threat assessment team may try counseling to prevent two students from fighting.	65.8	84.9

¹ This item and associated content is omitted from the national version of this online program.

Table 2

Student Willingness to Report Threats Scale

How much do you agree or disagree with these statements?	Strongly Disagree %		Disagree %		Don't Know %		Agree %		Strongly Agree %	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
If a student repeatedly picked on another student, I would tell one of the teachers or staff at school.	0.8	0.9	2.8	2.2	9.2	6.9	49.8	36.8	37.4	53.2
If another student talked about killing someone, I would tell one of the teachers or staff at school.	0.8	1.0	3.7	1.4	13.7	6.6	30.4	25.7	51.5	65.3
If another student brought a gun to school, I would tell one of the teachers or staff at school.	0.6	0.8	1.0	0.7	3.5	2.9	13.3	14.1	81.7	81.6
If you report a threat, you are snitching. ¹	40.9	57.5	35.0	27.3	14.6	7.3	5.8	4.1	3.7	3.8

¹ This item was reverse scored.

Table 3

Pre-post Knowledge of Threat Assessment and Willingness to Report Threats

	PreKnowledge	PostKnowledge	PreWillingness	PostWillingness
Category (N)	M (SE)	M (SE)	M (SE)	M (SE)
Gender				
Female (1,179)	5.50(.10)	8.66 (.08)	13.54 (.09)	14.16 (.09)
Male (1,159)	5.50 (.10)	8.64 (.08)	12.79 (.09)	13.56 (.09)
Race/Ethnicity				
Black (160)	5.47 (.20)	8.50 (.16)	12.98 (.18)	13.61 (.19)
Hispanic (294)	5.38 (.15)	8.47 (.12)	13.15 (.14)	13.80 (.14)
Other (571)	5.54 (.11)	8.76 (.09)	13.16 (.10)	13.98 (.10)
White (1,313)	5.60 (.07)	8.87 (.06)	13.36 (.07)	14.05 (.07)

Table 4

Regressions

Category (N)	PreKnowledge β (SE)	PostKnowledge β (SE)	PreWillingness β (SE)	PostWillingness β (SE)
Gender¹				
Male (1,159)	-.02 (.10)	-.04 (.08)	-.69 (.10)***	-.07 (.07)
Race/Ethnicity²				
Black (160)	-.13(.21)	-.34 (.15)*	-.37 (.19)	-.16 (.14)
Hispanic (294)	-.22 (.16)	-.34 (.12)**	-.20 (.15)	-.11 (.11)
Other (571)	-.06 (.13)	-.09 (.10)	-.20 (.12)	.07 (.09)
Grade Level	.10 (.07)	.07 (.05)	-.13 (.07)*	-.12 (.05)**
Adjusted R ²	.01	.19	.07	.55

¹ Female (1,179) is the reference group.

² White (1,313) is the reference group.

* $p < .05$; ** $p < .01$; *** $p < .001$.

Manuscript Two

Evaluation of Threat Assessment Training for School Personnel

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Author Note

An abbreviated version of this paper was presented as a poster at the American Psychological Association Annual Convention in 2019. Dewey Cornell is the primary developer of the *Comprehensive Student Threat Assessment Guidelines*.

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Abstract

Despite the widespread use of threat assessment in K-12 schools, there is a dearth of research investigating the staff training process. We evaluated the effectiveness of day-long training on the Comprehensive Student Threat Assessment Guidelines (CSTAG) in a sample of 4,666 multidisciplinary school personnel from administration, law enforcement, mental health, teaching, and other groups. Across 100 workshops conducted by 9 trainers, all discipline groups showed large and statistically significant increases in their knowledge of threat assessment from pretest to posttest. On average, participants achieved threat classification accuracy scores of 75% after completing the workshop. Over 95% of participants provided positive evaluations of the workshop, and highly endorsed motivation to implement threat assessment in their schools. Overall, these findings support the use of workshop training to prepare multidisciplinary school-based threat assessment teams.

Keywords: Threat assessment, school safety, student threats, training

Public Significance Statement: After completing a day-long training workshop, K-12 school personnel demonstrated high levels of threat assessment knowledge, threat classification accuracy, and motivation to use principles of threat assessment in their schools. All participants showed improvements regardless of demographic, trainer-related, or environmental differences. These results are promising given the increased demand for high-quality threat assessment training that can be disseminated on a large scale.

Evaluation of Threat Assessment Training for School Personnel

School threat assessment is becoming a standard safety practice in U.S. schools (Cornell et al., 2018). In 2013, Virginia became the first state to require all K-12 public schools to establish threat assessment teams (§ 22.1-79.4). In recent years, many other states have passed similar legislation (Erwin, 2019; Woitaszewski, Crepeau-Hobson, Conolly, & Cruz, 2018). By 2018, 44% of public schools reported using a threat assessment team (Diliberti, Jackson, Correa, & Padgett, 2019). In response to the 2018 school shooting in Parkland, Florida, Congress passed the STOP School Violence Act, which unequivocally encourages the adoption of threat assessment by providing schools with funding for threat assessment training.

Federal endorsement of school threat assessment, and the increasing number of states that mandate its use, have created a huge demand for professional in-service training. Reports by the National Threat Assessment Center (2018) and the Federal Commission on School Safety (2018) recommend that schools use behavioral threat assessment teams. However, reports recommending the use of threat assessment say very little about the training needed to implement it. Two investigations of school shootings identified inadequate training of school personnel as a serious problem (Goodrum & Woodward, 2016; Marjory Stoneman Douglas High School Public Safety Commission Report, 2019).

A comprehensive report on the 2013 shooting at Arapahoe High School in Colorado concluded that a failure in the school's threat assessment process contributed to the shooting that resulted in the murder of a student. The student who committed the fatal shooting had been identified for a threat assessment, but there were many errors and inadequacies in the process the team followed (Goodrum, Thompson, Ward, & Woodward, 2018). Neither the principal nor the assistant principal who conducted the threat assessment had received training. Additionally, the

report noted that the school's threat assessment training had lasted just two hours and included no role-playing or completion of a mock case. Among the report's recommendations was that schools adopt a formal training curriculum and that all staff participate in a minimum of a one-day program with a variety of training activities beyond a lecture (Goodrum & Woodward, 2016). The report specifically recommended that Colorado schools adopt a validated threat assessment process such as the Virginia Student Threat Assessment Guidelines.

The Marjory Stoneman Douglas High School Public Safety Commission Report (2019) also identified failures in threat assessment as a factor contributing to the shooting deaths of 17 people at the high school in 2018. The former student who committed the shooting had been repeatedly identified as a person of concern for a potential school shooting and the school district had a threat assessment protocol, but the Commission Report concluded that school staff were neither properly trained nor appropriately engaged in the threat assessment process. In response to the Commission Report, Florida legislation (Section 1001.212(12)) mandated that all its schools use a common standardized behavioral threat assessment instrument. In 2019, the Florida Department of Education adopted the Comprehensive School Threat Assessment Guidelines (CSTAG; formerly called the Virginia Student Threat Assessment Guidelines) for statewide use and established a group of trainers in this model to lead workshops for all schools (Oliva, 2019).

Given the increased demand for evidence-based threat assessment training, it is crucial to systematically evaluate training effectiveness. Authorities in program evaluation highlight the need to measure participant learning and perceptions of training, as well as trainer effectiveness (Bradley & Connors, 2007; Kirkpatrick & Kirkpatrick, 2016). In the context of threat assessment, effective training must be delivered in a manner that facilitates learning of threat

assessment principles and guidelines and promotes positive attitudes toward its implementation across trainers.

Challenges of School Threat Assessment Training

There are multiple challenges specific to school threat assessment training. The first challenge is that threat assessment is a multidisciplinary process (National Threat Assessment Center, 2018). School threat assessment teams typically draw staff from administration, teaching, law enforcement, and mental health. Training must engage all personnel from these groups, so that they can work together effectively while maintaining awareness of their roles in the threat assessment process (National Threat Assessment Center, 2018).

The second challenge is that many schools rely on disciplinary practices that fail to consider contextual factors surrounding threats. In the 1990s, many schools adopted a zero-tolerance approach to respond to student threats, and the use of these practices increased after the Columbine shooting (Skiba & Knesting, 2001). Zero tolerance relies on the use of exclusionary discipline practices, which are associated with worse academic outcomes and higher rates of school dropout (Maeng, Cornell, & Huang, 2019; Noltemeyer, Ward, & Mcloughlin, 2015).

A third challenge is that staff often overestimate the risk of a school shooting. Critics of threat assessment have raised concern that school authorities might misuse the threat assessment process to unfairly punish or stigmatize students (Swetlitz, 2019). To the contrary, with appropriate training, threat assessment gives school personnel an investigative process that can reduce over-reactions to a student's misbehavior (Burnette, Datta, & Cornell, 2018). This process involves considering both contextual factors and developmental differences so that staff can respond appropriately to student threats of violence (Cornell, 2018).

