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## An Evaluation of Parent Implemented Web-Based Behavior Skills Training for Firearm Safety Skills

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An Evaluation of Parent Implemented Web-Based Behavior Skills Training for Firearm Safety  
Skills

by

Marissa Ann Novotny

A dissertation submitted in partial fulfillment  
of the requirements for the degree of  
Doctor of Philosophy  
Applied Behavior Analysis  
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## **Dedication**

I dedicate this manuscript to my parents Kelly and Cathy Novotny. I can never repay you for patiently listening to all the late night phone calls I made (especially during Hurricane Irma). Additionally, I dedicate this manuscript to my amazing older sister Tasha Novotny for always knowing what to say to me even if I did not want to hear it and my brother-in-law Chris Kulzer for always making me feel like I was not intruding whenever I visited for weeks on end. Lastly, I dedicate this manuscript to my beautiful and smart nephew Kenton and niece Ada you will not remember this but your smiles and giggles made getting through all the tough time so much easier (even though you usually hung up on me). You are everything anyone could ask for in a family.

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## Table of Contents

List of Tables .....	iii
List of Figures .....	iv
Abstract .....	v
Introduction .....	1
Background of Safety Threats .....	1
Assessment of Safety Skills .....	3
Verbal Report Assessment .....	3
Role-Play Assessments .....	5
In Situ Assessment .....	7
Training Safety Skills .....	10
Informational Approach .....	11
Active Learning Approaches .....	15
Behavioral skills training .....	15
In situ training .....	18
Increasing Accessibility of Safety Skills Training .....	20
Manual Development .....	25
Purpose Statement .....	29
Phase I: Web-Based Behavioral Sills Training Manual .....	29
Method .....	29
Participants and Settings .....	29
Materials .....	30
Data Collection .....	31
Procedures .....	31
Results .....	31
Phase II: Parent Conducted BST .....	33
Method .....	33
Participants and Setting .....	33
Materials .....	34
Target Behaviors and Assessment .....	34
Interobserver Agreement .....	35
Procedural Fidelity .....	36
Social Validity Questionnaire .....	36
Design and Procedures .....	36
Baseline .....	37
Parent-conducted BST .....	37
In-situ training .....	38
Results .....	38
Discussion .....	40

References.....	44
Appendices.....	57
Appendix A: Expert Questionnaire.....	58
Appendix B: Parent Questionnaire .....	62
Appendix C: Treatment Fidelity Checklist.....	65
Appendix D: Social Validity Questionnaire .....	66
Appendix E: Side Effects Questionnaire .....	68
Appendix F: Consent Form.....	71
Appendix G: IRB Approval .....	78

**List of Tables**

Table 1: Expert ratings .....51

Table 2: Parent ratings .....53

Table 3: Expert and parent comments .....54

## **List of Figures**

Figure 1: Safety scores during in situ assessments for group 1 .....55

Figure 2: Safety scores during in situ assessments group 2.....56



## **Abstract**

Behavioral skills training (BST) is effective for teaching safety skills but often requires a behavior analyst to conduct the training, which can make it costly and inaccessible for most parents or teachers. Parent-conducted BST may allow for children to receive training without the need for a trained behavior analyst. However, providing parents with training can often be difficult. Manualized training from a website could allow parents access to needed material at a low or no cost. This study evaluated a web-based manualized intervention implemented by parents for teaching firearm safety skills using BST. First, BST experts and parents validated the web-based manual. Next, we used a multiple-probe across participants design to assess the effectiveness of parent-conducted BST. Results indicate that three children acquired the safety skills after parent-conducted BST alone, and the other three children required experimenter-conducted IST. The advantages of parent-conducted BST, limitations, and areas for future research are discussed.

## **Introduction**

### **Background on Safety Threats**

Children engage in a variety of safety skills throughout their lifetime. Some safety skills children practice on a daily basis (e.g., pedestrian skills, wearing seatbelts while in a car, and wearing a helmet while riding bike), while other safety skills are taught in some natural environments even when the threat is not present (e.g., fire drills, school lockdowns, tornado drills). However, there are other safety skills that are rarely, if ever, practiced in the natural setting (e.g., staying away from firearms, medications, and cleaning supplies; and responding to abduction lures) (Miltnerberger, 2008). Shows like Dateline (NBC News) have made parents aware that it is important for children to practice safety skills related to firearms by showing that even though children say they will respond correctly when they come into contact with a firearm, when they are put into the actual setting, they often times do not respond correctly.

Three safety threats that have been the focus of behavioral research include kidnapping, firearm injury, and poisons. These safety threats share some features in that they are low rate events that some children may never experience, and they are potentially life threatening; thus the child must engage in safe responses immediately when encountering such a threat.

A stereotypical kidnapping is defined as a nonfamily abduction in which the perpetrator is a slight acquaintance or a stranger and the child is detained overnight, transported at least 50 miles, held for ransom or abducted with the intent to keep or kill the child (Finkelhorn, Hammer, & Seldak, 2002). During stereotypical kidnappings, perpetrators often entice children by using one of four types of lures; simple, authority, incentive, and assistance lures (Victims of Violence). A simple lure consists of the perpetrator gaining the child's trust and simply asking the child to leave with him ("Do you want to come with me?"). An authority lure consists of the perpetrator informing the child that a parent or guardian has instructed the perpetrator to pick the

child up (“Your mom told me to pick you up from school.”). An incentive lure includes the perpetrator telling the child that the child will get something if the child comes with the perpetrator (“I’ll get you some ice cream if you come with me”). An assistance lure includes asking the child to help the perpetrator in some way (“I lost my dog will you help me find it?”).

Finkelhor et al. (2002) found that in 2002 about 115 stereotypical kidnappings occurred within the United States. Of these 115 children, 40% were killed and 4% were never found. Even though the number of stereotypical kidnappings per year is low, the risk to the abducted child is extremely high. When teaching children how to respond to abduction lures children are taught to recognize the four different lures and respond appropriately by saying “no,” walking away from the stranger, and finding an adult to tell (Miltenberger, 2008). The purpose of abduction prevention training is not to teach children to fear strangers, but rather to teach children to recognize when the individuals pose a risk and to get away from them and tell a trusted adult.

Another child safety risk is finding an unattended firearm. According to Everytownresearch.org there have been at least 24 accidental shootings by children so far in 2019 with 10 of those shootings ending in death. These shootings occur when children find loaded guns and play with them. Additionally there were at least 207 accidental shootings in 2018 with more than 40 of those shootings ending in death (Everytownresearch.org). Even though many of these shootings could have been prevented if the firearms were locked properly, this precaution does not seem to be occurring in every household (Everytownresearch.org). Due to firearms still being available to children, it is important to teach them how to respond appropriately when they find a firearm. During training children are taught to not touch the firearm, get away from the firearm, and tell an adult (Miltenberger, 2008). The purpose of

training is not to make children afraid of firearms, but instead to teach them how to respond safely when they find a firearm.

Accidental poisoning is another safety threat to children. In 2014 about 42.6 out of 1,000 children in the United States were exposed to poison according to the National Capital Poison Center (2014). The most common substances that lead to pediatric exposures are cosmetics and personal-care products; followed by cleaning substances and pain medications. Similar to firearm safety, parents can help prevent these incidents by locking up their medication, cleaning supplies, and cosmetics, but it is still important to teach kids how to respond when they find such items in their natural environment. Training related to poison hazards occurs in the same fashion as firearm safety in that individuals are taught to recognize the threat in their natural environment, to walk away from the threat, and tell an adult (Miltenberger, 2008).

### **Assessment of Safety Skills**

To determine if children have the skills to respond correctly to a safety threat, it is important to assess their skill level with a valid form of assessment. There are three ways to assess a child's safety skills; verbal report assessments, which assess the child's ability to describe the safety skills; role-play assessments, which assess the child's ability to execute the skills; and in-situ assessments, which assess the child's use of the skills in the presence of the safety threat simulated in a natural setting.

**Verbal Report Assessment.** With verbal report assessments an experimenter will explain a situation to a child that includes encountering a safety threat (e.g., "Imagine you walk into a room and see a gun lying on the counter"). The experimenter will then ask the child to describe how the child would respond if the child were to encounter this situation (e.g., Gatheridge et al., 2004; Himle, Miltenberger, Gatheridge, & Flessner, 2004; Miltenberger,

Thiesse-Duffy, Suda, Kozak, & Bruellman, 1990). Verbal report assessments only assess the child's descriptions of the safety skills; what the child says he or she would do when confronted with a safety threat.

