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Evaluating Small-Scale Simulation for Training Firearm Safety Skills

by

Trevor Maxfield

A thesis submitted in partial fulfillment
of the requirements for the degree of
Master of Science
Applied Behavior Analysis
Department of Child and Family Studies
College of Behavioral and Community Science
University of South Florida

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Keywords: Safety skills, firearm safety, gun safety, simulation training, in situ assessment, small-scale simulation, side effects

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Dedication

I dedicate this manuscript to my father and step-mother, Chris Maxfield and Donna-Marie Maxfield, for their never-ending support of my goals, unconditional love, and wealth of life advice. I would also like to dedicate this manuscript to my sister and brother-in-law, Dejah and Michael Reno, for being their whenever I needed them.

Acknowledgements

I would like to acknowledge the efforts of my thesis committee, Dr. Crosland and Dr. Catia, for their support and assistance during my thesis proposal and defense. Additionally, would like to acknowledge my research assistances for their hard-work and flexibility to help me, Marissa Novotny and Codye Manning. Most importantly, I would like to acknowledge all the efforts of my thesis advisor, Dr. Miltenberger, whom without, this could not have been possible.

Table of Contents

List of Figures

Abstract

There is limited research using small-scale simulation in applied behavior analysis. We used small-scale simulation to train firearm safety skills to 3 to 5-years-old children and assessed whether the skills generalized to the natural environment through in situ assessment. Three participants completed the training and all participants learned the safety skills from simulation training. Two of the participants acquired the safety skills after the first simulation training and the third participant required one booster training before demonstrating the safety skills in the natural environment.

Keywords: *Safety skills, firearm safety, gun safety, simulation training, in situ assessment, small-scale simulation, side-effects*

Introduction

Children need to be trained to recognize a situation with potential harm and to navigate it safely to ensure that they never encounter its natural –and potentially fatal- consequences. One potentially harmful situation is finding a loaded firearm (Eber, Annest, Mercy, & Ryan, 2004). Connor and Wesolowski (2003) used 628 telephone surveys to determine how caregivers thought their children would react to finding a gun; 87% reported that they did not feel that their child would be in danger if exposed to a firearm. However, Jackman, Farah, Kellerman, and Simon (2001) investigated what 8- to 12-year-old boys would do if they found an unlocked firearm, and found that 30 of the 48 boys who found the firearm handled it. Furthermore, the boys were unable to determine if the firearm was real or a toy. Of the boys that handled the firearm, half of them pulled the trigger with enough force to discharge the firearm. In 2014, The Centers for Disease Control and Prevention (CDC) reported 180 unintentional deaths and injuries from firearms among children ages 0 to 5 years-old. This report did not include cases where children discharge firearms by accident without causing injury or death and is likely to underrepresent the number of accidental firearm discharges. Every single one of those injuries and deaths was preventable. In a perfect world, there would be no need to teach children to avoid firearms. All gun-owning individuals would keep their firearms unloaded, locked, and safe from children who could find them. This is unfortunately not the world that we live in. We do live in a country where one third of homes in the United States has at least one firearm (Smith, Lanken, & Son, 2015). We live in a country where 60% of individuals who purchase firearms do so for self-

defense per a Gallup poll completed in 2013, and those individuals are less likely to store firearms safely to have them ready for use in case of home invasion. The need to teach firearm safety skills is, therefore, paramount and requires research to ensure training that is effective, efficient, and affordable.

In research on teaching safety skills, researchers have used three forms of assessment: verbal assessment, skills assessment, and in situ assessment (Miltenberger, 2008). A verbal assessment occurs when a researcher describes a safety threat and asks the child what he or she would do in that situation. The child's description of the safety skills is recorded (Gatheridge et al., 2004; Himle, Miltenberger, Gatheridge, & Flessner, 2004). Researchers use skills assessments (aka, role play assessment) to determine the level of safety skills present in the participant's repertoire. The researcher describes an environment that resembles the environment where a potential danger is most likely to occur and asks the child to engage in the safety skills (e.g., Gatheridge et al., 2004; Himle & Miltenberger, 2004; Miltenberger, 2008). For example, the experimenter might ask the child to imagine she is in her parent's bedroom and finds a gun on the bed. The experimenter then places a disabled gun on a table and asks the child to "show me what you would do," (e.g., Gatheridge et al., 2004; Himle, Miltenberger, Flessner, et al., 2004). Skills assessment is useful to assess safety skills but does not assess whether the participant will use those skills when in a potentially dangerous situation in the natural environment when no one is around (Miltenberger, 2008). In situ assessment is used to determine generalization of safety skills (Gatheridge et al., 2004; Kelso, Miltenberger, Waters, Egemo-Helm, & Bagne, 2007).

