Active Shooter Training: Data Based Recommendations For Retraining Depreciable Skills
Mark. D. Thomas & Daniel W. Carruth

ABSTRACT

The current project investigated the efficacy of a train-the-trainer active shooter response program that was used to provide patrol officers with the ability to resolve active shooters. Specifically, the transfer of information from subject matter experts, to local trainers, to officers at home agencies was examined, as well as the retention of declarative and procedural knowledge. The train-the-trainer paradigm was found to be a viable method for active shooter response training. Regarding skills, evaluating thresholds, and handling persons depreciated the fastest and the data indicated those skills need retraining at least every six months.

Key words: Active shooter, training, training evaluation, train-the-trainer, training recommendations
Active Shooter Training: Data Based Recommendations
For Retraining Depreciable Skills

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Although no single universal train-the-trainer method exists for providing training for law enforcement officers, broadly subject matter experts from outside agencies provide local training officers with specialized training; then, local trainers train fellow officers at their home agencies. The train-the-trainer paradigm is sometimes used when agencies adopt new equipment or when new techniques are presented; however, those situations are different. When adopting new equipment, officers usually deploy the equipment in the field and immediately apply their new knowledge. Alternatively, when learning a specialized technique, such as door breaching, an officer may not use that knowledge until considerable time has lapsed after training. In some instances, this training may never be used. The problem remains that officers are expected to be able use these training techniques in a moment’s notice. The current research examined the efficacy of the train-the-trainer paradigm for skills that the use of would be delayed. In particular, the transfer and retention of knowledge was examined for a train-the-trainer active shooter response training program.

The public perception is that mass homicides are commonplace, and the public expects action for mass shootings (Duwe, 2005; Mulvey & Cauffman, 2001). Despite statements in the literature about an “epidemic of school violence” (i.e. Redding & Shalf, 2001) and a history of mass homicide spanning back to Colonial America (Bernstein, 2009; Cort, 1886, Knoll, 2010), the perception of an epidemic is probably due to the availability heuristic generated by the widespread media coverage of “pseudocommando” (Dietz, 1986) “rampage violence” (Harris & Harris, 2012). Active shooters are widely covered major news events. The day after the tragedy at Sandy Hook Elementary School, an Internet search for “Sandy Hook Elementary School” returned approximately 245,000,000 results (Fern Creek 14,700,000; FSU 12,200,000; Rosemary Anderson High School 6,780,000). However, the victimization rates of children in schools did not change from 1989 to 1995, and less than one percent of child deaths occurred in or near schools (Anderson, et al. 2001; Kachur et al. 1996; Snyder & Sickmund, 1999; 2005). Fortunately, mass homicides are uncommon, and even active shooters at schools are rare (Cantor, Sheehan, Alpers & Mullen, 1999; Vossekui, Fein, Reddy, Borum & Modzeleski, 2004). Nonetheless, despite the sensationalism and the misconception of the threat, active shooters remain a legitimate concern.

Preventing active shooters before they occur would be ideal, but predicting active shooters is difficult due to the uniqueness of mass homicides. There are many complex motivating factors for active shooters (Kennedy-Kollar & Charles, 2012), and individual markers that appear to be predictor variables are often present in people who do not become active shooters (Mulvey & Cauffman, 2001). For instance, many people who own black trench coats never become active shooters. In addition, the infrequency of active shooter events does not provide an adequate sample for statistical predictions (Doswell, Davies-Jones & Keller, 1990;
Kahneman & Tversky, 1973). In short, no valid active shooter psychological profile exists (Kennedy-Kollar & Charles) and if there was a valid profile, active shootings do not occur often enough to allow accurate statistical predictions. Unfortunately, until predictability is improved, active shootings will continue to occur and law enforcement must remain prepared to resolve active shooters. However, the majority of law enforcement officers lack the use-of-force experience to resolve active shooters. Less than one percent of police service calls result in the use of force and only about one-half of a percent of those requires lethal force (International Association of Chiefs of Police, 2001). Therefore, law enforcement agencies are tasked with training officers to resolve an unfamiliar situation using methods with which they may have no practical experience. The agencies that participated in the present research were concerned with training first responders for active shooters.

Mississippi State University (MSU) exists as a separate entity with its own police department within the city of Starkville, Mississippi, which also has a police department. The population of Starkville is approximately 22,000 and the Starkville Police Department (SPD) has 52 sworn police officers. The Mississippi State University Police Department (MSUPD) has 29 sworn police officers with a population of about 16,000 students, which is about 1 officer for every 450 people in the contiguous area (excluding state police and the sheriff’s department). Both local agencies (e.g., SPD and MSUPD) believed it was important to mobilize as many officers as possible to an active shooter incident, and the Mississippi Active Shooter Training Evaluation (MASTE) project was implemented to support the local agencies’ active shooter response training efforts. The agencies identified four primary considerations for addressing active shooter response training needs.

