Graduate Thesis and Dissertation 2023-2024

2024

Spotting the Signs: An Investigation of the Effectiveness of a Peer Training Program in Increasing Students' Ability to Detect and Report the Warning Signs of a Peer School Shooting Plot

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SPOTTING THE SIGNS: AN INVESTIGATION OF THE EFFECTIVENESS OF A PEER TRAINING PROGRAM IN INCREASING STUDENTS'ABILITY TO DETECT AND REPORT THE WARNING SIGNS OF A PEER SCHOOL SHOOTING PLOT

by

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M.S. University of Central Florida, 2021

A dissertation submitted in partial fulfillment of the requirements
for the degree of Doctor of Philosophy
in the Department of Psychology
in the College of Sciences
at the University of Central Florida
Orlando, FL

Summer Term 2024

Major Professor: Clint Bowers

ABSTRACT

To date, there are no evidence-based peer bystander intervention trainings (BIT) aimed at educating peers in school shooting warning behaviors. The purpose of this study was to examine an interactive BIT where peers were taught warning behaviors related to someone planning a school shooting and how to report this information. This training was evaluated against a currently available training method (i.e., PowerPoint presentation based) and a control group to determine the best training approach. College students between 18 and 19 years old ($N = 57$) completed pre, post, and one-month follow-up assessments. At each timepoint accuracy in detection of warning behaviors, overall willingness to report, attitudes toward reporting, perceived behavioral control (PBC), and intent to report was assessed. A linear regression mixed effects model was performed for each variable of interest. Results indicate that all groups increased in accuracy from preassessment to post assessment, and from preassessment to one-month follow-up for the first accuracy assessment, but not the second. Participants' willingness to report, attitudes toward reporting, PBC, and intent to report increased between preassessment and post assessment, and preassessment and one-month follow-up. The was a significant interaction effect between time and group for willingness to report and PBC between preassessment and post assessment for the interactive BIT group compared to the control group. The interactive BIT group demonstrated the highest positive attitudes toward reporting compared to the control group between pre and post assessment. For intent to report, the PowerPoint presentation group demonstrated the highest increase in intent to report compared to the interactive BIT group at one-month follow-up. Results indicate the intervention training has potential for educating peers in warning behaviors with modifications. Future research should focus on these modifications.

For my mother: Thank you teaching me to always fight for what is important.

To my husband: Thank you for being my rock, and for always reminding me of the end goal.

For my sister: Thank you for always being there, no matter what country you are in.

For Dr. Nancy Suchman (1957 – 2020): Thank you for encouraging me to never stop asking questions.

For Officer Bobby Dinardo (1954-2009): Thank you for teaching me to always take the shot.

To all my friends, thank you for keeping me grounded and reminding me to have fun.

For my five-year-old self: You were always good enough.

ACKNOWLEDGEMENTS

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CHAPTER ONE: INTRODUCTION

The adverse effects of rampage school shootings extend beyond the walls of the affected schools (Cimolai et al., 2021). School-based homicides are low base-rate events at 0.03 per 100,000 students for single-victim homicides and 0.008 per 100,000 students for multiple-victim school-based homicides (Holland et al., 2019). Yet, following a mass shooting, there is a short-term increase in perceived fears and personal safety even among those not directly involved (Lowe & Galea, 2017). Community responses include mass panic and anxiety (Cimolai et al., 2021; Rowhani-Rahbar et al., 2019) and a loss of community cohesion (Cimolai et al., 2021; Rowhani-Rahbar et al., 2019). This loss can present as a loss of interest in school activities and higher absentee rates (Cimolai et al., 2021; Palinkas et al., 2004). With the addition of mass media coverage, allowing the ability to reach a wider audience instantly, the effects of school shootings extend beyond geographic boundaries. There is a global decrease in students' perceptions of safety (Cimolai et al., 2021; Stretesky & Hogan, 2001). However, these decreases may be warranted. In the six weeks following the Parkland school shooting, a significantly higher proportion of children receiving psychiatric evaluations reported engagement in school violence and had access to guns compared to the patients evaluated in the six weeks before the shooting took place (Haddad et al., 2021).

Consistent with research findings involving communities affected by school shootings, cross-sectional studies of 9th through 12th-grade students in both public and private schools, from 1991 until 2019, revealed a consistent increase in the number of students missing school because of safety-related concerns. Between 5 (Mukherjee et al., 2020) and 8.7 percent (Center

for Disease Control and Prevention, 2019) of students reported that in the prior month, they had missed at least one day of school because they felt unsafe at school, on their way to school, or leaving school. The rate of absences in 2019 was double the 4.4 percent endorsed in 1993 (Center for Disease Control and Prevention, 2019). This is concerning because a significant body of research has demonstrated that missing school results in negative consequences (Kirksey, 2019). Absenteeism is the most significant predictor of course grades (Allensworth et al., 2018; Kirksey, 2019), a significant predictor of school grade point averages, and school dropout rates (Kirksey, 2019).

CHAPTER TWO: LITERATURE REVIEW

Security Efforts within Schools

In an effort to prevent future school shootings, increased security measures have been put in place across the United States. These security measures fall into four categories: the institution of school security personnel, the stationing of law enforcement officers within the school, the installation of surveillance systems, and the creation of emergency preparedness plans (King & Bracy, 2019). Despite these measures, there is a lack of evidence that their use improves student safety (Carter et al., 2022; Tanner-Smith et al., 2018). For example. specific research into the institution of armed officers in schools indicates that their presence has been ineffective in reducing violence and has resulted in increased casualties (Carter et al., 2022; Peterson et al., 2021).

Stakeholder Perceptions of School Safety Initiatives

Historically, increased security protocols within schools have not had significant effects on students' perceptions of safety (Zhe & Nickerson, 2007) or have adversely affected their perceptions of safety (Mowen & Freng, 2019). One longitudinal study found that in schools with higher security, there is an increase in student victimization (Fisher et al., 2018). Despite different security strategies, only the presence of school security officers increases students' perceptions of safety (Lindstrom Johnson et al., 2018). Security cameras outside school buildings are related to increased student perceptions of support, but security cameras inside a building have an adverse effect and decrease students' perceptions of safety, equity, and support (Lindstrom Johnson et al., 2018). Students also reported that the use of metal detectors was burdensome and not helpful in the prevention of violence (Lindstrom Johnson et al., 2017).

Currently, active shooter and lockdown drills are the main strategies with student involvement, but these drills hurt students' perceptions related to safety and risk (Huskey & Connell, 2021).

Research investigating parents' perception of school shooting prevention reveals their support for all proposed solutions (Bliss et al., 2006; Carter et al., 2022). Specifically, parents rate increased security measures, threat assessment, zero tolerance policies, and exploratory measures as being acceptable. Overall, parents rate threat assessment procedures as the most acceptable intervention strategy (Carter et al., 2022). Additionally, parents reported more positive attitudes toward overall prevention efforts when schools provided information to children regarding education around active shooters through the provision of reading materials or watching videos (Wallace, 2020).

Threat Assessment Teams

The aftermath of the Columbine High School shooting saw the creation of the Safe School Initiative, a collaboration between the U.S. Secret Service and the U.S. Department of Education. The main findings from this effort were (a) that school-based attacks are typically planned in advance, (b) that peers were the first to know that a student was planning an act of violence, and (c) that there is no set profile that can be used to identify a potential perpetrator of a school shooting (Vossekuil et al., 2002). These findings led to the development of school threat assessment protocols and subsequently, Threat Assessment Teams (Modzeleski & Randazzo, 2018). Threat Assessment Teams are comprised of mental health providers, school personnel and law enforcement (Flannery et al., 2021; Modzeleski & Randazzo, 2018) and include four main components: (a) identification of a person who may be a safety risk, (b) information gathering regarding the suspected individual, (c) determination of the person's level of risk, and (d) the creation of a plan to address the threat (Modzeleski & Randazzo, 2018). In 2018, field experts

conducted a 15-year review of school threat assessment procedures. The authors determined that the incorporation of students into the threat assessment notification process would increase the efficiency of Threat Assessment Teams. The students' main function would be to communicate to proper authorities if they witnessed peers engaged in concerning behaviors (Modzeleski & Randazzo, 2018).

Additional field experts from the U.S. Secret Service's National Threat Assessment Team (Alathari et al., 2021; Alathari et al., 2019), the National Policing Institute Center for Targeted Violence Prevention (Langman & Straub, 2019; National Police Foundation, 2021), and experts involved in after action reports following the mass shootings at Columbine High School (Erickson, 2001), Virginia Tech (Virginia Tech Review Panel, 2007), Northern Illinois University (Northern Illinois University, 2008), and Arapahoe High School (Goodrum & Woodward, 2016) all recommend that students be educated on the warning signs that someone is planning a school shooting. Yet, current educational efforts have not produced actionable reports to authorities or tip lines. Specifically, the most recent analysis of reports collected by school safety tip lines revealed significant problems with how people currently report (Hendrix, 2022). The first problem is that in almost one-third of cases, reports were not completed the same day that the behavior was observed. In 13 percent of cases reported to the tip line, the person who engaged in the warning behavior was not identified. When tip lines are not given enough information to begin an investigation, there is little that can be done given the anonymous nature of the reporting systems (Hendrix et al., 2022). As a result, researchers recommend that students be trained in the specifics related to warning behaviors and how to report this information (Hendrix et al., 2022).

Current Student Involved Safety Programs

  Across the United States, several youth groups have been created to facilitate a more positive school climate. These programs include Students Against Violence Everywhere (SAVE), Striving to Reduce Youth Violence Everywhere (STRYVE) and Make Our School Safe (Poland & Ferguson, 2021). The SAVE project was created by the Sandy Hook Promise organization to build a safer community for students. Within this training, teachings include the negative consequences of violence and nonviolent alternatives to managing interpersonal conflict (Riley & Segal, 2002). Rather than one specific program, the STRYVE program is a collection of intervention efforts at the government, public health, and youth level to reduce youth violence (David-Ferdon & Simon, 2012). The Make Our School Safe program assists youth in the development of clubs aimed at creating a culture of safety (Poland & Ferguson, 2021). All of these programs have laudable goals, yet none of them train specifically on behaviors that help identify potential school shooters.

  Although not a youth-led group, to date, the Say Something program, developed by Sandy Hook Promise, is the only training that was available for review that was designed to teach middle and high school students about the warning signs that someone is preparing to hurt themselves, or others. The Say Something program is an approximately 20-minute- PowerPoint video presentation, which presents an educational overview of the warning signs that someone is planning to die by suicide, hurt others, or engage in self-harm (Sandy Hook Promise, 2021a). Based on data collected through June 30, 2021, over 3 million middle and high school students have participated in the Say Something Program (Sandy Hook Promise, 2021a). Four examples of warning behaviors are provided within the training. Two examples are of leakage warning behaviors, one example of identification warning behavior, and one example pathway warning

behavior (see below for a definition of these warning behaviors). The presenter reads the

material on the slides (Sandy Hook Promise, 2021b). There are breaks in the video to allow the

viewers to take notes (Sandy Hook Promise, 2021b). The Say Something training does not assess

acquisition and retention of the material. Additionally, within the training, the warning behaviors

are described but not demonstrated, which may have limited utility for training purposes.

Identifying and Reporting Warning Behaviors of School-Based Armed Violence

There is increasing evidence that the majority of those who complete or plan school

shootings engage in warning behaviors (Cowan et al., 2022; Langman & Straub, 2019; National

Police Foundation, 2021; Vossekuil et al., 2002; Winch et al., 2024). Warning behaviors are

observable actions that demonstrate someone is contemplating and preparing to carry out a

school shooting. Across various samples, between 61 (Gerard et al., 2016) and 81 percent

(Vossekuil et al., 2002) of school shooters engaged in warning behaviors prior to carrying out a

school shooting.

As outlined in the work of Meloy et al. (2014), there are eight categories of warning

behaviors, based on the actions of previous perpetrators of school shootings (Meloy et al., 2014;

Meloy & O'Toole, 2011). These warning behaviors are categorized as Pathway Warning

Behaviors, Fixation Warning Behaviors, Leakage Warning Behaviors, Identification Warning

Behaviors, Novel Aggression Warning Behaviors, Energy Burst Warning Behaviors, Last Resort

Warning Behaviors, and Directly Communicated Warning Behaviors. Descriptions and examples

of these warning behaviors can be found in Table 1.

Table 1: Definitions and examples of warning behaviors.