In situ assessment evaluates an individual's safety skill repertoire in the natural environment with a simulated safety threat (e.g., Gunby & Rapp, 2014; Jostad, Miltenberger,

Kelso, & Knudson, 2008; Miltenberger et al., 2005, 2009). The person being evaluated is naïve to the assessment and is unaware of the presence of any researchers to ensure the validity of his/her response to the safety threat. This method of assessment yields a valid measure of whether the participant will use the safety skills in the presence of the safety threat in the natural environment.

Research has focused on three methods of teaching firearm safety skills: informational approach, behavior skills training (BST), and in situ training (IST). The informational approach uses instruction and/or modeling (including live or video modeling) to teach individuals what to do in a potentially dangerous situation. Gatheridge et al., (2004) compared the Eddie Eagle GunSafe program and BST. The Eddie Eagle GunSafe program is an informational approach that teaches children to verbalize the safety skills "stop, don't touch, leave the area and tell an adult." The program uses videos, pictures, and other activities such as coloring books (Gatheridge et al., 2004; Himle, Miltenberger, Gatheridge, et al., 2004; Kelso et al., 2007). Gatheridge et al. (2004) found that the Eddie Eagle GunSafe program was effective at teaching children, ages 4 to 7, to verbalize the safety skills, but was not effective at teaching children to use those skills during skills assessment or in situ assessment. However, BST was effective at teaching safety skills during skills assessment and in situ assessment. Himle, Miltenberger, Gatheridge, et al. (2004) found similar results; the Eddie Eagle GunSafe program was not effective when skills were assessed using skills assessment or in situ assessment. Hardy, Armstrong, Martin, and Strawn (1996) used law enforcement officials to lecture to a group of children on the dangers of firearms and what to do if they found one. The authors showed that this informational approach was not effective; children who received the training were just as likely to touch a gun as were children in the control group. Results from research investigating informational approaches have

demonstrated that they are ineffective at teaching safety skills (Gatheridge et al., 2004; Himle, Miltenberger, Gatheridge, et al., 2004; Kelso et al., 2007). Despite the subjects being able to verbalize the safety skills, they did not demonstrate the safety skills consistently in skills assessment or during in situ assessment (Gatheridge et al., 2004; Himle, Miltenberger, Gatheridge, et al., 2004; Kelso et al., 2007).

In behavioral skills training (BST), the trainer provides the trainee with information on the safety skill, models the safety skill, provides the trainee with the opportunity for multiple rehearsals in the contrived environment, and delivers feedback on the trainee's performance. (e.g., Gatheridge et al., 2004; Miltenberger, 2008). The feedback includes both descriptive praise for correct performance and corrective feedback (further instruction) for errors. The trainee rehearses the safety skills until s/he demonstrates all of the safety skills correctly in multiple contrived situations in which the trainee is most likely to encounter the potential danger. Behavioral skills training has been used to train individuals and small groups, achieving similar results (Dancho, Thomson, & Rhoades, 2008; Gatheridge et al., 2004; Himle, Miltenberger, Gatheridge, & Flessner, 2004).

Despite the demonstration of safety skills in a contrived environment, trainees do not consistently demonstrate those skills during in situ assessment. Himle, Miltenberger, Flessner, et al. (2004) and Miltenberger et al. (2004) showed that half the children exhibited the safety skills following BST and half required in situ training (IST) to exhibit the skills during in situ assessments. However, Kelso et al. (2007) found that children taught using the informational approach and BST did not differ during the in situ assessment of firearm safety skills. All of the participants required IST to generalize the safety skills to the natural environment.

The third skills training method is in situ training. If the trainee does not demonstrate the safety skill during an in situ assessment, in situ training begins (e.g., Dancho et al., 2008; Gunby & Rapp, 2014; Miltenberger et al., 2013). The previously unseen trainer steps in and gives immediate feedback as soon as the trainee fails to demonstrate the safety skills. The trainee then rehearses the safety skill in the in situ assessment environment. In situ training has been the only method of training to produce consistent results for all trainees during in situ assessments; however, the number of IST sessions required for safety skills generalization is variable. Some trainees require a single session, while others require more (e.g. Gatheridge et al., 2004; Himle, Miltenberger, Flessner, et al., 2004; Miltenberger et al., 2004). Miltenberger et al. (2004) used IST for children who did not generalize firearm safety skills to the natural environment following BST. The three participants that required IST received anywhere from four to 10 sessions of IST, with one study participant requiring an incentives phase to establish motivation.