Threat Assessment Training Research

Two prior studies provided limited evidence that day-long workshops for school personnel enhanced knowledge of threat assessment and school safety. The first study examined two threat assessment workshops for 351 multidisciplinary school personnel (Allen, Cornell, Lorek, & Sheras, 2008). They found that school personnel across occupations showed substantial increases in threat assessment knowledge from pretest to posttest as well as a high degree of threat classification accuracy. Although most participants obtained high scores, there were statistically significant differences across occupational groups, with psychologists achieving the highest knowledge scores and law enforcement officers achieving the lowest knowledge scores. Over 90% of participants provided favorable evaluations of the workshop, acknowledging that they found the training helpful, practical, and useful in responding to student threats.

The second study examined the effects of threat assessment training for 142 school personnel across three workshops (Cornell, Gregory, & Fan, 2011). This study also found that participants had increased knowledge of threat assessment and were able to distinguish serious from not serious threats. A randomized controlled study showed that schools trained in threat assessment had reduced rates of long-term suspensions and increased use of counseling services for students who threatened violence, compared to schools without threat assessment training (Cornell et al., 2011).

Although these studies provide promising results, they were limited to five workshops that were all led by the same trainer. It is necessary to examine threat assessment training in a larger and more diverse sample and to investigate whether positive effects generalize across trainers. It is also important to consider a range of participant characteristics, including gender, occupation, years of experience working in schools, and prior training in threat assessment.

Training Environment

Research in professional development often focuses on structuring the content of training to be conducive to learning; however, it is also important to investigate environmental influences. Particularly in a full-day workshop with a large number of participants, there may be differences in learner engagement associated with seating (e.g., those seated in the rear of the room may be less engaged and learn less compared to those seated in the front). There also may be an effect of seat comfort and room temperature on learner engagement.

Multiple educational studies have investigated the relationship between classroom seat arrangement and student learning. They found that students who sat in the front of a classroom achieved better grades and were more motivated, confident, and engaged compared to students who sat in the back of the classroom (Benedict & Hoag, 2004; Burda & Brooks, 1996).

Research in professional development has found that perceptions of seat comfort can influence training effectiveness and employee performance. A study by EL Hajjar and Alkhanaizi (2018) examined environmental effects on employee training outcomes and found that participant ratings of seat comfort were positively associated with training effectiveness. Another study found that workplace comfort influenced employee productivity and satisfaction (Maarleveld & De Been, 2011).

Other studies have investigated the effects of temperature on academic performance and employee productivity. They found that temperatures perceived as either too hot or too cold can have detrimental effects on employee performance and school achievement (Lan, Wargoeki, & Lian, 2012; Wargoeki & Wyon, 2007). Although these studies suggest that environmental factors can influence academic and work-related performance, it is unclear whether these results apply

to the professional development of school personnel.

Current Study

There is relatively little research on threat assessment training and its impact on participants. The present study contributes to this effort by examining the effects of a day-long threat assessment training workshop for school personnel using the Comprehensive School Threat Assessment Guidelines. The study used a relatively large sample of 4,666 participants across 100 workshops delivered by nine different trainers between 2016 and 2019. The workshops took place in 28 states and one Canadian province.

The study outcome variables included knowledge of threat assessment, ability to classify threat assessment cases accurately, and participant evaluations of the workshop. The first research question was “How does the workshop affect school personnel knowledge of threat assessment?” It was hypothesized that school personnel would achieve significant knowledge gains from pretest to posttest after completing the workshop. The second research question was “How are school personnel characteristics of gender, occupation, work experience, and prior threat assessment training and experience associated with knowledge of threat assessment, threat classification accuracy, and evaluations of the workshop?” It is important to consider whether training results are consistent for participants of diverse occupations and backgrounds. The third research question was “Are workshop effects comparable across different trainers?” This assessment is needed to show that the positive results of training are not limited to a single trainer and can be obtained by multiple trainers. The fourth research question was “How do the environmental factors of seat location, seat comfort, and room temperature influence workshop experience?” This question has practical value to school systems as they try to ensure the best possible training experience for their staff.

Methods

Workshop

The day-long training workshops were designed to cover the content of the *Comprehensive School Threat Assessment Guidelines* (CSTAG) manual (Cornell, 2018). This model was developed at the University of Virginia with the purpose of responding to threats of violence without resorting to exclusionary discipline (Cornell, 2018). This training is primarily focused on students, consistent with a statewide survey which found that the majority (98%) of school threats were made by currently-enrolled students (Virginia Department of Criminal Justice Services, 2018). However, threats made by adults are also briefly covered in the workshop and manual. The CSTAG model uses a 5-step decision tree that facilitates the consideration of contextual and developmental factors relevant to the student's behavior to help teams avoid both over-reacting to student misbehavior that is not serious and under-reacting to students who pose a serious threat of violence. This model distinguishes "transient" threats that are not serious from "substantive" threats that are serious and require protective action.

Each workshop was led by either the primary developer of the CSTAG model (Cornell), or by one of eight psychologists who had been trained by the developer. All trainers delivered the same workshop with identical PowerPoint slides and handouts. These workshops were typically arranged by school authorities such as school districts, intermediate districts, or the state department of education. In accordance with recommendations from professional development literature (e.g., Desimone, 2009; Garet, Porter, Desimone, Birman, & Yoon, 2001; Gast, Schildkamp & van der Veen, 2017), trainers delivered content-focused information to bolster knowledge of threat assessment and school safety. Trainers used a variety of active learning techniques throughout the day, including team exercises using case vignettes so that participants could practice conducting threat assessments.

Measures

Knowledge. Thirteen pre/post knowledge questions (Table 1) were chosen based on a content analysis of the CSTAG manual and were intended to reflect some of the key concepts covered in the workshop. Participants responded to statements on threat assessment such as “About two-thirds of threats are transient and one-third are substantive,” or general trends of school violence such as “The probability that a student will be murdered at school is so low that the average school will experience it about once every 6,000 years” with one of three response options (*true/agree, false/disagree, or don't know*). Response options were then recoded as dichotomous (i.e., 1 = *correct*, 0 = *incorrect/don't know*). These 13 items had a Cronbach's alpha of .68 at pretest and .64 at posttest, which was considered adequate as an index that covered a variety of topics (Streiner, 2003).

Classification. Four posttest questions evaluated threat classification accuracy. Participants were asked classify four common student threat situations with one of four response options (*no threat, transient threat, serious substantive threat, or very serious substantive threat*). Response options were recoded as dichotomous (1 = *correct* vs. 0 = *incorrect*).

Evaluations. Five posttest questions (Table 2) investigated participant evaluations of the workshop. Statements such as “This training improved my understanding of student violence” had four response options (1 = *strongly disagree*, 2 = *disagree*, 3 = *agree*, 4 = *strongly agree*). These five items had a Cronbach's alpha of .93.

Prior Threat Assessment Experience. Participants indicated their experience working on a threat assessment team (*none, <5 cases, or 5 or more cases*) and prior training in threat assessment (*none, <5 hours, or 5 or more hours*). These questions were moderately correlated ($\rho = .48$) and combined into a single item.

Workshop Environment. Participants answered three questions regarding the comfort of their seating (*very uncomfortable, uncomfortable, neither uncomfortable or comfortable, comfortable, or very comfortable*), seat location (*front third of room, middle third of room, or back third of room*), and room temperature (*too hot, too cold, or just right*).

Participants

The project was approved by the University of Virginia Institutional Review Board. Participants answered demographic questions at pretest regarding gender, occupation, job experience, and threat assessment experience. The analytic sample consisted of 4,666 school personnel who attended one of 100 training workshops. When asked about gender, 69% of participants identified as female and 31% identified as male. Disciplinary breakdown was 39% administration, 7% teaching, 5% law enforcement, 35% mental health/counseling, and 15% other (e.g., social worker, nurse, behavioral specialist). On average, participants had worked at their school for 15 years (Range: 0-51 years). The majority of participants (62%) had no experience working on a threat assessment team; 21% worked on fewer than five threat assessment cases and 17% worked on five or more threat assessment cases. When asked about threat assessment training, 41% indicated that they had no prior training, 37% had less than five hours, and 22% had more than five hours of training.

Data Analysis

Participant responses were included in the analyses if they answered at least 11 of the 13 pre/post knowledge questions. Pretest and posttest knowledge variables were created by summing correctly-answered items. The questions regarding seat location, seat comfort, and room temperature were added to the survey after 48 of the workshops had been conducted; data were obtained from a subgroup of 1,991 participants.

To investigate the first research question, a repeated measures ANCOVA examined differences between pretest and posttest knowledge, controlling for participant gender, occupation, work experience, trainer effects, and prior threat assessment experience in the model. The relations between participant characteristics and pretest knowledge were examined through multiple regression. Subsequently, research questions two and three focused on evaluating the relationships of participant and trainer characteristics with posttest knowledge, threat classification accuracy, and workshop evaluations through a series of three-step multiple regressions. In each model, step one controlled for pretest knowledge. Step two evaluated and controlled for the nesting of participants within trainers through fixed effect models with J-1 deviation-coded trainer variables. Step three included the substantive participant characteristics of gender, occupation, prior threat assessment experience, and years of work experience. The fourth research question focused on the environmental variables of seat comfort, seat location, and room temperature. These variables were entered at step four in the subsample of 1,991 participants.