Warning Behavior	Definition	Examples
Pathway Warning Behavior	Any behaviors involved in the research, planning, preparation, or implementation of an attack (Calhoun & Weston, 2003; Meloy et al., 2014; Meloy & O'toole, 2011).	Acquiring blueprints for the school. Researching past mass casualty acts of violence. Acquiring weapons.
Fixation Warning Behavior	Any preoccupations related to a specific person or cause (Meloy et al., 2014; Meloy & O'toole, 2011; Robertz, 2013).	Submission of writing assignments with homicidal or suicidal themes (Meloy et al., 2014; Meloy & O'toole, 2011).
Leakage Warning Behavior	Any disclosure of a school shooting plot in a variety of ways without disclosing the plan to the intended target(s) (Meloy et al., 2014; Meloy & O'toole, 2011; Robertz, 2013).	Disclosures via social media, written word, videos, or discussion with a person that is not the target (Meloy & O'toole, 2011).
Identification Warning Behavior	Any excessive interest in weapons, previous suspects of	Reference to previous school shooters in a

Warning Behavior	Definition	Examples
	mass violence, or an exaggerated identification with a belief system or cause (Hempel et al., 1999; Meloy et al., 2014; Meloy & O'toole, 2011).	positive way, taking on extremist views related to race, religion, sexuality, etc.
Novel Aggression Warning Behavior	When a person engages in violent acts unrelated to their intended target to test their limits in preparation for the violent nature of a school shooting (Meloy et al., 2014; Meloy & O'toole, 2011).	Hurting animals or starting a fight could be examples of behaviors that a person engages in to prepare to carry out a school shooting.
Energy Burst Warning Behavior	Increased frequency or variety of activities toward a target (Meloy et al., 2014; Meloy & O'toole, 2011).	
Last Resort Warning Behavior	When a person communicates that they are so desperate that an act of violence is their only option (Meloy et al., 2014; Meloy & O'toole, 2011).	Posting on social media about a day or retribution.

Warning Behavior	Definition	Examples
Directly Communicated Threat Warning Behavior	The disclosure of the plot to the intended target (Meloy et al., 2014; Meloy & O'toole, 2011).	Posting on social media, calling law enforcement, or telling a target directly that they will be engaging in a school shooting.

Table adapted from Winch et al., 2024.

Several studies have evaluated suspects' engagement in these warning behaviors. In a comparative analysis of the behaviors of school shooting perpetrators versus students of concern (i.e., cases in which authorities found no serious intent to commit a school shooting) in a German sample, leakage warning behaviors were most prevalent across groups, while pathway, fixation, identification, novel aggression, and last resort warning behaviors occurred significantly more in school shooting cases (Meloy et al., 2014). In the United States, the warning behaviors with the highest frequency in averted school shootings include pathway, leakage, directly communicated threat, and fixation warning behaviors, in that order (National Police Foundation, 2021). In both averted and completed school shooting cases in the United States, peers were often aware of the suspect's planning (Alathari et al., 2021; Alathari et al., 2019; Langman & Straub, 2019; Meloy et al., 2014; Meloy & O'Toole, 2011). Data compiled by the U.S. Secret Service found that in 77 percent of completed school armed violence cases, a peer had previous knowledge of the plot (Alathari et al., 2019). In 61 percent of averted plots, a peer was the one to report the warning behaviors (Alathari et al., 2021).

Video-Based Learning

Clearly, being able to identify warning behaviors may be one way to avert school shootings. However, as noted above, the only program that teaches students about warning signs is a slide presentation where the behaviors are described but not illustrated. Although this is an important first step, data from studies examining teaching and learning suggest that demonstration of behaviors followed by feedback during the learning process promotes skill acquisition. For example, in a systematic review of basic life support training methods, the most efficacious training approach used the provision of real time feedback while the participant was learning the skill (García-Suárez et al., 2019). Additionally, undergraduate students who engaged in pre-training evaluations and receive corrective feedback performed significantly better on assessments of life support skills than those who only watched a lecture (Li et al., 2011) and these performance differences were maintained a year later (Li et al., 2013). Similarly, undergraduates who were taught cardiopulmonary resuscitation (CPR) utilizing a mixture of video and computer-generated feedback were able to achieve competency in CPR and almost half of the sample was able to maintain this level of competency 5-months post-training (Mpotos et al., 2013).

In addition to positive learning outcomes, students report satisfaction across studies that used video-based learning (Sablić et al., 2021). Research has validated that video-based demonstration enhances knowledge acquisition. For example, in a comparison study a cohort of physiotherapy students was given video-based learning materials in addition to the materials given to previous cohorts. When examination scores were compared, the cohort who engaged in video-based learning had significantly higher examination scores (Weeks & Horan, 2013). In another study involving a medical school sample, those students who engaged in only video-

based learning performed significantly better on final examinations than those who attended in-person classes (Eisen et al., 2015). Different types of video formats have also been evaluated to see how they influence student engagement and later performance. Findings reveal that students are more engaged and perform better when animated graphics, images and text are added to the video (Lackman et al., 2021). In addition to the increased performance and engagement that is a result of video-based learning, there are additional benefits, including the ability to standardize the intervention, reduced administration training required, and a reduced resource cost (Gilmore et al., 2021).

In summary, students have increasingly felt unsafe attending school given the increase in school shootings over the last two decades. To prevent future school-shootings, many after-action reports and research studies have cited the need to train students about warning behaviors (Alathari et al., 2021; Alathari et al., 2019; Erickson, 2001; Goodrum & Woodward, 2016; Langman & Straub, 2019; Northern Illinois University, 2008; Virginia Tech Review Panel, 2007; Vossekuil et al., 2002). Yet, the only available training consists of a static Powerpoint presentation of warning behaviors. To address this need, this study piloted a video-based educational training using the most common warning signs displayed by past averted and completed school shooting suspects, following the model developed by Sandy Hook Promise and the Say Something training (Sandy Hook Promise, 2021a, 2021b). The training used a pre-intervention evaluation of understanding of warning behaviors followed by feedback on each participant's accuracy in order to promote learning. The impact of the intervention on individuals' willingness to intervene was also evaluated using quantitative methods derived from studies evaluating bystander suicide intervention.

Study Aims

The purpose of this study was to develop and pilot educational trainings (video-based education and presentation-based education) of the most common warning behaviors displayed by potential school shooters (Hendrix et al., 2022; Meloy et al., 2014; Meloy & O'toole, 2011). The goal of the study was to find the most efficacious training method to increase students' abilities to idenitify behaviors of concern, and increase their willingness to intervene when they observe concerning behaviors. To addess the training efficacy, assessments occurred pre-intervention, post-intervention, and at a one-month follow-up (Jouriles et al., 2018; Jouriles et al., 2016; Kleinsasser et al., 2015; Moynihan et al., 2010).

Hypotheses

At **post-assessment**, and **one-month follow-up,** participants in the video group, in comparison to the presentation only, or control group, would:

1. More accurately identify school shooting warning behaviors.

   a) Accuracy in the identification of warning behaviors will be higher for the novel video compared to the training video, at post-assessment and will be maintained at one-month follow-up.

   b) Accuracy in the identification of warning behaviors will be higher when watching the text message video for the video-based group at post-assessment compared to the other two groups and will be maintained at one-month follow-up.

2. Report higher overall willingness to report peers planning to carry out a school shooting at **post-assessment** and **one-month follow-up**. Including:

a) Report more positive attitudes regarding reporting when someone is planning to carry out a school shooting.

b) Report increased perceived behavioral control in reporting someone who is planning a school shooting.

c) Report increased intent to report someone who is planning a school shooting.

CHAPTER THREE: METHODOLOGY

Power Analysis

A power analysis was conducted using g*power version 3.1 (Faul et al., 2009). As this is the first study of its kind, prior effect size estimates for efficacy in identifying warning behaviors were not available. Instead, effect sizes relevant to hypotheses 2-4 (bystander intervention programs related to sexual assault prevention) were examined. A 2018 meta-analysis found effect sizes (Cohen's d) ranged from small (0.22) to medium-to-large (0.78; Jouriles et al., 2018). Given this variance, a medium effect size was used (Cohen f = 0.25; Cohen, 1988) at 80 percent power (Jones et al., 2003) to conduct the power analysis. Results of the power analysis for a repeated measures analysis of covariance within-between interaction model indicated that a minimum sample size of 30 participants was necessary to sufficiently power the study. However, a total of 59 people were recruited to allow for the possibility of dropouts.

Participants

A total of 59 students participated in the study. A total of two participants were removed from the final statistical analyses. One participant was removed because they served as a pilot participant and modifications were made to the procedure after the participant's pre and post assessment data were collected. The second participant was removed because two members of the research team observed the participant not attending to the training materials (e.g., staring off, slow responses to verbal prompts, and limited engagement). The demographic information is based on the 57 participants whose data were analyzed. The majority of the sample identified as White (54 percent), and female (77.2 percent). Participants were undergraduate students recruited from the University of Central Florida, who were between 18 (N = 23) and 19 (N = 34)

years of age, who self-identified as being in their first year of college and having graduated from high school in the prior school year (between the months of May and June of 2022 for most participants; Table 2 outlines the demographic characteristics of the sample). The rationale was these students were the most developmentally similar to the future audience of the training, high school students, allowing for this study to act as an initial demonstration of usability and effectiveness of the intervention.

Table 2: Demographic Characteristics of the Sample

Demographics	Group A		Group B		Group C		Full Sample	
	n	%	*n*	%	*n*	%	*n*	%
Gender								
Female	18	85.7	13	68.4	13	76.5	44	77.2
Male	3	14.3	4	21.2	2	11.8	9	15.8
Nonbinary	0	0	2	10.5	2	11.8	4	7.0
Age								
18	10	47.6	8	42.1	5	29.4	23	40.4
19	11	52.4	11	57.9	12	70.6	34	59.6
Race/Ethnicity								
White/Non-Hispanic	10	47.6	8	42.1	12	70.6	30	52.6
White/Hispanic	0	0	2	10.5	0	0	2	3.5
Not Identified/ Hispanic	7	33.3	5	26.3	1	5.9	13	22.8
Black	1	4.8	0	0	0	0	1	1.8
Asian	3	14.3	3	15.8	3	17.6	9	15.8
Declined to answer	0	0	1	5.3	0	0	1	1.8

Inclusion/Exclusion Criteria

Study participants had to be at least 18 years of age, in their first year of college, and indicate that they had just graduated from high school in the prior school year. Participants had to be fluent in reading and writing in English; able to see and hear audio-visuals; and absent of psychosis, suicidal or homicidal ideation, or elevated levels of emotional stress or distress.

Additionally, they denied cognitive difficulties that could interfere with the learning of new information. Questions were administered via phone interview or Qualtrics questionnaire depending on the participant's preferred means of contact.

Random Assignment

To maintain an equivalent number of participants in each group, block randomization was used following the guidelines outlined in Altman and Bland (1999). Each block had two spots for the control group, two for the video-based group, and two for the presentation-based group. Each block contained a unique pattern of how participants were assigned to each group (Altman & Bland, 1999). Please see Appendix A for procedures related to maintaining participant confidentiality.

Measures

In addition to demographic data (age, sex, race/ethnicity) the following outcome measures were used.

Identification of Warning Behaviors Interview

Each participant was given the instructions: "Please pause the video clip if you see concerning behavior that could indicate that someone is preparing to complete a school shooting." If the participant paused the video clip, they were asked: "What behaviors did you see that made you pause the video clip?" All response were audio recorded and transcribed by an undergraduate research assistant.

Time points at which warning behaviors were observed were determined via consensus between two field experts who watched each video together and paused the video clip every time either expert saw a warning behavior. Behaviors that were demonstrated repeatedly were also noted by the experts. For the purposes of scoring participants' detection of warning behaviors,

behaviors that are repeated were only factored into the participant's overall score once, regardless of how many times they were able to detect the specific behavior.

All interviews were transcribed by an undergraduate research assistant. Once transcripts were complete, two different undergraduate research assistants, and the principal investigator independently coded each transcript utilizing the criteria outlined in the codebook located in Appendix B. All three coders were blinded to participant training condition. Cohen's Kappa was calculated to assess for inter-rater reliability, resulting in a value of 0.71, indicating substantial inter-rater reliability. For instances where the raters were not in complete agreement, the expert rating was chosen. Of the 1425 ratings, the principal investigator had agreement with at least coder in 1247 of the cases. The final rating for the 178 cases where the investigator did not have agreement with at least one other coder, the principal investigator's rating was used.