Boyle and Lutzker (2005) used both verbal report and role-play assessments to assess three children's sexual abuse prevention skills. They used the "What if Situation Test" (WIST) developed by Saslawsky and Wurtele (1986) which assess children's knowledge of appropriate versus inappropriate touching using six different scenarios. With the WIST the child is told to imagine that he or she is in each situation and then asked a variety of questions to assess the child's ability to recognize, resist, and report sexual abuse (Wurtele, Hughes, & Owens, 1998). Role-play scenarios were also conducted using puppets. The experimenter presented different scenarios with a puppet acting as an adult (e.g., teacher, family member, neighbor) and the child was told to show what he or she would say and do by manipulating the puppet. All participants showed an increase in both their WIST scores and role-playing scores after training; however, there was little correspondence between the WIST and role-playing scores for all three of the participants. The results of Boyle and Lutzker indicate that the validity of verbal assessments is questionable because what children say they will do in verbal report assessments does not always match to what they actually do during role-play assessments. Research has also shown that what children say they will do in verbal report assessments does not match what they will do in their natural environment (e.g., Carroll-Rowan & Miltenberger, 1994; Olsen-Woods, Miltenberger, & Forman, 1998).

Carroll-Rowan and Miltenberger (1994) used both self-report assessments and in situ assessments to assess children's abduction prevention skills after receiving training or receiving no training. Carroll-Rowan and Miltenberger calculated correspondence between self-report

assessments and in situ assessments and found that there was only 37% to 47% correspondence. In addition the training groups scored higher during the self-report assessment than they did during the in situ assessment indicating that even though the participants correctly described what behaviors they should engage in, they did not engage in the behaviors during an in situ assessment in their natural environment. Olsen-Woods et al. (1998) reported similar findings showing lack of correspondence between self-report assessments and in situ assessments of abduction prevention skills. Other studies also show a lack of correspondence between self-report assessments and in situ assessments for gun safety skills (Gatheridge et al., 2004; Himle, Miltenberger, Gatheridge, et al., 2004) and sexual abuse prevention skills (Lumley, Miltenberger, Long, Rapp, & Roberts, 1998; Miltenberger et al., 1999). These results make it clear that children's predictions of how they will act and how they actually act when confronted with a safety threat do not match. As a result, verbal report assessments are not considered a valid form of assessment of safety skills.

**Role-play Assessment.** A second way to assess a child's safety skills is in a role-play assessment. During role-play assessments, as in the verbal report assessment, the experimenter describes a scenario involving a safety threat. However, during the role-play assessment, the child is told to "act out" what the child would do during the scenario. For example, the researcher might tell the child, "Imagine that you are at the park with your parents. You are playing on the swings and your parents are way over there sitting on a bench (pointing to a researcher across the room). Pretend I am a stranger. I am going to walk up to you and ask you to leave with me and I want you to show me what you would do." The trainer would then act out the scenario, present a lure, and record the child's actual behavior in response to the lure.

Gatheridge et al. (2004) and Himle, Miltenberger, Gatheridge, et al. (2004) both included

role-play assessments and in situ assessments to test participants' gun safety skills after receiving behavioral skills training (BST) or the Eddie Eagle GunSafe program. Many participants in Gatheridge et al. who received training with the Eddie Eagle program engaged in correct responding during role-play assessments but failed to engage in the safety skills during the in situ assessments. They executed the safety skills in the presence of the trainer but then failed to engage in the same skills when they did not know they were being assessed. Himle, Miltenberger, Gatheridge, et al. had similar findings; participants responded correctly during role-playing assessments but not during the in situ assessments; responding did not generalize to the natural environment for both the BST and Eddie Eagle groups.

These studies show that the results of role-play assessments and in situ assessments often do not correspond. What children do in response to a safety threat when an adult is present is not always what they do when an adult is not present. Therefore, the role-play assessment may identify whether the safety skills are in the child's repertoire, but it does not identify whether the child will use the skills in the presence of the safety threat. Because children are most likely to experience a safety threat and act in an unsafe manner when an adult is not present, the role-play assessment is not an adequate assessment of safety skills. An in situ assessment simulates the actual safety threat situation (child experiences the safety threat with no adult present) and is thus the only valid form of assessment for safety skills.

In some situations, such as sexual abuse prevention, it may seem more acceptable to conduct verbal report or role-play assessments than in-situ assessments due to the ethical concern of having known individuals presenting sexual abuse lures to children. In a survey of child protective service workers, Kopp and Miltenberger (2008) found that that role-play assessments might be deemed more acceptable than in-situ assessments to use in sexual abuse prevention

training. Similarly, verbal report assessments are used frequently in research on child sexual abuse prevention (Wurtele, 1990; Wurtele, Marrs, Miller-Perrin, 1987), most likely due to ethical concerns with the use of in situ or even role-play assessments. This situation poses a dilemma because, even though verbal report or role-play assessments may be more acceptable, they are still not valid forms of assessment. In response to this problem, Lumley et al. (1998) and Miltenberger et al. (1999) developed and utilized in situ assessments for sexual abuse prevention skills among women with intellectual disabilities. Because sexual abuse is typically committed by a known individual and occurs through a process of luring the victim into agreeing with a sexual act, these researchers created in situ assessments that included “known” individuals. The known individuals were research assistants that were introduced to the women with intellectual disabilities as new staff members that would be working in the group home. After spending time talking with the women and building rapport, the “new staff member” found a way to be alone with one of the participants and then presented a sexual abuse lure. The lure did not involve any physical contact but consisted of a request for the participant to engage in an activity to would lead to sexual contact. The researchers measured the participant’s response to such lures in baseline and following training to assess the effects of training.

**In Situ Assessment.** An in situ assessment measures the child’s use of safety skills in response to a simulated safety threat within the natural environment without the child’s knowledge that he or she is being assessed. During an in situ assessment, a situation is arranged in which the child comes into contact with a simulated safety threat (e.g., an abduction lure, poison, unattended fire arm), and the child’s response to the safety threat is observed. According to Miltenberger (2008), because the child is unaware of the assessment, the child’s behavior is not under stimulus control of the assessment or the presence of an observer, but is instead under



the stimulus control of the safety threat being present. This allows experimenters to determine what the children will do in their natural environment when experiencing an actual safety threat.

In situ assessments have been used to determine how individuals will respond when finding a firearm, when finding a poison, when presented with abduction lures, and when presented with sexual abuse lures. The safety skills being observed in response to sexual abuse and abduction lures are similar; the participant is expected to say “no” to the individual presenting the lure, walk away from the person, and then tell a trusted adult. Fisher, Burke, and Griffin (2013), used in situ assessments to see how five young adults with intellectual disabilities responded when presented with abduction lures. During the assessments the participants were left alone in a specified area and a confederate approached the participants and delivered a lure (e.g., “Can you help me find the bathroom?”). The researcher (unseen by the participant) recorded the participant’s responses to the lure. Sanchez and Miltenberger (2015) conducted similar in situ assessments of abduction prevention skills with adolescents with intellectual disabilities to evaluate the effects of training.

Egemo-Helm et al. (2007) conducted in situ assessments to see how seven women with intellectual disabilities responded when presented with sexual abuse lures from a confederate posing as a staff member. During the in situ assessments the participant was left alone with the confederate and the confederate delivered a sexual abuse lure. Examples of lures included “The zipper on my jeans is stuck. Will you help me with it?” and “I fell down the other day and got a big bruise on my butt. Do you want to see it?” In both Fisher et al. (2013) and Egemo-Helm et al., data were collected on the participants’ response to the lure (1=said “no.” 2= said “no” and got away, and 3= said “no,” got away, and told and adult).