The first consideration was that patrol officers needed to be able to respond immediately to an active shooter, rather than wait for hostage negotiators or tactical teams to respond. Second, training had to be appropriate for officers with little or no tactical experience. Although both local departments had officers with some military or metropolitan tactical experience, most officers had no tactical experience, resulting in the use of several different tactical procedures with no consistent method across departments. Due to the variability in tactical methods, the departments could not work together as a single cohesive unit during tactical maneuvers. Thus, the third consideration was the SPD and the MSUPD had to be able to integrate their personnel during an active shooter event. The final consideration was the training had to be cost-effective. Most rural and suburban police departments probably have similar monetary and budgetary concerns.

The need for immediacy in a “minimize the casualties” scenario is universal because the faster an active shooter is resolved, the sooner the killing stops (U. S. Department of Homeland Security, 2008). Due to the need for immediacy, many law enforcement agencies are training patrol officers to respond to active shooters, but similar to the SPD and MSUPD, officers in smaller agencies may have little or no tactical experience. In addition, due to small agency sizes, if an active shooter occurs in rural areas, any sworn local officer will probably respond, including officers from parks and recreation, fish and game, and local other authorities. It is imperative that officers from different agencies be able to work together. Although the public expects law enforcement agencies to be prepared to resolve active shooters, law enforcement agencies must operate within budgetary constraints. Train-the-trainer paradigms appear to offer a cost-effective method for providing specialized training to rural and suburban agencies.

However, assuming the train-the-trainer paradigm is valid for active shooter response
training may not be prudent. In order to meet active shooter training objectives, training quality must be maintained from the original source to the local training events, but various problems may compromise training. Errors may occur at any point along the chain of information transfer. If the information is encoded incorrectly during the initial information transfer from SME instructors to local trainers, the correct information cannot be transferred correctly to local agencies. Information diffusion errors may pose another problem.

Information diffusion has been demonstrated by the “telephone game” (Blackmore, 2000). During the telephone game a teacher tells one student a sentence. That student repeats the sentence to a neighboring student, who does likewise, until the phrase has been passed through all the students. However, the phrase reported by the last student is usually different than the phrase given the first student and may have an entirely different meanings. Presumably, diffusion errors during the transfer of information from the initial source (SME instructors) to the final source (i.e., the officers expected to use the information) may impact training content. In addition, the general nature of learning, memory, and expertise might also impact train-the-trainer efficacy.

Distributed practice is better for optimal learning than massed practice (Oseas & Underwood, 1952); yet, training is often delivered in extended massed sessions. Further, memory is reconstructed, and memory distortions can arise from many sources, including: heuristics, tendencies for self-enhancement and self-verification, post-experience information, as well as a desire to maintain consistency (Bartlett, 1932; Braun, 1999; Giesler, Josephs & Swann, 1996; Hertwig, Fanselow & Hoffrage, 2003, Kwan, John, Kenny, Bond & Robin, 2004; Loftus, 1996; Loftus & Ketcham, 1994; Pieters, Baumgartner & Bagozzi, 2006; Wagner, et al. 1998). If memory is distorted for any reason, erroneous information may be transferred. Finally, the train-the-trainer paradigm takes training officers with varying levels of experience and creates active shooter response experts in a short period of time. It is possible that an officer with no use of force experience could become an active shooter response trainer with considerable factual declarative knowledge about active shooter resolution and any real-world experience. However, genuine expertise takes about 10 years of deliberate practice (Ericcson, 2006), and the effects of instant-expertise on training are not clear.

Although there are questions about the ability of a training officer, who has only recently learned the information, to effectively communicate the novel content to trainees, SME instructors and local trainers possess relevant, but different, expertise. SME instructors are very familiar with the training program and the specific problems a program is designed to address. Conversely, local training officers have a large amount of agency-specific information and are often expected to adapt the specialized training to the specific needs of their agency. However, they may not understand the theoretical underpinnings of the initial training, or they may be biased towards or against certain aspects of the training, which could cause local trainers to unintentionally dilute or corrupt the original content of the train-the-trainer course.

The primary objective of the Mississippi Active Shooter Training Evaluation project was to provide first responders with the means to save lives in an active shooter situation. Three goals were established to accomplish this objective: First, MSUPD and SPD training officers attended specialized active shooter instructor training. Second, the local trainers returned to their respective agencies and trained local officers. Third, MSU researchers evaluated the effectiveness of the train-the-trainer paradigm and the local training. The present research did not address the validity of the tactical methods that were taught to resolve active shooters, but
rather examined the transfer and retention of knowledge for a train-the-trainer active shooter response program. The MASTE project compared the initial instructional content provided by SME instructors to the instructional content provided by local trainers to their local agencies. In addition, the present research examined officer attitudes about active shooter training and knowledge retention by local agency officers who were trained by the local trainers.

