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Behavioral Skills Training for Active Shooter Scenarios: Human Service Staff

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by

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Abstract

Title: Behavioral Skills Training for Active Shooter Scenarios: Human Service Staff

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Active shooter scenarios have become increasingly prevalent in school and healthcare settings. Unfortunately, little information is available on training for active shooter scenarios when a staff member is also responsible for a client. Behavioral skills training has been shown to be an effective way to train safety skills in prior research. We found that behavioral skills training was more effective than an informational video at increasing correct responses to three different active shooter scenarios among three behavioral clinicians. These findings may impact how active shooter training is conducted.

Keywords: behavioral skills training, active shooter, client, training, safety

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Dedication

I would like to dedicate my thesis to my parents and my brother. Thank you for your continual support on my academic journey.

I love you more.

…

Behavioral Skills Training for Active Shooter Scenarios: Human Service Staff

In the United States, mass shootings have become a frequent part of the news and the lives of citizens. A school/health care shooting, for this paper, is defined as a shooting of a firearm on school/health care property that puts another in a perilous situation (Blair & Schweit, 2014). Moreover, an active shooting is defined as an individual actively engaged in attempting to kill or killing other individuals in a populated area or confined space (Department of Homeland Security [DHS], 2018). From 2000 to 2017, there were 250 active shooting incidents in the United States. Of those, 62 (25%) occurred in education or health care facilities (Federal Bureau of Investigations [FBI], 2018). In the year 2018, there were 23 active shooter scenarios before the end of June in school settings (Ahmed & Walker, 2018). This number is drastically high compared with past data. Unfortunately, it is unknown why there is such a large increase in these statistics over the recent years. From 2014 to 2017, a 3-year time span, 19 active shooter scenarios occurred in educational or health care settings (Blair & Schweit, 2014; FBI, 2017). This number of shootings (from 2014-2017) was trumped by the end of April 2018. Unfortunately, the number of casualties has also increased over the years. Casualties from all active shooter incidents (not just in education and health care settings) began at a low of seven in 2000, but by 2017, had reached 729

(FBI, 2017). Casualties have increased between 2000 and 2017with an exponential increase in trend from 2013 on (FBI, 2017).

Many of these active shootings ended in less than 5 min (69%) and often ended before law enforcement arrived (67% of scenarios; FBI, 2014). Law enforcement officers arrive within an average of 3-4 minutes of the initial call (Buster, 2008). This is because when an active shooter scenario occurs, dispatch will place a call to all nearby officers, both on and off duty. (Bryant, 2018). Due to the latency of the arrival of first responders, individuals in the location will have 180 seconds to fend for themselves (Buster, 2008).

When in an emergency setting, research has shown that individuals respond in one of three ways (Leach, 2004). Around 10-15% will be calm in the situation, devise a plan, and implement it; 10-15% will partake in counterproductive behavior (i.e. weeping, screaming, etc) (Leach, 2004). The final 75% will 'freeze,' be passive, or stand still and will not evacuate even if the opportunity presents itself (Leach, 2004). These percentages were collected from five maritime and six aircraft disasters that in total left approximately 1,280 dead (Leach, 2004). Similar responses can also be seen in fires and flash floods (Mawson, 2005). Here, around 12-25% of individuals fled their homes upon realization of their home being on fire or during an imminent flash flood (Mawson, 2005). The majority (75%) responded with irrelevant movements similar to those mentioned above that were "passive" (Mawson, 2005). Mawson (2005) proposes that individuals may cluster towards

others during a time of danger even if that puts them in a more threatening situation. Individuals clustering and heading into danger may be why the FBI (2018) instructs evacuation of a dangerous situation even if other individuals are not complying. Across incidents, it appears an average of 75% of individuals remain inactive when facing danger (Leach, 2004; Mawson, 2005). When in emergency scenarios, employees and clients are most likely to follow the behaviors being displayed by leaders and therefore having a plan is imperative (DHS, 2018).

Therefore, preventative measures, such as providing training to staff, must be taken in hopes of reducing casualties. An individual will respond differently when prepared versus unprepared. Through practice and training, one may improve response time, and therefore decrease "freezing" (Leach, 2004). If an individual can perform the steps of how to appropriately react in an active shooter scenario, there can be benefits for themselves and those around them. Of shootings that do occur, about 15% of attackers are subdued by victims (Blair & Schweit, 2014). Participating in education and training has the potential to be lifesaving for participants. Thus, it is imperative to explore procedures to train staff in a treatment clinic on how to respond to an active shooter situation.

Five precautionary steps can reduce the likelihood of active assailant scenarios at a workplace (Michigan Municipal Risk Management Authority [MMRMA], 2018). The steps are building security, awareness, notification of an event, employee exit interviews, and training/drills (MMRMA, 2018).

Bryant (2018), an active shooter expert and 20-year law enforcement veteran, discusses the possible functions of these shootings. In active or mass shooting scenarios, the function of the behavior is different from other forms of crime. It is not about gaining access to a tangible or materialistic item; rather, the goal is to achieve as many casualties as possible. It is believed the reason for killing as many people as possible may be for the notoriety. According to Bryant, the perpetrators have already dehumanized their victims and will not respond to pleas for mercy. Therefore, in an active shooter scenario, individuals should prepare to move with purpose and with the goal of survival. Training can aid in conditioning appropriate responses and plans of action during emergency situations, and more specifically, during active shooter scenarios (Bryant, 2018).

Fortunately, there is ample information detailing optimal responses individuals can perform in active shooter situations (DHS, 2018; FBI, 2017). Authorities from both the FBI and Department of Homeland Security agree that individuals should run, hide, and fight (or avoid, deny, defend). "Run" (or "avoid") focuses on removing oneself from the situation upon noticing a shooting. These antecedents can include hearing gunfire or screams, seeing others running away, or seeing others as visibly panicked. In this scenario, the individual should follow their agency's Emergency Action Plan (EAP) and exit through an escape path. Running is ideal, for it is the best method to completely avoid confrontation with the shooter. While evading the shooter, it is also suggested to help others as much

as possible without putting oneself in danger. Examples of this would be telling others of the active shooter, encouraging peers to leave, helping others to escape, or preventing others from entering dangerous areas (DHS, 2018; FBI, 2017).

"Hide" (or "deny") places emphasis on situations in which one cannot run or avoid the situation (DHS, 2018; FBI, 2017). During this phase, it is suggested that individuals remain out of view and block any possible entrances to their area. This includes, but is not limited to, locking doors, barricading doors, and hiding behind large items. It is also suggested in this condition to remain quiet, silence phones, and attempt to contact 911 through text, social media, or other means (DHS, 2018; FBI, 2017).

The third step discussed in the literature is "fight" (FBI, 2017) (or "defend;" DHS, 2018). In this phase, individuals should attack the shooter once the safety zone is breached. This is the last resort when there is an immediate threat; individuals should not be seeking out the active shooter to fight. When the safety zone is breached, individuals should yell, throw items, use improvised weapons, charge the shooter, and attempt to disarm the individual. When there is an attacker, their goal is to kill as many individuals as possible; therefore, those individuals must be committed to a counterattack. With all three scenarios (run, hide, fight), it is suggested to contact 911 when it is safe. If possible, one should report a description of the shooter, number of shooters, location of the shooter, location of the victims, type of weapons used, number of weapons the shooter has, and number

of victims. This information can help the police locate the individual and deescalate the situation (DHS, 2018; FBI, 2017).