Himle, Miltenberger, Flessner, and Gatheridge (2004) used in situ assessment to observe what eight typically developing children would do when finding a gun before and after receiving behavioral skills training. To set up the assessments the experimenters left a disabled firearm within the children's preschool classroom and had a hidden video camera in the room to record the child's behavior. The child was told to play in the room for 5 min while the experimenter pretended to do work in another room. After each assessment the child's behavior was scored on a 0 to 3 scale (0 = touched the firearm, 1 = did not touch the firearm but stayed in the room, 2 = did not touch the fire arm, left the room, but did not tell an adult, and 3 = did not touch the fire arm, left the room, and told an adult). In situ assessments have been used in numerous studies evaluating intervention to teach gun safety skills to children (e.g., Gatheridge et al., 2004; Miltenberger et al., 2004, 2005, 2009)

In situ assessments that are conducted to determine how children respond to finding household poisons are similar to those used to assess gun safety. The child is left alone in a room in which the empty poison container or simulated poisonous substances (e.g., pills) are present to see how the child responds (e.g., King & Miltenberger, 2017). Dancho, Thompson, and Rhoades (2008) conducted in situ assessments to observe how 15 typically developing preschool children would respond to potential poison hazards. Each child was brought into a room with a one-way mirror and found two containers, one that contained small candies that looked like pills and the other contained water or water with food coloring. Data were collected on the frequency of opening the "poison" containers, asking to eat or drink from the containers, and inappropriate ingestion from the containers. King and Miltenberger (2017) used in situ assessments to assess poison prevention skills of children with autism. In each assessment, the child found a container

of pills (empty capsules placed in a pill bottle, pill box, or Ziploc baggie) while alone in a room and a hidden camera recorded the child's response.

To assess whether participants engage in the correct safety behaviors in a variety of relevant settings, in situ assessments are often conducted in a range of settings and with different stimuli. Fisher et al. (2013) and Egemo-Helm et al. (2007) used different confederates and different lures to assess whether abduction prevention or sexual abuse prevention skills generalized in the natural setting after training. Himle, Miltenberger, Flessner, et al. (2004) assessed generalization of gun safety skills by using different guns and conducting in situ assessments in a variety of locations in the participants' school and home. King and Miltenberger (2017) assessed poison avoidance skills by putting pills in three different containers and placing them in various locations at home and at school. Finally, Beck and Miltenberger (2009) and Miltenberger et al. (2013) assessed abduction prevention skills by having a variety of confederates present four different types of lures in a variety of public locations.

Researchers have used all three forms of assessment (verbal report, role play, and in situ assessment) to determine the efficacy of procedures to teach safety skills. However, because verbal report assessment assesses only verbal behavior and role-play assessment assesses skills in the presence of an adult, in situ assessment is the only one in which the child responds solely to the presence of the safety threat and not outside variables (e.g., presence of parents, or experimenters). Therefore, in situ assessment is the only valid form of assessment; it allows experimenters to determine what a child will do when he or she confronts a safety threat within the natural environment.

## **Teaching Safety Skills**

Research on teaching safety skills has evaluated three different approaches; the information approach, behavioral skills training (BST), and in situ training (IST). The informational approach generally consists of presenting information on safety threats and the skills needed to respond safely through videos, lectures, readings, coloring books, and plays (Miltenberger, 2008). After the children are presented with the information they are asked to describe the safety skills in response to descriptions of safety threats presented verbally or in skits or plays. Behavioral skills training and IST are active learning approaches where the participants receive instructions and modeling and then act out how they would respond to safety threat situations so the trainer can provide feedback to correct errors and reinforce correct performance. Although both approaches involve active rehearsal and feedback, BST generally is conducted in a contrived setting and IST is conducted within the natural environment (Miltenberger, 2008).

**Informational Approach.** Informational approaches have been evaluated for teaching safety skills including abduction prevention and firearm injury prevention. In these studies, the informational approaches included instructions and modeling (live or video) and verbal rehearsal but no actual rehearsal of the skills with feedback (e.g., Beck & Miltenberger, 2009; Gatheridge et al., 2004)

Poche, Yoder, and Miltenberger (1988) compared three different methods for teaching abduction prevention skills to children ages 5 to 7. Participants were 74 kindergarten and first-grade students, who were assigned to a videotape condition, videotape plus behavior rehearsal program condition, a standard program condition already being used in the school, or a control condition. Participants in the videotape only condition watched a 20-min video that included

multiple scenes of an adult male approaching a child and asking the child to leave. In each scene the child said, “No, I have to ask my mother/father” and then walked away to their parent or teacher. After each scene, the narrator asked the viewers if the children did the right thing. There were also scenes in which the abductor faced the children viewing the video and presented an abduction lure allowing the children to practice saying what they would do in that specific situation.

The participant in the video plus behavioral rehearsal condition watched the same video, but then rehearsed engaging in the safety skills through role-plays of abduction scenarios. The participants were provided with praise if they engaged in the correct behavior or corrective feedback if they engaged in incorrect responses. In the standard program, an instructor described the behaviors the children should engage in if strangers approached them and described typical abduction scenarios and had the children report what they would do. The session then ended with a brief instructional video that talked about personal safety and what children should do if strangers approach them. Lastly, participants in the control condition received no formal training on abduction prevention skills.

Results of Poche et al. (1988) showed that 0% of participants in the control and standard condition engaged in criterion verbal responses (said “No, I have to ask my teacher.”) while 0% and 12.5% respectively ran away from the perpetrators during post training probes. In the video modeling condition, 68.4% of participants engaged in criterion verbal responses while 47.6% ran away from the perpetrator. In the video modeling and behavioral rehearsal condition, 84.2% of participants engaged in criterion verbal responses while 73.7% of participants ran away from the perpetrator. These results indicate that informational programs are not effective but, as the

programs became more interactive, participants demonstrated higher levels of correct responding during the post training probes.

Beck and Miltenberger (2009) had similar results when comparing a DVD purchased online called “Stranger Safety” to in situ training. Participants were six children ages 6- to 8-years old. After baseline in situ assessments, each participant watched the Stranger Safety DVD, which was 42-min long and included instructions and modeling of safety skills in response to lures from strangers in a variety of different scenes. The DVD modeled the children running away and telling an adult. About a week after watching the DVD participants received another in situ assessment and, if they did not respond correctly, their parents implemented IST.

In situ training consisted of the parents walking into the room if their child failed to engage in the safety skills. The parents told their child about the potential safety threat and had their child state what behaviors the child should have engaged in. The parent then modeled the safety skills and had the child practice the skills three consecutive times. None of the participants engaged in correct responding after watching the DVD. However, once IST was implemented, four of the six participants engaged in correct responding with three of the participants engaging in all of the correct responses after the first IST session. The two remaining participants required a booster session, which consisted of BST within the home. Results of Beck and Miltenberger (2009) again demonstrate that an informational approach is not effective for teaching safety skills but that the active learning approach (IST) is effective. Miltenberger et al. (2013) also evaluated the Stranger Safety DVD and IST and found the same results; the informational approach was not effective, but IST was effective. In this study, IST was effective for children who watched the Stranger Safety DVD and for children in the control group who received no prior training.

Gatheridge et al. (2004) and Himle, Miltenberger, Gatheridge, et al. (2004) compared the National Rifle Association's Eddie Eagle GunSafe Program to BST for teaching gun safety skills to children. Participants in Gatheridge et al. were 45 6- to 7- year olds while participants in Himle, Miltenberger, Gatheridge, et al. were 42 4- to 5-year olds. Participants were assigned to the Eddie Eagle group, BST group, or control group. The Eddie Eagle program is an informational approach that consisted of five 10-min sessions during which the children watched a video and colored a coloring book that discussed and modeled the safety skills to use when finding a gun (don't touch, leave the area, and tell an adult.) The children recited the safety skills but never practiced the actual skills during training. During the BST program, training consisted of five 10-min sessions during which a trainer provided instructions and modeled the safety skills and required the children to rehearse the skills with feedback during role-plays in which they found a gun. The control group received no instructions before assessments. Consistent with the findings from research on informational approaches to teaching abduction prevention skills, Gatheridge et al. and Himle Miltenberger, Gatheridge, et al. found that the Eddie Eagle program was not effective for teaching gun safety skills when assessed with in situ assessments. The children who received the Eddie Eagle training described the skills during verbal report assessments and some demonstrated the skills during role-play assessments, but they did not demonstrate the skills during in situ assessments.

Overall research has shown that informational approaches may be effective for teaching kids how to verbalize what to do when they come into contact with different safety threats. When skills are assessed in the natural environment; however, informational approaches have not proven to be effective. Children receiving this training do not engage in the safety skills when they come into contact with a number of safety threats during in situ assessments. Active

learning approaches in which children rehearse the safety skills with feedback are more effective in teaching these skills.