**General Design and Implementation**

**Training Program**

The MSUPD and SPD selected the *Advanced Law Enforcement Rapid Response Training* (ALERRT) train-the-trainer program (http://alerrt.org/) at Texas State University – San Marcos for their active shooter training. The program provides 40 hours of training to local trainers to prepare them to teach a 16-hour local operator course. During the first 16 hours of the 40-hour instructor course, trainees complete the 16-hour course they are expected to teach. During the remainder of the 40-hour course, local trainers practiced teaching the components of the 16-hour course under the supervision of the SME instructors. Anecdotally, the program appeared to be well structured. It provided instructor manuals, lecture slides, and additional teaching materials.

**Local Instructor Training**

Coincidently, the Mississippi Office of Homeland Security (MOHS) contracted the ALERRT program to provide instructor courses in Mississippi during the same period as the present research, and three officers from each local agency attended the MOHS sponsored instructor courses. The goal of attending the instructor courses was to provide departmental training officers with the ability to teach the 16-hour operator courses locally for members of their departments. However, the MOHS offered the operator course to all sworn officers in the State and the local training officers also taught MOHS courses outside their departments.

**Training Evaluation**

Two aspects of the active shooter training program were examined. First, the course content of instructor courses taught by SME instructors was compared to the 16-hour operator courses taught by local trainers for consistency. One training objective was interoperability between the MSUPD and SPD officers. If the training was inconsistent from course-to-course or from instructor-to-instructor, officers trained in different courses may not have been able to successfully work together. Second, the effectiveness of the local 16-hour operator courses was evaluated. The evaluation of effectiveness attempted to determine whether trainees considered the training relevant and useful, if the training increased trainee knowledge, and if outcomes produced desired behaviors.

**Train-the-Trainer Evaluation**

**Method**

The consistency of the training from course-to-course and instructor-to-instructor was examined by comparing the content of SME instructor courses and local agency courses. Video recordings were made of the courses and the informational content of both course-types were coded to identify additions, omissions, and errors. Two SME instructor courses and two local
operator courses were observed and recorded.

**Transcription.** In order to analyze class content, the verbal content from the video recordings was transcribed to digitally stored text files. The courses included video presentations about domestic and international terrorism. Generally, those sections of the course did not include commentary from the instructors. Therefore, those portions of the courses were not recorded or transcribed. Importantly, the first 16 hours of the 40-hour SME instructor course was the same 16-hour course that local trainers taught. In other words, during the first 16 hours of the 40-hour instructor course, local trainers were the trainees with SME instructors. In order to focus on the comparison between an expert 16-hour operator course and a local 16-hour operator course, only the first 16 hours of the instructor courses were analyzed. Excluding the video presentations, two 16-hour SME instructor courses and two 16-hour local instructor courses were recorded and transcribed.

**Coding.** Idiosyncrasies, such as grammar, vocabulary, phrasing, and etc. were eliminated. Training manual content was assumed to contain the information that trainees were expected to learn. Therefore, the manual was used as the gold standard for course content. Any deviations from the manual content were considered personal additions or errors. The course, as well as the manual was divided into training modules, and the main points from each module were identified and assigned a corresponding number. For example, Module 1 discussed engaging suspects and that section of the module was assigned the identifier of 1.731. Coding the manual content allowed the course transcripts to be cross-referenced with specific knowledge in the manual.

Course transcripts were parsed into individual statements and the current module being taught was identified, the relevance of the statement to the class was determined, the source of the statement was identified (from the manual or the instructor), and, if the source was the manual, the relevant content in the manual was identified. Refer to Table 1 for illustrations of content coding. Coding transcriptions could not directly identify omissions, because they were the exclusions of course content. Therefore, omissions were identified through the comparisons of coded course content to the coded manual content. An omission was considered anything in the manual not referenced by a transcribed statement.
Table 1. Example Statement Coding

Statement: “Lower that gun barrel and you’ll see the difference.”
  Current Module: 2
  Source: From Manual
  Content Type: Explanation to Class
  Related To Module Content:
    2.150 First responder issues
    2.152 Lower weapon to open visual field
    1.731 Engaging suspects

Statement: “I don’t know much about medical stuff and, ah, but I would suggest not using a tourniquet.”
  Current Module: 2
  Source: Personal
  Content Type: Explanation to Class
  Related to Module Content:
    3.200 Rapid response bag (go bag)
    3.219 Pressure bandages / CAT – combat application tourniquet
  Modification Type: Error
  Personal Item Code:
    8.002 Not recommending use of tourniquet

Note. Statement was the instructor’s statement as transcribed from the video. Current Module identified the section of the course manual currently being taught. Source indicated whether the content was directly from the manual or a novel statement generated by the instructor (i.e. based on personal opinion, experience, anecdote, etc.). Content Type described the situation (i.e. explanation to class, demonstrating a maneuver, etc.). Related to Module Content indicated the manual content referenced by the statement. Modification Type indicated whether the statement was an addition or an error. Personal Item Code was a numeric reference assigned to topics not included in the manual. It was used to identify the same additions or same errors across modules and instructors.