In addition to how to respond in each of the three scenarios, there is also information on how to respond when law enforcement arrives (DHS, 2018; FBI, 2017). It is suggested that individuals always keep their hands shown with fingers spread. Additionally, take deep breaths, avoid quick movements, and avoid yelling or pointing. The first officers on the scene will be attempting to find the shooter and will not stop for those injured. Individuals should not stop or block these officers to ask for help or directions. There will be additional rescue teams that can provide aid in treating and removing individuals (DHS, 2018; FBI, 2017). Unfortunately, there is little literature on what to do when a staff member is responsible for another person, specifically an individual with a special need or disability. In fact, in the paperwork from the Department of Homeland Security, who are identified as experts in this field, only two sentences are devoted to this population: "Ensure that EAPs [Emergency Action Plan], evacuation instructions and any other relevant information address [sic] to individuals with special needs and/or disabilities. Your building should be handicap-accessible, in compliance with ADA requirements" (p.9). In addition, while drills are required in school settings, there is not a federal regulation for drills in clinic settings (Occupational Health and Safety Administration [OSHA], 2001).

Safety and Behavior Analysis

Applied Behavior Analysis (ABA) has a long history of researching practices to promote safety. Applied Behavior Analysis is a science devoted to changing socially significant behaviors through environmental manipulations (Cooper, Heron, & Heward, 2007). Past studies taught children to avoid consuming poisons (Dancho, Thompson, & Rhoades, 2008), to respond appropriately to discovering a firearm (Flessner, Gatheridge, Johnson, Satterlund, & Egemo, 2004; Gatheridge et al., 2004; Miltenberger; Himle, Miltenberger, Flessner, & Gatheridge, 2004; Himle, Miltenberger, Gatheridge, & Flessner, 2004), and to resist a stranger's attempt at abduction (Bergstrom, Najdowski, & Tarbox, 2014; Gunby, Carr, & LeBlanc, 2010; Johnson, Miltenberger, Knudson, Egeno-Helm, Kelso, Jostad, & Langley, 2006). Other studies taught fire safety skills (Bigelow, Huynen, & Lutzker, 1993; Garcia, Dukes, Brady, Scott, & Wilson, 2016; Houvouras & Harvey, 2014; Knudson, Miltenberger, Bosch, Gross, Brower-Breitwieser, & Tarasenko, 2009), steps for lockdown drills (Dickson & Vargo, 2017), and how to find help when lost in public (Bergstrom, Najdowski, & Tarbox, 2012; Taylor, Hughes, Richard, Hoch, & Coello, 2004).

Behavioral Skills Training. One procedure derived from ABA is behavioral skills training (BST). It consists of the trainer implementing four steps: instructions, modeling, rehearsal, and feedback (Miltenberger, 2008b). In

instructions, the learner is provided information on the expected safety skill. Modeling involves the researcher demonstrating what the safety skill should look like. In the rehearsal step, the participant is given multiple chances to practice the skill. The rehearsal step also includes supportive (praise) and critical (clarification on instruction) feedback on the trainee's performance. The participant will continue with rehearsal and feedback until all safety skills are completed correctly (Miltenberger, 2008b).

BST has been shown to be effective in many training scenarios, most notably safety skills for children (Bergstrom et al., 2014; Dancho, Thompson, & Rhoades, 2008; Dickson & Vargo, 2017; Garcia et al., 2016; Gunby et al., 2010; Himle et al., 2004a; Himle et al., 2004b; Houvouras & Harvey, 2014; Johnson et al., 2006; Knudson et al., 2009). These safety skills branch into a variety of realms including fire safety, abduction prevention, firearm safety, and appropriate lockdown behavior.

There have been studies detailing how to use BST to encourage fire safety (Houvouras & Harvey, 2014; Knudson et al., 2009). Knudson (2009) used BST to instruct individuals with disabilities residing in group homes how to exit if a fire occurred. While only one participant was able to exit alone after training, three additional participants were able to exit with a less intrusive staff prompt (Knudson et al., 2009). In a slightly different context, Houvouras and Harvey (2014) used BST to teach three boys how to appropriately respond upon finding a lighter. The

participants were expected to complete three steps: avoiding the lighter, leaving the immediate location, and telling an adult about the risk (Houvouras & Harvey, 2014). Both studies used BST to illustrate the risk of fire and to encourage fire safety skills, whether it be evacuating the area during a fire or reporting a lighter to an adult (Houvouras & Harvey, 2014; Knudson et al., 2009).

BST has also been used to teach abduction prevention (Bergstrom et al., 2014; Gunby et al., 2010; Johnson et al., 2006). While abduction may not occur frequently, knowing how to evade lures can be life-saving for the individuals involved. Johnson and colleagues (2006) used BST to teach abduction prevention skills in a variety of locations to 50 children. Their age range spanned from kindergarten to 2nd grade. When evaluated for initial results, the interventions were shown to be effective compared to the control (Johnson et al., 2006). In a similar study, three children with autism in an early intensive behavioral intervention (EIBI) setting were instructed using BST on abduction-prevention skills (Gunby et al., 2010). These children successfully acquired the skills and were able to display them one month later in a follow-up assessment (Gunby et al., 2010). Additionally, one participant was able to generalize to a novel setting (Gunby et al., 2010). Bergstrom and colleagues (2014) also evaluated the effects of BST on teaching abduction prevention to three children with autism. Here, the researchers focused on how to respond when a stranger attempted to lure the child (Bergstrom et al., 2014). Each participant displayed the safety skills learned when in the setting

where the skills were taught and generalized these skills to untrained settings (Bergstrom et al., 2014).

BST has also been shown to be effective in terms of firearm safety (Gatheridge et al., 2004; Himle et al., 2004a; Himle et al., 2004b; Miltenberger et al., 2004). Two studies focused on comparing BST to another form of intervention put out by the National Rifle Association (NRA) called Eddie Eagle GunSafe Program (Gatheridge et al., 2004; Himle et al., 2004b).

Gatheridge and colleagues (2004) compared the two intervention options with forty-five children between 6-7 years of age as participants; they were recruited from an after-school program. Both BST and Eddie Eagle GunSafe Program led to students being able to say what they were to do upon finding a gun. For the verbal demonstration, the researcher would describe a scenario to a participant (e.g., you go into the kitchen for a snack and there is a gun on the table) and participant is asked to show the safety skills they would use in a possibly dangerous situation (i.e., not touch it; go find mommy; not to play with it). There was a difference, however, in rehearsal. Those with BST were more likely to demonstrate the safety skills desired in rehearsal along with assessments. The demonstration would be the individual correctly completing the steps while rehearsing it with a researcher present. The assessment is when the researcher is absent and the child is placed in a contrived scenario where they are expected to respond appropriately (Gatheridge et al., 2004).

Himle and colleagues (2004b) compared these two interventions as well with a focus on children 4-5 years old of age. Similar to the previous research, children were able to verbally state what was expected of them, but it was found that only BST was effective during supervised role play (Himle et al., 2004b).

Furthermore, Himle and colleagues (2004a) solely used BST to instruct children on the proper steps to take when one finds a firearm. Eight children who were 4-5 years of age partook in this study. While only three of the children accurately performed the skills after BST, all were additionally trained to reach mastery criterion. These safety skills were generalized to other settings and, come the 2-8 week follow up, the safety skills maintained (Himle et al., 2004a).

Researchers in a follow-up study (Miltenberger et al., 2004) evaluated BST on teaching firearm safety skills with six individuals who were 6-7 years old in age. Similar results were displayed in which half could perform the expected skills after BST (Miltenberger et al., 2004).