**Active Learning Approaches.** Active learning approaches include instructions and modeling as used in informational approaches but then provide an opportunity for rehearsal and feedback. Two active learning strategies are behavioral skills training (BST) and in situ training (IST). These strategies are discussed next.

***Behavioral skills training.*** Behavioral skills training starts with providing information on the safety threat and the behaviors the child should engage in when he or she comes in to contact with this safety threat. The behaviors are then modeled for the child in a role-play simulating a realistic context. Next, a trainer asks the child to rehearse the behaviors in a role-play and then provides praise and corrective feedback. Rehearsal continues until the child engages in the skills successfully without the need for assistance (Miltenberger, 2008).

Behavioral skills training has been used to teach a variety of skills since the late 1970s. For example, Yeaton and Bailey (1978) and Young and Lee (1987) used BST to teach pedestrian safety skills to children. Jones, Kazdin, and Haney (1981) used BST to teach children how to engage in emergency fire safety skills, while Poche, Brouwer, and Swearingen (1981) used BST to teach children how to respond when lured by a stranger. Even though the term BST was not used in these studies the authors used the four components of BST to teach the safety skills.

More recently studies have continued to look at the efficacy of BST to teach a variety of safety skills to both children and adults. Johnson et al. (2005) used individualized BST to teach fourteen 4- and 5-year-olds abduction prevention skills. Through instructions and modeling, the children were taught to respond safely to the four different lures often used by abductors. Next they rehearsed the safety skills until they responded correctly without assistance. After the first



session of BST the following sessions began with an in situ assessment to determine if the child had acquired the safety skills. If the child did not engage in the safety skills another BST session was conducted. If children still did not engage in the skills, in situ training was conducted until the participant demonstrated all the skills for three consecutive in situ assessments.

All participants demonstrated the safety skills during three consecutive in situ assessments, with five of the participants engaging in correct responding after the first BST session. The other eight participants required additional BST and IST with one participant requiring six additional trainings before they engaged in all the correct behaviors. Additionally, the six participants that had follow-up assessments demonstrated all of the safety skills during at least one follow-up assessment. Johnson et al. (2006) compared groups of 6- and 7-year old children who received either BST, BST with IST, or no intervention. In situ assessments were conducted 1-week, 2-week, 1-month and 3-months after training. Children who received BST or a combination of BST and IST scored higher than the control group at the 1-week assessment.

Miltenberger et al. (2004) evaluated the use of BST to teach gun safety skills to six children aged 6- and 7-years old. Training consisted of providing information about the dangers of playing with guns and what the children should do if they find a gun. After instructions were provided the trainer modeled the skills using a real, but disabled, gun and then had the children rehearse the skills using the same gun. During rehearsal, the instructor placed the gun in a variety of locations within the home and provided praise and corrective feedback when necessary. Rehearsal continued until the child engaged in the skills five consecutive times. After training was completed the children's skills were assessed through in situ assessments and, if the child did not respond correctly, up to two booster sessions were conducted.

Three of the six participants demonstrated the safety skills after receiving BST; however, two of the participants required at least one booster session, before demonstrating the safety skills. Three participants required in situ training. Of those three participants one participant continued to either play with the gun or stay in the same room as the gun so an incentive phase was introduced. During the incentive phase the experimenter provided the participant with a treat if he or she responded correctly during in situ assessments (Miltenberger et al., 2004). Additionally three out of eight participants in Himle, Miltenberger, Flessner, et al. (2004) demonstrated all firearm safety skills after receiving BST, while 11 out of the 15 participants who received BST in Gatheridge et al. (2004), demonstrated all of the safety skills.

Olsen-Woods, Miltenberger, and Foreman (1998) evaluated BST and BST with added correspondence training (CT) for teaching abduction prevention skills. Thirty-one 4- to 5-year-old children were separated into two groups (BST and BST with CT). During BST, trainers provided praise during the role-playing scenarios when the children engaged in correct responding and corrective feedback if they did not engage in correct responding. The participants in the BST with CT group received a sticker if they stated what behaviors they would engage in during the role-play and then engaged in the correct behaviors (reinforcement of correspondence). Data were collected during in situ probes and self-report assessment before and after training. Responding during in situ probes increased for the BST and BST with CT groups. Likewise, responding during the self-report assessments also increased for both groups. These results indicate that BST was an effective intervention but that the addition of CT was not more effective.

Overall research has shown that BST is a more effective approach to teaching safety skills than informational approaches. Behavioral skills training has been shown to be effective

for teaching a variety of safety skills to some children (Carroll-Rowan & Miltenberger, 1994; Dancho et al., 2008; Miltenberger et al., 2004). However, in many studies BST works for only about half the children and IST is needed for participants to engage in the safety skills (Gatheridge et al. 2004; Hanratty, Miltenberger, & Florentino, 2016; Miltenberger et al., 2004).

***In situ training.*** In situ training is another active learning approach to teach safety skills in which the trainer will interrupt an in situ assessment if the child does not engage in the correct behavior and conduct BST on the spot. Gatheridge et al. (2004) implemented IST for teaching gun safety skills to 6 and 7 year olds when BST was not effective. In this study, each child found a gun during an in situ assessment and if the child did not engage in the safety skills, the trainer entered the room and conducted BST. The results showed that children exhibited the skills after participating in IST. Other researchers also showed that IST worked for increasing gun safety skills when BST was not effective for some children (Himle, Miltenberger, Flessner, et al., 2004; Miltenberger et al., 2004).

Miltenberger et al. (2013) evaluated the effectiveness of parent-conducted in situ training for teaching abduction prevention skills to two groups of 6- to 8-year-old children. One group watched the *Stranger Safety* DVD prior to the in situ assessment while the control group did not watch the video. During the in situ assessment if the child did not engage in the safety skills, IST was implemented in which the parent approached the child and told the child how the child should have responded to the threat. The parent then modeled the skills and had the child rehearse the skills in the same scenario until the child demonstrated the safety skills three times. A week after the first assessment a follow up assessment was conducted for all participants.

Participants in both the control and the DVD groups did not engage in the safety skills; they stayed in proximity to the confederate during the first assessment. Scores for the DVD

group and the control group increased significantly after IST, which indicates that participants in both groups got away from the strangers during the second assessment. Results of Miltenberger et al. (2013) indicate that the Safe Side DVD was not effective in teaching children how to respond when approached by strangers, but that parent conducted IST was effective.

Beck and Miltenberger (2009) found similar results related to teaching children how to respond to two different abduction situations (knock on the door and approach by a stranger). In baseline and after viewing the Stranger Safety video children did not engage in the safety skills. However, similar to Miltenberger et al. (2013), the children exhibited the safety skills following in situ training.

Although research shows that IST is effective when BST was not, some researchers used in situ training in conjunction with BST. Miltenberger et al. (2005) provided 10 children aged 4 to 5 years old with both BST and IST to teach firearm safety skills. Children received two BST sessions in their classroom and, 30 min after the second session, the teacher set up a situation where the child was left alone so that the child would find a gun. If the child did not respond correctly, IST was conducted immediately. Seven children engaged in the safety skills after the first IST session, and three children engaging in the skills after the second IST session. Five of the children needed a booster session of IST for the skills to continue across repeated assessments.

Johnson et al. (2006) evaluated the effectiveness of BST with and without IST. Fifty 6- and 7-year-old children were assigned to a BST, BST with IST (IST group), or a control group. Behavioral skills training using instruction, modeling, rehearsal, and feedback to teach participants how to respond to abduction lures, was conducted within three separate sessions. In situ training was implemented after the third BST training for the IST group. The control group

was assessed prior to receiving any abduction prevention training and then received one BST session. Each group was assessed prior to receiving any training and 1-week after training. The BST and IST groups were also assessed during a 2-week, 1-month, and 3-month follow-up.

Both the BST and IST groups had a mean score above 3 on a 0 to 4 scale (said “no,” walked away, but did not tell an adult) during the posttest, while the control group had a mean score of 1.5 (does not agree to leave, but does not walk away). Johnson et al. (2006) hypothesized that participants in the IST group would respond higher than participants in the BST group because research has shown that adding IST has increased the effectiveness of BST (Gatheridge et al. 2004; Hanratty et al., 2016; Miltenberger et al., 2004). However, the only difference found between the BST and IST group was during the 3-month follow-up assessment, indicating that IST might be beneficial to maintain skills.