All statements were divided into one of two primary types based on the source, either manual or personal. Manual statements directly referenced the material in the manual. Personal statements were not from the manual but originated from some external source. The sources of personal statements were impossible to identify from the transcripts and could have been from any number of things, such as: personal experience, personal bias, previous training, instructor confusion, etc. Any statements that could not be cross-referenced with the manual were considered additions to the course content. The information content of additions was assigned a personal item code, which was similar to the codes assigned to manual content. Personal item codes were used to identify added content that was similar across the classes.
Personal additions were further divided into two secondary types: additions related to existing content and new content. Some additions were directly related to existing module content. For instance, the tourniquet example in Table 1 was coded as personal, added content that was directly related to the sections in the manual covering the rapid response bag and the use of tourniquets. Although it was directly related to the manual content, it contradicted the manual instructions about using tourniquets, and the statement was coded as an error. Similarly, any additions directly related to manual content, but contradicting it, were coded as errors. Alternatively, some course content additions were coded as relevant but not directly related to existing module content. For example, discussions of the vulnerable points in body armor coverage were coded as relevant to the course, but had no related to module content code.

**Content Analysis.**

*Overall content.* Coding resulted in a collection of statements with associated data that identified the informational content of the statements in various ways. Statements coded as irrelevant to the informational content of the course were removed from the analysis and only statements coded as relevant to course content were analyzed. The statements were counted to determine the total number of statements and the number of statements relevant to the course content, the number of statements that were additional content, and the number of errors. Table 2 presents the frequencies of statements for each category. Overall, the SME class had the highest number of statements. However, once the irrelevant statements were removed, the SME classes actually had the lowest number of relevant statements.

*Table 2. Frequencies of statements for each category*

<table>
<thead>
<tr>
<th>Class Type</th>
<th>Relevant</th>
<th>Addition</th>
<th>Error</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>SME Class</td>
<td>2583 (61.6%)</td>
<td>119 (4.6%)</td>
<td>2 (0.1%)</td>
<td>4196</td>
</tr>
<tr>
<td>Local 1</td>
<td>3019 (79.2%)</td>
<td>131 (4.3%)</td>
<td>11 (0.4%)</td>
<td>3812</td>
</tr>
<tr>
<td>Local 2</td>
<td>2998 (76.3%)</td>
<td>219 (7.3%)</td>
<td>4 (0.1%)</td>
<td>3927</td>
</tr>
</tbody>
</table>

*Note.* Relevant percentage refers to the percent of all statements that were relevant. Addition and error percent refers to the percentage of relevant statements that were additions or errors respectively.

Because the SME instructors were the most familiar and comfortable with the course material, they may have been better able to concisely complete the core material, which allowed them additional time to expound on topics that were not directly related to the class, but the SME instructors had the lowest number of relevant additions. The SME instructors tended to drift to
unrelated topics and much of the content they added was not directly relevant to active shooter response.

Additions. However, other additions made by the SME and local instructors consisted of personal anecdotes used to elaborate course content. Other relevant additions tended to be centered primarily on three topics: historical references, breaching, and the contents of the rapid response bag. Historical references discussed previous active shooter or terrorist episodes in relation to the need for preparation and training. Breaching additions consisted primarily of the discussion of specific breaching tools and methods, including everything from tomahawks, axes, carpenter framing tools, and rocks to patrol cars (i.e. ramming doors at low speeds in order to avoid airbag deployment and applying constant force to doors without ramming). The final category added content focused on rapid response bags (i.e. “go bags”). Three items (discussed at length by all classes) that were suggested for inclusion in the manual and in a rapid response bag were tampons and sanitary pads for use as bandages that could be applied quickly and nutrition in the form bottled water and some type of food.

Errors. Errors were defined as additional content directly related to, but contradicting, manual content. Errors across the classes accounted for less than 0.5% of relevant statements. Over the course of 16 hours of instruction and thousands of statements, the most errors identified in a single class were 11. Errors are presented in Table 3. Two errors occurred in the SME course, but these errors were not replicated in local courses and the errors made during local courses were unique.

Table 3. Errors identified during training and their frequencies.