While literature has focused on BST and IST, another training method – simulation training - has not received as much attention. Simulation training is training that simulates stimuli from the natural environment or incorporates some replica of stimuli from the natural environment into to the training situation. It allows the participants to respond to the stimuli in a training environment as they would in the natural environment (Thornton & Hanson, 2004). Simulation has been used for many years to teach a variety of skills. Since the Roman sand tables (Perla, 1990), militaries around the world have used forms of simulation training, war games, to teach battle strategies. Militaries continue to teach life-saving field skills using simulation training such as role-playing and virtual reality simulation. In 1929, Edwin Link created the world's first flight simulator to train pilots to use the plane's instruments to "fly blind" in inclement weather. During World War II, pilots used the Link Trainer to learn to fly bomber

planes (Link, 1937). In the 1960s, simulation training became more popular in the field of medicine, where work on corpses was used to simulate the treatment of human patients to teach the administration of anesthesia and endotracheal intubation (Lateef, 2010). Simulation training was also used to teach a number of critical skills required of anesthesiologists, such as emergency responses and team communication. The medical field is in transition to the integration of simulation training into their teaching and training methods (Aebersold, 2016). With safety as a common driving force, simulation training has been adopted and is being well-integrated into the training of safety skills in the military, aviation, and medical fields.

In small-scale simulated training, a trainee manipulates a doll or avatar of some kind to represent him/her in a tangible small-scale modeled environment. Page, Iwata, and Neef (1976) used dolls and a small-scale model environment of four square city blocks to train pedestrian safety skills to five adults with intellectual disabilities. The small-scale environment included pictures of the area the model represented, along with stoplights and stop signs made of cardboard, with people, houses, trees and other common stimuli that were either drawn or glued onto the small-scale model. Their results showed that the pedestrian skills generalized from the small-scale environment to the natural environment. Neef, Iwata, and Page (1978) used the same small-scale model environment from the previous study to teach bus riding skills and found similar results. They used simulation to train the participants to ride the public bus and compared the results to on-site training. On-site training included a researcher accompanying the participant on the street and the bus and providing modeling, other forms of prompts, and verbal feedback. Neef et al. (1978) found that the simulation training was as effective as on-site training for teaching the bus-riding skills. In addition, simulation training required, on average, one-

quarter of the amount of training time and a quarter of the cost as compared to the on-site training.

BST is not always effective at teaching skills that generalize to the natural setting (e.g. Himle, Miltenberger, Flessner, et al., 2004; Kelso et al., 2007; Miltenberger et al., 2004). To date, there is not a study comparing BST and small-scale simulation training, but the results from the two training methods are similar. Some of the participants generalize the skills to the natural setting and some do not. Page et al. (1976) and Neef et al. (1978) provided evidence that small-scale simulation is a time and cost-effective method of training. In addition, small-scale simulation training might be more effective at teaching safety skills with younger populations who engage in play using dolls. There is limited research on teaching children younger than 6-years-old, therefore, more research is needed. There is some evidence that BST and IST are effective at training children 4- to 5-years-old (Himle, Miltenberger, Flessner, et al., 2004; Miltenberger et al., 2004), but there is currently no research on the effectiveness of using simulation training for children or persons without diagnoses of developmental disabilities.

The purpose of this study was to determine if small-scale simulation training is effective for teaching firearm safety skills to children 3- to 5-years-old. The research addressed the following questions:

1. Will children 3 to 5-years old learn firearm safety skills through small-scale simulation training?
2. Will the safety skills learned in the small-scale model generalize during in situ assessment?
3. Will there be behavioral side-effects to the participants from being exposed to a firearm?

It was hypothesized that the participants would learn to engage in firearm safety skills from the small-scale simulation training and the training would generalize to the natural setting and no adverse side-effects would be reported by the parents of the participants.

Methods

Participants and Setting

Four participants were recruited for the study using fliers and word-of-mouth. Participants were ages 3- to 5-years old and all participants were required to follow simple instructions and report objects seen in another room which was determined by a probe assessment. The probe consisted of placing a known stimulus in a separate room and asking the participant to go to the room containing the stimulus, look at it, and return to tell the caregiver what the stimulus was. All participants recruited for this study were typically developed.