Recently, there has also been a study that focuses on one aspect of run, hide, and fight. In the study by Dickson and Vargo (2017), BST was taught to 32 kindergarten students, 5-6 years of age, using the behaviors needed in a lockdown (or hide) setting. When in a lockdown scenario, participants need to move to a concealed area quickly after a lockdown announcement and remain quiet. BST was used to increase the correct steps taken in lockdown while also decreasing noise levels in dangerous situations. Following the implementation of BST, students were

able to demonstrate six of seven steps and decreased the total noises emitted (Dickson & Vargo, 2017). Neff (2011) instructed parents of children with ASD how to implement behavior management strategies

BST has also been documented as an effective way to train adults, (Aherne & Beaulieu, 2018). Aherne and Beaulieu (2018) taught therapists at a group home how to appropriately use discrete trial teaching. To further the research on training adults using BST, researchers should focus on the behaviors of staff with clientele in emergency situations, such as during an active shooter incident. For example, staff members may need to implement full physical prompting to ensure the safety of their clients (Knudson et al., 2009). To display safety skills in an active shooter situation, staff members need education and training. Studies addressing this gap can add to the growing body of research on increasing the safety of clientele who have disabilities. It is imperative to prepare staff for emergency situations. By being trained on how to respond in emergency scenarios, staff members and their clients will have a better likelihood of survival from chance against assailants. Identifying available resources and ideal responses can be brought to fruition through staff training. Training is an antecedent intervention (Wilder, Austin, & Casella, 2009) that could save lives during an active shooter scenario (Reid, O'Kane, & Macurik, 2011).

Prior research has supported the use of BST both for the training of safety skills and staff training. However, a gap in the research is present in training staff

members to implement safety procedures that children may not be capable of doing on their own. With the frequency of active shooter situations, the limited research is concerning. Additional training components, like BST, may be needed when completing an emergency scenario training for staff members. The purpose of this study is to evaluate the effectiveness of behavioral skills training for teaching staff who work with children with autism to engage in optimal behaviors during active shooter role-play scenarios.

Method

Participants

Researchers recruited three behavior technicians, ranging in age from 24 to 32, from agencies that provide services for individuals with autism. All three participants were Registered Behavior Technicians™ and had been working in the human service field for at least one year. All three participants reported having minimal experience with active shooter training drills. Researchers did not exclude participants by race, gender, disability, or sexual orientation. Participation in the study did not lead to compensation, nor did it affect participants' job status. Before the study began, the researcher obtained a signature from each participant on an informed consent form. The informed consent form (see Appendix B) contained a description of the study and what the participant should expect. In addition, the

researchers provided participants with a video consent form in which they agreed to be videotaped for data collection purposes. We also instructed participants not to research this topic outside of the sessions.

Setting and Materials

We conducted sessions at the participants' workplace in a room equipped with a one-way mirror, lockable door(s), door stops or items for a door (e.g., tables, chairs, desks, bookshelves). These sessions were run at a time or place that clients from the center could not observe so that clients or caregivers would not be upset upon viewing or hearing the training. We arranged the room before each session to include locations where the participant could be out of view from the shooter. These locations were chosen by the researchers standing in the same location where the shooter would stand and looking through the window in the door to determine what was out of sight from that perspective. A fellow research assistant was the videographer and followed participants wherever they went so that behaviors could be recorded even if they took place in a hidden location (i.e., in hide, out of the sight of the shooter, but in sight of the participant) or if on the move (i.e., in run, the videographer followed the participant). One confederate researcher played the part of a client, who was instructed to follow what participant informed them to do and another confederate played the part of a shooter. The confederate shooter carried a mock weapon, wore a black shirt and black pants, and wore protective

equipment to guard against injury in the "fight" condition. Data collection materials included data sheets, clipboards, and writing utensils.

Dependent Variable and Response Definitions

The dependent variable was the percentage of steps performed correctly in the categories run, hide, and fight. Each category consisted of six pertinent behaviors adapted from the Department of Homeland Security recommendations (2018), modified to include procedures for ensuring client safety.

Run. Behaviors in the run category included: (a) remain quiet (i.e., refrain from making noises that could be heard from 5 feet away), (b) take confederate client, (c) leave belongings, (d) evacuate building quickly (i.e., move at a pace faster than a walk), (e) go to a designated safe area, and (f) attempt to contact emergency services (e.g., pull out phone, ask someone to contact 911).

Hide. Behaviors in the hide category included: (a) close/lock door, (b) turn out lights, (c) barricade door, (d) position self and confederate client out of the shooter's view, (e) provide protection to the confederate client (e.g., position self in front of client, position self and client behind large object, hold a potential weapon), and (f) attempt to contact emergency services (e.g., pull out phone, ask someone to contact 911).

Fight. Behaviors in the fight category included: (a) attempt to redirect shooter (e.g. they aren't here, leave us alone, look at me), (b) place self between the

shooter and the confederate client, (c) yell aggressively (i.e., should be heard from outside of room), (d) identify possible weapons to be used against the shooter (i.e., names or grabs an improvised weapon), (e) attempt to disarm the shooter (i.e., approach the confederate and place hands on the mock weapon), and (f) attempt to contact emergency services (i.e., pull out phone, ask someone to contact 911).

Experimental design

We used a concurrent multiple baseline across participants design to evaluate the effects of behavioral skills training on the correct implementation of safety skills in mock active shooter scenarios.

Procedure

We ran sessions on the weekends, which was on average 18 sessions per week, per participant. Sessions lasted less 3 min. We presented the three conditions—run, hide, and fight—in random order, which was determined by a random list generator prior to the onset of the study. All three conditions occurred before any specific condition was repeated (i.e., run, hide and fight all needed to be run before any could be run again). Each participant completed five phases: baseline 1, informational video baseline, instructions and modeling, rehearsal and feedback, and post-training. A potential confound was participants informing one

another about the procedures. Therefore, we kept participants in separate rooms between each session and instructed participants not to talk with one another.

Baseline 1. To begin, we walked each participant from their designated room to the predetermined classroom where a confederate client, a fellow researcher, was waiting. We then delivered the instruction, "You will be running an EIBI program with Jordan, who is playing the role of the client. If any health or safety concerns arise, respond to the situation as you see fit" for each session. The participants then explored instructional materials and ran instructional programs as if at work for 1 to 5 min prior to each session.

The session time began when the relevant antecedent was given for each condition. In the run condition, the researcher told the participant in a neutral voice, "There is an armed individual on the other side of the building." In the hide condition, the researcher told the participant in a neutral voice, "An armed individual is coming this way." In the fight condition, the confederate shooter (an individual wearing a black sweatshirt, black pants and protective equipment holding a mock weapon) entered the room. A session would end if no response occurred for 20 s, if inter-response time was greater than 20 s, if all the desired behaviors occurred for that condition, or if the session reached 3 min in length (the average amount of time it takes for law enforcement to arrive; Buster, 2008), whichever came first.

We collected baseline data on each of the six target behaviors for each condition. We conducted baseline sessions for a minimum of three times for each condition (nine data points) or until responding was stable in each condition.

Informational video baseline. After completing baseline, each participant watched a video from the Department of Homeland Security (2017) on how to respond in active shooter scenarios. While a researcher was present during this presentation, this video did not include opportunities for participants to actively engage, and therefore participants were not able to ask questions to the researcher either. The informational video did not provide learners with response opportunities. Additionally, it did not link the antecedents that may occur to the responses a participant is expected to display. We included this passive informational component to simulate what agencies may currently provide as training. Researchers wanted to explore whether this alone would be an effective training strategy. The purpose of this phase was to determine whether a video alone would be effective. After the video, researchers conducted a probe to assess effects on participants' responding.