Results

Preliminary analysis revealed that individuals achieved an average gain of 5.72 correct answers from pretest ($M = 4.44$) to posttest ($M = 10.16$; $F(1, 4333) = 1368.39, p < .001$). Descriptive statistics for pretest and posttest knowledge as well as workshop evaluations can be found in Tables 1 and 2. Results from the stepwise regression models described below are presented in Table 3.

Multiple regression analysis revealed that participant characteristics accounted for 11% of variability in pretest knowledge scores, $F(7, 4378) = 77.37, p < .001$. After controlling for

pretest knowledge and trainer effects, participant characteristics accounted for 1% of variability in posttest knowledge scores $F(7, 4332) = 8.33, p < .001$.

Participants with more threat assessment experience answered more questions correctly at pretest than those with less experience ($\beta = 0.29, p < .001$). However, these differences were no longer significant at posttest ($\beta = 0.01, p = .555$). Male participants answered more questions correctly at pretest in comparison to female participants ($\beta = 0.04, p = .015$). At posttest, male participants answered fewer questions correctly in comparison to female participants ($\beta = -0.04, p = .005$). There were no significant differences between years of school work experience and scores at pretest ($\beta = -0.02, p = .219$) or posttest ($\beta = -0.02, p = .148$).

All occupational groups achieved between 26-36% accuracy at pretest and 74-78% accuracy at posttest. Using administration as the reference group, participants working in teaching achieved lower pretest scores ($\beta = -0.10, p < .001$), and these differences remained at posttest ($\beta = -0.04, p = .008$). Similarly, individuals working in law enforcement answered fewer questions correctly at pretest than individuals working in administration ($\beta = -0.08, p < .001$), and these differences persisted at posttest ($\beta = -0.06, p < .001$). Participants working in mental health/counseling scored higher than individuals working in administration at pretest ($\beta = 0.05, p = .004$), but these differences were no longer significant at posttest ($\beta = -0.02, p = .217$). Although there were no significant differences at pretest, individuals who identified their position as “other” scored significantly lower than individuals in administration at posttest ($\beta = -0.10, p < .001$).

The next hierarchical linear regression compared participant characteristics with threat classification accuracy. After controlling for pretest knowledge and trainer effects, participant characteristics accounted for a small but statistically significant amount of variation in

classification scores, $F(7, 4279) = 4.151, p < .001, \Delta R^2 = .01$. Participants with more work experience in their school had lower threat classification accuracy ($\beta = -0.06, p < .001$).

The next hierarchical linear regression compared participant characteristics with participants' overall evaluations of the workshop. Participant characteristics accounted for a statistically significant amount of variation in workshop evaluation scores after controlling for pretest knowledge and trainer effects $F(7, 4220) = 5.55, p < .001, \Delta R^2 = .01$. There were no significant differences by prior threat assessment experience or years of school work experience. Male participants had slightly lower evaluations of the workshop compared to female participants (97.0% positive vs. 97.3% positive) ($\beta = -0.03, p = .038$). Participants in law enforcement had slightly lower evaluations of the workshop compared to individuals in administration ($\beta = -0.05, p = .003$). Using administration as the reference group, participants provided higher workshop ratings when they worked in teaching ($\beta = 0.03, p = .046$).

Analyses of trainer effects revealed statistically significant differences across trainers in posttest knowledge of threat assessment, threat classification accuracy, and workshop evaluations, after controlling for pretest knowledge scores. Participant posttest scores in workshops led by four of the trainers significantly deviated from the grand posttest mean across trainers, and trainers accounted for 3% of variability in posttest scores, $F(8, 4339) = 19.54, p < .001$. Participant evaluation ratings in workshops led by four of the trainers significantly deviated from the grand evaluation mean across trainers, and trainers accounted for 2% of the variability in workshop evaluation scores, $F(8, 4227) = 13.14, p < .001$. Threat classification accuracy scores in workshops led by two of the trainers significantly deviated from the grand classification accuracy mean. Across all trainers, participants achieved averages between 71% and 77% in

threat classification accuracy; trainers accounted for 1% of the variability in participant threat classification scores, $F(8, 4286) = 7.72, p < .001$.

Secondary analyses on the subsample of 1,991 participants revealed that environmental variables had only a modest association with workshop evaluations. After controlling for pretest knowledge, trainer effects, and participant characteristics, the inclusion of seat location, seat comfort, and room temperature accounted for 1% of the variability in workshop evaluation scores, $F(5, 1872) = 2.90, p = .013$. Individuals who perceived their seat as more comfortable provided higher evaluations of the workshop ($\beta = 0.08, p = .001$). There were no other significant associations between room temperature, seat comfort, or seat location with posttest knowledge, workshop evaluations, or threat classification accuracy (all $ps > .05$).

Discussion

This study demonstrated the effects of professional development training in threat assessment for a relatively large sample of workshops conducted by nine different trainers. Overall, participants demonstrated substantial gains in knowledge of threat assessment from pretest (34%) to posttest (78%) and demonstrated a high degree of threat classification accuracy (75%) after completing the CSTAG workshop. These results compare favorably to previous studies of professional development training in the criminal justice field; an examination of four different training programs found that participants scored 34% at pretest but only achieved 56% at posttest (Bradley & Connors, 2007).

Consistent with prior research (Allen et al., 2008), there were differences in threat assessment knowledge by occupation. Mental health/counseling staff had the highest levels of threat assessment knowledge at pretest (36%), followed by administrators (34%), other staff (34%), law enforcement officers (27%), and teachers (26%). Because threat assessment is

conducted by multidisciplinary teams, it is important that training produces comparable effects across disciplines. Participants in different occupational groups likely have varying strengths and weaknesses in their threat assessment knowledge. For example, law enforcement officers may have a greater knowledge of the legal implications once a threat has been reported, while teachers may have a greater understanding of the developmental differences between students that can influence the seriousness of the threat. It is important that workshops effectively transmit knowledge across occupations and levels of experience to bridge gaps in knowledge.

Teachers and law enforcement officers demonstrated the highest knowledge gains from pretest to posttest. This is notable given that they were the two lowest scoring occupational groups at pretest. These higher gains enabled them to achieve posttest scores that were comparable to the other occupational groups. At pretest, there was a 10% range in knowledge scores across occupational groups; at posttest, this was reduced to a 4% range in knowledge scores. Although these differences were still statistically significant, the knowledge gap decreased from pretest to posttest. More importantly, these differences do not appear to be practically significant. All of these groups showed large gains, generally doubling their scores from pretest to posttest.

There is a high demand for quality threat assessment training that can be implemented on a large scale. Therefore, it is important that training is effective across participant differences. At pretest, men demonstrated slightly higher threat assessment knowledge (36% correct) than women (34% correct), but women had higher gains and moved slightly ahead at posttest (78% correct versus 77% correct). Overall, these findings show that both men and women had significant knowledge gains after completing the workshop. Individuals who had higher levels of prior threat assessment experience had better pretest scores, but these differences were no longer

significant at posttest. This shows that participants, regardless of prior experience, benefitted from completing this workshop. Furthermore, across occupations as well as differences in gender and experience, participants showed gains in threat assessment knowledge that reduced group variation and brought them to a common standard.

Participants across trainers answered between 75-81% of questions correctly at posttest, showing that knowledge gains were not specific to a particular trainer. This is a notable finding; states are increasingly adopting threat assessment and there is a high need for training that can be disseminated on a large scale. Because of the large number of schools that need training, many states—such as Arizona, Florida, Kentucky, New York, Pennsylvania, and Utah—are using train-the-trainer models to disseminate training. Although there were some small differences between trainers, all of the trainers in this study effectively provided education on threat assessment.

A core goal of threat assessment is to distinguish cases in which someone poses a serious threat from cases in which someone makes threats that are not serious. In the CSTAG model, this distinction is captured by the concepts of transient (not serious) and substantive (serious) threats. The ability to distinguish between transient and substantive threats is important to avoid overreacting to student threats and to facilitate interventions. The average threat classification accuracy for participants ranged between 71% and 77% across trainers. This accuracy rate is consistent with prior threat assessment training and coder reliability studies (Allen et al., 2008; Burnette et al., 2018).

Individuals with more school work experience had slightly lower threat classification accuracy than those with less experience. However, it is important to note that they only significantly differed in their responses to one case vignette. This vignette described a child who

was yelling obscenities at a teacher. Although the student did not make a threat of violence, individuals with more work experience tended to classify this situation as a threat, while those with less experience identified the situation as not a threat. It is possible that individuals with more work experience may have a slight tendency to judge the student's behavior more seriously than less experienced individuals. It is also possible that this difference reflects a generational difference in reactions to student misbehavior, but the study did not have participant age as a variable to distinguish from years of work experience. There were no differences in threat classification accuracy by gender, occupation, or prior threat assessment experience. Overall, participants were able to achieve a high degree of threat classification accuracy after completing the workshop.

The National Threat Assessment Center (2018) published a series of recommendations on enhancing school safety using threat assessment. They indicate that threat assessment should be a multidisciplinary process, and that staff across occupations should receive training. This study provides a way for schools to attain these recommendations, showing that this day-long workshop is effective in transmitting threat assessment knowledge across multiple disciplines. Further, multidisciplinary school personnel reported that the training was practical and provided useful information in responding to student threats of violence.