### **Increasing Accessibility of Safety Skills Training**

Although BST and IST are shown to be effective for teaching safety skills, they are time intensive procedures that require a trained behavior analyst to implement. In order to increase the efficiency of providing BST and IST researchers have evaluated BST conducted by non-behavior analysts and BST conducted in a group or classroom setting. Kelso, Miltenberger, Waters, Egemo-Helm, and Bagne (2007) used group BST to teach 8- and 9- year old children firearm safety skills. Behavioral skills training was similar to Himle, Miltenberger, Gatheridge, et al. (2004) and Gatheridge et al. (2004), the instruction and modeling components were done in a group setting before each participant individually rehearsed the skills. Training sessions continued until participants correctly responded during five consecutive trials. Participants’ scores in the BST group were compared to a control group and an Eddie Eagle group. During the first in situ assessment, 55.5% of the participants in the BST group scored a 3 indicating they

engaged in all of the safety skills, while only 40% and 25% of the Eddie Eagle and control group respectively scored a 3. These results indicate that group BST was effective at teaching firearm safety skills to a little over half of the participants, but the remaining participants required IST in order to score a 3 during in situ assessments. Himle, Miltenberger, Gatheridge, et al. and Gatheridge et al. had similar results showing that group-implemented BST was effective at teaching some of the participants how to respond correctly when a firearm is present, while others needed IST in order to demonstrate the safety skills.

Carroll-Rowan and Miltenberger (1994) used a classroom-wide BST approach to teaching abduction prevention skills to preschoolers. They compared a video training to a training implemented by teachers using a manual. Eight Head Start classes were assigned to the video training, manual training, or a control group. Participants in the videotape group watched a video portraying scenes of children being approached by male and female adults who attempted to entice the children to leave with them. Before the child in the video responded, the videotape paused and the narrator asked the children how the child should respond, in order to add an interactive component to the video. After watching the video, the participants rehearsed the safety skills with the teacher who provided praise and corrective feedback when needed. This training was repeated two and four days after the first training. The participants in the teacher's manual condition received a similar training however, the teacher taught from a manual that discussed the situations portrayed in the videotape. After the teacher read the situation to the participants, the participants were quizzed on how to respond correctly and the teacher praised the students who responded correctly. After training with the manual, the participants went through the same rehearsal component as the children in the videotape condition. Participants in the control group did not receive training until after the study had concluded.

In situ assessments were conducted within 1 week after training was completed. The mean score of the manual group during the in situ assessment was 3.5 (on a 0-4 point scale) meaning most participants were saying no to the stranger and leaving the area but not telling an adult. The video group had a mean score of 2.4 meaning most were saying no to the stranger but not leaving the area. The control group had a mean score of 1.7 meaning most participants did not leave with the abductor but they did not say “no” and remained in the same area as the abductor. Even though participants in the manual group and video group scored higher than the control group, 12 of 22 participants in the video group and nine of 23 participants in the manual group required in situ training after the first in situ assessment.

Hanratty et al. (2016) used a classroom-wide BST approach to teach five preschoolers firearm safety skills. The teacher of the preschoolers was given a training manual and role-play cards. The experimenter conducted a proficiency check in which the teacher had to score 100% prior to implementing BST. Training consisted of instruction and modeling, but was provided to the classroom as a whole instead of in small groups or individually. The teacher then read from a role-play card a scenario in which the child found a gun, had one child at a time rehearse the skills, and provided feedback. If the students did not exhibit the safety skills during in situ assessments following BST, the researchers implemented IST, followed by incentive or timeout conditions.

Results of Hanratty et al. (2016) showed that BST implemented by the teacher was not effective; all five participants required IST, or IST with incentives or timeout to demonstrate the safety skills. Hanratty et al. discuss how these results were unexpected because previous research has shown that BST is effective at teaching safety skills about half of the time and that IST is effective in almost all cases. A possible reason for the lack of skill execution could be related to

the fact that treatment fidelity of BST was only at 71%, and the components that the teacher missed were having the children rehearse the required number of times and providing corrective feedback. Reasons for failure of IST were less clear, but the social contingencies implemented during IST did not seem to include potent reinforcers for these particular students.

Another way to increase the efficiency of training is to have peers conduct BST and IST. Jostad, Miltenberger, Kelso, and Knudson (2008) trained 6- and 7-year-old children (peer trainers) to teach 4- and 5-year-old children (students) firearm safety skills. Training of the upper trainers continued until the peer trainer completed a simulated training without prompts. Once the peer trainers were trained, they conducted BST with the students. After peer-conducted BST, four out of the six peer trainers engaged in the safety skills while the remaining two participants required IST conducted by the experimenters. Three out of the six students engaged in the safety skills after BST only, while the remaining three participants required IST, which was also conducted by the peers. Tarasenko, Miltenberger, Brower-Breitwieser, and Bosch (2010) had similar results with two 7- and 8-year old trainers and three 6- and 7-year-old students. Both of the trainers engaged in correct responding after training their students, while all three of the students engaged in correct responding after two peer conducted BST and one or two IST sessions. These results maintained during a 6-month follow-up for one trainer and one student.

In addition to having peers conducting BST, research has looked at providing manualized interventions to parents in order for them to conduct BST. Parent conducted BST decreases the need for a behavior analyst to be present to conduct training with the parent allowing the training to be more accessible. Gross, Miltenberger, Knudson, Bosch, and Breitwieser (2007) evaluated using parents as trainers to conduct BST. Parents received a training manual that told them what to do and say while training their child on safety skills related to firearms. Parents also watched a



13-min video that showed a parent conducting both BST and IST. There were no active responding components to the manual and training took parents approximately 30 min to complete. After the parents read the manual and watched the video each parent conducted two 30-min BST sessions with their child. After the second BST session was implemented, in situ assessments were conducted. If the child did not respond correctly during the assessment the parent walked into the room and conducted IST.

During baseline three of the four children touched or played with the gun, and at no point did any of the children demonstrate the safety skills. After parent-conducted training three out of the four children demonstrated the safety skills; in their home, at an after school program, or in a neighbor's yard. These results indicate that parent-conducted BST, when implemented with fidelity, can be effective in teaching firearm safety to children and that the skills generalize to areas outside of their home.

There is some research that indicates training of non-behavior analysts to conduct BST is beneficial (e.g., Carroll-Rowan & Miltenberger, 1994; Gatheridge et al., 2004; Gross et al., 2007) but future research should continue to investigate ways to increase the efficacy of such training. The manual developed for Hanratty et al. (2006) was a brief manual with no active responding component and with no accompanying video. The inclusion of an active responding component to the manual would help ensure that the teachers are reading and understanding the material prior to implementation. Additionally adding videos that demonstrate how to correctly implement BST, as was done in Gross et al. (2007), could increase the treatment integrity of teacher implementation of BST so that key components such as providing corrective feedback and allowing all students to practice are not missed. Considering the efficiency of manualized interventions and the success of a manualized intervention demonstrated by Gross et al., more

research should be conducted to develop and evaluate a training manual for training safety skills to children. Additionally, providing the manual in a web-based format will increase the accessibility of the training for parents because they are not required to purchase a book and videos for the training since all materials would be accessible on the website.

### **Manual Development**

Fraser and Galinsky (2010) describe a five-step process to develop manualized interventions. Step one is to determine what the problem is and where the intervention will be implemented, such as in the classroom, in the home, or in the community. During step one it is important to determine who will be implementing the intervention to ensure that the manual will be appropriate for the consumers and setting in which it will be implemented. Step two includes specifying the intervention that will be used to address the problem and the development of the manual. Fraser and Galinsky discuss how the manual should include an overview of the intervention, session-by-session content, achievable goals, and elective activities. Another part of step two is to have stakeholders, which may include those implementing the intervention, participants in the intervention, and scholars in the field, review the manual and provide feedback. Only after the feedback from the reviewers has been addressed should the manual go through pilot testing. During pilot testing the research questions are related to how easily the intervention can be implemented and if it can be implemented with fidelity.