Willingness to Intervene against Suicide Questionnaire (WIS) assesses bystanders' willingness to intervene when someone endorses suicidal ideation (Aldrich, 2017). The original measure was modified to assess participants attitudes toward reporting when someone is planning a school shooting. Specifically, the Attitudes, Perceived Behavioral Control and Intention subscales were modified and included in the study. Modifications to the questionnaire were approved by the scale's developer, Dr. Rosalie Shemanski Aldrich. In a pilot administration of the revised questionnaire, as indicated by an a priori power analysis, 15 graduate students in the UCF Clinical Psychology Ph.D. program volunteered and completed the questionnaire on June 21, 2022, and then again on June 28th, 2022, to determine preliminary test-retest reliability. The intra correlation coefficient was above the .75 cut-off at ICC = .81 indicating good test-retest reliability (Koo & Li, 2016). Two field experts assessed the modified questionnaire prior to its administration to study participants. The modified measure will be referred to the Willingness to

Report Questionnaire (WRQ). The WRQ can be found in Appendix C. The measure is composed of three subscales Attitudes Toward Reporting, Perceived Behavioral Control, and Intent to Report. The minimum score for the Attitudes Toward Reporting subscale was 15 and the maximum was 75. Scores for the perceived Behavioral Control subscale could range between a minimum of 8 and a maximum of 40. Finally, on the Intent to Report subscale the minimum possible score is 8 and the maximum score is 40. The overall Willingness to Report score has a range of possible scores with a minimum of 31 and a maximum score of 155.

Training Content Overview

There were three educational video clips with durations between two and five minutes long. The videos depicted the warning behaviors most observed prior to the completion of a school shooting plot including pathway warning behaviors and leakage warning behaviors (Abel et al., 2022; Meloy et al., 2014; National Police Foundation, 2021), followed by the direct communication of warning behaviors (Meloy et al., 2014; National Police Foundation, 2021) and last resort warning behaviors (Abel et al., 2022; Meloy et al., 2014). Due to the high prevalence rate of pathway and leakage warning behaviors found in previous averted and completed school shootings, they were demonstrated throughout the videos. The lower prevalence rate warning behaviors (i.e., last resort warning behavior, direct communication of warning behavior, and identification warning behavior) were portrayed at least once in the films. There is a lack of evidence that energy burst warning behaviors and novel aggression warning behaviors have been present prior to a school shooting (Abel et al., 2022; Meloy et al., 2014; National Police Foundation, 2021), as a result, these warning behaviors were not included in the film clips. None of the videos depicted someone carrying out a school shooting.

The videos were made specifically for this project with the script designed by the study's author. The author also supervised the production of the videos, which were produced by the UCF Film Department. In the pretraining video, participants watch a person going about his day. This includes being in class, interacting briefly with a teacher, and being in his home interacting with his brother. This video depicts a person who is preparing to carry out a school shooting alone and engaging in observable warning behaviors. In the first post-training video, the camera follows two male students talking quietly at a cafeteria table by themselves. They are then briefly approached by a member of school personnel, toward whom they react negatively. This is all in the view of two female students who comment to each other about the concerning behaviors the two students display. In the final video, participants watch text messages between two students. One is revealing several warning behaviors during the conversation. For the full video clips, please follow the links found here, pre-training video (https://youtu.be/RfO4T1vAis4), training video for video-based training group (https://youtu.be/M8Wuuazae58), novel post-training video (https://youtu.be/9lY_TEVFHB8), novel post-training alternate form video (https://youtu.be/pK2Fse6uzzU).

Data Collection

Consent

Every participant signed a written consent to participate. Participants were recruited via public postings, classroom announcements, newsletter postings, and emails. Participants were informed that it was a paid research study (American Psychological Association, 2003). Each participant received $25 for participating in the pre and post assessments and an additional $25 for participation in the follow-up appointment. A flow chart of study participation is presented in Figure 1.
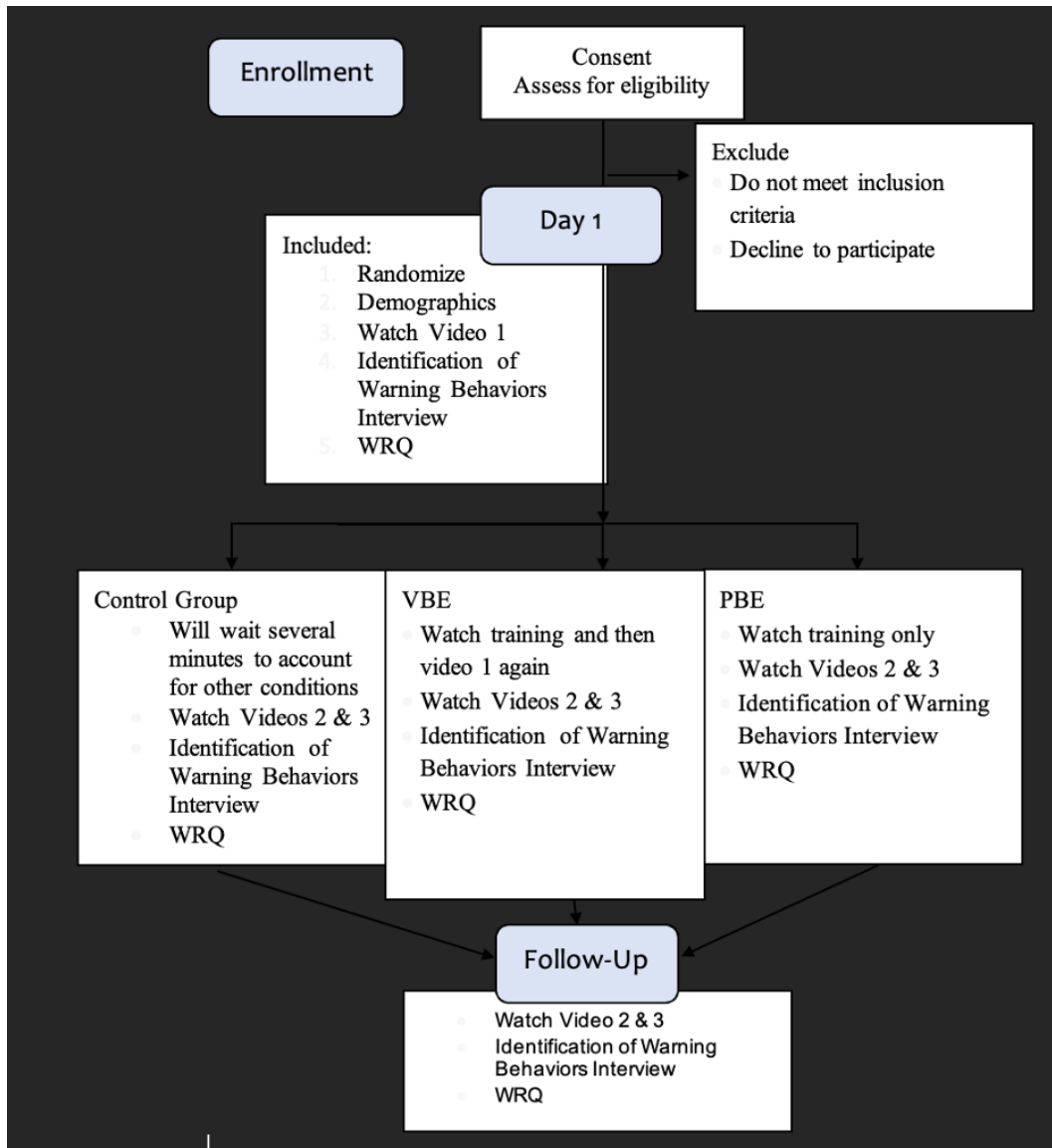
Figure 1: Administration Procedure

All study procedures were conducted by the Principal Investigator (PI) or one of the IRB approved research assistants. The Principal Investigator completed all testing procedures for pre and post assessment with the participants in individual testing appointments to maintain participant confidentiality, ensure reliable and valid administration, and to monitor participant distress. During assessment of distress, only one participant reported concerns related to the material they were shown. Their distress was determined to be transient in nature, as the participant reported that they were able to return to their baseline in less that 5 minutes, and they returned for follow-up reporting minimal concerns.

Timeline

Data Collection Day 1

Preassessment. Each participant completed the study individually (i.e., there was no group instruction/training). Next, the participants were instructed to watch the pretraining video, as described above. Prior to starting the video, the participant was instructed as follows: "Please watch this video clip and press pause if you see behavior that would indicate that someone is planning to carry out a school shooting." Any time the participant paused the video, the researcher asked, "What behavior or behaviors did you see that resulted in you pausing the video clip?" Once the participant answered, the researcher resumed playing the video. At the end of the video clip the researcher asked, "Are there any behaviors we have not already discussed that you would like to mention?" Following the ending of the video clip, participants completed the revised WIS questionnaire. Depending on their group assignment, the next phase of the experiment was as follows:

Control Group. Participants assigned to the control group were instructed not to use their electronic devices to research school shootings and were asked to sit quietly for a total of 8

minutes to account for the average amount of time spent in the other two conditions. The examiner would leave the room during the break duration to reduce unnecessary discomfort.

Presentation Group. Those assigned to the presentation group then watched an information presentation delivered by the PI explaining different types of warning behaviors. This training mimicked the Sandy Hook Promise Say Something program. At the end of the presentation there was a brief educational presentation regarding how to report concerning behaviors and to whom concerning behaviors should be reported. The recommendations included texting, submitting a web-based report, or calling an anonymous tip line; or calling local Law Enforcement.

Video Based Group. Those randomly assigned to the video-based group again watched Video One with the incorporation of the intervention. The training began with an overview of warning behaviors. Then the PI played Video 1, stopping each time a warning behavior appeared, whereupon the specific behavior was identified to the participant. At the end of the video there was the same brief educational component regarding how to report concerning behaviors and to whom concerning behaviors can be reported to. The recommendations included texting, submitting a web-based report, or calling an anonymous tip line; or calling local Law Enforcement.

Post Assessment. After the training was completed, all participants then watched Video Two and Three, each of which represented a new scenario but included behaviors representing the various warning behaviors, as described above. There was no education provided by the PI during these videos, and participants were told to stop the videos and report any warning behaviors they see. Post intervention assessment included Identification of Warning Behaviors Interview, and the WIS questionnaire. This was the end of data collection for Day One.

Data Collection – One Month Follow-Up Participants watched Video Two and Three again and completed the same measures that were completed pre and post intervention. This constituted the final data collection.

Statistical Method

Data was analyzed using jamovi (Version 2.5; 2024). While a repeated measures ANOVA was originally proposed, this method could not be used due to the violations of assumptions, especially related to the normal distribution of the residuals. As a result, a linear mixed effects regression (LMER) was used due to its use of maximum likelihood estimation, which is more robust to violations of normality. In addition, the model allows for the utilization of subjects that have missing data and can model the correlated data that occurs in a longitudinal study of this nature (Singer & Willett, 2003). The outcome variables for the hypotheses are 1) accuracy in detection of warning behaviors, 2) attitudes towards intervening, 3) perceived behavioral control, and 4) intent to intervene. For each variable it was hypothesized that the intervention group would have significantly higher ratings at both post-assessment and one-month follow-up. Each variable had a minimum of five ordinal data points, which previous research was determined to be sufficient to consider the variable continuous (Johnson & Creech, 1983; Norman, 2010; Sullivan & Artino, 2013). The LMER data analyses were conducted utilizing the Singer and Willett (2023) recommendations. For each hypothesis, three models were developed. Model A, the unconditional means model; Model B, the unconditional growth model; and Model C, the uncontrolled effects of training type. Model fit was compared utilizing Akaike Information Criterion (AIC) because it is more robust to assumptions compared to Bound Sates in the Continuum (BIC) (Vrieze, 2012). For hypothesis 1a, participants accuracy in detecting warning behaviors was evaluated by comparing the number of warning behaviors they were able

to detect during while watching the training video, versus how many they were able to detect while watching the novel video during the post and follow-up assessments. For hypothesis 1b, an alternate form video was first introduced at post assessment. As a result, accuracy was measured at post and follow-up assessment. Hypothesis 2 was evaluated using the adapted WRQ measure. The WRQ was administered during the pre-, post-, and follow-up assessment phases of the study. The WRQ consisted of three subscales attitudes toward reporting (hypothesis a), perceived behavioral control (hypothesis b), and intent to report (hypothesis c).