Workshop Evaluations

One of the most widely-used models for measuring training effectiveness is the Kirkpatrick Four Level Evaluation Model (Kirkpatrick & Kirkpatrick, 2016). The first two steps of this model emphasize the need to gauge participant reactions to training as well as their perceptions of their learning experience. These components are crucial so that the last two steps of the model—behavior and results—can be assessed after the completion of training. If

participants are not motivated to use the training principles and do not feel confident in their ability to use the techniques learned in training, it is unlikely they will apply this training in their jobs (Desimone, 2009; Kirkpatrick & Kirkpatrick, 2016).

After completing the workshop, school personnel across trainers provided high evaluations of both the training and threat assessment. Over 95% of participants reported that the workshop improved their understanding of student violence and threat assessment, and felt that the training contained the right amount of practical information. Approximately 98% of participants endorsed motivation to use threat assessment principles in their school. The findings from this study are consistent with the Allen et al. (2008) study showing that individuals who complete the workshop provided positive workshop evaluations and indicated that they were motivated to use these principles in school.

Overall, between 96.6% and 97.9% of participants across occupational groups provided positive evaluations of the workshop. Although this range is small, these differences were statistically significant. Teachers, mental health/counseling staff and other staff gave the highest overall workshop ratings, followed by administrators, and law enforcement officers. Law enforcement officers tended to provide the least positive evaluations of the workshop's ability to enhance their knowledge of student violence (95% positive) and the workshop's utility in responding to student threats of violence (96% positive) in comparison to the other occupational groups. Despite these slight differences, it is important to note that nearly all participants across occupational groups provided positive evaluations of the workshop.

Consistent with the Allen et al. (2008) study, school personnel demonstrated a decrease in support for zero tolerance disciplinary practices after workshop completion. Prior to workshop completion, 45% of participants believed that zero tolerance disciplinary practices were effective

in maintaining school safety; at posttest, this number dropped to 7%. This decrease in support is notable; studies have found that zero tolerance disciplinary practices are ineffective and can lead to negative outcomes such as increased rates of suspension (American Psychological Association Zero Tolerance Task Force, 2008). This supports the findings by Maeng, Cornell, and Huang (2019) that schools using CSTAG have lower rates of suspension and expulsion compared to schools using an alternative model of threat assessment. Further, Heilbrun, Cornell, and Lovegrove (2015) found that principal endorsement of zero tolerance disciplinary practices was associated with increased rates of suspension and exclusionary discipline. In contrast to zero tolerance, studies have shown that schools demonstrate decreases in suspensions rates after implementing threat assessment (Cornell et al., 2011; Nekvasil & Cornell, 2015). This change in attitudes, coupled with the motivation to use principles of threat assessment in school, reflects a shift away from punitive disciplinary practices towards the use of a problem-solving approach to violence prevention.

Environment

Environmental characteristics had only a minor effect on evaluations of the training. Seat comfort was positively associated with ratings of the workshop. This is consistent with prior studies which found that environmental characteristics, such as seat comfort, can have an impact on workshop experience (EL Hajjar & Alkhanaizi, 2018, Maarleveld & De Been, 2011). In contrast with prior research (e.g., Benedict & Hoag, 2004; Lan, Wargoeki, & Lian, 2012; Wargoeki & Wyon, 2007), we did not find that seat location or room temperature was significantly associated with workshop experience. On average, each workshop had 47 participants; there might be effects of seat location in larger groups. A future study should investigate whether there is an interaction effect between group size and seat location, seat

comfort, and/or room temperature.

Limitations and Future Directions

A limitation of this study is that this assessment of learning was limited in scope and timeframe. The scope of knowledge was measured at the end of the day with 13 pre/post items and 4 posttest-only items. A more extensive study would include many more items and test participant knowledge after a longer interval of time. The content of the pre/post survey was not as comprehensive as the Certified Threat Manager examination developed by the Association of Threat Assessment Professionals (see Scalora, 2015).

Another limitation is that this study examined only one threat assessment model, the Comprehensive School Threat Assessment Guidelines and a group of nine experienced trainers. It would be important to show that training in other models can produce similar effects and that less experienced trainers, such as those recently completing a train-the-trainer program, can achieve comparable results. This study only considered in-person group training in which a single trainer presented to groups of school teams. The trainer was able to interact with the group and respond to questions, and the participants were able to work together as teams on practice exercises. In light of public health restrictions on group meetings, it is important to examine whether live or recorded online training would produce similar results.

Finally, there is a need to show that the positive effects obtained at the end of the workshop carry forward to school practices (Kirkpatrick & Kirkpatrick, 2016). A study of the German NETWASS threat assessment model found that training produced staff adherence to a case management protocol seven months after training (Leuschner et al., 2017). Further work is also needed to show how much and what kind of training is needed to prepare team members to conduct threat assessments with high fidelity and positive student outcomes.

Conclusions

The FBI, Secret Service, and Department of Homeland Security recommended training for school personnel conducting threat assessments to facilitate effective implementation (National Threat Assessment Center, 2018; O'Toole, 2000). Yet, there has been relatively little research on standards of training and evidence of training effectiveness. It is important that threat assessment training is useful for multidisciplinary staff, can be implemented effectively across trainers, and includes methods to evaluate both participants' learning and their reactions to the training (Kirkpatrick & Kirkpatrick, 2016; National Threat Assessment Center, 2018). As threat assessment is becoming more widespread, standards of training need to be established to provide schools with high-quality training that can be disseminated to multidisciplinary school personnel. Training should enable the threat assessment team to make high-quality assessments and develop effective interventions to maintain school safety and facilitate positive outcomes for students.

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Table 1
Pretest and Posttest Knowledge of Threat Assessment

Questions	Pretest % Correct	Posttest % Correct
Violence in schools has increased over the past ten (10) years. (False)	14	75
A safety plan should be implemented for a transient threat. (False)	13	76
If a student threatens an act of violence, immediate suspension is necessary. (False)	62	89
When interviewing a student about an alleged threat, the student should be reassured that his/her statements are confidential. (False)	60	90
An angry student who says “I could kill him for that” should always be regarded as making a substantive threat. (False)	53	79
Mental health threat assessments are designed to predict violence. (False)	42	81
The probability that a student will be murdered at school is so low that the average school will experience it about once every 6,000 years. (True)	29	91
A student who writes an essay describing a violent event should be given a threat assessment. (False)	26	65
About two-thirds of threats are transient and one-third are substantive. (True)	43	90
The typical school violence prevention program can reduce fighting by 50%. (True)	45	85
Controlled studies have found that threat assessment reduces school suspensions. (True)	61	95
Zero tolerance is an effective way to maintain school safety. (False)	56	93
Until the law can be changed, federal law (FERPA) prevents school officials from notifying parents the name of the student who has threatened their child. (False)	17	81

Table 2
Participant Evaluations of the Threat Assessment Workshop

	Strongly Disagree %	Disagree %	Agree %	Strongly Agree %
This training improved my understanding of student violence.	1.8	1.5	44.9	51.8
I understand the basic concepts and guidelines for conducting a threat assessment.	1.5	0.2	43.0	55.3
The training contained the right amount of practical information.	1.7	2.8	45.7	49.8
This training will be helpful to me in responding to student threats of violence.	1.6	0.8	41.4	56.2
I am motivated to use principles of threat assessment in my school.	1.5	0.7	40.6	57.2

Table 3
Standardized Regression Coefficients for Participant Characteristics

	Pretest knowledge ¹		Posttest knowledge			TA Classification			Workshop Evaluations		
	<i>B</i>	<i>R</i> ²	<i>B</i>	<i>R</i> ²	ΔR^2	<i>B</i>	<i>R</i> ²	ΔR^2	<i>B</i>	<i>R</i> ²	ΔR^2
Step 1											
Pretest				.07			.02			.00	
Step 2											
Trainers				.11	.03***		.03	.01***		.03	.02***
Step 3											
Prior TA Experience	0.29***		0.01			-0.00			-0.02		
Years	-0.02		-0.02			-0.06***			-0.01		
Gender ²	0.04*		-0.04**			0.01			-0.03*		
Teaching ³	-0.10***		-0.04**			-0.03			0.03*		
Law Enforcement ³	-0.08***		-0.06***			-0.00			-0.05**		
Mental Health/Counseling ³	0.05**		-0.02			0.02			0.03		
Other ³	-0.01	.11***	-0.10***	.12	.01***	-0.03	.04	.01***	0.04*	.04	.01***

¹All predictors were entered simultaneously at pretest. ²Female was used as the reference group;

³Administration was used as the reference group.

* $p < .05$; ** $p < .01$; *** $p < .001$.

Manuscript Three

High School Graduation Outcomes of Student Threat Assessment

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Author Note

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Abstract

School threat assessment has become increasingly widespread over the past 20 years; however, there is a lack of research on the graduation rates for students who undergo a threat assessment. The primary purpose of this study was to evaluate the graduation/dropout rates for 146 students who received a threat assessment in two large school districts. The graduation rate for these students was 86% in District A and 79% in District B. In District A, but not District B, linear probability modeling showed that students receiving SPED services had an increased likelihood of graduating. Race/ethnicity was not associated with graduation, indicating that receiving a threat assessment did not place minority students at an additional disadvantage for adverse graduation outcomes. Students who made more serious threats were not at a significantly increased risk of failing to graduate. There were no significant associations across gender, GPA, grade level, FRPM, or race/ethnicity. Overall, this study showed that most students who received a threat assessment went on to graduate from high school at comparable rates to their peers.