Step three consists of testing the manual in small studies and refining the manual as needed (i.e., determine what parts of the intervention to include and what parts to adjust). During step three researchers are also able to determine how the intervention will work for different populations of people. Step four consists of testing the manual in a variety of settings to determine if the intervention will continue to be effective even if all of the aspects of the

treatment manual are not adhered to or in more difficult environments (e.g., after budget cuts, different leadership, etc.) Lastly, step five is disseminating the manual usually through published journal articles.

In addition to discussing the steps in developing a manual, Fraser and Galinsky (2010), also provide lessons they learned while developing a manual. The lessons include having the intervention be developed for certain people in specific settings, meaning that interventions developed for teachers should be presented like a routine educational curriculum a format familiar to teachers. A second lesson is that implementers should also be provided with ongoing support and training if needed once the manual has been finalized and has been disseminated to ensure high treatment fidelity.

Kern, Evans, and Lewis (2011) discuss a similar five-step process for manual development but include how those that may implement the programs can be included throughout phases one through three. During their manual development, phase one consisted of talking to practitioners to determine what problems were not being adequately addressed with current programs and what interventions would be effective to address the problems. Additionally, stakeholders were included during step one by developing Community Development Teams whose main purpose was to provide information that would assist in developing and implementing the interventions. During phase, two Kern et al. developed a variety of activities to determine what would be needed to implement the interventions within the schools. The activities were designed to include potential implementers in this process by interviewing school personnel who worked with students that would likely receive treatment. The school personnel were asked to determine what services were already being provided, how much time the practitioners spent providing each of the services, and the number of students who

were receiving services. Lastly, Kern et al. collected data on the feasibility and acceptability of the different interventions by asking the practitioners most likely to implement the interventions if they thought implementation of the intervention would be feasible and if it would be acceptable.

During phase three after the interventions were implemented, Kern et al. (2011) provided practitioners and students with School Intervention Rating Forms to determine the social acceptability of the interventions. Based on the feedback that was provided intervention components were revised or eliminated if needed. Having practitioners involved with the development of the different interventions helped Kern et al. ensure that their manualized interventions had a balance between science and practice. Dunlap and Kincaid (2001) identify a need for balance between science and practice in that it is important for behavior analytic manuals to stick to their behavioral-analytic foundation while allowing others outside of behavior analysis to use the manuals effectively. Dunlap and Kincaid reviewed four manuals developed to help educators conduct functional assessments. Each of the manuals had an empirical foundation for the content and procedures listed, but they also provided different features such as examples on how to conduct assessments, references for practitioners, and forms for direct development of different programs, to increase the efficacy of the manual for those outside of the field of behavior analysis.

Recently research has looked at providing training packages online for training teachers and undergraduate students on how to conduct behavior analytic interventions (Higbee, Aporta, Resende, Nogueira, & Goyos, 2016; McCulloch & Noonan, 2013; Pollard, Higbee, Akers, & Brodhead, 2014). Pollard et al. (2014) developed an interactive computer-training program to teach discrete-trial instruction (DTI) to four undergraduate students with no prior training in DTI.

The computer-training program included PowerPoint presentations, video examples of correct and incorrect implementation of DTI and self-guided practice opportunities. After training all four participants increased their implementation of DTI to at least 90% of components completed correctly. Correct implementation also generalized for three out of the four participants to role-plays conducted with children diagnosed with autism. Higbee et al. (2016) used the same interactive computer-training program as Pollard et al. to teach DTI to four university students and four special education teachers. Correct implementation of DTI increased for all participants after using the interactive computer training and results generalized to probes conducted with children diagnosed with autism. Unlike Pollard et al., however, five out of the eight participants required feedback to reach proficiency

Online training videos have also been used to teach mand training to paraprofessionals (MuColloch & Noonan, 2013). MuColloch and Noonan (2013) provided three paraprofessionals with online training videos that included 18 2- to 6- min videos with classroom demonstrations on how to conduct mand training. Additionally, the paraprofessionals had to complete a pre-test and post-test and were provided with a checklist to use while completing training in their classrooms. Two of the three participants' implementation of mand training increased to a set criterion of 88% correct steps implemented after completing the online video training. Additionally, there was an increase in spontaneous mands for each of the children the paraprofessionals were working with. Results from Higbee et al. (2016), MuCulloch and Noonan, and Pollard et al. (2014) demonstrate the online and computer-based training may be an effective tool for training non-behavior analysts to conduct behavior analytic programs.

Research has shown that BST can be an effective intervention to teach safety skills to children (Carroll-Rowan & Miltenberger, 1994; Gatheridge et al., 2004; Miltenberger et al.,

2004). Additionally, research has looked at increasing the efficiency of providing BST by providing manualized interventions to parents and teachers. Gross et al. (2007) demonstrated the effectiveness of a training manual and video used by parents to conduct BST and IST to teach safety skills and Carroll-Rowan and Miltenberger (1994) demonstrated the effectiveness of a training manual used by teachers to conduct classroom-wide BST to teach children abduction prevention skills. These results are promising, but more research is needed to establish more efficient ways to provide training to non-behavior analysts to conduct BST. Web-based training manuals would be a more efficient training format for parents due to all materials being provided to the parents through the website, decreasing the need for the parents to purchase or find a variety of different materials.

### **Purpose Statement**

The purpose of this study is to evaluate a web-based manual with video training to guide parents to implement BST to teach their children firearm safety skills. Phase 1 focused on the development and validation of the web-based manual. Phase 2 evaluated parent conducted BST using the web-based training.

## **Phase I: Web-Based Behavioral Skills Training Manual**

### **Method**

**Participants and Settings.** Three experts in behavioral skills training (BST) were selected to assess the validity of the training manual. Individuals were considered experts if a Google Scholar search showed they had published at least three studies related to teaching safety skills using BST. Expert 1 was a Board Certified Behavior Analyst – Doctorate (BCBA-D) who was a clinical Assistant Professor in Neuroscience. She received her Ph.D. in applied behavior analysis and had four articles related to teaching safety skills. Expert 2 was a BCBA-D who was the director of an autism center. She received her PhD in behavior analysis had five articles related to teaching safety skills. Expert 3 was a BCBA-D who was an Assistant Professor in Department of Pediatrics. She received her Ph.D. in Behavior Analysis and had four articles related to teaching safety skills. Additionally, four parents with children aged 4- to 7-years old with internet access were also selected to assess the ease with which parents would be able to use the website to implement BST with their children. All four of the participants were mothers two with their bachelors and two with their masters. Potential parent participants were excluded if they (a) did not have children in the stated age range, or (b) did not have internet access. To recruit parents, fliers were posted on social media outlets and provided to Board Certified Behavior Analysts (BCBA), Board Certified Assistant Behavior Analysts (BCaBA), and

Registered Behavior Technicians (RBT)s to distribute to parents who had children in the stated age range. When participants showed interest in participating, a link to the website and rating scale were emailed to them.

**Materials.** A web-based manual was developed for parents to implement BST for teaching firearm safety skills to their children. To develop the web-based manual, the primary investigator choose a template from the website wix.com. The main page of the website developed for this study discussed the purpose of the website and what the parents were expected to do. The website included four separate tabs (a) one on information on how to conduct BST, (b) videos for parents to view and use during training, (c) different scenarios that parents could use during training, and (d) printable materials parents could use during training. Under the “Manual” tab, the website included four sections, one for each component of BST and a section that discussed how to end training. Each section had an overview of the component, followed by a description of what the parent was expected to do when conducting the training. Additionally, there was a question at the end of each section about the information in that section. The question was designed to evoke active responding to help the parents retain the information in the manual. (e.g., “What are the three steps included in the instruction component of BST?”). Under the “scenarios” tab there were 10 different scenarios such as “Imagine you are going to my room to watch TV and you see a gun on our bed. Show me what to do” The BST videos under the video tab were made using iMovie. Volunteers were recruited to act in the videos and the primary investigator filmed the videos at the volunteers’ homes. Each video was approximately 5 minutes long one for the parents to watch prior to training and two for the parents to use during training. From the printable materials section, a printable checklist was available that included all the steps the parents needed to complete BST, as well as a picture of a firearm.



**Data Collection.** The experts and parents each completed a questionnaire using a 5-point Likert scale to rate the manual on its validity and ease of implementation. Open-ended questions were also included in both questionnaires to allow respondents to provide expanded feedback. See Appendices A and B for the Expert Questionnaire and Parent Questionnaire, respectfully.