CHAPTER FOUR: FINDINGS

Hypothesis 1: Accuracy in Detection of Warning Behaviors.

Video 1 versus Video 2. The unconditional means model (Model-A1 Accuracy), unconditional growth model (Model-B1 Accuracy), and the model for the uncontrolled effects of training group (Model-C1 Accuracy) were created to determine if participants assigned to the video-based group had a higher accuracy rate at post-assessment and one-month follow-up compared to the presentation-only and control groups (Table 3). No data were excluded for the purposes of the analysis. Model-A1 Accuracy was statistically significant ($p < .001$), indicating that the average accuracy was non-zero, and that variance exists between and within participants. The total variation in accuracy attributed to differences among participants was negligible (ICC $= 4.61e^{-15}$). Model- B1 Accuracy assessed for the linear change of accuracy over time without inclusion of training. The overall intercept (b_0) was 6.33 ($SE = 0.18$, $p < .001$). The slope between Time 1 and Time 2 (b_1) was 3.44 ($SE = 0.28$, $p<.001$), and the slope between Time 1 and Time 3 (b_2) was 3.38 ($SE = 0.28$, $p<.001$). As represented by $R^2_{marginal}$, 44.70 percent of the variance in accuracy was a result of the fixed effects of time. Sixty-four percent of the variance in accuracy was a result of the fixed effects of time and the random effects of the participants as demonstrated by the $R^2_{conditional}$. Model-C1 Accuracy incorporated the independent variable of training group in the model, as well as the interaction of time and group. There was no difference in the accuracy of the participants based on group membership. However, there was a marginally significant difference over time between participants across trainings groups ($p=.06$). Specifically, there was a statistically significant difference between the video-based training group and the control group at preassessment versus post-assessment ($p<.05$), and between the video-based training group versus the presentation-only training group at preassessment versus

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one-month follow-up ($p<.05$). To determine the best fitting model, AICs were compared, the AIC for Model-C1 Accuracy (645.39) was not significantly different from the AIC of Model-B1 Accuracy (643.83; Liu et al., 2017). Therefore, Model C1-Accuracy was determined to be the best fitting model, ($F(4, 102.8) = 2.33$, $p=.06$). At preassessment, the control group had the highest mean accuracy with 4.41 detection points out 10 possible points, followed by the presentation-only group (4.16 points), with the video-based group having the lowest accuracy scores at 3.63. At post assessment, all groups increased their mean accuracy with the video-based group having the highest accuracy (7.89), followed by the presentation-only group (7.32), followed by the control group (7.24). At one-month follow-up, participants' accuracy remained high with the video-based group having another increase in mean accuracy (8.00), followed by the control group (7.63), and the presentation-only group had the lowest mean accuracy (6.79). These results indicate that there was a marginal, but not statistically significant, difference in participants' ability to accurately detect warning behaviors across groups and time.

Figure 2: Mean differences in accuracy at pre, *post, and follow-up assessment across groups*

Table 3: Accuracy in Detection at Pre-, Post-, and Follow-up

		Parameter	UMM	UGM	Model C
		Fixed Effects			
Initial Status, π_{0i}	Intercept	γ_{00}	6.32*** (0.19)	6.33*** (0.18)	6.33*** (0.18)
	Group 1 (B-A)	γ_{01}			-0.41 (0.44)
	Group 2 (C-A)	γ_{01}			-0.09 (0.46)
Rate of Change, π_{1i}	Rate of Change, π_{1i}				
	Time 1 (2-1)	γ_{10}		3.44*** (0.28)	3.41*** (0.27)
	Time 2 (3-1)	γ_{10}		3.38*** (0.28)	3.38*** (0.28)
	Time 1 * Group 1	γ_{11}			-1.11 (0.65)
	Time 2 * Group 1	γ_{11}			-1.71* (0.66)
	Time 1 * Group 2	γ_{11}			-1.44* (0.67)
	Time 2 * Group 2	γ_{11}			-1.18 (0.69)
		Variance Components			
Level 1	Within-person	σ_ε^2	5.82 (2.41)	2.13 (1.46)	2.03 (1.42)
Level 2	In initial status	σ_0^2	2.68e^{-14} (1.64e^{-7})	1.10 (1.05)	1.17 (1.08)
		Goodness-of-fit			
	R^2_{marginal}		0	0.45	0.46
	$R^2_{\text{conditional}}$		4.61e^{-15}	0.64	0.66
	AIC		755	643.82	645.39
	BIC		766	662.58	679.81

Notes. Standard errors are in parentheses. *p <.05, **p<.01,***p<.001; Model A1-Accuracy

(Unconditional Means Model); Model B1-Accuracy (Unconditional Growth Model); Model C1 –

Accuracy (Uncontrolled Effects of Training Group). Group A is the video-based group, Group B

is the presentation-only group, and Group C is the control group. Time 1 if preassessment, Time 2 is post-assessment, and Time 3 is one-month follow-up.

Table 4: Mean differences in accuracy at pre, post, and follow-up assessment across groups.

Group	Preassessment		Post-Assessment		One-Month Follow-Up	
	Mean	*SD*	*Mean*	*SD*	*Mean*	*SD*
Video	3.63	1.74	7.89	1.59	8.00	1.37
Presentation	4.16	2.06	7.32	1.83	6.79	2.20
Control	4.41	2.18	7.24	1.48	7.63	1.31

Video 3 and post- and follow-up-assessment. The protocol conducted in the evaluation of accuracy of detecting warning behaviors in the pretraining video versus novel video was repeated for the alternate form novel video. The alternate form novel video displayed text messages as opposed to actors acting out the warning behaviors. As a result, this video was too dissimilar to the pretraining video and the novel video, therefore the model only evaluated two time points, post- and follow-up-assessment. The unconditional means model (Model-A2 Accuracy), unconditional growth model (Model-B2 Accuracy), and the model for the uncontrolled effects of training group (Model-C2 Accuracy) were created to determine if participants assigned to the video-based group had a higher accuracy rate at post-assessment and one-month follow-up compared to presentation-only, and control group (Table 5). The unconditional means model (Model-A2 Accuracy) was statistically significant ($p < .001$), demonstrating that the average accuracy was non-zero, indicating that variance exists between and within participants. The total variation in accuracy attributed to differences among participants was substantial (ICC = 0.61). Model-B2 Accuracy and Model-C2 Accuracy were not statistically significant. This indicates that differences between accuracy at post- verses follow-

up-assessment were largely a result of the individual differences in participants with respect to accuracy, therefore hypothesis 1b was not supported.

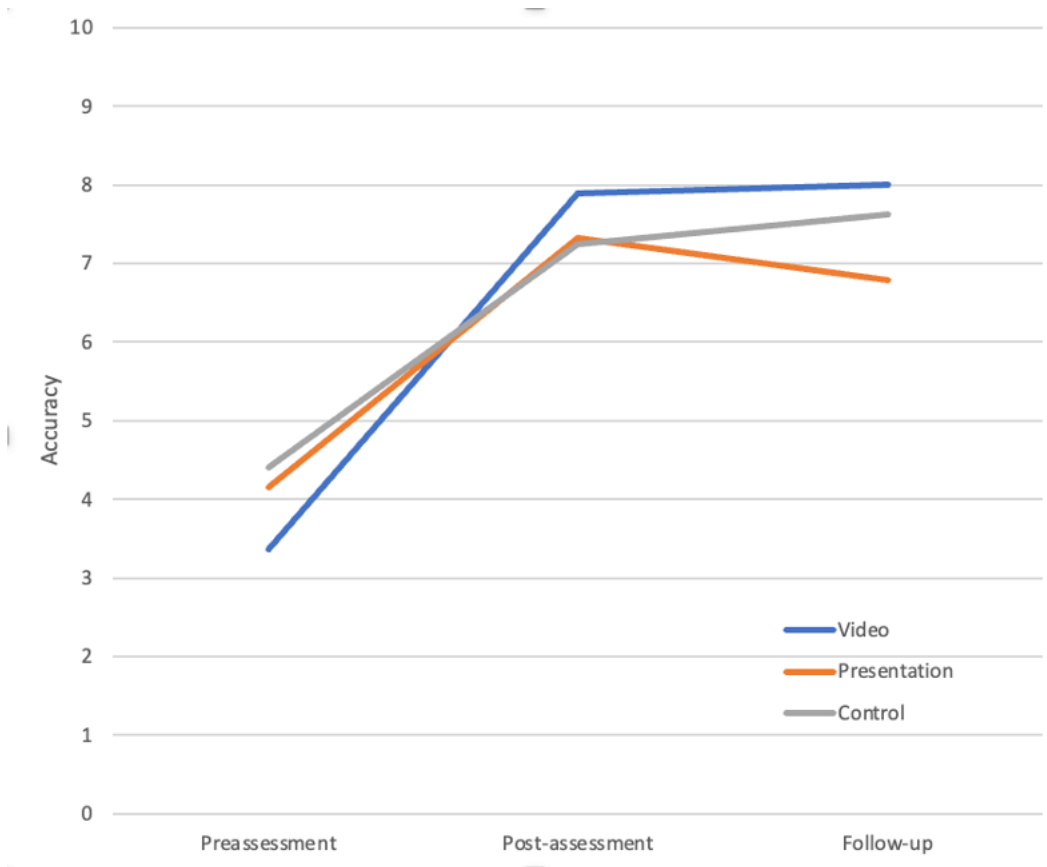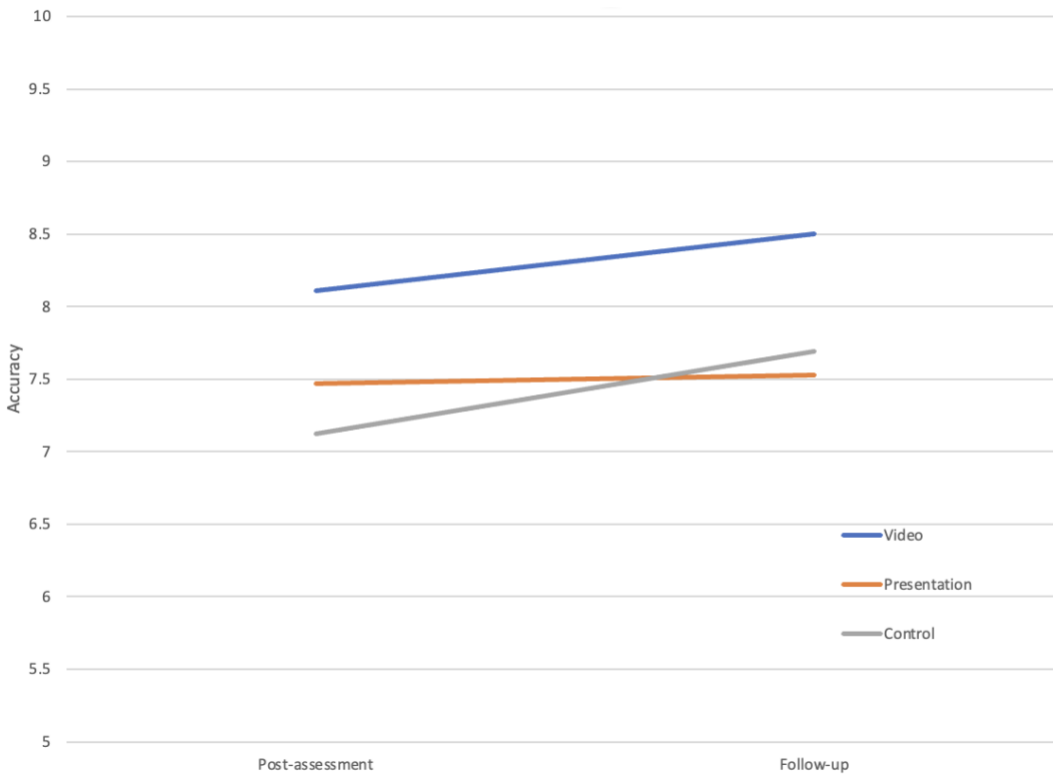*Figure 3: Mean differences in accuracy at post, and follow-up assessment across groups*

Table 5: Accuracy in Detection at Post-, and Follow-up

		Parameter	UMM	UGM	Model C
		Fixed Effects			
Initial Status, π_{0i}	Intercept	γ_{00}	7.70*** (0.23)	7.70*** (0.23)	7.70*** (0.22)
	Group 1 (B-A)	γ_{01}			-0.59 (0.53)
	Group 2 (C-A)	γ_{01}			-0.58 (0.51)
Rate of Change, π_{1i}	Rate of Change, π_{1i}				
	Time	γ_{10}		0.30 (0.22)	0.32 (0.23)
	Time * Group 1	γ_{11}			-0.24 (0.54)
	Time * Group 2	γ_{11}			0.32 (0.57)
		Variance Components			
Level 1	Within-person	σ_ε^2	1.32 (1.15)	1.31 (1.14)	1.37 (1.17)
Level 2	In initial status	σ_0^2	2.10 (1.45)	2.10 (1.45)	2.01 (1.42)
		Goodness-of-fit			
	$R^2_{marginal}$		0	0.01	0.03
	$R^2_{conditional}$		0.61	0.62	0.61
	AIC		418.46	418.64	423.84
	BIC		427.65	431.70	445.91

Notes. Standard errors are in parentheses. *p <.05, **p<.01,***p<.001; Model A2-Accuracy

(Unconditional Means Model); Model B2-Accuracy (Unconditional Growth Model); Model C2 –

Accuracy (Uncontrolled Effects of Training Group).