High School Graduation Outcomes of Student Threat Assessment

Threat assessment has become a widely-used practice in schools for investigating and responding to student threats. Once a threat is reported, multidisciplinary teams convene to evaluate the seriousness of a threat, and respond accordingly to prevent violence (Cornell, 2018). In 2013, Virginia became the first state to require that all public schools use threat assessment teams (§ 22.1-79.4). Subsequently, other states have passed similar legislation (Erwin, 2019), and by the 2017-2018 school year, approximately half of U.S. secondary schools reported using threat assessment teams (Diliberti et al., 2019).

Although threat assessment is becoming widely used, there is a dearth of research investigating the academic outcomes for students after they have received a threat assessment. There is a heightened demand for this research because there are concerns that receiving a threat assessment could lead to increased rates of school dropout and contribute to inequitable outcomes for minority students and students receiving special education services (Elbe & Rogers, 2019; Jordan, 2020).

Threat assessment has been endorsed by authorities in education and law enforcement as a way to maintain school safety in lieu of zero tolerance disciplinary practices (National Association of School Psychologists [NASP], 2015; National Threat Assessment Center, 2018). Zero tolerance policies provide predetermined sanctions for student misbehavior without consideration for external circumstances; these practices have been associated with poor academic and disciplinary outcomes for students (Morgan et al., 2014). In contrast to zero tolerance practices, threat assessment considers contextual factors surrounding a threat. This allows threat assessment teams to respond proportionately to the nature and seriousness of a student's behavior (Maeng et al., 2019; NASP, 2015). Although studies (e.g., Cornell et al.,

2011; Cornell et al., 2012) have found that students are less likely to be suspended in schools that use threat assessment and are almost always able to return to school, there is a gap in the literature regarding whether these students are able to ultimately complete their schooling.

Comprehensive Student Threat Assessment Guidelines

The Comprehensive Student Threat Assessment Guidelines (CSTAG) is a commonly used and well-researched model of school-based threat assessment that was developed at the University of Virginia in 2001 (Cornell, 2018). In this model, once a threat is reported, multidisciplinary teams evaluate the seriousness of a threat to determine whether it is transient (not serious) or substantive (serious) (Cornell, 2018). This classification process helps prevent schools from overreacting to student threats that do not pose a serious risk of harming someone (Burnette et al., 2018). A recent study of 844 threat cases in a statewide sample found that 78% of threats were transient and 22% were substantive (Burnette et al., 2018). Transient threats do not reflect a genuine intent to harm someone and are resolved quickly, often with an apology; substantive threats are more serious and require more intensive interventions (Cornell, 2018). Burnette et al. (2018) found that students who made substantive threats were 4.8 times more likely to receive an out-of-school suspension than students who made transient threats. Studies have yet to investigate whether students who make more serious threats are at an increased risk of dropout in comparison to students who make less serious threats.

Thus far, studies have focused on the immediate outcomes of threat assessment such as whether the threat was carried out and whether the student was able to return to school. Cornell et al. (2004) examined the outcomes of 188 threat cases over one year in 35 schools using CSTAG. The threat assessment teams determined that 70% of the cases were transient and were able to be resolved quickly. They found that the remaining 30% of cases were substantive and

required protective action. None of the 188 threats were carried out and only three students were expelled from school. Strong and Cornell (2008) investigated the outcomes of 209 threat cases over one school year. None of these threats were carried out and the majority of students who made these threats were able to come back to their school. In a randomized controlled study of 40 schools, Cornell et al. (2012) found that students who underwent a threat assessment were more likely to be provided mental health/counseling services and were less likely to be suspended from school. However, the timeframe for all of these studies was limited to a single year. We do not know how these students fared after they received a threat assessment. It is important to assess whether these students graduated from high school.

A major concern in school discipline is whether students receive disparate treatment based on race/ethnicity and special education (SPED) status (Morgan et al., 2014; Skiba et al., 2014). Minority students and students who receive SPED services have higher rates of suspension in comparison to White students and students in general education (Balfanz et al., 2014; Morgan et al., 2014). A study by Cornell et al. (2018b) investigated disparities in school discipline for students who underwent a threat assessment. They found no significant racial disparities in the use of school suspensions, alternative school placements, or legal consequences, but again these findings were limited to the school year in which the assessment occurred.

Studies have found mixed results regarding the relationship of SPED status with immediate threat assessment outcomes. In one analysis, Cornell et al. (2018b) found that students who received SPED services were 27% more likely to be suspended than students in general education; however, this finding was no longer significant when they limited their sample to schools that provided data on all of their threat assessment cases versus a subsample of five

cases. They also found no significant differences in rates of school transfer or legal actions between students receiving SPED services and students in general education. Kaplan and Cornell (2005) found that although students receiving SPED services were referred for threat assessment at higher rates, there were no differences in suspension rates for these students in comparison to students in general education.

These studies provide promising results that threat assessment does not produce disparities in disciplinary outcomes based on race or special education status. It will be important to determine whether students from minority groups and students receiving special education services were able to complete their education at comparable rates to their peers. Prior research for the general school population has indicated that Black and Hispanic students have higher dropout rates in comparison to White students, and that students with disabilities have higher rates of dropout than students in general education (McFarland et al., 2019).

Prior research has shown that, in addition to SPED status and minority status (McFarland et al., 2019), there are multiple risk factors associated with school dropout. Male students tend to have higher dropout rates than female students (McFarland et al., 2019). Students who are from low socioeconomic backgrounds, who have lower GPAs, or who receive suspensions are also at increased risk for school dropout (Balfanz et al., 2014; McFarland et al., 2019; National Research Council, 2011; Noltemeyer et al., 2015; Suh et al., 2007). It is important to identify whether these factors influence dropout risk for students who receive a threat assessment, and whether threat assessment places these students at an additional risk for school dropout.

Other studies have investigated the influences of CSTAG on schoolwide suspension rates. Cornell et al. (2011) found that high schools experienced 52% fewer long-term suspensions and 79% fewer bullying infractions one year after implementing CSTAG. Nekvasil

and Cornell (2015) found that schools that have been using CSTAG for longer had reduced rates of both short-term and long-term suspensions. Cornell et al. (2009) found that students in schools implementing CSTAG endorsed less bullying and greater help-seeking behaviors. These results are promising because schools with lower rates of suspension tend to have lower rates of school dropout (Lee et al., 2011).

Current Study

Although there has been a surge of interest in school threat assessment, critics have speculated that threat assessment teams might over-identify youth for relatively minor misbehavior and label them as dangerous (Swetlitz, 2019). They have raised concerns that threat assessment could result in exclusionary discipline and criminal charges, leading students to drop out of high school and end up in the school-to-prison pipeline (Elbe & Rogers, 2019; Jordan, 2020). One response to this concern is to examine the high school graduation rate for these students and look for any evidence that a threat assessment contributes to a higher dropout rate. However, threat assessment is relatively new to most school districts. Even if they have been using this approach for several years, many districts have not yet accumulated enough cases to assess graduation rates for these students. In the present study, we identified two large school districts that have been using CSTAG for over four years, so that they would have established graduation records for a group of students who received a threat assessment. These districts each developed practices of tracking the outcomes for students who received a threat assessment over time that made this study possible.

These districts were both large, affluent, suburban school systems with a racially and ethnically diverse enrollment. They differed in their record-keeping practices, but both had useful information about their students. District A was able to provide information on both

transient and substantive threats, as well as whether a student was suspended immediately following threat assessment. District B was only able to provide data on substantive threats; additionally, they were able to provide data for all students who had one or more out-of-school suspensions. Because of these differences, graduation data were analyzed separately for each district and thus our sample size for each district was relatively small.

The primary purpose of this study was to investigate whether students who received a threat assessment had comparable graduation/dropout rates to their peers. To achieve this aim, we first established comparison groups comprised of students from their same school districts using cohort data from their state Department of Education. However, we recognized that these groups may not be directly comparable because students who receive a threat assessment are not representative of the general student population and often have a history of misbehavior (Strong & Cornell, 2008). Therefore, we also looked at the graduation rates from a comparison group of students who received one or more out-of-school suspensions

Prior research has shown that minority students, male students, economically disadvantaged students, and students receiving SPED services are more likely to be suspended from school, and have higher rates of school dropout (Balfanz et al., 2014; Ksinan et al., 2019; McFarland et al., 2019; Noltemeyer et al., 2015; Suh et al., 2007). These same students are referred for threat assessment at disproportionately high rates (Burnette et al., 2018; Cornell et al., 2018a; Kaplan & Cornell, 2005). For these reasons, we tested whether these characteristics place these students at an increased risk for school dropout.

To this point, student-level studies have only looked at suspension as an immediate consequence of threat assessment and found that students are more likely to be suspended when they make a substantive threat (Burnette et al., 2018). Therefore, we also looked at whether

threat seriousness and whether receiving a suspension immediately following a threat assessment were associated with increased likelihood of school dropout.