Behavioral skills training. We conducted these sessions in the same manner as described above except researchers implemented behavioral skills training (BST) as well. BST includes four steps: instructions, modeling, rehearsal, and feedback (Miltenberger, 2008b). This phase ended when each condition (run, hide, and fight) reached 100% mastery across two consecutive sessions.

Instructions and modeling. Participants watched a presentation created specifically for this training in the presence of a researcher. The presentation explained the specific safety skills for each condition. Then the participants watched a video for each condition in which the researcher modeled these behaviors. The instructions and modeled behaviors contained each of the six steps from run, hide, and fight. We required that the participants view the presentation and videos before going on to rehearsal. At the end of the video, researchers encouraged the participant to ask the researcher if they had any questions regarding the training. If there were questions, the researcher answered appropriately.

Rehearsal and feedback. We conducted rehearsal sessions in the same manner as baseline. After completing the condition (run, hide, or fight), the participants received feedback. Feedback was structured as follows: positive/empathy statement, correct steps displayed, incorrect or missed steps, instructions on how to do the step correctly, asking if the participant needs clarification, stating whether future sessions would be conducted, and ending with a positive statement (Parsons & Reid, 1995). While completing these steps, researchers delivered specific, clear, and concise feedback that was linked directly to the measures (Hirst & DiGennaro Reed, 2015). Feedback was delivered after each rehearsal for prior research has shown that this is the most efficient and effective use (Jenkins & DiGennaro Reed, 2016). Participants reached mastery

criterion when they displayed 100% mastery across two consecutive sessions for all three conditions.

Post-training

Post-training generalization probe. We conducted generalization sessions as described above, except, instead of giving a calm verbal statement to signal the onset of sessions, researchers introduced stimuli more similar to those that may be experienced in a real active shooter situation (e.g., audio recordings of gunfire, people screaming, people running down the hallway). We warned participants during their informed consent meetings that this would occur, and researchers ensured that people unaffiliated with the study and, therefore, unaware of the procedures, were not in the building when these sessions were conducted. For all three conditions, audio recordings of screaming and gunfire played. For run, these audio recordings were played from 30 ft away and were paired with a confederate researcher (victim) running past the room and out the door while screaming "they are shooting in the __ wing!" The wing screamed was a wing on the other side of the building. For hide, researchers played the audio recordings immediately outside of the classroom door. For fight, the audio recordings were played immediately outside of the door and paired with a confederate shooter entering the room.

Post-training maintenance probe. We included maintenance in this study to examine the effectiveness of training over time. Sessions consisted solely of

rehearsal and feedback and were conducted two to six weeks later in a similar setting to the original rooms used. If the participant erred, the researcher noted which errors were made and gave feedback on these missed steps and how to correct them for future implementation. This continued until the participant successfully completed the six steps of the scenario.

Social Validity

Prior research has shown that parents of children with autism say that physical safety of their children is a top concern, for they have a greater risk for physical harm (Gunby et al., 2010). In the event of an emergency scenario, staff may need to guide individuals they are working with (Knudson et al., 2009). Therefore, if staff are more efficient at displaying these skills, it may lead to increased levels of client safety. The success of a training program is in part due to whether those partaking in the training find it to be beneficial (Parsons, Rollyson, & Reid, 2012; Wolf, Kirigin, Fixsen, Blasé, & Braukmann, 1995). To see participant opinions, researchers distributed a questionnaire to participants after the study to assess their opinions on the acceptability of the training (see Appendix D).

Interobserver Agreement and Treatment Integrity

Interobserver agreement. We assessed interobserver agreement (IOA) using the trial-by-trial method (Kazdin, 2011). The primary researcher recorded

each step in a condition (the six steps) as an occurrence or non-occurrence (+/-), and simultaneously or subsequently, a second researcher independently collected data. After this, the number of trials in which there was agreement (i.e., both recorded occurrence or both recorded non-occurrence) were added together and divided by the total number of trials, then multiplied by 100 to obtain the percentage IOA score (Kazdin, 2011). The research assistant could collect the information in person while the session was occurring through the one-way mirror or after from watching the videotape footage. We collected IOA for a total of 37.40% of sessions with a mean of 98.9% reliability (range= 83.3-100). In Matilda's sessions, IOA was collected for 38.24% of sessions with an average of 98.7% reliability (range= 83.3-100). Lavender's sessions had IOA collected for 45.45% of sessions with an average of 97.5% reliability (range= 83.3-100). Lastly, IOA was collected in 46.67% of Magnus's sessions with an average of 100% reliability.

Treatment integrity. We collected treatment integrity data to ensure that sessions were being run as specified in the written protocols. Before being permitted to run sessions, researchers had to verbally explain the required steps and complete a practice session. Researchers needed to state explain what each expected step consisted of prior to collecting treatment integrity. We scored treatment integrity data either in person or through video recordings. The data sheet consisted of a list of behaviors the researcher was expected to demonstrate in a

session (see Appendix C). We scored treatment integrity for 47.2% of sessions with an average of 99.7% integrity (range= 83.3-100). In Matilda's sessions, treatment integrity was collected for 47.06% of sessions with an average of 100% integrity. Lavender's sessions had treatment integrity collected for 47.73% of sessions with an average of 100% integrity. Lastly, treatment integrity was collected in 46.67% of Magnus's sessions with an average of 99.20% integrity (range= 83.3-100).

Results

Figure 1 depicts hypothetical data for the three participants.

Matilda

Run. In the baseline phase of the run condition, Matilda successfully completed three out of six possible steps (mean=3). In the informational video probe, Matilda's responding remained stable (i.e., 3). After implementing BST, levels further increased from those of the informational video probe to mastery criterion (mean=5.6, range=4-6). In the generalization to a novel antecedent phase, her levels of responding remained at mastery criterion. During posttraining two weeks later, Matilda's performance remained at the mastery criterion.

Hide. Matilda emitted three of the six identified steps (mean=3) in the baseline phase of the hide condition. In the informational video probe, Matilda's

behavior remained stable (i.e., 3). After implementing BST, her level of responding further increased to the mastery criterion (mean=6). In the generalization to a novel antecedent phase, her levels of responding remained at the mastery criterion. During posttraining two weeks later, Matilda's responding remained at the mastery criterion.

Fight. In baseline, Matilda successfully completed zero to one of the necessary steps (mean=.66, range=0-1). In the informational video probe, Matilda's behavior slightly increased over the baseline level. She improved by one step (2). After implementing BST, her levels of responding further increased to the mastery criterion (mean=5.4, range=4-6). In the generalization to naturalistic antecedents phase, Matilda initially displayed five of the six necessary steps. In the following probe, she returned to mastery criterion (i.e., 6). During posttraining two weeks later, Matilda's responding remained at the mastery criterion.

Lavender

Run. In the baseline phase of the run condition, Lavender typically completed three out of six possible steps (mean=2.5, range 1-3). In the first informational video probe, the number of steps completed correctly slightly increased (i.e., 4) from baseline, so researchers conducted a second probe to determine whether Lavender would continue to demonstrate increased responding. However, her levels of responding decreased (i.e., 3). After implementing BST, her

level of responding increased to the mastery criterion (mean=6). In the generalization to naturalistic antecedents phase, her levels of responding remained at the mastery criterion. During posttraining two weeks later, Lavender's responding remained at the mastery criterion.

Hide. Lavender initially responded at a moderate level (four of the six steps correct) in the hide condition, but correct responding declined as baseline progressed (mean=2.33, range=1-4). In the informational video probes, Lavender's behavior remained stable (i.e., 2) and then decreased (i.e., 1). After implementing BST, her level of responding increased to the mastery criterion (mean=4.75, range= 2-6). In the generalization to naturalistic antecedents phase, Lavender initially displayed five of the six necessary steps and then returned to the mastery criterion. During posttraining two weeks later, Lavender's responding remained at the mastery criterion.