Tom was a 4-year old boy who lived in a three-bedroom house, Ron was a 5-year old boy who lived in a three-bedroom house, Hermione was a 3-year old girl who lived in a four-bedroom home, and Harry was a 4-year old boy who also lived in a four-bedroom home. Ron was the only participant whose parents had a firearm in the home during the study that was kept in a lockbox. The participants were recruited through flier dissemination, through businesses, and word-of-mouth from people who had information about the study.

The simulation training and assessment took place in a common area of the participants' houses. The areas used for training and assessment were determined via an initial walk-through, after a signed consent form was received. Areas chosen for training and assessment were determined by which areas were available in the participant's home and the amount of clutter in the room. Areas that were included were: the kitchen, bedroom, family room, dining room, front porch, and yard.

Materials

A small-scale model environment was crafted from reclaimed wood. The house was painted and decorated using patterned paper and cloth. Other household items, furniture, plants, and appliances were created from wood scraps and painted or colored, and small plastic versions were purchased from online stores. The house had 2 bedrooms, a living room, dining room, kitchen, and bathroom with no ceilings or roof so the rooms were open and visible to the child. Dolls of varying ethnicity and both genders were provided to the participants for the doll to resemble the participant. The cost of materials was about $130.00. A video camera was used to record the participant's interactions in the natural environment during in situ assessments and during assessment and training in the model. Two different types of disabled handguns were used for the in situ assessments, a revolver and a pistol. Both firearms were disabled by metal filled barrels, welded hammers, welded and removed magazines, and welded triggers.

Target Behaviors

The target behaviors were not touching the firearm, leaving the area containing the firearm, and informing an adult of the firearm. During in situ assessment and simulation assessment, the target behavior was scored using a 0-3 point scale. A score of 0 was given if the participant touched the firearm during the assessment; a score of 1 was given if the participant did not touch the firearm and stayed in the room with the firearm; a score of 2 was given if the participant did not touch the firearm, left the area, but did not inform an adult; a score of 3 was given if the participant did not touch the firearm, left the area, and informed the adult. In addition, an alternate 3 was possible if the participant did not touch the gun and yelled for the adult to come to the room; whereby, the adult entered the room and removed the firearm. All

participants were capable of reporting events with phrases and sentences. In addition, we recorded what the participants did with the firearm when they touched or grabbed them.

Assessment

Two forms of assessment were conducted, in situ assessment and assessment in the model (simulation assessment). In situ assessment consisted of planting the disabled firearm where the participant was likely to discover it, and observing the behavior of the participant via video recording without the child's knowledge. The researcher was not on property during the in situ assessments. The researcher would park across from the house or about 30-meters from the home and observe the assessment using a smartphone. The participant's caregiver asked the participant to go to the room where the disabled firearm was planted by the researcher or parent and to follow an instruction that necessitated the participant locating the firearm. For example, the caregiver asked the child to play with some toys in the room where the firearm was placed. The firearm was clearly visible in the room. If the child did not return after 30-s from the instruction, the caregiver was instructed to go to the room and ask the child to come out. The caregiver was instructed to refrain from providing feedback on the child's performance when the child returned independently or required the caregiver to retrieve the child. Simulation assessment consisted of the participant manipulating the doll in the small-scale model. The participant was instructed to perform an action with the doll that would necessitate the participant finding the toy firearm. For example, the researcher, while manipulating a doll representing the adult, said "pretend to watch TV." The toy firearm has already been placed under the miniature TV the participant has been instructed to watch in the scenario. The level of safety skill demonstration with the doll was recorded.

Interobserver Agreement, Treatment Integrity, and Social Validity Measures

Interobserver agreement (IOA) and treatment integrity was calculated for 64% of the sessions throughout the study via video recordings, which were scored by research assistants. For IOA, the second observer recorded the target behavior and the recordings of the two observers were compared. The number of agreements on the target behavior was divided by the number of agreements and disagreements to calculate interobserver agreement. For treatment integrity, the second observer recorded the steps in the intervention task analysis (see appendix A) and the percentage correct was calculated by dividing the number of steps correct by the number of total steps. A social validity questionnaire was provided using a 5-point Likert scale to gather the caregiver's opinions of the study such as "Would you recommend this form of training to other families?" and "How much did you enjoy doing this study?" (see Appendix B)

Side Effects Questionnaire

In addition to the social validity questionnaire, the caregivers were asked to complete a side effect questionnaire adapted from the side effects questionnaire used by Johnson et al. (2005). The side-effect questionnaire asked questions related to any changes in the participant following the study such as "Do you believe he or she is more likely to play with firearms?" (see appendix c). A six-item questionnaire was provided to the caregiver of the participant to assess changes in behavior following the study and to receive feedback on their attitude of the study. The questionnaire was provided with a pre-postage envelope to mail the completed questionnaire to the author anonymously.