**Procedures.** To search for the BST experts, the primary investigator completed a Google Scholar search with the terms “Behavioral skills training” and “Safety skills.” The primary investigator then determined how many times each individual was cited as an author. All individuals with at least three peer-reviewed publications received an email that explained the purpose of the study and asked if they were interested in answering questions on the validity of the manual. For parents who agreed to participate, a link to the web-based manual and questionnaire were provided. They were asked to complete and return the questionnaire within 2 weeks. When the parents and experts had returned the questionnaires, the primary investigator calculated the average scores for each question. No question had an average score below 3, but the parents or experts suggested changes to the manual. The primary investigator reevaluated and adjusted the areas recommended for change. Parent participants used this revised version during Phase II of the study.

## **Results**

Table 1 shows the experts’ overall ratings on the clarity of the manual’s purpose and the different components of BST. These ratings ranged from 4.33-5 (M= 4.72), indicating that the expert reviewers agreed or strongly agreed that each component was clearly explained within the web-based manual. The overall ratings by experts on the importance of each BST component ranged from 4.33-5.0 (M= 4.83), indicating that the expert reviewers agreed or strongly agreed that each component was important to include. The mean ratings on the importance and accuracy

of the videos, active responding questions, and checklist, ranged from 4.66-5 (M= 4.83) across reviewers, with all experts but one strongly agreeing that each of the components was important and accurate. Additionally, all experts either agreed or strongly agreed that the manual was user-friendly (M = 4.33), would help parents teach their children firearm safety skills (M= 4.66), and would help parents understand BST and implement it effectively (M= 4.66).

Table 2 shows the overall ratings by parents on the clarity of the manual's purpose and how clearly all the BST components were explained. These ratings ranged from 4.5-5 (M= 4.89), indicating that the parent reviewers agreed or strongly agreed that the web-based manual clearly described each component. The mean ratings on the clarity and importance of the videos, the active responding questions, and checklist were 4.75. These ratings indicate that the parents either agreed or strongly agreed that these components were needed and would help parents with training their children. All parents strongly agreed that the website was easy to navigate and that the links brought them to what they expected. Last, all parents either agreed or strongly agreed that the website was user friendly (M= 4.75), the organization of the information was clear (M= 4.75), the manual would help parents teach their child firearm safety (M = 5) and would help parents understand BST and implement it effectively (M= 4.75).

The comments provided by expert reviewers (Table 3) indicate that the web-based manual was brief but to the point and that it guided the parents well. Additionally, parent comments describe the website as comprehensive, covering everything that the parents needed to know to effectively teach their children. However, all expert reviewers had general feedback for some minor edits, and Expert Reviewer 1 and Parent Reviewer 2 showed concerns about the parents' ability to comprehend and stay engaged with the manual as written. Based on their feedback, the following changes were made to the manual before it was evaluated in phase II of

this study: (a) wording of the manual was changed so the reading level was at a 7<sup>th</sup>-grade level  
(b) the minor edits such as number of bullets used and wording were changed (c) terminology  
was introduced earlier in the manual for safety skills.

## **Phase II: Parent Conducted BST**

### **Method**

**Participants and Setting.** Seven child-parent dyads participated in this study. To participate in this study, a safety score of less than 3 was required for the initial in situ assessment. Further, child participants were only included if they were 4 to 7 years old at the start of the study, and did not have a diagnosis of a developmental disability. Participants were excluded if any child participant earned a perfect safety score during the initial in situ assessment, or had received any firearm safety training. Additionally participants were excluded if the parent had any previous experience with BST. Participants were recruited by distributing fliers in the community and on social media, or by word-of-mouth. Next, informed consent was obtained from parents who expressed interest in participating.

Betty was a 7-year-old girl who participated with her mother. Betty's mother was 34 years old, and held a bachelor's degree. Rachel was a 5-year-old girl who also participated with her mother. Rachel's mother was 36 years old and held a bachelor's degree. Even though Rachel's mother worked for a company that provided ABA services, she had no experience conducting BST. April was a 4-year-old girl who participated with her father. Rachel's father was 24 years old and held a certificate from a trade school. Evan was a 6 year-old-boy and his dad (no age available) had a high school diploma. Fiona was a 4-year-old girl who participated

with her father. Fiona's father was 43 years old and held a bachelor's degree. Frank was a 4-year-old boy who participated with his mother. Frank's mother was 37 years old with some college education. Ian was a 7-year-old boy who participated with his mother. Ian's mother was 36 years old, and held a master's degree. Rachel, Betty, April, and Fiona's parents reported that they had firearms in their homes, but their children were unaware of the firearm, or that it was kept in a lockbox. Trainings and assessments occurred within the participants' home during times selected by the parents. Assessments were conducted in different areas of the participants' homes (e.g., bedroom, bathroom, kitchen). Areas for the training were identified during an initial walkthrough of the house and selected on the likelihood that the child would go into the room alone. Additionally, training sessions only occurred if assured that other children in the house, if present, would not enter to the room during an assessment.

**Materials.** Parents received a link that brought them to the website from Phase 1. The website was comprised of: (a) information about how to conduct BST related to firearm safety, (b) videos that demonstrated the rehearsal and feedback component of BST, (c) videos for the instruction and modeling component of BST (to be used within the BST training), (d) a printout of a handgun, and (e) a checklist of what to do during BST sessions. A disabled handgun was used during in situ assessments. In situ assessments were video recorded in the participants' home.

**Target Behaviors and Assessment.** The target behaviors, in response to finding a firearm, were: (a) not touching the firearm, (b) leaving the area in which the firearm is present, and (c) telling an adult about the firearm. Responses were coded as follows: 0 = touched the firearm, 1 = did not touch the firearm but stayed in the same room as the firearm, 2 = did not

touch the firearm, left the room within 10 s, but did not tell an adult, and 3 = did not touch the firearm, left the room within 10 s, and told an adult within 30 s of leaving the room.

Experimenters conducted in situ assessments before and after the parent conducted the training. To set up the in situ assessment, the parent placed a disabled firearm inside the home and placed the video camera in a position in which it recorded the child's engagement with the firearm. During the assessments, the experimenter was outside the participants' home and was watching the assessments through the webcam. The experimenter was also on the phone with the parent to inform them of when to go and get the firearm if the child did not run away. A session began when the parent told their child to go into the room with the firearm for a specific purpose (e.g., to eat a snack, to play with some toys). If the child left the room and reported that he or she found a firearm, the parent thanked the child and said that he or she would remove the gun and "put it in a safe location." If the child did not leave the room within 10 s, the experimenter instructed the parent to go into the room and get the firearm without mentioning anything to their child.

**Interobserver Agreement.** A second observer watched and scored at least 60% of the videos for each participant to assess interobserver agreement (IOA). The second observer coded the video according to the scale provided. If both the primary investigator and the secondary observer coded the child's behavior with the same safety score, it was counted as an agreement. Safety scores that differed for a session across the two observers were considered a disagreement. Interobserver agreement was calculated as agreements divided by agreements plus disagreements, multiplied by 100. Interobserver agreement for all participants was 100% for all sessions.

**Procedural Fidelity.** Procedural fidelity was assessed for all of parent training sessions using a task analysis (see Appendix C). Procedural fidelity was calculated by dividing the number of correct steps by the number of steps in the task analysis and multiplying by 100. For the first group of participants, procedural fidelity for the parents of Betty, Rachel, April, and Evan was 100%, 92%, 84%, and 100%, respectfully. For the second group, procedure fidelity for the parents of Fiona's, Frank, and Ian was 31%, 97%, and 100%, respectfully. With the exception of Fiona's and Rachel's parents, the step that most parents missed was having their child practice the skills three additional times if their child did not engage in all the skills correctly. Further, Rachel's mother did not pause the video and allow Rachel to state what the child in the video should do. Fiona's father had the lowest procedural fidelity (31%) because he did not require Fiona watch any of the videos or instruct her to practice the safety skills. Instead, he asked Fiona to state what she would do when she saw a gun while holding up the picture of the gun.