Fight. In baseline, Lavender successfully completed one of the steps for half of her sessions (mean=.5, range=0-1). In the informational video probe, Lavender's behavior slightly increased from baseline (i.e.2), so researchers conducted a follow-up probe in which behavior decreased (i.e., 1). After implementing BST, her level of responding increased to the mastery criterion (mean=5.25, range=3-6). In the generalization to naturalistic antecedents phase, her level of responding remained at mastery criterion. During posttraining two weeks

later, Lavender initially displayed five of the six steps. In the following probe, she demonstrated all six steps correctly.

Magnus

Run. In the baseline phase of the run condition, Magnus typically completed three out of six possible steps (mean=2.4, range 0-3). In the informational video probe, Magnus's behavior remained stable (i.e., 3). After implementing BST, he displayed more correct behaviors (mean=6). In the generalization to naturalistic antecedents phase, his level of responding remained at the mastery criterion. During posttraining two weeks later, Magnus's responding remained at the mastery criterion.

Hide. In the hide condition, Magnus typically displayed three of the six necessary steps (mean=3.22, range=2-5). In the informational video probe, Magnus's behavior remained stable (i.e., 3). After implementing BST, his level of responding increased to the mastery criterion (mean=6). In the first generalization probe, Magnus initially froze (i.e., did nothing). After receiving feedback, Magnus reached the mastery criterion in the following session (i.e., 6). Researchers ran an additional probe to assess stability and Magnus's responding remained at the mastery criterion (i.e., 6). During post-training two weeks later, Magnus's responding remained at the mastery criterion.

Fight. In baseline, Magnus typically completed zero of the necessary steps (mean=.11, range=0-1). In the informational video probe, Magnus's behavior did not increase from baseline (i.e., 0). After implementing BST, his level of responding increased to the mastery criterion (mean=6). In the generalization to naturalistic antecedents phase, his level of responding remained at mastery criterion. During posttraining two weeks later, Magnus initially displayed five of the six steps, but returned to the mastery criterion in a subsequent probe.

Discussion

The present study evaluated the effectiveness of behavioral skills training (BST) for teaching human service staff to engage in optimal behaviors during active shooter role-play scenarios. In baseline, all three participants demonstrated moderate levels of responding in the run and hide conditions, and poor performance in the fight condition. The informational video had little to no impact on correct execution of the steps. After implementing BST, all three participants executed all the steps correctly in all three conditions. These gains were demonstrated at or near mastery criterion in naturalistic generalization and maintenance probes in two-week follow-up sessions. These findings suggest that BST is more effective than the informational video for training active shooter safety skills in the workplace.

Our findings align with previous research on the effectiveness of using BST to train safety skills (Bergstrom et al., 2014; Dancho, Thompson, & Rhoades, 2008;

Dickson & Vargo, 2017; Garcia et al., 2016; Gunby et al., 2010; Himle et al., 2004; Houvouras & Harvey, 2014; Johnson et al., 2006; Knudson et al., 2009; Miltenberger, 2008b; Tarasenko, Miltenberger, Brower-Breitwieser, & Bosch, 2009) as well as training a variety of skills to adults (Aherne & Beaulieu, 2018; Belisle, Rowsey, & Dixon, 2016; Whiting, Miller, Hensel, Dixon, & Szekely, 2014). The participants in this study displayed a higher percentage of correct steps following BST as compared to the baseline and informational video conditions. This is likely due to the active responding component of the procedure, which has been shown to produce better results than information-only training (Miltenberger, 2008b; Sawyer, Crosland, Miltenberger, & Rone, 2015). This further supports the findings of prior BST research, specifically those that found rehearsal was a critical component of effective training (Gatheridge et al., 2004; Himle et al., 2004b). Therefore, when agencies train novel skills to their staff, an active component should be required, especially when it concerns safety skills.

Additionally, our findings are congruent with past research that has found BST to be an efficient training strategy (Parsons, Reid, & Green, 1996; Tarasenko et al., 2009; Whiting et al., 2014). The information and modeling portion of this study took less than 10 min to deliver and the participants quickly reached the mastery criterion thereafter. This adds to the research suggesting that BST offers an advantage by the rapidness with which training can occur (Whiting et al., 2014).

This could allow for entire organizations to be trained quickly. Therefore, BST would be more desirable due to the efficiency of training (Parsons et al., 1996).

Why does BST work?

BST comprises four steps: instruction, modeling, rehearsal, and feedback (Miltenberger, 2008a). When these steps are combined, the collective experience provides multiple opportunities for the trainee to be exposed to the expected skill set by including clear, concise steps, a demonstration of the skills, and an opportunity for the learner to practice the skills and get precise feedback. This culmination of experiences can aid a learner to understand how to appropriately complete the desired performance.

The first step in BST is instruction. The instruction phase can provide objectives or tasks to clarify employee expectations. Instructions could consist of brief lectures or presentations, but could also include job aids (Carroll, Miltenberger, & O'Neill, 1992; Durgin, Mahoney, Cox, Weetjens, & Poling, 2014; Parnell, Lorah, Karnes, & Schaefer-Whitby, 2017). Instructions by themselves often lead to an improvement in behavior (Catania, 2013). Having instructions allows for learners to have guidance on performing skills they may not have previously emitted or encountered. These instructions provide indirect-acting contingencies where the instruction would have control over the behavior (Weatherly & Malott, 2008). When this occurs, the resulting change in performance

is called *rule-governed behavior* (Catania, 2013) and may signal a future meaningful outcome (Daniels & Bailey, 2014). However, training programs that focus solely on instruction-based learning are often criticized due to their inability to fully establish the expected skills to mastery-level performance (Gatheridge et al., 2004; Parsons et al., 2012). While instructions can evoke behavior (Catania, 2013), research has found that if there is poor correlation between antecedents and consequences, the resulting behavior change will not be long-lasting (Daniels & Bailey, 2014).

The next step in BST is modeling. By including the modeling portion during training, learners can view an ideal example of how the skills should be displayed (Guerico & Dixon, 2010). This gives the learner an example they can imitate. A model serves as a prompt. That is, it is an antecedent that already exerts stimulus control over the desired response. The imitative response is part of a higher-order class which initially develops in infancy. Imitation allows learners to be able to execute a wide array of behaviors they may have never performed before. The purpose of modeling and other kinds of prompts is to decrease the amount of time it takes a learner to meet mastery criterion. In this study, video modeling was used to ensure consistency across participants receiving the training. Video modeling has been effective in training staff in a variety of human service settings (Catania, Almeida, Liu-Constant, & DiGenarro Reed, 2009; Collins, Higbee, & Salzberg, 2009; Guerico & Dixon, 2010; Jenkins & DiGennaro Reed,

2016; Loughrey, Marshall, Bellizzi, & Wilder, 2013). While video modeling produces moderate increases in performance, research has shown it is critical to include a rehearsal component (Jenkins & DiGennaro Reed, 2016). This reaffirms that while antecedents are beneficial, they are insufficient when used alone.