The first research question was “How do the graduation rates for students who undergo a threat assessment compare to their peers?” The second research question was “How are graduation rates related to the seriousness of the initial threat incident, responses to the initial threat incident, race/ethnicity, gender, economic disadvantage, GPA, and special education status?”

Methods

Study Design

We conducted an archival study to investigate the graduation rates for students who made threats across two large, affluent, suburban school districts. We used linear probability modeling and descriptive statistics to investigate whether student characteristics were related to graduating or dropping out of high school.

Graduation rates for students who made threats were compared to two groups: (1) state records of completion rates for all students in the same district and (2) completion rates for students in the same district who received one or more out-of-school suspensions (District B only). These comparisons permitted an analysis of graduation rates across gender, race/ethnicity, disability status, and economic disadvantage.

Participants

For District A, the analytic sample consisted of 73 students across 15 high schools who received at least one threat assessment and were eligible to graduate from 2015 through 2019. Grade level breakdown at the time of the threat assessment was 11 (15%) 9th graders, 18 (25%) 10th graders, 21 (29%) 11th graders, and 23 (32%) 12th graders. There were 12 (16%) girls and 61

(84%) boys. The racial/ethnic breakdown was 52% White, 22% Hispanic or Latino, 11% Black, 11% Asian and 4% Two or more races. These students were compared to district cohort data regarding the graduation/dropout rates of approximately 27,000 students who completed their schooling between 2015 and 2019.

For District B, the analytic sample consisted of 73 students across 27 high schools who were eligible to graduate from 2013 through 2019. Unlike the sample for District A, this sample was limited to students who made substantive threats because the district did not retain consistent records of transient threats. Grade level breakdown at the time of the threat assessment was 19 (26%) 9th graders, 15 (21%) 10th graders, 18 (25%) 11th graders, and 16 (22%) 12th graders. No grade level data were available for five students. There were 10 (14%) girls and 63 (86%) boys. The racial/ethnic breakdown was 38% White, 22% Hispanic or Latino, 12% Black, 16% Asian and 11% Other. Approximately 33% of students who made threats qualified for free or reduced-price meals (FRPM). Fifty-one (70%) of the threats were classified as substantive, and 22 (30%) were classified as very serious substantive threats. These students were compared to district cohort data regarding the graduation/dropout rates of approximately 99,000 students who completed their schooling between 2013 and 2019. District B also provided data on out-of-school suspensions and graduation rates for all students enrolled in high school between 2013 and 2019. From this population, we selected an analytic sample of 3,163 graduation-eligible students who received one or more out-of-school suspensions.

Measures

Predictors

For both districts, demographic information regarding student gender and race/ethnicity were obtained from student files. Grade level at the time of the initial threat incident was also

obtained from student files to control for the amount of time between the threat assessment and student graduation/dropout. Grade point average (GPA) was collected at the end of the year that the threat assessment occurred. For District A, the student's most recent SPED status was obtained because status at the time of the initial threat incident was unavailable. For District B, the student's SPED status and FRPM status at the time of the initial incident were used.

For both districts, information on threat type (transient, serious substantive, or very serious substantive for District A; serious or very serious substantive for District B) was extracted from student files. Additionally, District A provided data on whether the student was suspended as a result of the threat incident (1 = yes, 0 = no).

Outcome

The following outcome was measured: whether a student graduated or dropped out from high school (1 = graduated; 0 = dropped out). A student was counted as a graduate if they obtained a diploma or completed school by obtaining a GED or Certificate of Program Completion before the end of the 2018-2019 school year. Any student who entered 9th grade before 2014 could have taken more than four years to complete their schooling and would have been counted as a graduate as long as they completed their schooling before the end of 2018-2019 academic year.

To be consistent with this time frame, we used district cohort completion rates matched to the year when the student began 9th grade. We used 6-year completion rates if a student began 9th grade before or during the 2012-2013 school year; 5-year completion rates if the student began 9th grade during 2013-2014 school year; and 4-year completion rates if the student began 9th grade during 2014-2015 school. A student was counted as a dropout if they discontinued their schooling prior to graduating or receiving an alternative credential at any point during the 4-year,

5-year, or 6-year time frame (McFarland et al., 2019). From this data, we calculated overall graduation/dropout rates across 2015-2019 for District A, and 2013-2019 for District B.

Across the threat assessment group, out-of-school-suspension group, and state district cohort rates, students who transferred schools, were still enrolled in school, took a long-term absence from school, or who had missing/unconfirmed graduation statuses were not included in the analytic sample because they did not fall into either category of dropout/graduate. From the threat assessment group, 14 students transferred (5 from District A, and 9 from District B); five students who made threats in District B had missing/unconfirmed graduation statuses. From the out-of-school suspension group, 354 students transferred schools and 659 had missing/unconfirmed graduation statuses. Students who were still enrolled or who had a long-term absence accounted for <2% of the threat assessment group, <4% of the suspension group, and <1% of the state district cohort group.

Data Analysis

To investigate the first research question, we compared graduation rates for students who received a threat assessment with overall district graduation rates and to a group of students who received one or more out-of-school suspensions. To address the second research question, linear probability modeling examined the associations between graduation status and gender, grade level, GPA, race/ethnicity, SPED status, FRPM (District B only), threat type, and whether a student was suspended because of the threat (District A only). Linear probability modeling was chosen due to concerns for complete separation in our relatively small data set (Caudill et al., 2013; Hellevik, 2007). Missing data were accounted for using listwise deletion in the linear probability model. Cluster robust standard errors were calculated to account for nesting within schools (Cameron & Miller, 2015).

Results

District A

Descriptive statistics for the 73 students revealed that 86% of students who made threats graduated and 14% dropped out of school. Sixty percent of threats were classified as transient, 22% were classified as substantive, and 18% were classified as very serious substantive threats. District cohort data showed that 97% of all students graduated and 3% of all students dropped out of high school between 2015 and 2019.

Forty-nine percent of the students who made threats received services under an individualized education plan (IEP). Of these students, the most common primary disability was a specific learning disability (33%), followed by other health impairment (25%), autism (19%) and emotional disability (11%). Linear probability modeling (see Table 1) revealed that individuals who received SPED services were 18% more likely to graduate compared to students who were not receiving SPED services ($B = 0.18, p = .02$). Only one student who received SPED services and had a threat assessment dropped out of high school. This student was a White, male student in the 12th grade with an emotional disability who made a serious substantive threat against a staff member and was suspended following his threat assessment. He had a GPA of approximately 1.6 at the end of the year that the threat assessment occurred. Cohort data showed that 97% of students with a documented disability in this district graduated from high school and 3% dropped out.

There were no significant differences in graduation rates based on GPA at the end of the year that the threat assessment occurred ($p > .05$). The average GPA for students who eventually graduated from high school was 2.55 ($SD = 0.71$), and the average GPA for students who dropped out was 1.78 ($SD = 0.45$) at the end of the year that the threat assessment occurred.

There were no other significant associations with graduation/dropout rates based on student grade level, gender, or race/ethnicity (all $ps > .05$).

By race/ethnicity, all Asian, Black, and Multiracial students who received a threat assessment graduated from high school (see Table 2). That being said, two Black students transferred schools following their threat assessment and we do not know whether they ultimately completed their schooling. District cohort data showed completion rates between 98-99% across these groups. Of the 38 White students who received a threat assessment, 35 (92%) graduated and three (8%) dropped out of school. District cohort data revealed that White students had a 99% graduation rate and 1% dropout rate. Of the 16 Hispanic students who received a threat assessment, nine (56%) graduated and seven (44%) dropped out of high school. The Hispanic students who dropped out made two transient, three serious substantive, and two very serious substantive threats. These students had an average GPA of 1.72; only one Hispanic student who later dropped out had a GPA over 2.0 at the end of the year that the threat assessment occurred. All but one of the Hispanic students who dropped out were suspended following their threat assessment. District cohort data showed that 87% of Hispanic students graduated from high school and 13% dropped out.

Similarly, there were no significant differences in graduation rates based on the seriousness of the student's initial threat and whether the student was suspended as a result of the threat incident (all $ps > .05$). The majority of students (60%) made transient threats; 93% of these students graduated from high school and 7% dropped out. Sixteen students made serious substantive threats; 75% of them graduated from high school and 25% dropped out. Thirteen students made very serious substantive threats; 77% of these students graduated and 23% of

these students dropped out. This finding remained insignificant even after removing cluster robust standard errors from the model.

Of the students who were suspended as a result of the threat, 76% graduated from high school and 24% dropped out. Comparatively, 97% of students who were not suspended graduated from high school, and 3% dropped out. Only one student was arrested, and that student graduated from high school. Two students made subsequent threats of violence and received another threat assessment. One of these students transferred and the other graduated from high school.

District B

Descriptive statistics for the 73 students revealed that 79% of students who received a threat assessment graduated and 21% dropped out of school. District cohort data showed an average graduation rate of 94% and a dropout rate of 6% for the years 2013 to 2019. Comparatively, students who received an out-of-school suspension had a 76% graduation rate and a 24% dropout rate.