Procedure

Small-scale simulation training was used with multiple probe design across participants. Baseline data were collected using in situ assessment and simulation assessments as described

previously. Phase changes were based on in situ assessment data. Following the conclusion of the baseline phase, the participants were provided with a session of small-scale simulated behavior skills training, followed by an in situ assessment to avoid the possibility that a simulation assessment would possibly provide further training to the participant due to the researcher's presence and possible feedback. Mastery criterion was reached when participants received a score of 3 during three consecutive in situ assessments. When the participant did not score a 3 during the in situ assessment, a booster session of simulation training was provided followed by another in situ assessment.

Baseline. Baseline consisted of in situ assessments and simulation assessments. No feedback or other consequences were delivered for participant performance by the researcher or caregiver. The caregivers were trained using BST to ensure that they were adequately prepared and did not provide feedback to the participant. The researcher instructed the caregiver on what to do, modeled the appropriate way to retrieve the child from the assessment room and how to remove the firearm from the child appropriately, rehearsed scenarios with the researcher as the child in the scenarios, and provided positive and corrective feedback to the caregivers until performance reached a satisfactory level. The participants were not present during parent training, and the parents were trained in multiple scenarios. The scenarios included what to do if the participant comes out of the assessment room with the firearm, if the participant talked about the firearm, if the participant pointed the firearm at self, if the participant pointed and made firearm sounds, and if the participant pointed the firearm at another person, animal, or object.

Simulation training. Each simulation training session included modeling, instruction, rehearsal, and feedback, and required the children to verbalize the safety skills as they manipulated a doll in the model. The small-scale model was placed in front of the participant

after the researcher provided a scenario and placed the toy firearm in the model. The participant was provided with instructions on what to do with the doll, and the researcher informed the participant of each safety skill step. The researcher modeled the correct behavior by manipulating a doll in the model while verbalizing each safety skill step. For example, upon finding a gun the researcher said, “There’s a gun! Need to tell mommy,” used the doll to run to the mommy doll, and then said, “Mommy there’s a gun.” The participant rehearsed the safety skills with the doll while verbalizing them, and the researcher provided feedback on the performance. The participant continued to practice the safety skills with the doll and received feedback until all safety skill steps were demonstrated correctly three consecutive times. Multiple exemplars were trained in each session by changing the location of the gun and the instruction provided to the participant. The duration of training was recorded and averaged across training sessions 5 min and 52 s.

Results

The three participants who completed training all engaged in the safety skills during in situ assessments following simulation training. Tom touched the firearm during two different in situ assessments in baseline. In the first assessment, Tom picked up the firearm by the handle and had it pointed towards the ceiling, replaced the firearm, and stayed in the assessment area without reporting the event. During the second in situ assessment, Tom touched the handle of the gun with his pointer finger and moved it in a circular motion. He did not leave the area or report the firearm later. During the simulation assessment, Tom touched the firearm in the model with his doll and pretended to carry it around the house. Following the first simulation training, Tom reported the firearm to his mother during the in situ assessment; however, he also touched the firearm with his pointer finger as he walked out of the room to tell his mother. As a result, he scored a 0 for that assessment. His mother decided to end their participation in the study after that assessment due to time constraints in her schedule.

Ron had two in situ assessments and two simulation assessments in baseline. He did not touch the gun during in situ assessment, he also did not leave the area and did not report the firearm to the parent at any point prior to training. Ron demonstrated the same level of safety skills during simulation assessments. Following the first simulation training, Ron demonstrated all safety skills during three in situ assessments and two simulation assessments. Hermione's safety skill demonstration during baseline was the same as Ron's. Following the first simulation training, she scored a 3 in three in situ assessments; she attracted the attention of her mother and reported the firearm in the first assessment and left the area and reported the firearm to the parent

without touching it the next two assessments. She did not have any simulation assessments after training due to refusal to use the model after the training.

Harry scored a 0 in the first baseline in situ assessment; he touched the firearm and lifted it slightly with the tips of his fingers before dropping it and leaving the area. He did not report the firearm to his parents. In the remaining baseline assessments (in situ and simulation) Harry scored a 1; he did not touch the firearm, nor did he report the firearm prior to training. During his first in situ assessment after training, Harry brought the disabled firearm to his mother and reported finding it. During a simulation assessment following that, Harry demonstrated all safety skills in the model. A booster simulation training was completed, and he demonstrated all safety skills during the following in situ assessments as well as an additional simulation assessment.