The imperative portion of BST is rehearsal and feedback. Rehearsal transforms training from passive learning to active learning by requiring the learner to demonstrate the skill. In rehearsal, a simulated environment is created in which the antecedents and consequences can be controlled (Miltenberger, 2008a). The discriminative stimulus evokes a response from an individual, who then can receive feedback from researchers or trainers (Miltenberger, 2008a). This displays procedural knowledge, or when an individual can display the behavior when in a scenario (Baum, 2008). Without rehearsal, the knowledge is likely categorized as declarative, or when one knows *about* what to do; individuals may be able to verbally respond as to what they should do, but they do not display the skills (Baum, 2008). This declarative knowledge is evident in some of the comparative studies mentioned earlier in which BST was compared to Eddie Eagle (Gatheridge et al., 2004; Himle et al., 2004b). The children were able to say what they should do following Eagle Eddie but did not actually perform the action (Gatheridge et al., 2004; Himle et al., 2004b). They know about it, but not how to do it. By rehearsing, the learner repeatedly practices the correct behaviors. It is the goal following

training for the learners to be able to display the behaviors, not merely state what they should be doing.

The last step in BST is the feedback provided throughout the rehearsal phase. This feedback provides the learner with information about which skills were completed correctly as well as which steps should change or improve (Daniels & Bailey, 2014). Feedback has been shown to be effective in leading to behavior change (Alvero, Bucklin, & Austin, 2001; Alvero & Austin, 2004; Daniels & Bailey, 2014; So, Lee, & Oah, 2013; Palmer, Johnson, & Johnson, 2015). Feedback provides an immediate consequence to the learner (Miltenberger, 2008a). In this feedback, according to best practice, there is always some sort of praise included (general empathy statement, steps completed correctly) as well as information on how to improve (Parsons & Reid, 1995). By receiving feedback that is positive, immediate, and certain to occur, behavior is likely to increase (Daniels & Bailey, 2014). However, feedback alone is not always sufficient for behavior change, especially when learning new behaviors (Daniels & Bailey, 2014). By combining instructions, modeling, rehearsal, and feedback into one cohesive training package, learners have greater exposure to training tactics that have been shown to be effective in the research literature.

Maintenance

The findings of the present study demonstrated maintenance over a two-week period; however, it is likely the participants will need to be retrained. Further information needs to be gathered to determine how often safety skills need to be retrained. As most follow-up probes in BST research occur one month or less from the initial training, further research is needed to determine when retraining of safety skills is needed. One safety skill to model our retraining after could be CPR implementation. American Red Cross requires recertification every two years, even though the evidence suggests that retention of skills declines only a few weeks after training (American Red Cross, 2018; Berhardt, 2012; Woollard, Whitfield, Newcombe, Colquhoun, Vetter, & Chamberlain, 2006). In a study across three years, 124 occupational first aiders were tested at varied times on performing CPR (McKenna & Glendon, 1985). Only six months after receiving training, fewer than 20% of the first aiders performed at 75% or higher according to the data printouts from a Recording Reusci-Anne manikin (McKenna & Glendon, 1985). Some have suggested that CPR retraining should take place every seven months to maintain the skills at a proficient level (Woollard et al., 2006). This half year retraining mark is also seen in some self-defense research (Haseltine & Miltenberger, 1990). Here, eight adults with mental disabilities were taught ways to protect themselves using BST and seven of these individuals maintained these skills in a six month

follow-up session (Haseltine & Miltenberger, 1990). While it is unclear the extent to which we could generalize the findings from the CPR and self-defense research, agencies should consider conducting shooter training drills every six to seven months until further research is available. BST makes institutionalism of safety skills more feasible. Internal employees can be trained to do BST and embed it into the culture. By having feedback programmed into training, it allows for a smooth transition from training to coaching. When follow-up probes occur, feedback can be used to refine the skills instead of reteaching each step to the learner.

Generalization across Stimuli

An added benefit of using BST is the incorporation of strategies that have been shown to aid in generalization (Miltenberger, 2011). BST in this study incorporated generalization strategies like those in previous research (Himle et al., 2004; Miltenberger et al., 2004; Miltenberger, 2011). One strategy, known as *training loosely* (Stokes & Baer, 1977), involved conducting sessions in different locations. The participants rotated through six different locations throughout the course of the study. Furthermore, the order in which the conditions occurred was randomized using a list generator, using a strategy known as *indiscriminable contingencies* (Stokes & Baer, 1977), which involves making the antecedents and/or consequences unclear to learners. This may aid in generalization because participants did not know whether they would be required to run, hide, or fight at

the onset of each session. The last phase of this study was conducted using confederate clients, confederate shooters, and audio recordings of screaming and gunfire to help facilitate generalization, using a strategy known as *programming common stimuli* (Stokes & Baer, 1977). This involves incorporating relevant stimuli into the training environment that would be present in the real-life situation in which the trained behaviors should occur. During training, these more natural stimuli should come to exert stimulus control over the desired responses, making those trained responses more likely to occur when they are needed. In this study, all participants responded appropriately to naturalistic stimuli within two sessions (range= 1-3; mean= 1.3) when novel stimuli were used.

Unfortunately, even with training, one cannot predict what may occur when a real active shooter launches an assault. Therefore, it is important to consider which antecedents may facilitate generalization to novel situations. If a less intrusive method can evoke the correct responses, it is more likely to be used in organizational training. Altering the antecedent prompts used or the environment in which a learner is training may increase the generalization of participants responding appropriately in a variety of novel situations.

Stimulus Control

While each of the skills in the training may not need to be used, exposing employees to various response options can be beneficial for those who find

themselves in this scenario. Multiple antecedents can function reliably as motivating operations for a skill set of behaviors (Catania, 2013). This stimulus control may aid in reducing freezing that is typically noted in previous emergency response research (Leach, 2004; Mawson, 2005). A variety of response options may allow individuals to solve problems faster in scenarios.

For example, if one encounters any of the following issues: a lockless door, shatterproof windows, or incapability to flee from the building, one can focus on barricading. Another example in which barricading can help solve a problem would be if an individual is responsible for clients and is having difficulty keeping them quiet. While the assailant may be able to hear the clients, they would not be able to enter the area if the door is barricaded, which is arguably more beneficial in this scenario. Here, if one wants to obtain the reinforcer of safety, there is an increased likelihood of the behavior "barricade" due to the noted inability to perform other behaviors (Catania, 2013). When one cannot accomplish part of their plan, they should try something else. This adaptability is important in active shooter scenarios as actively adapting to a situation is beneficial for those involved. Brainstorming these sorts of solutions is something that individuals can practice in their day-to-day lives. In any scenario, one has the option to survey the area around them and determine how they would respond if an assailant were to enter. By assessing one's environment, it may increase respondent behavior when a situation occurs.

Acceptability of the Procedures

When participants were asked about whether they feel this study made them safer in an active shooting scenario, the average response was a four (agree; range=3-5). When asked if they believed they and their client would be better protected, the average response was a four (agree; range=3-5). However, when asked if this study was relevant for the social climate, all participants rated as a five (strongly agree) thereby hinting that most participants agreed that the study was relevant. When asked if they believed BST was more effective than the lecture, participants ranked their opinions as 4.67 (agree to strongly agree; range= 4-5). Lastly, when participants were asked if they would recommend the training to others, the average response was a 4.67 (agree to strongly agree; range= 4-5). Most responses for participants were between agree or strongly agree.

Dissemination

When disseminating to those outside of the field, it is important to discuss the steps to take and the potential outcomes of active shootings in non-jargonistic terms. Researchers suggest organizations have safety-based conversations with their employees regularly.

An employee will only have around 180s (Buster, 2008) to respond and it is unlikely that one would display all the skills trained in this study. Therefore, we

propose that employees across levels in the company determine which steps are most important in an emergency scenario. The actions found as most important should be taken first. To determine which steps these should be, employees can create if-then scenarios or cost-benefit analyses for emergency situations. For example, while turning off lights may lead the intruder to believe no one is in the room, it may be a better use of time to barricade the door so that whether the intruder believes someone is present or not, there is an added safety measure. Researchers attempted to replicate this if-then logic with the antecedents used in training (i.e. if the individual is on the other side of the building, then run; if the individual is coming this way, hide; if the individual breaches the safety zone, then fight).