Table 6: Mean differences in accuracy at post, and follow-up assessment across groups.

Group	Post-Assessment		One-Month Follow-Up	
	Mean	*SD*	*Mean*	*SD*
Video	8.11	1.33	8.50	1.76
Presentation	7.47	1.84	7.53	1.58
Control	7.12	2.00	7.69	2.44

Overall Willingness to Report

The unconditional means model (Model-A Willing), unconditional growth model (Model-B Willing), and the model for the uncontrolled effects of training group (Model-C Willing) were created to determine if participants assigned to the video-based group endorsed more positive attitudes toward reporting at post-assessment and one-month follow-up compared to presentation-only, and control group (Table 7). No data were excluded for the purposes of the analysis. Model-A Willing was statistically significant ($p < .001$), meaning the average participant's willingness to report was non-zero signifying variance exists between and within participants. The total variation in participants' willingness to report that was attributed to differences among participants was substantial (ICC = 0.52). Model- B Willing assessed for the linear change of participants' willingness to report over time without inclusion of training. The overall intercept (b_0) was 121.73 ($SE = 1.18$, $p<.001$). The slope between Time 1 and Time 2 (b_1) was 8.00 ($SE = 1.05$, $p < .001$), and the slope between Time 1 and Time 3 (b_2) was 9.19 ($SE = 1.06$, $p < .001$). As represented by $R^2_{marginal}$, 14.90 percent of the variance in participants' willingness to report was a result of the fixed effects of time. Seventy-three percent of the variance in attitudes was a result of the fixed effects of time and the random effects of the

participants as demonstrated by the $R^2_{conditional}$. Model-C Willing incorporated the independent

variable of training group in the model, as well as the interaction of time and group. There was

not a significant difference in participants' willingness to report across trainings groups (F (2,

52.10) = 0.96, p = 0.39). However, there was a significant difference in participants' average

willingness to report across time (F (2,102.50) = 49.49, p < 0.001), and there was a significant

interaction between training group and time (F (4,102.50) = 4.32, p < 0.01). The best fitting

model, of the significant models, was the unconditional effects of training (Model-C Willing).

Hypothesis 2 was partially supported. The video-based group endorsed a significantly higher

overall willingness to report school shooting plots compared to the control group at post

assessment compared to preassessment (p < .01). There was no significant difference between

groups between preassessment and one-month follow-up.
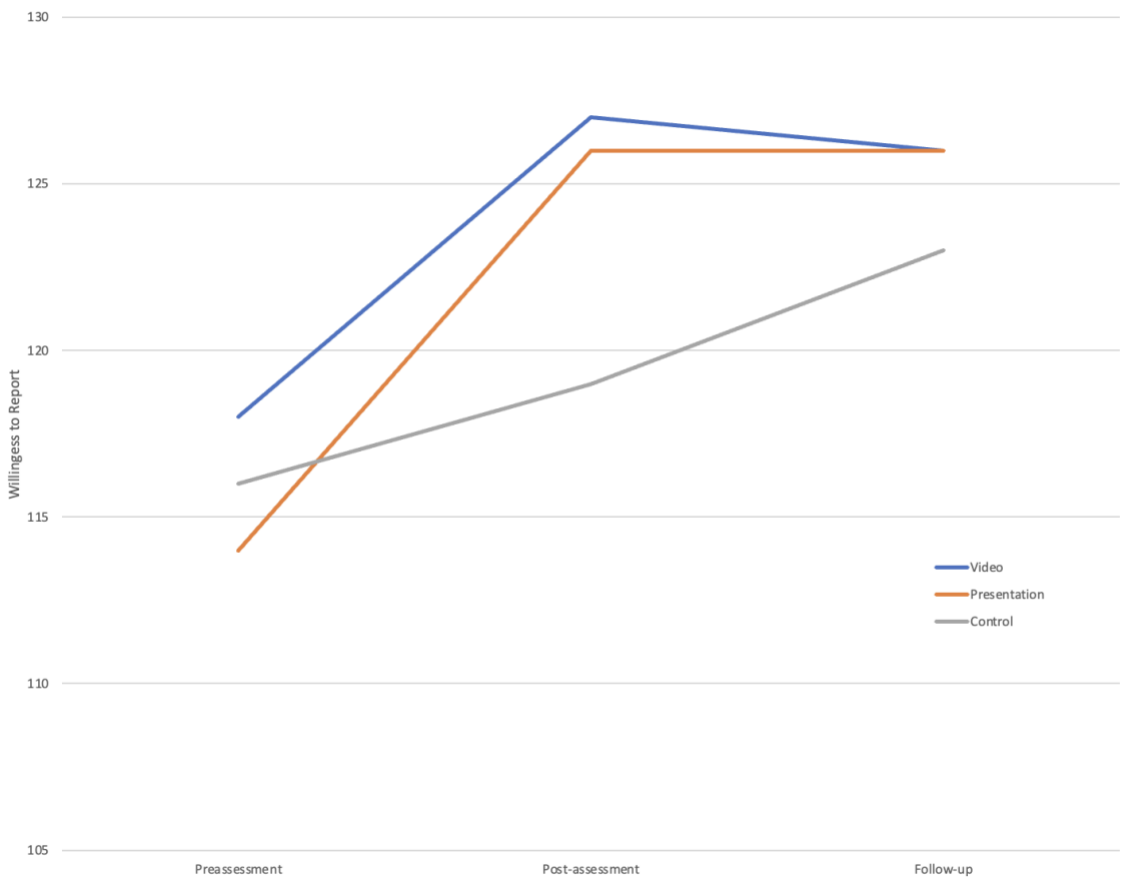
Figure 4: Mean differences in overall willingness to report at pre-, post, and follow-up assessment across groups.

Table 7: Attitudes Toward Reporting at Pre-, Post-, and Follow-up

	Parameter	UMM	UGM	Model C
		Fixed Effects		
Initial Status, π_{0i}	Intercept	γ_{00}	122.00***	121.73***	121.66***
			(1.18)	(1.18)	(1.18)
	Group 1 (B-A)	γ_{01}			-1.73
					(2.84)
	Group 2 (C-A)	γ_{01}			-4.05
					(2.92)
Rate of Change, π_{1i}	Rate of Change, π_{1i}				
	Time 1 (2-1)	γ_{10}		8.00***	7.85***
				(1.05)	(0.99)
	Time 2 (3-1)	γ_{10}		9.19***	9.11***
				(1.06)	(1.00)
	Time 1 * Group 1	γ_{11}			1.86
					(2.39)
	Time 2 * Group 1	γ_{11}			3.36
					(2.38)
	Time 1 * Group 2	γ_{11}			-7.31**
					(2.46)
	Time 2 * Group 2	γ_{11}			-1.16
					(2.48)
		Variance Components		
Level 1	Within-person	σ_{ε}^2	54.60	30.10	26.70
			(7.39)	(5.48)	(5.17)
Level 2	In initial status	σ_0^2	58.10	66.00	67.40
			(7.62)	(8.13)	(8.21)
		Goodness-of-fit		
	R^2_{marginal}		0	0.15	0.19
	$R^2_{\text{conditional}}$		0.52	0.73	0.77
	AIC		1197.86	1135.08	1128.20
	BIC		1204.98	1144.80	1135.96

Notes. Standard errors are in parentheses. *p <.05, **p<.01, ***p<.001; Model A-Attitude

(Unconditional Means Model); Model B-Attitude (Unconditional Growth Model); Model C –

Attitude (Uncontrolled Effects of Training Group).

Table 8: Mean differences in overall willingness to report at pre, post, and follow-up assessment across groups.

Group	Preassessment		Post-Assessment		One-Month Follow-Up	
	Mean	*SD*	*Mean*	*SD*	*Mean*	*SD*
Video	118	11.10	127	12.40	126	9.56
Presentation	114	9.31	126	7.76	126	10.10
Control	116	9.74	119	8.96	123	7.31

Attitudes Toward Reporting

The unconditional means model (Model-A Attitude), unconditional growth model (Model-B Attitude), and the model for the uncontrolled effects of training group (Model-C Attitude) were created to determine if participants assigned to the video-based group endorsed more positive attitudes toward reporting at post-assessment and one-month follow-up compared to presentation-only, and control group (Table 9). No data were excluded for the purposes of the analysis. Model-A Attitude was statistically significant ($p < .001$), meaning the average attitude endorsement was non-zero signifying variance exists between and within participants. The total variation in attitudes attributed to differences among participants was substantial (ICC $= 0.74$). Model- B Attitude assessed for the linear change of attitudes toward reporting over time without inclusion of training. The overall intercept (b_0) was 54.61 ($SE = 0.76$, $p < .001$). The slope between Time 1 and Time 2 (b_1) was 1.63 ($SE = 0.58$, $p < .01$), and the slope between Time 1 and Time 3 (b_2) was 1.44 ($SE = 0.58$, p $< .05$). As represented by $R^2_{marginal}$, 1.40 percent of the variance in attitudes was a result of the fixed effects of time. Seventy-six percent of the variance

in attitudes was a result of the fixed effects of time and the random effects of the participants as demonstrated by the $R^2_{conditional}$. Model-C Attitude incorporated the independent variable of training group in the model, as well as the interaction of time and group. There was a significant difference in the average attitudes of the participants across time (F (2,102.30) = 4.58, p < 0.05), and there was a significant difference in attitudes across trainings groups (F (2,52.00) = 4.12, p<0.05). However, there was not a significant interaction between training group and time (p=0.38). The best fitting model, of the significant models, was the unconditional effects of training (Model-C Attitude). Consistent with hypothesis 2a, participants in the video-based group had the highest attitudes toward reporting at each time point, followed by the presentation-only group, with the control group having the lowest scores on the Attitudes Toward Reporting subscale (see Table 10 for mean scores for Attitudes Toward Reporting across time). In terms of statistical significance, the video-based group endorsed significantly higher positive attitudes toward reporting school shooting plots compared to the control group (p <.01). While the interaction of time and group was not statistically significant, overall, participants' positive attitudes toward reporting significantly increased between preassessment and post assessment (p <.01), and from preassessment to one-month follow-up (p <.05).
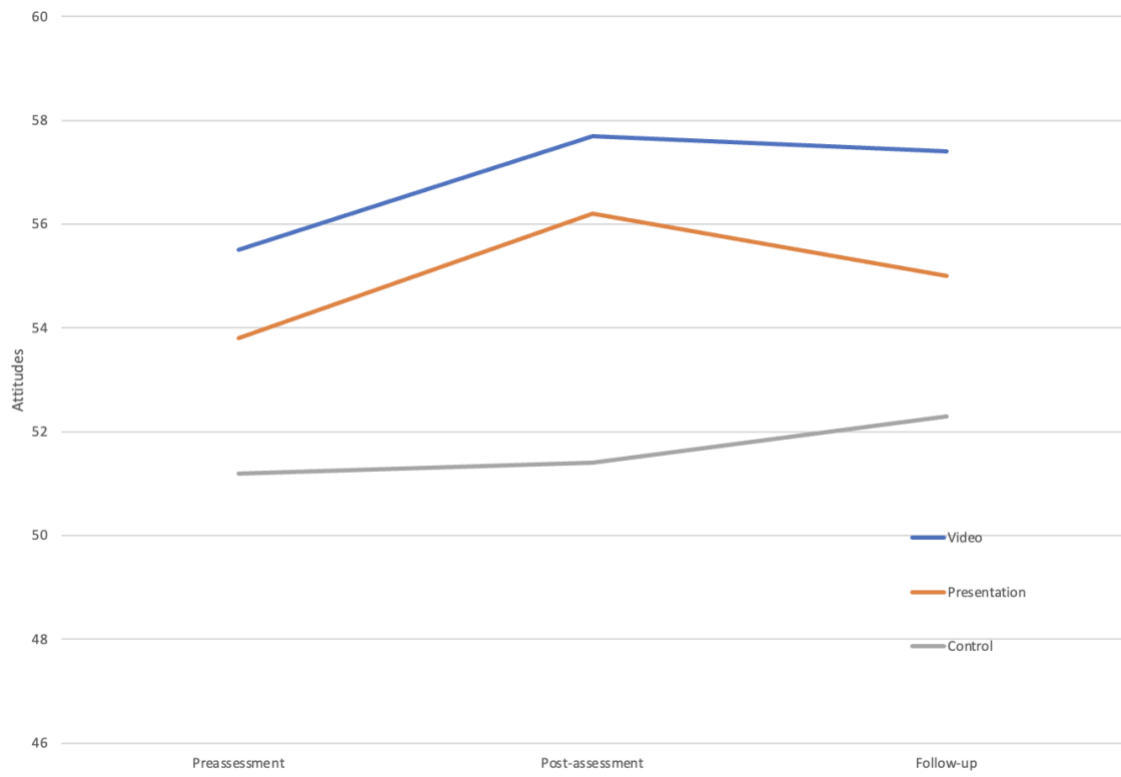
Figure 5: Mean differences in Attitudes Toward Reporting at pre, post, and follow-up assessment across groups