<table>
<thead>
<tr>
<th>SME Instructor Errors</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recommended taking a knee in hallway – contradicts moving and shooting instruction.</td>
<td>1</td>
</tr>
<tr>
<td>Stated that a one-man team might be necessary – contradicts minimum contact team size.</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Local Instructor Errors</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recommended not using tourniquet – contradicts advice for tourniquet use.</td>
<td>4</td>
</tr>
<tr>
<td>Discussed 360 degrees – contradicts 540 degrees instruction.</td>
<td>1</td>
</tr>
<tr>
<td>Incorrectly defined priority of fire.</td>
<td>4</td>
</tr>
<tr>
<td>Allowed not squaring up on target in shooting posture – contradicts shooting instruction.</td>
<td>2</td>
</tr>
<tr>
<td>Taught over penetration during room entry – contradicts room entry instruction.</td>
<td>1</td>
</tr>
<tr>
<td>Claimed no time for an action plan – contradicts planning instruction.</td>
<td>2</td>
</tr>
<tr>
<td>Contact team responsible for evacuating personnel – contradicts general procedure</td>
<td>1</td>
</tr>
</tbody>
</table>

Note. Local instructors made more errors than SME instructors. Clearly, tourniquet use and priority of fire were the most difficult areas for local instructors, but even error rates in those areas were not very frequent. However, in matters of safety, there is a question as to the number
of errors that are acceptable. For example, four errors represent an error rate of less than .06%, which is negligible; however, an error that causes an increased risk of death is considered a significant error.

Omissions. The analysis of the class content appeared to reveal exclusion of several large sections from the course. However, many of the exclusions would be expected. For example, the section “Frequently Asked Questions” referencing a video was not addressed. The section was an explanation of the key issues and common concerns related to the video. If there were concerns or questions raised by the students, this section was not covered. Additionally, the information was available in the student handbook. Some topics, such as the readiness of law enforcement to cope with terroristic attacks were discussed indirectly over many parts of the course, but were not addressed directly as a separate part of the course.

An area that may have lacked adequate class coverage was room entry. None of the classes (SME or local) explicitly covered a list of 10 common mistakes found in the course handbook that are often made by first responders when entering rooms. Most of the items were demonstrated and taught correctly, but were not explicitly identified as problem areas. An item not covered by local classes was clearing the immediate corner of threats. Patrol officers may not be aware of the benefits and risks associated with entering a room and moving toward the known – what they can see, or moving toward the unknown – what they cannot see.

The low light training appeared to suffer the most. Local classes only demonstrated one proper technique for using flashlights, but demonstrated several improper techniques and explained the problems associated with those techniques. Local instructors also failed to report the fatality statistics for low light conditions, which could motivate learning the proper techniques. Local classes tended to not cover low light close quarters conflict resolution and failed to inform students “all dark areas have guns.”

Some aspects of breaching were also neglected. For example, one local class covered only a few breaching tools and entirely omitted one method of building approach. The local classes also failed to differentiate between breaching metal doors, wood doors, and wood doors with metal frames. There were also some unrelated, but common minor problems with the training. Concerning rescue teams, local classes did not suggest passing victims out windows.

Content Summary.

The training content analysis was designed to evaluate the consistency of the training as it passed from the SME instructors through local instructors to local patrol officers. The results indicated similar overall coverage and information density (number of statements – relevant and irrelevant) across the courses. More importantly, the number of content additions and errors were relatively low (7.3% and 0.4% of relevant statements respectively). The low number of additions may suggest that the class content covered many of the topics that would be relevant for an active shooter class. The very low number of errors indicated that local instructors are passing on correct information to local officers. Although it was not perfect and assuming the SME training was adequate, given the similar information density and the low error rates, the train-the-trainer paradigm offers an effective method of delivering active shooter response training to local agencies.
Effectiveness of Training

However, it is not enough that training is consistent from course-to-course or instructor-to-instructor. If training is not effective, it wastes crucial training funds, instructor time, and officer time. Kirkpatrick’s (1959a, 1959b, 1960a, 1960b, 1976, 1985, 1994) model of training evaluation was used to evaluate the effectiveness of local training. The Kirkpatrick Model includes four levels of evaluation: (a) Reaction – measures trainee opinions about the training, (b) Learning – measures the knowledge acquired, skills improved, or attitude changes due to the training, (c) Behavior – measures whether trainees practice newly learned material, and (d) Results – measure the organizational benefits (i.e. reduction of costs, reduction of grievances, improved morale, etc.).

The current evaluation focused on Reaction, Learning, and Behavior. It did not focus on organizational benefit because organizational level changes brought about through the training were considered outside the scope of the present evaluation. However, given the mindset change that appeared to accompany the training, an analysis of the organizational impact might be of interest and should be considered for future research efforts. Learning was evaluated with two methods: a paper knowledge test and scenario performance tests.

Knowledge Test

Method. The initial class included a 25-question pre-training and post-training paper exam to assess trainee’s declarative knowledge of topics covered in the class. The exam was administered before training began and after completion of the classroom training. Trainees were required to score at least 80% in order to receive continuing education credit and course certification. The pre-training and post-training scores from four local classes were analyzed, N = 77. In addition, 24 local officers took the exam again six months after training.