On a larger scale, this topic allows for collaboration with other professions. Recently, there has been a large increase in both incidents and casualties for active shootings; however, it is unclear as to why. Behavior analysts can work to pinpoint metrics and identify variables that may be responsible for these events. Researchers can investigate the possible functions to these behaviors and view these shootings from a systems perspective.

Limitations

One limitation of this study is we could not train nor assess the participants in a daytime clinic environment where children and other staff members were

present. We do not know how participants would respond in a true scenario. Additionally, due to these conditions, participants may have been displaying a higher percentage of correct skills in the run conditions for baseline than they would have during business hours. Two of the steps, “be quiet” and “leave belongings,” were frequently correct across participants. Researchers suspect these high scores may be due to the setup of sessions. When a session was run, a participant was with their confederate child; other participants were not in the room at the same time. Participants likely displayed the skill of “being quiet” for there was no one else to speak to. Future researchers should consider running multiple sessions at one time because if participants were in a scenario together, they may talk to one another. As for “leaving belongings,” sessions were run on the weekends with only participants and researchers in the building. Each participant had a room where they resided between sessions and therefore, participants brought minimal items with them to training. Therefore, participants often correctly displayed “leaving belongings” because the items in the classroom were not their personal properties.

All three participants held a bachelor’s degree and were pursuing further education. This may reduce the external validity of this study to other populations. An additional limitation is the participants are a sample of self-selected individuals. The email sent out to the potential pool of participants informed participants they would be learning active shooter training drills. Therefore, the individuals who

agreed to take part might have had an increased investment compared to the average employee. This is important to note if one intends to use this training with an entire company.

This leads to other possible limitations. If this study is scaled up for training a company, the results will likely differ. This study had a small sample size of participants who had an individualized training experience. There would need to be altered methods to efficiently apply this training to multiple individuals at a site. Pyramidal training, or when upper-level staff train employees on how to train skills to additional staff, could be considered to increase efficiency (Parsons, Rollyson, & Reid, 2013).

Further Research

One option for further research would be to evaluate how frequently these safety skills should be retrained. Since active shooter scenarios are rare occurrences, skills would not be facing extinction, but instead would encounter forgetting. Extinction occurs when the stimulus is present, a response occurs, but the response is no longer reinforced (Daniels & Bailey, 2014). This is not the case for active shooter scenarios because the stimulus is not present for the behavior to occur. Since the stimulus (i.e. a shooter) is not available to evoke the response, the lapse in displayed skills at a testing point would be due to forgetting, which happens when an individual does not have the opportunity to engage in the skill

(Daniels & Bailey, 2014). In order to evaluate at what point an individual may forget, a specific time frame would need to be researched to determine how frequently training would need to take place. Prior CPR and self-defense research has suggested retraining occur between 6-7 months from initial training (American Red Cross, 2018; Berhardt, 2012; Haseltine & Miltenberger, 1990; McKenna & Glendon, 1985; Woollard, Whitfield, Newcombe, Colquhoun, Vetter, & Chamberlain, 2006). This time interval may be a starting point for active shooter training.

If an active shooter scenario were to occur, it is unlikely that an individual would display all the steps provided, specifically in the fight condition. A potential direction for further research could be researching the previously mentioned cost-benefit analysis to determine which steps considered to be most important or most likely to increase the level of safety of the individual. By training steps in a prioritized fashion, it allows individuals to focus on the most important steps first and to complete the following steps if there is ample time. The main goal is to do *something.* Ranking the steps from most to least important or in a flow chart fashion has the potential to increase the safety of the individuals participating.

An additional way to further this research is replicating the study with more realistic antecedents. To make the antecedents more realistic, the urgency/volume of the vocal antecedents could be increased. Individuals screaming “active shooter” or hearing gunfire as an antecedent is more likely to occur in a true scenario than an

individual delivering a statement in a calm tone. It would be interesting to see whether there would be a change in actions or latency to actions when compared to the neutral stimulus delivery. In these emergency situations, participants may display respondent behaviors like decreased blood flow or a loss of fine motor skills. Researchers should implement realistic components to ultimately reach habituation to the antecedents. However, habituation is temporary, and these skills need to be continued to be re-trained.

This study can also be altered in terms of training itself. Training is typically delivered in a group format to a larger number of individuals. Therefore, future researchers can replicate with more participants as a multiple baseline across groups design. These results would increase the external validity of this study for a wider range of individuals would be included.

By running further research in this safety-based topic, there can be dissemination of these skills and terminology. This field of study has the potential to be lifesaving. By replicating this research and furthering the scopes in which it is applied, behavior analysts would have another field in which our research is prevalent as well as a socially valid measure to the public, which would allow for dissemination.

Implications

An active shooter can choose any place at any time therefore active shooter training is imperative to implement across organizations and businesses to preemptively counter emergency situations. Three participants participated in a training intervention to establish the differences in the effectiveness of active versus passive training. The data suggest that BST resulted in higher levels of correct steps taken across all three conditions (run, hide, fight). Improvements in behavior were inferred to be from the intervention, not extraneous variables due to the staggered intervention. The intervention was staggered in time across participants and the participants were stationed in different regions of the facility and therefore could not communicate with one another. Therefore, when one individual's behavior increased, the other participants' performances did not. This elucidates the need to have an active training session compared to a passive training. Furthermore, ongoing training and/or posttraining should be included in organizations to maintain mastery level of safety skills.

The results of this study suggest an effective way to train individuals the skills to display in an active shooter scenario. Unfortunately, this is a branch of research that is required due to the increase in the frequency of active shootings occurring. Herein lies a gap in research that behavior analysts can help to fill. By

applying behavior analysis to a socially valid safety skill, there is a potential to save lives.

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Appendix A – Figure 1

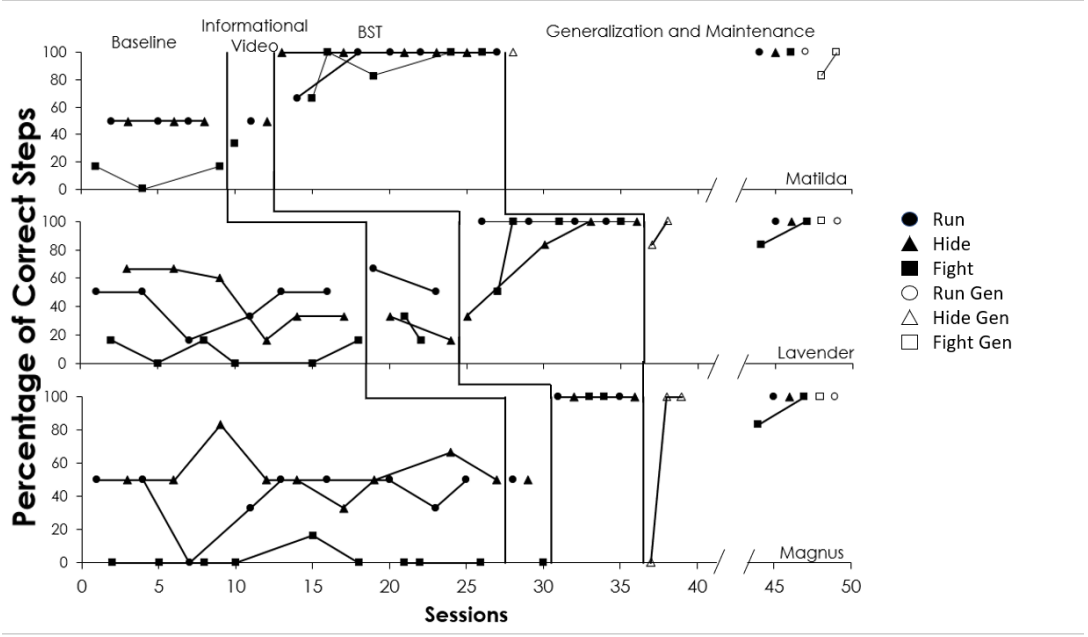

Figure 1. The effects of BST on performing safety skills. Follow-up sessions were conducted after a 2-week break to assess maintenance and generalization.