Table 9: Attitudes Toward Reporting at Pre-, Post-, and Follow-up

		Parameter	UMM	UGM	Model C
		Fixed Effects			
Initial Status, π_{0i}	Intercept	γ_{00}	54.60*** (0.76)	54.61*** (0.76)	54.51*** (0.72)
	Group 1 (B-A)	γ_{01}			-1.80 (1.73)
	Group 2 (C-A)	γ_{01}			-5.06** (1.78)
Rate of Change, π_{1i}	Rate of Change, π_{1i}				
	Time 1 (2-1)	γ_{10}		1.63** (0.58)	1.59** (0.58)
	Time 2 (3-1)	γ_{10}		1.44* (0.58)	1.45* (0.58)
	Time 1 * Group 1	γ_{11}			0.20 (1.40)
	Time 2 * Group 1	γ_{11}			-0.54 (1.40)
	Time 1 * Group 2	γ_{11}			-2.10 (1.44)
	Time 2 * Group 2	γ_{11}			-0.37 (1.45)
		Variance Components			
Level 1	Within-person	σ_{ε}^2	9.80 (3.13)	9.17 (3.03)	9.15 (3.02)
Level 2	In initial status	σ_0^2	28.35 (5.32)	28.56 (5.34)	25.28 (5.03)
		Goodness-of-fit			
	R^2_{marginal}			0	0.01	0.13
	$R^2_{\text{conditional}}$			0.74	0.76	0.77
	AIC		963.73	958.50	957.99
	BIC		971.74	971.47	975.15

Notes. Standard errors are in parentheses. *p <.05, **p<.01, ***p<.001; Model A-Attitude (Unconditional Means Model); Model B-Attitude (Unconditional Growth Model); Model C – Attitude (Uncontrolled Effects of Training Group).

Table 10: Mean differences in Attitudes Toward Reporting at pre, post, and follow-up assessment across groups.

Group	Preassessment		Post-Assessment		One-Month Follow-Up	
	Mean	*SD*	*Mean*	*SD*	*Mean*	*SD*
Video	55.50	6.68	57.70	7.82	57.40	5.43
Presentation	53.80	5.81	56.20	4.79	55.00	6.31
Control	51.20	6.09	51.40	4.23	52.30	4.56

Perceived Behavioral Control (PBC)

The unconditional means model (Model-A PBC), unconditional growth model (Model-B PBC), and the model for the uncontrolled effects of training group (Model-C PBC) were created to determine if participants assigned to the video-based group endorsed more positive attitudes toward reporting at post-assessment and one-month follow-up compared to the presentation-only, and control group (Table 11). No data was excluded for the purposes of the analysis. Model-A PBC was statistically significant ($p < .001$); therefore, the average PBC endorsement was non-zero demonstrating variance exists between and within participants. The total variation in PBC attributed to differences among participants was low (ICC = 0.30). Model- B PBC assessed for the linear change of PBC over time without inclusion of training. The overall intercept (b_0) was 31.78 ($SE = 0.43$, $p < .001$). The slope between Time 1 and Time 2 (b_1) was 3.98 ($SE = 0.48$, $p < .001$), and the slope between Time 1 and Time 3 (b_2) was 5.22 ($SE = 0.48$, $p < .001$). As represented by $R^2_{marginal}$, 26.00 percent of the variance in PBC was a result of the fixed effects of time. Sixty-eight percent of the variance in PBC was a result of the fixed effects of time and the random effects of the participants as demonstrated by the $R^2_{conditional}$. Model-C

PBC incorporated the independent variable of training group in the model, as well as the interaction of time and group. There was a significant difference in the average PBC of the participants across time (F (2, 102.50) = 74.75, p < 0.001). There was not a significant difference in PBC across trainings groups (F (2, 52.00) = 0.09, p = 0.92). However, there was a significant interaction between groups and time (F (4, 102.50) = 5.97, p <.001). The best fitting model, of the significant models, was the unconditional effects of training (Model-C PBC). Hypothesis 2b was only partially supported. The video-based group endorsed significantly higher PBC compared to the control group between the preassessment and post-assessment (p<.01).
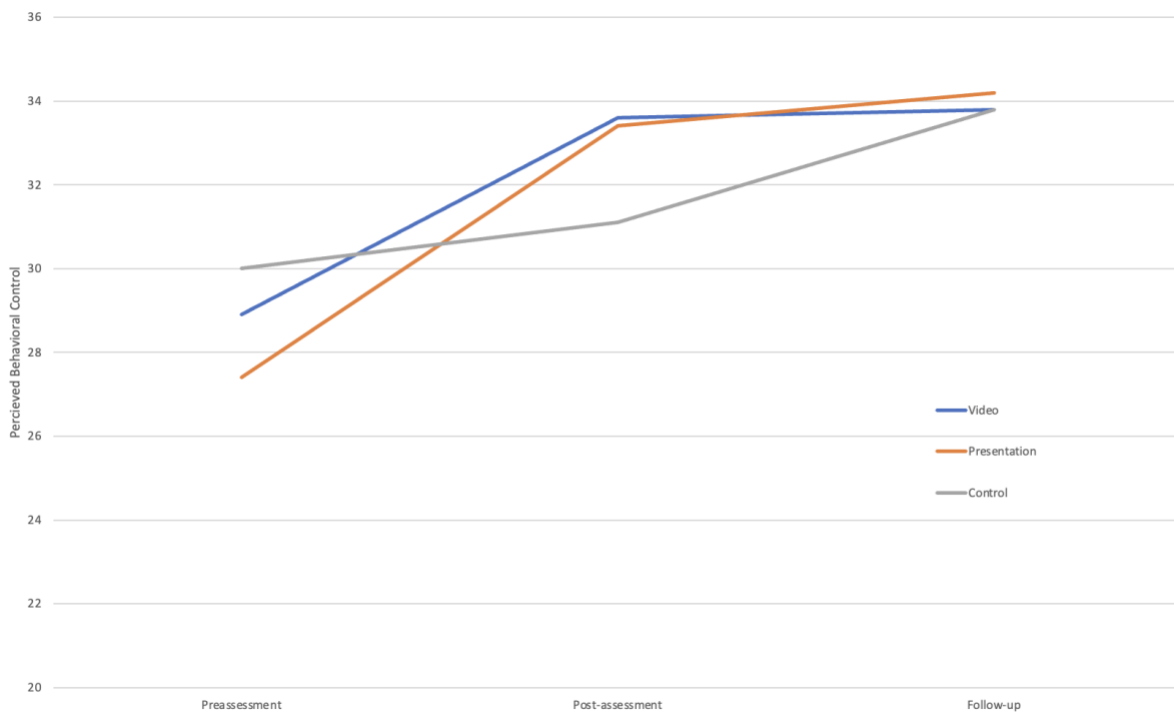

Figure 6: Mean differences in PBC at pre, post, and follow-up assessment across groups

Table 11: Perceived Behavioral Control (PCB) at Pre-, Post-, and Follow-up

		Parameter	UMM	UGM	Model C
		Fixed Effects			
Initial Status, π_{0i}	Intercept	γ_{00}	31.80*** (0.43)	31.78*** (0.43)	31.77*** (0.44)
	Group 1 (B-A)	γ_{01}			-0.38 (1.06)
	Group 2 (C-A)	γ_{01}			-0.39 (1.09)
Rate of Change, π_{1i}	Rate of Change, π_{1i}				
	Time 1 (2-1)	γ_{10}		3.98*** (0.48)	3.89*** (0.44)
	Time 2 (3-1)	γ_{10}		5.22*** (0.48)	5.17*** (0.44)
	Time 1 * Group 1	γ_{11}			1.49 (1.06)
	Time 2 * Group 1	γ_{11}			1.94 (1.06)
	Time 1 * Group 2	γ_{11}			-3.50** (1.09)
	Time 2 * Group 2	γ_{11}			-0.99 (1.10)
		Variance Components			
Level 1	Within-person	σ_{ε}^2	13.57 (3.68)	6.23 (2.50)	5.25 (2.29)
Level 2	In initial status	σ_0^2	5.72 (2.39)	8.10 (2.85)	8.80 (2.97)
		Goodness-of-fit			
	$R^2_{marginal}$		0	0.26	0.29
	$R^2_{conditional}$		0.30	0.68	0.74
	AIC		937.83	854.52	843.64
	BIC		946.98	869.40	867.10

Notes. Standard errors are in parentheses. *p <.05, **p<.01, ***p<.001; Model A-PCB

(Unconditional Means Model); Model B-PCB (Unconditional Growth Model); Model C – PCB

(Uncontrolled Effects of Training Group).

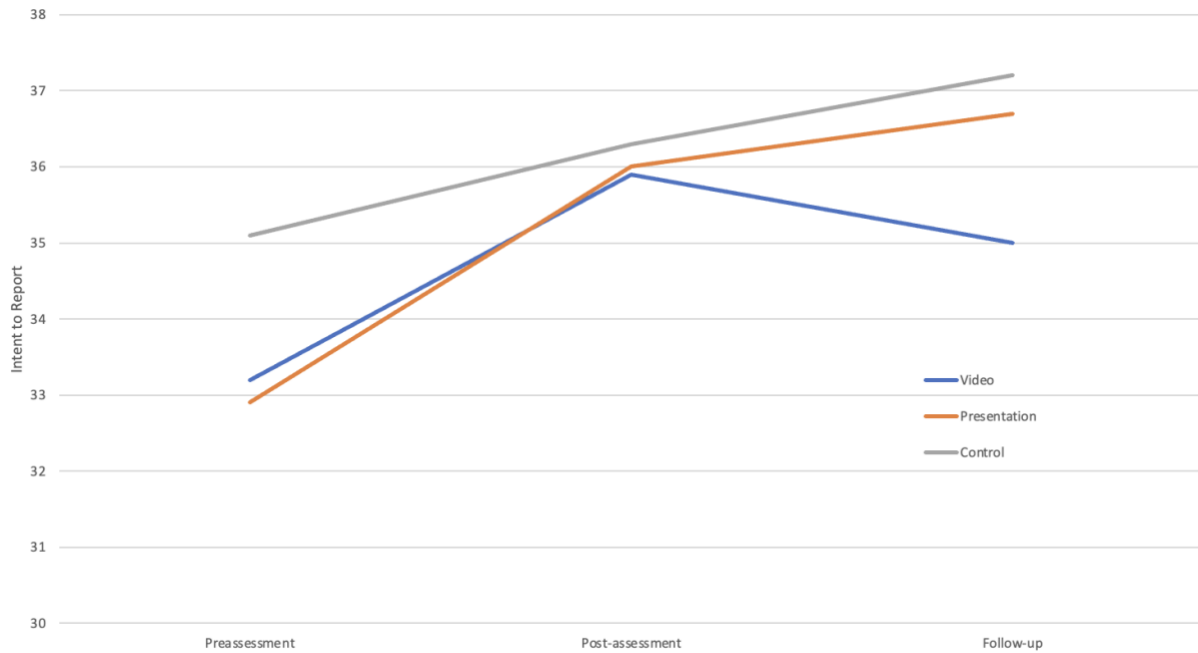*Table 12: Mean differences in PBC at pre, post, and follow-up assessment across groups.*