Social validity was collected from four parents using questionnaires provided to them at the end of the study and their ratings were averaged. Parents agreed to strongly agreed that their child is safer now when he/she finds a gun (4.75), would recommend this training to others (4.75), believed that they would be able to do the training themselves (4.75), their child enjoyed participating (4.5), and liked the procedures used to train their child (4.75). A side-effects questionnaire was completed by four parents. All parents reported that they were very satisfied with communication from the researcher. One parent was neutral about participating in the study and three parents reported they were very pleased with participating. Two parents reported no change when asked if their child appeared to be more scared of firearms, and the others reported less and much less scared of firearms. One parent reported that their child was a little more cautious to touch firearms and three reported much more cautious. One parent reported no change when asked if their child was more concerned about the issue of firearms. One parent reported less upset and two parents reported a little more upset. When asked to note any behavior

changes, one parent wrote that he/she noticed their child being honest regarding firearms and felt that their child understood the importance of reporting firearms when found. One parent did report that they terminated their child's participation in this study due to scheduling conflicts. Treatment integrity was 100% and calculated for 60% of the training sessions.

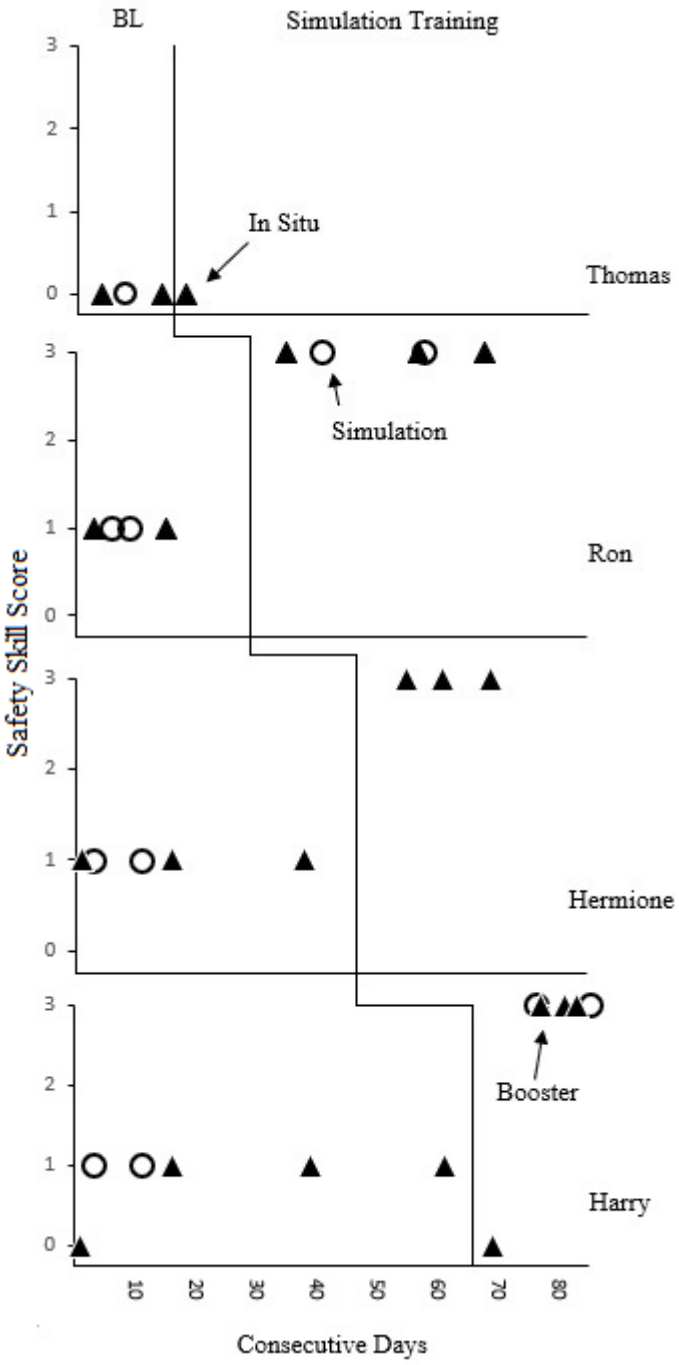

Figure 1. Each child's score during simulation and in situ assessments in baseline and simulation training phases. The circles represent simulation assessment and the triangles represent in situ assessment.