At the time of the threat incident, 56% of students received SPED services. Of these students, the most common disability was emotional disability (44%), followed by learning disability (32%) and autism (17%). Approximately 78% of students who received SPED services and 81% of students who did not receive SPED services went on to graduate from high school. District cohort data showed that 93% of students with a documented disability graduated from high school and 94% of students without a documented disability graduated from high school.

Linear probability modeling (see Table 3) revealed no significant associations between graduation/dropout rates and gender, grade level, race/ethnicity, GPA, SPED status, FRPM status, and threat seriousness for students who received a threat assessment (all $ps > .05$).

Descriptive statistics (see Table 4) show that 78% of male students and 90% of female students who received a threat assessment graduated from high school. Students who eventually graduated from high school had an average GPA of 2.54 ($SD = 0.88$) and students who dropped out had an average GPA of 1.36 ($SD = 1.04$) at the end of the year that the threat assessment occurred.

By race/ethnicity of students who made threats, 92% of Asian students, 78% of Black students, 56% of Hispanic students, 89% of White students, and 75% of Other students graduated from high school. District cohort data showed that 98% of Asian students, 94% of Black students, 79% of Hispanic students, 98% of White students and 97% of Other students graduated from high school.

Approximately 75% of students who made serious threats and 91% of students who made very serious threats graduated from high school. Six students made subsequent substantive threats of violence. Four of these threats were serious and two were very serious substantive threats. All of these students graduated from high school.

Fifty-four percent of students who were eligible for FRPM and received a threat assessment graduated from high school, and 92% of students who received a threat assessment and were not eligible for FRPM graduated from high school. Cohort data showed that 89% of economically disadvantaged students graduated from high school, while 95% of students who were not economically disadvantaged graduated from high school.

Discussion

This study provides the first investigation of the graduation rates of students who received a threat assessment. Overall, in the combined sample of 146 students from two school districts, 83% completed high school. Although the graduation rate for students who received a

threat assessment was lower than the overall district graduation rates (97% for District A and 94% for District B), this lower rate is not necessarily attributable to the threat assessment process. Students who are identified for a threat assessment are not representative of the general student population and tend to have multiple risk factors for dropping out. Our sample was disproportionately comprised of boys (85%), SPED students (53%), minority students (55%), and economically disadvantaged students (33%, District B only), all of whom are at an increased risk for school dropout (McFarland et al., 2019, Suh et al., 2007). In contrast to other violence prevention strategies such as zero tolerance, students who receive a threat assessment do not incur disproportionately harsh disciplinary consequences based on race/ethnicity, SPED status, or gender (Burnette et al., 2018; Cornell et al., 2018; Kaplan & Cornell, 2005). Therefore, these at-risk groups likely benefit from higher rates of threat assessment referral because this process helps identify areas of need and can serve as a starting point for initiating needed services.

Many students who are referred for threat assessment have prior disciplinary histories, which increases risk for school dropout (Burnette et al., 2019; Strong & Cornell, 2008). Consequently, this study compared students who received a threat assessment with students who received one or more out-of-school suspensions. Only District B was able to provide this kind of a comparison group. Results showed that students who made substantive threats had slightly higher graduation rates (79%) than students who received one or more out-of-school suspensions (76%). Fifty-two percent of students who made substantive threats in District B also received one or more out-of-school suspensions during their schooling.

Suspension and Threat Seriousness

Approximately half (52%) of the students in District A were suspended immediately following their threat assessment; of these students, 63% made substantive threats and 37% of

made transient threats. This is consistent with prior research suggesting that students who make substantive threats are more likely to be suspended (Burnette et al., 2018). However, receiving a suspension immediately following the threat assessment was not significantly associated with graduation/dropout rates. That being said, descriptive statistics showed that 24% of students who were suspended as a result of making a threat eventually dropped out of school, while only 3% of students who were not suspended after making a threat ultimately dropped out of high school.

District B was able to provide data on all students who received an out-of-school suspension, regardless of whether they received a threat assessment. Of the threat assessment students who were suspended, 68% graduated from school, and 32% dropped out. In contrast, of the threat assessment students who were not suspended, 91% graduated from school and only 9% dropped out. These trends align with prior research which suggest that students who receive suspensions are at an increased risk of school dropout (Balfanz et al., 2014; Noltemeyer et al., 2015). Balfanz et al. (2014) showed that 32% of students who receive one suspension dropped out of high school; this number increased with every subsequent suspension that the student received. Therefore, it seems plausible that the decreased graduation rates could be attributable to suspension.

Threat assessment teams should be cautious about using suspension for students who make threats of violence. Although schools using CSTAG tend to have lower suspension rates (Cornell et al., 2011; Nekvasil & Cornell, 2015), approximately half of the students in District A were suspended for making a threat, and half the students in District B were suspended at some point during their schooling. In situations where a student makes a threat, suspension should only be used sparingly. Students tend to disengage from school after receiving a suspension and are at a higher risk for dropout (Balfanz et al., 2014). When these students are suspended, school

personnel should take steps to actively engage these students upon their return to school, and closely monitor their progress. This could involve providing appropriate mental health services and assigning a staff mentor to maintain close and supportive contact with the student to facilitate school engagement (Valdebenito et al., 2018).

There were no statistically significant associations between threat seriousness for rates of graduation/dropout. However, this relationship may have been confounded by receiving a suspension. In District A, 32% of students received a suspension after making a transient threat; 69% received of students received a suspension after making a serious substantive threat, and 100% of students received a suspension after making a very serious substantive threat. Students who made transient threats had a 93% graduation rate, which is comparable to the district cohort graduation rates. In contrast, students who made serious and very serious substantive threats had lower graduation rates of approximately 76%.

In both districts, students who made very serious substantive threats had higher graduation rates than students who made serious substantive threats. It is possible that students who made very serious substantive threats came to the attention of school personnel sooner and received more intensive interventions that helped them ultimately complete their schooling. Threat assessment for serious substantive threats often involves fighting (Burnette et al., 2018); students who make such threats typically receive an intervention that facilitates conflict resolution. Threat assessment for very serious substantive threats triggers a more comprehensive evaluation of the student's needs and leads to the development of a safety plan that often includes more services as well as ongoing support and monitoring (Cornell, 2018).

Future studies should investigate the types of interventions that are being implemented for students who receive a threat assessment, how these vary depending on threat seriousness, the

immediate outcomes of these interventions, and how these interventions are associated with graduation outcomes. It will be important to track the progress of these students over time. Schools should use threat assessment as a starting point to help identify and initiate needed services to promote student success and decrease the risk of violence. Of note, very few students made subsequent threats of violence, and those who did were not at an increased risk for school dropout.

GPA

In both districts, students with higher GPAs at the end of the year that the threat assessment occurred were not significantly more or less likely to graduate from high school. That being said, students who went on to graduate from high school from District A had an average GPA of 2.55 while students who dropped out of high school had an average GPA of 1.78. Similarly, students in District B who went on to graduate from high school had an average GPA of 2.54, while students who dropped out of high school had an average GPA of 1.36.

These descriptive findings are largely consistent with prior research which suggest that low GPA increases risk for dropout (National Research Council, 2011; Suh et al., 2007). The National Research Council (2011) indicated that students with a GPA of less than 1.5 at the end of their freshman year had a 53% chance graduating, while students with a GPA of 2.5 or higher had an 86% chance of graduating. These districts were only able to provide data at the end of the year that the threat assessment occurred. Future studies should look into GPA trends over time for students who receive a threat assessment in a larger sample. School personnel may consider using teacher mentoring services for students with low GPAs; a review found that these services can increase student engagement and academic achievement (Valdebenito et al., 2018).

Economic Disadvantage

Prior research has shown that economic disadvantage puts students at an increased risk for school dropout (McFarland et al., 2019; Suh et al., 2007). Although descriptive statistics from this study showed that students who received a threat assessment and qualified for FRPM had lower graduation rates than students who did not qualify for FRPM, these differences were not statistically significant. District B cohort data showed that economically disadvantaged students had dropout rates of 11%. McFarland et al. (2019) found that only 78% of economically disadvantaged students graduated on time in 2017. Therefore, it is possible that these lower graduation rates are attributable to the risk factor of economic disadvantage, rather than a direct result of threat assessment.

Studies (e.g., Suh et al., 2007) have found that an economically disadvantaged student's perceptions of their teachers is an important predictor of school dropout. Future research should explore implementing interventions to increase student-teacher engagement for these at-risk students after they undergo a threat assessment.

Race/Ethnicity

Overall, minority students who received a threat assessment were not at an increased risk for school dropout. There were no statistically significant differences in graduation/dropout rates based on race/ethnicity for students who received a threat assessment in either district. This is notable given that minority students tend to have higher dropout rates in comparison to White students (McFarland et al., 2019). This may be linked to the general trend of disproportionately higher rates of exclusionary discipline and economic disadvantage for minority students, which have been linked to school dropout (Balfanz et al., 2014). Nationwide, Hispanic students had an 88% high school completion rate in 2017, compared to a 95% completion rate for White students (McFarland et al., 2019).

Descriptively, these students followed the same trends as district cohort data, wherein Hispanic students had the highest rates of school dropout in comparison to all other groups. District A's threat assessment sample had a higher proportion of Hispanic and Black students than the general student body composition, showing that these students were referred for threat assessment at higher rates.