Results. Figure 1 depicts mean scores on the pre-test (N = 77), the post-test (N = 77), and the retention test (N = 24). T-tests were calculated to compare group differences. There was a significant increase in test scores for the initial training (from before the training to the immediately after the training) indicating that learning occurred, p < .01. However, there was a significant decrease in test scores during the time between immediately after training to 6 months after training, p < .01, but the 6 month retention scores were still significantly higher than the pre-training scores, p < .05. Although some knowledge was lost over time, trainees retained some of the material, indicating that training resulted in a relatively permanent change in knowledge.
Figure 1. Mean Pre-Training, Post-Training, and Retention knowledge test scores with standard errors. Pre-Training was before training. Post-Training was immediately after training. The Retention group was trained six months earlier.

Performance Assessment

Method. Even though a paper exam is useful for assessing the accrual of declarative knowledge, procedural knowledge – the ability to perform the desired behaviors during an active shooter event is the most important outcome of an active shooter course. Monitoring behavior on-the-job would require response to an active shooter, but in the case of active shooter response, hopefully those skills will never be needed. Therefore, in order to evaluate trainee behavioral performance, three groups of officers with varying levels of active shooter response training were compared on simulated active shooter response scenarios. Four teams consisting of four or five officers were recruited from the ranks of the MSUPD and SPD officers. Team members were selected based on availability and level of training.

The PreTest team consisted of officers who received no active shooter training before testing. The PreTest+ team consisted of officers who received 2 hours of training covering primarily formations and weapons safety. The PreTest+ group was included because it represented the effects of receiving a small portion of the training. The PostTest team consisted of officers who completed the 16-hour active shooter response course no more than 60 days prior to testing. The RetentionTest team consisted of officers who completed the 16-hour active shooter response course approximately 180 days prior to testing.

The four teams completed a homicide-in-progress scenario that required the contact team to advance down a hallway to a classroom. The officers were expected to evaluate the threshold, enter the room, and eliminate the threat. Scenario performance was recorded using multiple video cameras. A Team Performance Assessment Form was created to analyze the performance of the teams. The form was based on descriptions of contact team operations from the training manual. The form included 25 statements describing the expected behaviors of the contact teams. Team performance was rated for each statement using a 5-point Likert-type scale ranging from 1 (poor performance) to 5 (excellent performance). Two local instructors reviewed the
recordings and assessed team performance using the assessment form. Importantly, by this point in time, the Mississippi Office of Homeland Security had implemented the same active shooter training program statewide and the local instructors had each taught multiple 16-hour courses.

**Results.** The mean instructor performance ratings are presented in Table 4. The overall column indicates each team’s overall performance score. The remaining columns indicate team performance on individual components of the training.

*Table 4. Mean overall scenario and component ratings by instructors.*

<table>
<thead>
<tr>
<th>Team</th>
<th>Overall</th>
<th>Formation</th>
<th>Speed</th>
<th>Threshold Evaluation</th>
<th>Room Entry</th>
<th>Firearms Safety</th>
<th>Handling Persons</th>
</tr>
</thead>
<tbody>
<tr>
<td>PreTest</td>
<td>1.3</td>
<td>1.1</td>
<td>1.6</td>
<td>1.5</td>
<td>1.5</td>
<td>1.2</td>
<td>1.4</td>
</tr>
<tr>
<td>PreTest+</td>
<td>2.4</td>
<td>2.8</td>
<td>2.1</td>
<td>1.8</td>
<td>2.4</td>
<td>2.3</td>
<td>3.2</td>
</tr>
<tr>
<td>PostTest</td>
<td>4.1</td>
<td>4.4</td>
<td>4.5</td>
<td>3.7</td>
<td>3.3</td>
<td>4.1</td>
<td>5.0</td>
</tr>
<tr>
<td>RetentionTest</td>
<td>3.6</td>
<td>4.3</td>
<td>4.0</td>
<td>2.8</td>
<td>3.0</td>
<td>3.8</td>
<td>3.5</td>
</tr>
</tbody>
</table>

*Note.* Ratings were based on a 5-point Likert-type rating ranging from 1 = poor performance to 5 = excellent performance.

The PreTest team with had no active shooter training, performed very poorly (M = 1.3) and scored slightly higher than the lowest possible score. The PreTest+ team who received 2 hours of formation and firearm safety training, scored higher (M = 2.4) than the team with no active shooter training. Not surprisingly, the PostTest team whose members had most recently completed the active shooter course, scored higher than officers with no or minimal training (M= 4.1). The RetentionTest team whose members completed the course 6 months earlier, scored slightly lower than the PostTest team (M = 3.6), but higher than officers with no or minimal training. Overall team scores are presented in Figure 2 and the component scores for each team are presented in Figure 3.
Figure 2. Mean overall instructor scenario ratings with standard errors. Overall contact team performance during the simulated active shooter scenario as scored by training instructors. The PreTest team received no active shooter training before testing. The PreTest+ team received minimal active shooter training before testing. The PostTest team completed the full 16-hour active shooter course no more than 60 days prior to testing. The RetentionTest team completed the full 16-hour active shooter course at least 180 days before testing.