Appendix B - Informed Consent

Florida Institute of Technology

Letter of Consent

Behavioral Skills Training for Active Shooter Scenarios: Human Service Staff

Principal Investigator: Jacqueline Noto

Co-Investigator: Catherine A. Nicholson, Ph. D., BCBA-D

Purpose of the Study

The purpose of this study is to evaluate the effectiveness of behavioral skills training when teaching active shooter response skills to staff of children with autism.

Procedures Involved in the Research

Each session is expected to last ten minutes and will include three conditions. It will take around two weeks to complete this study. Sessions will be run on Saturday and Sunday falling between the hours of 8 AM and 4 PM. The training may conclude earlier; however, you should plan for the entire duration. You will be rotating with other participants during this time and therefore can bring other materials to work on or other things to do (i.e., homework, session notes, video streaming, etc.) During these sessions, you will be asked to run an EIBI session with another adult who will be playing the role of a child. We will either tell you where an armed individual is in the building, or you will hear screams or gunfire in the hallway while you are "working with" the confederate client. We will tell you the correct actions to take with a client in an active shooter scenario. We will then model these actions for you, ask you to do the steps, and give you feedback on how you do. There will be a follow up measure of these skills 2-6 weeks after the conclusion of the study. This measure will be collected after hours during the week at should take a total of 10 minutes.

Potential Harms, Risks or Discomforts:

Based on the premise of the study, you may experience heightened nervousness and/or mild psychological harm. You will hear audio recordings of gun fire and screaming and see an individual dressed to look like a shooter, which may be distressing for you. Real guns will not be used in this study and you will not be in any physical danger. We will provide contact information for counseling services.

Benefits

You: You will be trained on the correct steps, per recommendations from the Federal Bureau of Investigation (FBI) and Department of Homeland Security (DHS), to take when with a client in an active shooter scenario.

Scientific Community and Society: The community will potentially benefit by identifying an effective method for training safety skills in an active shooter scenario.

Payment or Reimbursement:

There is no compensation for participation.

Confidentiality:
Any data or information collected that could identify you will not be published or told to anyone else, unless we get your permission. Your privacy will be respected, and we will not ask for any personal information. Data will be presented using a pseudonym for each participant.

b) Legally Required Disclosure:
Your performance will be kept confidential to the full extent of the law and we will treat all information provided to me as subject to researcher-participant privilege.

Videotaping:
You will be videotaped in this study for the sake of data collection. Please see Video Consent Form.

Participation:
It is your choice to take part in this study. If you decide to participate, you can decide to stop at any time. You may stop after signing the consent form or at any time during the study. If you decide to stop participating, there will be no consequences to you. If you wish to withdraw from this study, please contact the principal investigator or the program coordinator. In cases of withdrawal, any data collected to that point will be either destroyed or used in the study, entirely at your discretion. Your decision of whether or not to participate will not affect your employment.

Information About the Study Results:
You may obtain information about the results of the study by contacting the principal investigator. You will also receive a summary of the results once the study is complete.

Information about Participating as a Study Subject:
If you have questions or require more information about the study itself, please contact Jacqueline Noto at (321) 674-8357.

This study has been reviewed and approved by the Institutional Review Board. If you have concerns or questions about your rights as a participant or about the way the study will be conducted, you may contact:

Institutional Review Board Office
Dr. Lisa Steelman, Chair IRB
School of Psychology
(p) 674-8104
lsteelman@fit.edu
http://www.fit.edu/research/committees/irb/index.html

I have explained and defined in detail the research procedures in which the subject (legal representative has given consent) has consented to participate.

_____

Participant

Jacqueline Noto, Principal Investigator

CONSENT

I have read the information presented in this form about a study being conducted by Jacqueline Noto of the School of Behavior Analysis. I have had the opportunity to ask questions about my involvement in this study and receive any additional details I wanted to know about the study. I understand that I may withdraw from the study at any time and I agree to participate in this study. I have been given a copy of this form.

I understand that **participation is voluntary.** Refusal to participate or discontinuing participation once started will involve no penalty or loss of benefits to which I am otherwise entitled.

Name of Participant

Date

Appendix C - Treatment Integrity Data Sheets

Baseline

Participant initials: Session number:	Y/N
1. Arranged the participant and confederate child in the appropriate positions and gives instruction, "You're running a tacting program with Jordan. If any health or safety concerns arise, respond to the situation as you see fit."	
2. Start video camera and state script with session number.	
3. Waited 1-5 minutes	
4. Delivered the predetermined verbal prompt to the participant, per the condition in effect	
5. Confederate child refrains from prompting or indicating what participant should do	
6. No consequences were delivered for correct or incorrect responses	

Informational Video Probe

Participant initials: Session number:	Y/N
1. Prior to session, the participant viewed the video from DHS	
2. Researcher did not answer questions about video	
3. Arranged the participant and confederate child in the appropriate positions and gives instruction, “You’re running a tacting program with Jordan. If any health or safety concerns arise, respond to the situation as you see fit.”	
4. Started video camera and state script with session number.	
5. Waited 1-5 minutes	
6. Delivered the predetermined verbal prompt to the participant, per the condition in effect	
7. Confederate child refrained from prompting or indicating what participant should do	
8. No consequences were delivered for correct or incorrect responses	

BST

Participant initials: Session number:	Y/N
1. Provided instructions before implementing session	
2. Modeled the specified actions for each condition	
3. Arranged the participant and confederate child in the appropriate positions prior to condition being run	
4. Delivered the predetermined verbal prompt to the participant	
5. Following demonstration, deliver the following: • Positive/empathy statement • Steps correct • Steps incorrect • How to fix the steps • General praise statement	

Generalization

Participant initials: Session number:	Y/N
1. Ran session in a novel environment	
2. Arranged the participant and confederate child in the appropriate positions and gives instruction, “You’re running a tacting program with Jordan. If any health or safety concerns arise, respond to the situation as you see fit.”	
3. Delivered the novel antecedent stimuli	
4. Following demonstration, deliver the following: • Positive/empathy statement • Steps correct • Steps incorrect • How to fix the steps • General praise statement	

Appendix D - Social Validity Survey

Please rate the degree to which you agree with the following statements by circling the appropriate number. Ratings range from 1-5, with 1 as "strongly disagree" and 5 as "strongly agree."

I believe I am now safer if I were in an active shooter scenario.

Strongly Disagree 1 2 3 4 5 Strongly Agree

I am better able to protect myself and my client than I was before taking part in this training.

Strongly Disagree 1 2 3 4 5 Strongly Agree

This experience is relevant for today's social climate.

Strongly Disagree 1 2 3 4 5 Strongly Agree

The BST portion of this experience was more effective than the informational video.

Strongly Disagree 1 2 3 4 5 Strongly Agree

I would recommend this training to others.

Strongly Disagree 1 2 3 4 5 Strongly Agree