Discussion

This study investigated teaching firearm safety skills using small-scale simulation training in a model home built by the principal investigator. Little research has been conducted on this method of training. Findings from this study suggest that simulation training could be an effective method of training firearm safety skills. Ron and Hermione demonstrated the safety skills during in situ assessments after a single simulation training session and Harry required an initial training session and one booster training before demonstrating the safety skills during an in situ assessment. Interestingly, although he scored a 0 because he touched the gun during the first post training assessment he also got away and reported the firearm which was a skill not demonstrated in baseline. Tom was removed from the study by his caregiver before training was completed so it is unclear if he would have benefitted from training. However, similar to Harry, after one training session, he touched the gun but also got away and reported the firearm, a skill he did not demonstrate in baseline. Except for Hermione, the participants reported that the training was enjoyable. She was resistant to follow instruction and became noncompliant during the training for a short while; however, she did complete the training and the skills generalized to the natural environment.

This study demonstrated the potential of small-scale simulation training, in particular, training delivered on a table-top model using a doll to engage in the safety skills. It adds support for the effectiveness of small-scale simulation training as demonstrated by Page et al. (1976) and Neef et al. (1978) who used this method to train pedestrian skills to adolescents and adults with intellectual disabilities. In the current study, the model home was not individualized to the

participants but contained common stimuli that any house would likely have. The lack of similarity of the small scale-model to the participant's home did not appear to affect the generalization of safety skills to the natural environment. This is an important finding as it suggests that a generic model home might be used in training and produce behavior change that generalizes to the child's actual home.

It is unclear what components of the small-scale simulation model contributed to the effectiveness of the training. It is likely that the requirement that the participants actively engage the doll in the safety skills and the feedback provided by the experimenter for engaging the doll correctly contributed to correct responding during in situ assessments. It is also possible that requiring the child to verbalize the dolls behavior as the doll engaged in the safety skills contributed to the generalized use of the skills in the home. More research needs to identify the essential components of simulation training. Furthermore, it is not clear what aspects of the model are necessary for effectiveness. It is possible that the model could have fewer stimuli present and retain its effectiveness, or the dolls used in the model did not need to resemble the participant as did the dolls in this study. In the current study, the dolls were not posable which limited the behavior the participant could engage in using the dolls. Posable dolls may improve the quality of training in the small-scale simulation. Although this limitation did not limit the effectiveness of simulation training in this study, posable dolls might increase generalization for some children. Another limitation was the safety skills were only assessed in-home as was the model's purpose; it is unclear whether the safety skills would generalize to other settings such as a school or store. Additionally, because the study did not evaluate in situ training, the researcher was unable to compare the average training time for in situ training and small-scale simulation

training to replicate the claim that small-scale simulation training was four times faster than in situ training (Neef et al, 1978).

Future research should include a replication of this study with a larger number of children, children of different ages, children with different ability levels, and different target behaviors (e.g., poison prevention skills) due to limited research on this method of training. The model could also be adapted to train the skill for different settings other than a home, as well as including peers in the training to determine if the training remains effective when a peer attempts to touch or convince the participant to touch a firearm. The utility of the model to teach large numbers of children should also be assessed as it has potential to be used as a mass training tool. For example, research should evaluate the effectiveness of small scale simulation training in a classroom or preschool setting with groups of children. The success of this rudimentary form of simulation training suggests that more complex forms of simulation training (e.g., virtual reality) could be highly effective for teaching a variety of skills. However, research needs to evaluate whether manipulating an avatar electronically in a virtual reality simulation is as effective as the act of physically manipulating a doll in the model that is physically present in the environment. More research is needed to investigate the full range of simulation training for teaching safety skills and other important skills to children.

In summary, this study demonstrated that a low tech, inexpensive, and efficient form of simulation training was effective for teaching safety skills in just one or two sessions. Although these results are preliminary, this approach has the potential to increase the accessibility of safety skills training. More research should evaluate this approach and the parameters that contribute to its effectiveness.