Figure 3. Mean instructor scenario ratings for each component with standard errors.
There was a slight benefit for the small amount of informal training the PreTest+ group received on the Formation and Firearms Safety components (approximately 2 hours). The PreTest+ group also appeared to do better than the PreTest group (no training) on Room Entry and Handling Persons. However, the PreTest+ group received no specific training on these two training components. Performance was better for the PreTest+ group than the PreTest group across all components, indicating that there was a benefit for minimal training.

Regarding capabilities lost over time, the RetentionTest group appeared to have lost capabilities related to Evaluating Thresholds and Handling Persons, suggesting these components may need more regular training than other components. The performance of the PreTest+ group on the areas they were trained indicates that short refresher training focused on particular task components is effective. Short training sessions after the initial training could provide a low time investment and cost-effective method of maintaining officer capabilities.

Comparing the two post-training groups, suggested that Overall, Evaluating Thresholds, Room Entry, and, perhaps, the Firearms Safety components were the most difficult for the post-training groups. The lowest performance of both post-training groups was on Room Entry, which indicated one or two possibilities. It may indicate that Room Entry should be covered more thoroughly than it was in the training courses, or it may indicate that Room Entry should be practiced regularly following training (refer to the Discussion section for more detail).

Although the previous analyses indicated that valuable declarative knowledge and important procedural abilities were learned, reactions to training are also an indicator of training effectiveness. If officers reject new training for any reason, they will not use the training. For example, if officers do not trust the training or dislike the training, they will not become active stakeholders. Therefore, an acceptability survey was completed to assess officer reactions to the local active shooter classes.

**Acceptability Survey**

**Method.** In order to assess trainee reactions to the training, a pre-training and post-training survey was distributed to the Mississippi active shooter classes by the MOHS. The survey presented statements such as “Active shooter response should not be a regular part of my training” and asked trainees to respond using a 5-point Likert-type scale with responses ranging from strongly agree to strongly disagree by circling the appropriate response. The survey statements were divided into the following categories: training quality, training relevance, training difficulty, effect on confidence, and awareness of effects of stress. The first four categories provided an assessment of trainee reaction to the training. The last category assessed knowledge about the effects of stress on performance. The reported results were based on 96 surveys received from the MOHS from across the state.

**Quality of training.** The statements related to the quality of training were asked only in the post-training survey. Overall, the responding officers tended to agree that the training was of high quality. Specifically, 98% of the officers claimed they would recommend that other officers complete the active shooter training and 94% expressed a desire to take the course again. When asked about the instructors, 93% of the officers felt the instructors instilled confidence and knew the material, while 59% felt that the methods learned during the training were new to them. The active shooter course focuses mainly on fundamentals; however, the popularity of this training could be explained by the trainee’s perception that they received novel training.
Relevance of training. Statements related to relevance of the training were presented in both the pre-training and the post-training survey. Students agreed before training that active shooter training was relevant to them; however, after training, 20% of the students shifted from “agree” to “strongly agree”, indicating that officer attitudes changed. On an item similar to an item related to quality of training, 96% of the officers felt that all officers should complete the training. When asked if the training would save their life or the lives of others, 96% of the officers felt that the training would help them save lives during an active shooter event.

Difficulty of training. In the post-training survey, officers were presented with statements related to the difficulty of the training. The trainees did not believe the paper exam was very difficult (only 26% rated it as difficult). However, officers found the Force-on-Force Simunition training to be more challenging. While they felt that all officers should complete the training (96%) and would recommend the training to other officers (98%), only 53% of officers felt that any officer could complete the training. Overall, there was a sense that the officers felt that the training had difficult components and the training was challenging.

Effect of training on confidence. The training course attempted to provide patrol officers with basic techniques for responding to an active shooter. The course taught officers that a 2-man team could and should immediately form a plan and make entry upon arriving at an active shooter scene, which is different the normal day-to-day job expectations for patrol officers. An important element of the training was instilling the confidence to respond to an active shooter. Before training, almost 30% of the responses were neutral or in disagreement that they were capable of responding to an active shooter. After the training, most of these officers shifted to agreeing or strongly agreeing that they were capable of responding to an active shooter. Ninety-seven percent (97%) of the officers credited the training with increasing their overall confidence while 93% believed that with another trained officer they could respond effectively and stop an active shooter.