Group	Preassessment		Post-Assessment		One-Month Follow-Up	
	Mean	*SD*	*Mean*	*SD*	*Mean*	*SD*
Video	28.90	3.96	33.60	3.76	33.80	3.99
Presentation	27.40	3.20	33.40	3.98	34.20	4.29
Control	30.00	2.83	31.10	3.86	33.80	3.53

Intent to Report

   The unconditional means model (Model-A Intent), unconditional growth model (Model-B Intent), and the model for the uncontrolled effects of training group (Model-C Intent) were created to determine if participants assigned to the video-based group endorsed a greater intent to report at post-assessment and one-month follow-up compared to presentation-only, and control group (Table 13). No data were excluded for the purposes of the analysis. Model-A Intent was statistically significant ($p < .001$). The average intent endorsement was non-zero indicating that variance exists between and within participants. The total variation in intent attributed to differences among participants was substantial (ICC = 0.55). Model- B Intent assessed for the linear change of intent over time without inclusion of training. The overall intercept (b_0) was 35.53 ($SE = 0.40$, $p<.001$). The slope between Time 1 and Time 2 (b_1) was 2.40 ($SE = 0.37$, $p <$ .001), and the slope between Time 1 and Time 3 (b_2) was 2.53 ($SE = 0.37$, $p < .001$). As represented by $R^2_{marginal}$, 11.00 percent of the variance in intent was a result of the fixed effects of time. Seventy-one percent of the variance in intent was a result of the fixed effects of time and the random effects of the participants as demonstrated by the $R^2_{conditional}$. Model-C Intent incorporated the independent variable of training group in the model, as well as the interaction of time and group. There was a significant difference in the average intent to report across time (F (2,102.40) = 30.91, p < 0.001). There was not significant difference in the average intent to report across trainings groups (F (2,52.00) = 1.04, $p = 0.36$). However, there was a significant interaction between groups and time (F (4,102.40) = 2.90, $p < .05$). The best fitting model, of the significant models, was the unconditional effects of training (Model-C PBC). Results indicate that hypothesis 2c was not support. The video-based group endorsed a marginally statistically significant higher intent to report between preassessment and post-assessment compared to the

control group ($p = .06$). In contrast, the presentation-only group reported significantly higher intent to report compared to the video-based group between preassessment and the one-month follow-up assessment ($p < .05$).

Figure 7: Mean differences in Intent to Report at pre, post, and follow-up assessment across groups.

Table 13: Intent to Report at Pre-, Post-, and Follow-Up

		Parameter	UMM	UGM	Model C
		Fixed Effects			
Initial Status, π_{0i}	Intercept	γ_{00}	35.30*** (0.40)	35.35*** (0.40)	35.38*** (0.40)
	Group 1 (B-A)	γ_{01}			0.45 (0.96)
	Group 2 (C-A)	γ_{01}			1.41 (0.99)
Rate of Change, π_{1i}	Rate of Change, π_{1i}				
	Time 1 (2-1)	γ_{10}		2.40*** (0.37)	2.37*** (0.36)
	Time 2 (3-1)	γ_{10}		2.53*** (0.37)	2.50*** (0.36)
	Time 1 * Group 1	γ_{11}			0.17 (0.86)
	Time 2 * Group 1	γ_{11}			1.96* (0.86)
	Time 1 * Group 2	γ_{11}			-1.71 (0.89)
	Time 2 * Group 2	γ_{11}			0.20 (0.90)
		Variance Components			
Level 1	Within-person	σ_ε^2	5.71 (2.39)	3.73 (1.93)	3.48 (1.87)
Level 2	In initial status	σ_0^2	6.86 (2.62)	7.56 (2.75)	7.64 (2.76)
		Goodness-of-fit			
	R^2_{marginal}		0	0.11	0.15
	$R^2_{\text{conditional}}$		0.55	0.71	0.73
	AIC		835.02	791.19	789.41
	BIC		844.31	807.24	815.87

Notes. Standard errors are in parentheses. *p <.05, **p<.01, ***p<.001; Model A-Intent (Unconditional Means Model); Model B-Intent (Unconditional Growth Model); Model C – Intent (Uncontrolled Effects of Training Group).

Table 14: Mean differences in Intent to Report at pre, post, and follow-up assessment across groups.

Group	Preassessment		Post-Assessment		One-Month Follow-Up	
	Mean	*SD*	*Mean*	*SD*	*Mean*	*SD*
Video	33.20	4.38	35.90	3.48	35.00	3.45
Presentation	32.90	3.58	36.00	2.36	36.70	2.52
Control	35.10	3.72	36.30	3.46	37.20	2.40

This was a pilot study designed to evaluate the efficacy of a peer intervention training in improving students' detection of school shooting warning behaviors. In addition, the study aimed to increase students' willingness to report concerning behaviors demonstrated by peers. In this study, linear regression mixed effects models were used to determine the effects of training type (e.g., video-based, presentation-based, or no training) on accuracy of detecting of warning behaviors, overall willingness to report, attitudes toward reporting, perceived behavioral control, and intent to report.

With respect to accuracy, on average, participants significantly improved their ability to detect warning behaviors in a novel video at post-assessment and one-month follow-up compared to their accuracy for the preassessment video. While the video-based group increased the most in their detection of warning behaviors, as hypothesized, the interaction between time and group membership was only marginally significant. Given that this was a pilot investigation, the interaction effects were further evaluated to gain more information regarding to aide in future modifications of the training. There were statistically significant differences in accuracy between the video-based and presentation-based group between preassessment and post assessment, and the video-based and the control group from preassessment and one-month follow-up. The improvement in accuracy was not statistically significant; therefore, the hypothesis that exposure to the video-based training would result in the highest accuracy at post assessment and one-month follow-up was not supported. However, given the trends in this pilot study, a follow-up investigation with a larger sample size could provide a more definitive answer. It is important to note, that while the mean accuracy at preassessment was normally distributed, at post assessment and one-month follow-up, all groups had means that were less than two standard deviations away

from the maximum possible scores, indicating that there was evidence of the ceiling effect (Meier, 2022).

Accuracy was also measured by having participants detect warning behaviors present in a text message conversation between two peers. The goal of this assessment was to determine if participants could identify warning behaviors across the situations where research has demonstrated leakage is most likely to occur (Alathari et al., 2021). This assessment was only completed at post and follow-up assessment. There was no statistical difference between groups or time points in accuracy of detecting warning behaviors, therefore the hypothesis that the video-based group would have the highest accuracy at post assessment and one-month follow-up was not supported. This portion of the study also experienced the ceiling effect (Meier, 2022). The majority of participants performed exceptionally well on the text message accuracy task, the average score at post assessment and one-month follow-up for each group was above 70 percent, with all groups performing marginally better at the one-month follow-up. The video-based group did not have significantly higher accuracy at post assessment and one-month follow-up; however, the group had an average accuracy of 81 percent at post assessment, and 85 percent at one-month follow-up.

The results further indicate repeated exposure to school shooting warning behaviors increases students' ability to detect and appropriately verbalize the warning behaviors observed. Of the 59 participants that were consented to the study, 57 participants attended the one-month follow-up for an overall retention rate of 97 percent. The two students who did not return for the one-month follow-up had scheduled a follow-up appointment but were unable to attend due to unknown reasons. This retention rate is substantially higher than studies in the area of bystander intervention for sexual assault, average retention rates for these studies was 64 percent (Mujal et

al., 2021). All participants were asked at the end of each assessment period if they were experienced any distress that would interfere with their ability to carrying out the remained of their day as a result of the material reviewed. While some participants verbalized school violence was a difficult topic, all participants denied experiencing distress that would interfere with the remained of their day. There were no reported adverse experiences that resulted from participating in the research study.

Willingness to report peer warning behaviors was measured using an adapted measure taken from previous research in peer intervention for suicide (Aldrich, 2017) and was a combination of three constructs, attitudes toward reporting, perceived behavioral control, and intent to report. It was expected that the video-based group would have a significant increase in overall Willingness to Report at post assessment and that these gains would be maintained at the one-month follow-up when compared to the presentation-only group and the control group. The video-based group demonstrated the hypothesized increase from preassessment to post assessment and maintained these scores at the one-month follow-up. Furthermore, the increase from preassessment and post-assessment was significantly greater when compared to the control group.

Attitudes toward reporting were evaluated as an individual construct to determine if participants felt more positively about reporting warning behaviors over time based on condition. Higher scores indicated more positive attitudes toward reporting. Overall, participants reported more positive attitudes toward reporting at post assessment and one-month follow-up compared to preassessment. Additionally, the video-based group had the most positive attitudes beginning at preassessment and maintaining through one-month follow-up, with significantly higher attitudes compared to the control group, but not the presentation-only.

With respect to perceived behavioral control, all participants reported higher perceived behavioral control at post assessment and one-month follow-up compared to preassessment. In addition, there was a statistically significant interaction of time and group. The video-based group had a significant increase in perceived behavioral control between preassessment and post assessment compared to the control group.

Finally, intent to report was evaluated as an independent construct to conclude if exposure to training increased one's intent to report. Overall, participants reported a higher degree of intent to report concerning behaviors from preassessment to post assessment and from preassessment to the one-month follow-up. There was no difference in the average intent to report based on training condition. However, there was a significant interaction of time and group. The video-based group reported a marginally higher intent to report compared to the control group from preassessment to post assessment, the increase in intent to report was not sustained at the one-month follow-up. At the one-month follow-up compared to preassessment, participants in the presentation-only group reported higher intent to report in comparison to the video-based group.

In evaluating the trends discovered in the overall Willingness to Report scores; and the Attitude, Perceived Behavioral Control, and Intent to Report individual subscales, participants performance on the Attitude subscale was somewhat consistent with the hypothesis. The Video-Based group reported higher overall positive attitudes toward reporting in comparison to the control group. It is hypothesized that a larger sample size may demonstrate a significant stratification in attitudes between the Video-Based and Presentation-Only group. When examining overall Willingness to Report, the means across groups and time points were approximately normally distributed. However, the Willingness to Report measure in a

combination of all three subscales, and the Perceived Behavioral Control and Intent to Report subscales experienced the ceiling effect. The Perceived Behavioral Control subscale was normally distributed at preassessment across groups. Conversely, at post assessment, the video-based training group and the presentation-only group reached the ceiling effect. At one-month follow-up, all groups reached the ceiling effect. Indicating that the Willingness to Report total, while not directly, also experienced a ceiling effect. The Intent to Report subscale experienced the ceiling effect at all points of assessment, indicating that the participants in this sample were particularly motivated to intervene in school shootings prior to entering the study. Overall, these findings are similar to those found in bystander intervention trainings related to sexual assault. Several research studies related to bystander sexual assault trainings found that volunteer-based participation resulted in participants having high interest and knowledge of the topic prior to training took place (Park & Kim, 2023). Additionally, there was a similar decreasing trend in attitudes and intent to report between post-assessment and one-month follow-up to findings related to bystander intervention for sexual assault (Jouriles et al., 2018), although it is unclear if this decreasing trend was due to specific decreases in attitude and intent or represents regression to the mean.

At the one-month follow-up, participants were asked "How likely are you to recommend this training to others?" on a scale of 1 to 10 (10 being extremely likely). The video-based group had a mean likelihood score of 9.22 and a minimum rating of 7. Participants in the presentation-only group had an average likelihood score of 8.41 with a minimum rating of 5. This was consistent with participant comments made during the study ("This was really mild compared to what they have shown us in school;" "What is shown on the news is really scary, this is actually helpful;" "I think that this training was really helpful. I would like to show it to my brother who

is still in high school. I think what makes it good is that it does not show a school shooting and just shows the warning behaviors;" "This is more helpful than the trainings we have gotten in school because it focuses on prevention."). Recent research has found that college students who engaged in lockdown drills in high school were more likely to experience increased fear and perceptions of risk, and decreased perceptions of school safety (Huskey & Connell, 2021). A study of over 10,000 high school students found that students reported less fear and perceived lower risk of a school shooting; however, they were more likely to skip school due to safety related concerns following participation in a lock down drill (Schildkraut & Nickerson, 2022). Student absenteeism is associated with a variety of negative outcomes including reduced math and reading achievement scores, reduced educational engagement, and decreased social engagement (Gottfried, 2019), therefore, it is essential that school shooting prevention efforts due not increase students school avoidance. Given participants' high likelihood of referring the program to peers, it is hypothesized that the training developed for the purposes of this study, with some modifications, may be an appropriate replacement for the current prevention strategies that are in place.