All but one of the Hispanic students who later dropped out of school in District A received a suspension as a result of their threat assessment, and four out of these seven students were referred to law enforcement. Additionally, only one Hispanic student had a GPA over 2.0 at the end of the year that the threat assessment occurred in District A. In District B, all of the Hispanic students who dropped out also qualified for FRPM and 57% of these students had limited English proficiency. Taken together, the Hispanic students who later dropped out had multiple risk factors for school dropout. Future research should investigate the risk factors for school dropout for Hispanic students who receive a threat assessment in a larger sample.

Gender

There were no statistically significant differences by gender in rates of graduation/dropout. Consistent with prior research (e.g., Burnette et al., 2018), the majority (84-86%) of the students who received a threat assessment were boys. Descriptively, male students who received a threat assessment tended to drop out at higher rates than female students who received a threat assessment. These trends are consistent with both district cohort data and prior research (e.g., McFarland et al. 2019), which suggest that boys are at an increased risk for high school dropout in comparison to girls. Nationwide, boys had a high school completion rate of 92% while girls had a 94% completion rate in 2017 (McFarland et al., 2019). Boys also tend to have higher rates of disciplinary referral and suspension in comparison to girls (Skiba et al.,

2002), which are factors that increase risk for school dropout. Overall, it does not appear that male students who receive a threat assessment are at an increased risk for school dropout, and their higher rates of dropout are consistent with extant research (e.g. McFarland et al., 2019).

There were no statistically significant differences by grade level in rates of graduation/dropout. The National Research Council (2011) indicated that early intervention is crucial in reducing risk for school dropout. Future research should look at the effects of targeted interventions for students who make threats to examine how these influence their high school trajectory.

Special Education Services

Students receiving special education services were not at an increased likelihood of dropping out of school after receiving a threat assessment. In fact, students receiving SPED services who made threats in District A were more likely to graduate than students who were not receiving SPED services. Only one student from District A who received SPED services and had a threat assessment dropped out of high school; the other 35 (97%) students receiving SPED services went on to complete their schooling. This finding is notable because prior studies have demonstrated that students receiving SPED services tend to have lower graduation rates than students in general education. McFarland et al. (2019) found that across the United States, students with disabilities had a high school completion rate of approximately 85% in 2017, while students without disabilities had a high school completion rate of 94%.

It is possible that our findings were inconsistent with this trend because these students received additional services as a result of undergoing a threat assessment. Future studies should investigate what kinds of services these students receive and track their responses to these interventions.

Ultimately, these results showed that threat assessment did not put students who received SPED services at an increased risk of dropout. This finding is notable in light of recent concerns (e.g., Elbe & Rogers, 2019) that threat assessment could unfairly target these students. Elbe and Rogers (2019) specifically noted that students may be unfairly disciplined for behaviors that may arise due to an emotional disability, and highlight the need for quality training to determine whether these students actually pose a threat.

Of note, both of these districts have been using threat assessment for many years and have been trained in threat assessment. Additionally, they conduct their own annual training on threat assessment for new staff. Well-trained school personnel are critical to the effective implementation of threat assessment. Training helps school personnel consider the contextual factors surrounding a threat and respond appropriately, rather than following a zero tolerance approach. Training should explicitly teach intervention strategies that may be helpful for students depending on the circumstances that led to the threat. For example, social emotional learning or using mental health services may be helpful interventions for students that have difficulty expressing anger or frustration in adaptive ways (Valdebenito et al., 2018).

Limitations/Future Directions

Given that threat assessment is relatively new for many districts and these districts have limited case data, our sample size was somewhat small. District A and District B varied in their tracking and measurement of threat assessment data and student outcomes. In particular, District B was only able to provide data on substantive threats. If states were able to provide uniform standards for maintaining threat assessment records, this would greatly facilitate a more in-depth study of long-term outcomes for students who receive a threat assessment. Ideally, a future study would look at academic data for each student before and after they underwent a threat

assessment. This would provide a better picture of how receiving a threat assessment could influence their academic trajectory.

This study was archival/retrospective in nature and all of the cases were from two large suburban school districts in the same state. Therefore, these results may not be generalizable to other school districts. Furthermore, these districts were unable to monitor the graduation rates of students who transferred.

Despite these limitations, the findings from this study contribute valuable information regarding the graduation/dropout rates for students who receive a threat assessment and highlight the need to develop a set of outcome measures that can be looked at and measured uniformly across schools. As more research investigates what happens to these students after they receive a threat assessment, it will be important to look at what interventions are being implemented and how these may help students graduate.

Overall, receiving a threat assessment did not appear to be associated with lower graduation rates. As expected, graduation rates for students who received a threat assessment were lower than overall district cohort rates. The students in our sample who were referred for a threat assessment had pre-existing risk factors for school dropout, which likely contributed to these lower rates. Notably, students who made threats did not obtain lower graduation rates than students with a documented suspension history. Threat assessment is designed to both help troubled students and prevent acts of violence from being carried out. Particularly for students who make very serious threats, the threat assessment team works to assess needs and institute appropriate services rather than implementing overly punitive measures. Threat assessment can be used to identify these areas of difficulty to initiate needed interventions and services to help the students succeed in school.

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Table 1
District A Linear Probability Model

	<i>B</i>	<i>T value</i>
Intercept	0.79	3.04**
Demographics		
Male ¹	-0.06	-0.46
SPED ²	0.18*	2.26*
Grade 10 ³	-0.05	-0.42
Grade 11 ³	-0.10	-1.00
Grade 12 ³	-0.01	-0.09
Asian	0.05	0.72
Black	0.01	0.10
Hispanic	-0.28	-1.61
Two or More Races	0.05	0.34
GPA	0.09	1.46
Threat Incident		
Serious Substantive ⁴	-0.15	-0.95
Very Serious Substantive ⁴	-0.08	-0.48
Suspension ⁵	-0.06	-0.76

¹Female was used as the reference group; ²Students who were not receiving SPED services were used as the reference group; ³Grade 9 was used as the reference group; ⁴Transient was used as the reference group; ⁵Students who were not suspended were used as the reference group.

* $p < .05$; ** $p < .01$; *** $p < .001$.

Table 2
District A Graduation and Dropout Rates

	Students who received a threat assessment		State cohort data for District A	
	Graduate	Dropout	Graduate	Dropout
Gender				
Female	92	8	98	2
Male	85	15	96	4
Race				
Asian	100	0	99	1
Black	100	0	98	2
Hispanic	56	44	87	13
White	92	8	99	1
Two or More Races	100	0	99	1
Grade				
9	91	9	-	-
10	78	22	-	-
11	86	14	-	-
12	91	9	-	-
IEP Services				
Yes	97	3	97	3
No	76	24	97	3
Type of Threat				
Transient	93	7	-	-
Serious Substantive	75	25	-	-
Very Serious Substantive	77	23	-	-
Suspension from Threat Assessment				
Yes	76	24	-	-
No	97	3	-	-

Table 3
District B Linear Probability Model

	<i>B</i>	<i>T value</i>
Intercept	0.85	2.50*
Demographics		
Male ¹	-0.17	-0.85
SPED ²	-0.08	-0.67
FRPM ³	-0.11	-0.54
Grade 10 ⁴	-0.06	-0.42
Grade 11 ⁴	0.09	0.62
Grade 12 ⁴	0.03	0.32
Asian ⁵	0.07	0.60
Black ⁵	0.02	0.08
Hispanic ⁵	-0.02	-0.08
Other ⁵	-0.05	-0.29
GPA	0.09	1.13
Threat Incident		
Very Serious Substantive ⁶	-0.01	-0.04

¹Female was used as the reference group; ²Students who were not receiving SPED services were used as the reference group; Students who were not eligible for FRPM were used as the reference group. ⁴Grade 9 was used as the reference group; ⁵White was used as the reference group;

⁶Serious substantive was used as the reference group

* $p < .05$; ** $p < .01$; *** $p < .001$.

Table 4
District B Graduation and Dropout Rates

	Students who received a threat assessment		Students who received an out-of-school suspension		State cohort data for District B	
	Graduate	Dropout	Graduate	Dropout	Graduate	Dropout
Gender						
Female	90	10	79	21	95	5
Male	78	22	75	25	92	8
Race						
Asian	92	8	87	13	98	2
Black	78	22	84	16	94	6
Hispanic	56	44	57	43	79	21
White	89	11	90	10	98	2
Other	75	25	84	16	97	3
Grade						
9	68	32	--	--	--	--
10	80	20	--	--	--	--
11	89	11	--	--	--	--
12	94	6	--	--	--	--
IEP Services						
Yes	78	22	78	22	93	7
No	81	19	75	25	94	6
Type of Threat						
Serious	75	25	--	--	--	--
Substantive						
Very Serious	91	9	--	--	--	--
Substantive						
FRPM						
					Economic Disadvantage ¹	
Yes	54	46	69	31	89	11
No	92	8	83	17	95	5

¹State cohort data for economic disadvantage includes any student who 1) is eligible for FRPM or receives TANF, or 2) is eligible for Medicaid, or 3) identified as either Migrant or experiencing Homelessness.