Awareness of effects of stress. The acceptance survey included a number of statements related to awareness of effects of stress on performance. These were included on the pre-training survey and the post-training survey. Overall, officers tended to have a reasonably good awareness of the effects of stress before receiving the training. After the training, officers tended to have stronger opinions on the effects of stress but little else changed.

Training effectiveness summary

The evaluation of the effectiveness of training examined two aspects of the Kirkpatrick framework: learning and reaction. The evaluation of learning investigated two types of learning relevant to an active shooter training program. First, the knowledge gained and retained over time was evaluated using a paper knowledge test. Based on the pre-test, post-test, and retention-test scores, trainees gained significant knowledge during the training but over time they lost a significant amount of that knowledge. Second, changes in behavior during simulated active shooter scenarios were examined. While the amount of data for the pre-test, post-test, and retention-test, was too small for a formal statistical analysis of the change in performance, the data trends suggested that the operator course modified officer behavior to a simulated active shooter event. Some of the new behavior diminished over time, especially Evaluating Thresholds and Handling Persons. Given this diminished capability and the effectiveness of small, focused training as evidenced by the PreTest+ group’s performance, the development of small, regular practice courses would be appropriate to maintain acceptable skill levels.
Discussion and Conclusion

Although some analyses were limited, the consistency of knowledge gains and behavioral changes indicated the train-the-trainer active shooter response program effectively met the goals of providing inexpensive effective training on a broad scale to provide patrol officers with the basic techniques necessary to respond to active shooters. The relatively low number of deviations at the local level from the SME instruction indicated that training was consistent from instructor-to-instructor and across courses. Trainee reaction as measured by the acceptance survey indicated that the majority of officers accepted the training, believed it was relevant and useful, and would recommend the training to other officers. The knowledge and performance tests indicated that new knowledge and new capabilities were learned, and that some of the knowledge and capabilities were retained over long periods of time. Alternatively, the results clearly demonstrate that the skills needed to address active shooters depreciate over time. Given that some skills showed deterioration six months after initial training, retraining for some components probably should occur at least every six months.

Specifically, Handling Persons and Threshold Evaluation declined the most after six months. Arguably, both are extremely important from the standpoint of officer safety, because poor performance on either may lead to an increased risk of being shot. For example, improper threshold evaluation could cause an officer to telegraph his/her position to a gunman, and improper suspect handling could increase the likelihood of an officer’s weapon being taken. Approximately 20% of all police officers feloniously killed are shot with their own weapons (Ashley, 2007). Formation performance was best for both post-training groups, and six months after training there was only a negligible decrease in Formation performance. Thus, handling Persons and Threshold Evaluation appear to need retraining more often than Formations. The results indicated that brief training could remediate Handling Persons and Threshold Evaluation skills, but those skills might also be better addressed during initial training to increase skill retention.

With the exception of Formations, about the same amount of instructional time was devoted to each component during the initial training. Overlearning may be the reason Formation performance was about the same immediately after training and six months after training. With the exception of parts of the Firearms Safety training, all other components included being in a formation. In other words, formations were taught independently, and formation training was also integrated when the other components were taught. Arousal levels were not measured, but the scenarios used Simunition and, anecdotally, it appeared to be arousing. Assuming the test scenario was arousing, it is very likely that overlearning contributed to the better Formation performance than Handling Persons and Threshold Evaluation six months after training.

People perform best at an optimal arousal level and performance is poor above or below optimal arousal levels (i.e. Yerkes-Dodson Law, 1908). Although overlearning does not necessarily precipitate better semantic memory over time, it may lead to increased effective procedural mastery (Rohrer, Taylor, Pashler, Wixted & Cepeda, 2005), and overlearning can result in more advantageous performance at high levels of arousal because a behavior becomes automatic, requiring little thought (Yerkes & Dodson, 1908). In other words, overlearning may not increase performance on the paper knowledge test used in the present research, but could result in better scenario performance. The most important outcome of any active shooter response training is the ability to perform the appropriate behaviors (procedural mastery) in order
to immediately stop an active shooter. Presumably, responding to an active shooter would be highly arousing and automaticity would play a role in task performance. Ideally, all components should be overlearned because responding to an active shooter would be extremely arousing and overlearning would result in better performance.

The generalizability of the present research should be cautiously regarded because all active shooter training courses are not the same, but there are clear implications for active shooter response training. First, the skills needed to resolve active shooters are depreciable and it appears that retraining at six-month intervals is appropriate. If an active shooter training program is drastically different than the one evaluated in the present research, the evaluation methods presented here can be used to evaluate that program. Second, patrol officers need more and regular threshold evaluation training. Threshold evaluation is simply something patrol officers do not use regularly. Lastly, that patrol officers often choose not to use force even when it is warranted (International Association of Chiefs of Police, 2001), indicates they are good at handling people, but the present research indicated they need more training to handle people who are a homicidal threat.

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