Limitations

As with any pilot study, this project is not without limitations. The first is that participants were self-selected into the study indicating at least a minimal interest in school shooting prevention. This was demonstrated in the Intent to Report subscale, where preliminary scores were in the upper extreme and these levels were maintained at each subsequent time point. Additionally, the accuracy measures only allowed for a maximum of 10 points, this reduced the ability for there to be stratification in scores. Furthermore, the substantial increases in the scores of the no-training control group suggests that the videos shown at post assessment and one-

month follow-up likely had more obvious warning behaviors. Due to time constraints, there was no ability to create the videos, pilot test them for equivalency of difficulty, and revised them, if necessary. Future investigations will need to attend to address issues of content equivalency prior to replicating the training sequence.

Another potential limitation is that participants in the control group were not observed during the break they received to account for the time that the other participants were receiving their trainings. It is possible that some participants did not abide by the directions and looked up information related to school shootings. While an a priori power analysis was conducted, the lack of prior research in this area precluded estimating sample size on similar research. Thus, an alternative estimated sample size was collected, and the possibility remains that the sample size was not large enough to allow for variability.

Implications and Applications

This pilot study was the first to evaluate the feasibility and utility of training adolescents about potential warning behaviors exhibited by a potential school shooter. The goal for the training was to increase accuracy of detecting subtle behaviors, in addition to increasing positive attitudes, behaviors, and intentions towards reporting when these behaviors are observed. The development of this training was in accordance with recommendations made by field experts and findings from multiple after-action reports regarding multi-victim school shootings (Alathari et al., 2021; Alathari et al., 2019; Erickson, 2001; Goodrum & Woodward, 2016; Langman & Straub, 2019; Northern Illinois University, 2008; Virginia Tech Review Panel, 2007; Vossekuil et al., 2002). Anecdotal data collected as part of this study indicate that students want to learn about warning behaviors and want their peers to learn about them, both of which could aid in the

likelihood that a school shooting plot will be identified and appropriately investigated prior to the

occurrence of the event.

CHAPTER FIVE: CONCLUSION

This is the first pilot study of a bystander intervention training that has undergone an experimental trial to determine its efficacy. The behavioral intervention is a promising first step into the development of a bystander intervention training for school shooting warning behaviors. The results of this study demonstrate that exposure to the video-based training resulted in increased accuracy (although not statistically so) in the detection of warning behaviors related to school shootings. The results indicate that the training program is feasible to implement, does not create negative emotional distress among the recipients, and increases their willingness and attitudes to report warning behaviors to the proper authorities. Future studies should replicate the training paradigm with a larger sample size, assessment videos that are calibrated for equivalency and subtlety, and modify the current Perceived Behavioral Control and Intent to Report subscales in order to accurately reflect the variability in participants comfort and intent to report concerning behaviors related to peers preparing to carry out a school shooting. Additionally, questions related to perceptions of peer support in reporting school shooting warning behaviors, as these perceptions have been associated with a greater likelihood of intervening in studies investigating bystander sexual assault programs (Brown et al., 2014; Mainwaring et al., 2023).

Diversity Considerations

Researchers recruited participants from a convenience sample of students enrolled at the University of Central Florida. Central Florida is home to a diverse population. Within the university 49.1 percent of the university identifies themselves as a minority and 27.8 identify as Hispanic (University of Central Florida, 2022). This study utilized fill-in answers and checkbox-style questions to collect demographic information accurately. For example, to assess race, the

fill-in question was, "How would you define your race?" Given the current legislation in Florida concerning gender identity and sexuality (Florida House of Representatives, 2022), it is essential to reflect the American Psychological Association's recommendations regarding gender affirmation (American Psychological Association, 2022). Rather than giving checkboxes, a fill-in question asked, "How do you define your gender?" This question was designed to circumvent interference with Florida legislation while also allowing the participants the autonomy to define their gender for themselves.

Ethical Considerations

Participants confidentiality and mental health were two of the main considerations that were taken into consideration given the context of this study. As outlined by the American Psychological Association, limits to confidentiality, the right to withdraw from the research and the consequences of doing so, who to contact with questions, and risks and benefits of participation will be reviewed both verbally and within the consent document (American Psychological Association, 2003). Since funding permitted for participant incentives, this was also be disclosed at the time of consent (American Psychological Association, 2003). In order to maintain participant confidentiality, any information with the participants name on it was kept on the UCF RESTORES Teams application in compliance with IRB protocol. Distress was assessed on each data collection day to ensure that exposure to the material covered in the study did not result in the participants experiencing unnecessary harm.

APPENDIX A: ANNONYMOUS PARTICIPANT CODE

Anonymous Participant Code.

To maintain confidentiality of the participants, at no time will participants enter their names during the data collection portion, they will only include their names during consent. To maintain confidentiality, they will be given unique identification codes derived from a series of simple questions that the participants can remember the answers to. This includes the first letter of their first name, the first letter of month they were born in, the first letter of their first pet's name or zero if they have never had a pet, the first number of their current street address (e.g., if they live at 2522 they would put 2), and the last number in their phone number. This method has been used in studies that involve multiple measurement points and allows for the tracking of participants without the utilization of Protected Health Information (Yurek et al., 2008).

APPENDIX B: ACCURACY CODEBOOK

Codebook

Video 1

1.1 Pin –

0 – did not comment

1 – I do not know what it is, but it seems important.

2- Could be an extremist group / military

1.2 Books –

0 – did not comment / the books upside down

1 – Researching something

2– books have to do with school shooters

1.3 Writing –

0 – did not comment

2 – commented on all of the words

1.4 Clothes –

0 – did not comment

1 – the clothes are not what he usually wears

2 – he might be trying to disguise himself / hide his appearance for the attack

1.5 Online Chat –

0 – did not comment

1 – it is concerning

2 – might be a fringe group or people he is planning the school shooting with

Video 2

2.1/4.1 Gun –

0 – did not comment

1 – did finger guns at the teacher walking by

2 – May be one of his targets / the friend is slapping his hand away (trying to hide)

2.2/4.2 School Shooters –

0 – did not comment

1 – they are talking about school shooters

2 – they are idolizing school shooters

2.3/4.3 Map –

0 – did not comment

1 – blueprint/map of the school

2 – looks like they are mapping out their points of attack/ planning

2.4/4.4 Hit List –

0 – did not comment

2 – hit list /targets

2.5/4.5 Obsession –

0 – did not comment

1 – just comment on that it is the ex-girlfriend without saying anything else

2 – obsessed with this person / stalking

Video 3

3.1/5.1 Don't want to hurt you –

0 – did not comment

1 - What he is saying is concerning

2 – leakage / insinuating or implying that he will be hurting other people

3.2/5.2 Columbine –

0 – did not comment

1 – potential targets / people that are dead / possible co-conspirators or shooters

2 – former school shooters

3.3/5.3 Last Resort –

0 – did not comment

2 – suicidal/homicidal ideation/feeling like there is no other option

3.4/5.4 Have it all planned out –

0 – did not comment

2 – planned out/ has all the materials/ premeditated

3.5/5.5 Direct Threat –

0 – did not comment

2 – he is directly threatening Brian/ directly threatening the person

APPENDIX C: WILLINGNESS TO REPORT QUESTIONNAIRE

Willingness to Report Questionnaire

Q1 What is the first letter of your first name?

_____

Q2 What is the first letter of the street you grew up on?

_____

Q3 What is the first letter of the high school you attended in 9th grade?

_____

Q4 What is the first letter of the month you are born in?

_____

Q5 What is your favorite animal?

_____

X→

Q1 Alerting authorities when someone is planning to carry out a school shooting would be...

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	
Worthless	○	○	○	○	○	Valuable
Beneficial	○	○	○	○	○	Harmful
Not Regrettable	○	○	○	○	○	Regrettable
Bad	○	○	○	○	○	Good
Forgivable	○	○	○	○	○	Not Forgivable
Negative	○	○	○	○	○	Positive
Useful	○	○	○	○	○	Useless
Upsetting	○	○	○	○	○	Not Upsetting

Q30 Alerting authorities when someone is planning to carry out a school shooting would be...

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	
Not Scary	○	○	○	○	○	Scary
Possible	○	○	○	○	○	Impossible
Stressful	○	○	○	○	○	Not Stressful
Frightening	○	○	○	○	○	Not Frightening
Uncomfortable	○	○	○	○	○	Comfortable
Easy	○	○	○	○	○	Difficult
Unpleasant	○	○	○	○	○	Pleasant

End of Block: Each answer choice is different, despite the question being the same.

Start of Block: Block 2

Q16 The following survey items concern your ability to alert authorities when someone is planning to carry out a school shooting. Please indicate the extent that you disagree or agree

with each of the statements listed below. Please rate the following statements on a scale from 1 (Strongly Disagree) to 5 (Strongly Agree).

	Strongly Disagree (1)	Disagree (2)	Neither Disagree nor Agree (3)	Agree (4)	Strongly agree (5)
School shootings are preventable. (3)	○	○	○	○	○
I am not confident in my ability to contact/discuss my concerns about a potential school shooting with authorities. (9)	○	○	○	○	○
I know where to seek help if I know someone is planning to carry out a school shooting. (10)	○	○	○	○	○
Only experts can prevent a school shooting. (11)	○	○	○	○	○
I am knowledgeable about campus resources related to school shooting prevention. (12)	○	○	○	○	○

I am confident I could access school shooting prevention resources. (17)	○	○	○	○	○
I believe I am quite knowledgeable about school shooting prevention. (18)	○	○	○	○	○
I would know who to contact if someone was planning a school shooting. (19)	○	○	○	○	○

Q17 The following survey items concern your confidence in your ability to advise someone who comes to you with concerns that someone they know might be planning a school shooting. Please indicate how likely you would be to engage in the following behaviors in each of the

statements listed below. Please rate the following items on a scale from 1 (Very Unlikely) to 5 (Very Likely).

	Very Unlikely (1)	Unlikely (2)	Undecided (3)	Likely (4)	Very Likely (5)
Tell the person to report their concerns to the authorities. (2)	○	○	○	○	○
Encourage the person with information to tell someone. (6)	○	○	○	○	○
Tell the person to stop being so dramatic. (13)	○	○	○	○	○
Ignore the situation it is not my place to intervene. (15)	○	○	○	○	○
Tell the person who has the information to seek help from a school shooting prevention webpage. (16)	○	○	○	○	○
Provide social support to the person who has the information to make sure it is reported to the authorities. (19)	○	○	○	○	○

Call the campus counselor and/or wellness center. (20)	○	○	○	○	○
Call 911. (21)	○	○	○	○	○

APPENDIX D: IRB APPROVAL LETTER

Institutional Review Board
FWA00000351
IRB00001138, IRB00012110
Office of Research
12201 Research Parkway
Orlando, FL 32826-3246

UNIVERSITY OF CENTRAL FLORIDA

<u>APPROVAL</u>

March 16, 2023

Dear Ashley Winch:

On 3/16/2023, the IRB reviewed the following submission:

Type of Review:	Modification / Update
Title:	Spotting the Signs: An Investigation of the Effectiveness of a Peer Training Program in Increasing Young Adults' Ability to Detect and Report the Warning Signs of a Peer School Shooting Plot
Investigator:	Ashley Winch
IRB ID:	MOD00003907
Funding:	Name: UCF RESTORES - Research
Grant ID:	None
IND, IDE, or HDE:	None
Documents Reviewed:	• HRP-503-Protocol, Category: IRB Protocol; • Professor Annoucements, Category: Other;

The IRB approved this modification on 3/16/2023.

In conducting this protocol, you are required to follow the requirements listed in the Investigator Manual (HRP-103), which can be found by navigating to the IRB Library within the IRB system. Guidance on submitting Modifications and a Continuing Review or Administrative Check-in is detailed in the manual. If continuing review is required and approval is not granted before the expiration date, approval of this protocol expires on that date.

Use of the stamped version of the consent form is required.

When you have completed your research, please submit a Study Closure request so that IRB records will be accurate.

If you have any questions, please contact the UCF IRB at 407-823-2901 or irb@ucf.edu. Please include your project title and IRB number in all correspondence with this office.

Sincerely,

Harry Wingfield
Designated Reviewer

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