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Appendices

Appendix A: Simulation Treatment Integrity Scale

Task	Pass	Fail
1. Arrange model to resemble the environment and placing the firearm where it is likely to be found		
2. Present the model to the participant and assign dolls and roles (e.g. mother or father doll)		
3. Present SD to engage in play with the doll in the small-scale model		
4. If the participant does not engage in one or more of the safety skill steps: a) Immediately stop the play in the small-scale environment		
b) Provide positive and corrective feedback		
c) Model the correct behavior using the doll		
d) Have the participant rehearse the safety skill steps until all steps are done correctly		
e) Rearrange the model and set up a different scenario until all steps are done correctly in a total of 5 scenarios		
5. If the participant does engage in all safety skill steps correctly provide social positive reinforcement		

Appendix B: Social Validity Questionnaire

On a scale of 1 to 5, Please circle your level of agreement with the statements below.	Rating
I believe my child is safer now when he/she finds a gun. 1 2 3 4 5 strongly disagree disagree neutral/ no opinion agree strongly agree	
I would recommend this form of training to others. 1 2 3 4 5 strongly disagree disagree neutral/ no opinion agree strongly agree	
I believe that I would be able to use this form of simulation training with my child. 1 2 3 4 5 strongly disagree disagree neutral/ no opinion agree strongly agree	
My child enjoyed participating in this study. 1 2 3 4 5 strongly disagree disagree neutral/ no opinion agree strongly agree	
I liked the procedures used to teach my child. 1 2 3 4 5 strongly disagree disagree neutral/ no opinion agree strongly agree	

Additional Comments regarding the study:

_____
_____
_____
_____
_____
_____

Appendix C. Side-Effects Questionnaire Items

1. Compared to before this study my child now appears:
    a. Scared: afraid to leave parents, showing fear of firearms
        __Much more scared
        __A little more scared
        __No change
        __Less scared
        __Much less scared

    If a change occurred, please describe briefly

    _____
    _____
    _____

    b. Cautious: hesitant to touch firearms
        __Much more cautious
        __A little more cautious
        __No change
        __Less cautious
        __Much less cautious

    If a change occurred, please describe briefly

    _____
    _____
    _____

    c. Upset: concerned about the issue of firearms, personal safety, etc.
        __Much more upset
        __A little more upset
        __No change
        __Less upset
        __Much less upset

2. Other changes I noted in my child's behavior are: Please describe or mark N/A if no change was observed

    _____
    _____
    _____

3. How pleased are you that your child participated in the study?
        __Very pleased
        __Pleased
        __Neutral
        __Disappointed
        __Very disappointed

4. How satisfied are you with the way the researchers communicated what was going on throughout the study?

__Very satisfied
__Satisfied
__Neutral
__Unsatisfied
__Very unsatisfied

5. Did you terminate your child's participation in the study? Yes or No If yes, please explain why

_____
_____
_____

6. Please note any additional comments you have about the study.

_____
_____
_____

Appendix D: USF IRB Approval

RESEARCH INTEGRITY AND COMPLIANCE
Institutional Review Boards, FWA No. 00001669
12901 Bruce B. Downs Blvd., MDC035 • Tampa, FL 33612-4799
(813) 974-5638 • FAX(813) 974-7091

4/28/2017
Trevor Maxfield College of Behavioral and
Community Sciences 14410 Caribbean Breeze
Dr. #101 Tampa, FL 33613

RE:	Full Board Approval for Initial Review
IRB#:	Pro00028213
Title:	Evaluating Small-Scale Simulation for Training Firearm Safety Skills

Study Approval Period: 3/17/2017 to 9/17/2017

Dear Mr. Maxfield:

On 3/17/2017, the Institutional Review Board (IRB) reviewed and **APPROVED** the above application and all documents contained within, including those outlined below.

Approved Item(s):

Protocol Document(s):

28213 IRB protocol version 1

Consent/Assent Document(s)*:

28213 Combined Consent ver 1.pdf

*Please use only the official IRB stamped informed consent/assent document(s) found under the "Attachments" tab. Please note, these consent/assent documents are valid until the consent document is amended and approved.

Research Involving Children as Subjects: 45 CFR §46.404

This research involving children as participants was approved under 45 CFR 46.404: Research not involving greater than minimal risk to children is presented.

Requirements for Assent and/or Permission by Parents or Guardians: 45 CFR 46.408
Permission of one parent is sufficient.

Assent is not appropriate due to the age, maturity and/or psychological state of the child.
As the principal investigator of this study, it is your responsibility to conduct this study in accordance with IRB policies and procedures and as approved by the IRB. Any changes to the approved research must be submitted to the IRB for review and approval via an amendment. Additionally, all unanticipated problems must be reported to the USF IRB within five (5) calendar days.

We appreciate your dedication to the ethical conduct of human subject research at the University of South Florida and your continued commitment to human research protections. If you have any questions regarding this matter, please call 813-974-5638.

Sincerely,

John Schinka, Ph.D., Chairperson
USF Institutional Review Board