**Social Validity Questionnaire.** At the completion of the study, six of the parents completed a social validity questionnaire using a 5-point Likert scale, which assessed the parent's opinion of the ease of implementation and if they would use the training in the future or recommend it to other parents. Additionally, the six parents completed a side-effects questionnaire to assess if they had observed any changes in their child following the study. (See Appendices D and E)

**Design and Procedures.** A multiple-probe across participants design was used to evaluate the parent-conducted BST and trainer-conducted IST for teaching firearm safety. Two weeks before conducting BST, the parents were provided with a link to the finalized website to review and complete within the 2-week time frame.

**Baseline.** Baseline consisted of in situ assessments, during which, no feedback or other consequences were provided.

**Parent-conducted BST.** Each dyad participated in one parent-conducted BST session that ranged from 10-30 min. Prior to the initiation of the training, the parent was told that the experimenter would not be able to provide any feedback and was only there to collect data.

During the training session, the parent showed a video to their child that discussed the dangers of touching a firearm and what they should do when they come across a firearm. After the instruction component of the video, the parent was instructed by the website to ask their child why it is dangerous to touch firearms and what they should do in that scenario. The parent then showed a video of similar-aged peers responding correctly when finding a firearm in different areas of their homes and outside (e.g., park). The videos showed the peers engaging in the correct steps of not touching the firearm, leaving the area with the firearm, and telling an adult about the firearm. It then showed the adult providing praise for this behavior. The parent was instructed by the website to pause the video before it showed the correct steps demonstrated by the peer, and the parent asked their child what they should do if they find a firearm.

After the child watched the video with the parent, the parent used role-play scenarios with a picture of a firearm to have their child practice engaging in safety skills. The parent read a scenario to their child and then set up the scenario. The child then rehearsed what he or she would do in each specific scenario (refrain from touching the firearm, get away from the firearm, and tell the parent). During the scenario, if the child engaged in all of the correct responses, the parent provided praise. However, if the child did not engage in all of the correct responses, the parent provided corrective feedback consisting of further instruction (e.g., “Remember we need to leave the room when we see the gun”) and then required the child practice the correct



responses, three times, without assistance. Role-playing in this manner continued until the child engaged in correct responding across three consecutive scenarios.

***In-situ training.*** For participants who did not engage in all three target behaviors during the post-training assessments, in situ training was implemented. The experimenter entered the assessment area and provided the child with on-the-spot BST. First, the experimenter provided corrective feedback for the steps that the child missed (e.g., “I see you did not touch the gun; however, you need to remember to run away from the gun and tell your mom.”). The child then practiced the safety skills until he or she engaged in all three behaviors correctly, three consecutive times. For example, the child practiced pointing out the gun, leaving the room where the gun is, and going up to his or her caregiver and saying, “I found a gun.”

## **Results**

Seven parents used the web-based training to conduct BST with their children. Six of the seven had high procedural fidelity during training with a mean of 95.5% (range, 84-100%). Furthermore, safety skills increased for all children after their parents conducted training. Figures 1 and 2 show that six children received scores of 0 or 1 during baseline assessments. Betty, Rachel, and Fiona touched the firearm during their respective baseline assessments, resulting in a score of 0 for each of them. Evan participated in five baseline assessments and touched the firearm in four of the assessments resulting in a score of 0. However, in one baseline assessment, he refrained from touching the firearm but did not leave the area for a score of 1. During baseline, Frank touched the firearm during the first assessment, scoring 0. For the subsequent baseline assessments, he refrained from touching the firearm, but did not leave the area for a score of 1. April refrained from touching the firearm in the baseline assessments, but did not leave the area for a score of 1. Although April yelled for her parents to come into the room where

the gun was present for her first assessment, she did not score above 1 because she stayed in the area near the gun. The experimenter reasoned that, beyond training sessions, her parents may not be around if she finds a gun, thus it would be important for her to demonstrate running away to recruit adult assistance.

Ian initially received scores of 0 during baseline assessments because he either picked up the firearm and looked at it or touched the firearm after running to tell his mother. However, the following two baseline assessments resulted in scores of 1 because he refrained from touching the firearm, but did not leave the area. At one point, Ian's assessments were on hold for a month due to the holidays and medical events with the family. When Ian was able to continue in the study, in his remaining baseline assessments, he began to demonstrate the safety skills of refraining from touching the firearm, running away, and telling his mom, resulting in scores of 3 each session. Even though Ian was engaging in the safety skills in baseline, and therefore did not need training, his mother chose to complete training with him anyway, and he continued to score 3 after the training.

Following parent-conducted BST, three participants scored a 3 for three consecutive assessments, Betty (Figure 1), April (Figure 1), and Frank (Figure 2). All three children participated in a follow-up assessment one month after the last in situ assessment. April and Frank continued to engage in all the safety skills, while Betty did not touch the gun and ran away, but did not tell an adult for a score of 2. Experimenter IST was conducted for Betty, but no other follow-up sessions could be scheduled with Betty to determine if her score increased back to 3.

Three participants did not exhibit all of the safety skills consistently following parent-conducted BST, Rachel (Figure 1), Evan (Figure 1) and Fiona (Figure 2). In at least one of their

assessments following BST, they did not touch the gun and left the area, but she did not tell an adult about the gun, for a score of 2. However, all three participants received three consecutive scores of 3 after one or two (Rachel) in situ training sessions conducted by the experimenter. In a one-month follow-up assessment, Rachel and Fiona maintained the safety skills and received a score of 3. Evan was not available for a follow-up assessment.

Six parents completed the social validity questionnaires provided to them at the end of the study. All parents strongly agreed that the manual prepared them to implement BST with their child, that they would recommend this training to others, that it was easy to implement BST with their child, and that they liked the procedures used to teach their child. Parents either strongly agreed, agreed, or neither agreed or disagreed that the training did not take up too much time ( $M= 3.1$ ). When asked for additional comments, one parent stated “It was great!” while another parent stated “Well done program, she is very aware of gun safety.”

Six parents completed a side-effects questionnaire. All parents reported that they were very pleased with their child’s participation in the study. One parent reported that their child was a little more scared to go into rooms where they found guns, while the other parents reported no change. All parents reported no change when asked if their child appeared more hesitant about going into a room alone, or more upset about issues related to firearms or personal safety. When asked if they noted any other changes in their child, one parent stated that their child seemed more aware and cautious about firearms, while another reported that their son asked about how the guns got into their home.

## **Discussion**

This study showed that a web-based manual was effective at teaching six of the seven parents how to conduct BST with their children to teach firearm safety skills. Although there was

low treatment integrity for one parent, all children showed improvement in safety skills after parent-conducted BST, with all children running away from the firearm. Three of the six children who received parent-conducted BST engaged in all the safety skills without the addition of experimenter-implemented IST. These results align with research that has found BST to be effective with approximately fifty percent of individuals who receive BST (Gatheridge et al. 2004; Himle, Miltenberger, Flessner, et al., 2014; Miltenberger et al., 2004). Additionally, two children exhibited all the safety skills during one of two assessments after parent-conducted BST, but required experimenter-implemented IST to exhibit the safety skills consistently. For Ian, we could not evaluate parent-conducted BST because he exhibited the safety skills in baseline before his parent conducted training. When asked, Ian's mom stated that they never talked about the firearm being present or what to do when Ian found a firearm.

This study demonstrated the utility of a web-based training program for parent-conducted BST for firearm safety skills. Six of seven parents conducted the training with high fidelity after training with the web-based program. The current study extends the results of Gross et al. (2007), who gave parents a manual and videos to train them to conduct BST, by eliminating the need to acquire materials directly from a live expert. Additionally, videos with instructions and modeling were provided to the parents to show their child, thus removing the effort and potential errors involved when parents implement the instruction and modeling components of BST themselves.

Another extension of the current study is that, during BST, a picture of a firearm was used in place of a disabled firearm or a replica. The picture was included to eliminate the need for parents to acquire materials that are not easily accessible. This extension is important to the safety skill literature because, to date, all studies that have evaluated procedures for teaching firearm safety skills have included a replica of a firearm or a disabled firearm. Caregivers,

including parents and teachers, are often hesitant to conduct or have their child receive BST because of their concern with having their child come into contact with an actual gun or realistic replica. Further research is necessary to determine if a picture of a firearm is as effective as a replica of a firearm when used as the S<sup>D</sup> that the child learns to respond to in training sessions. If a picture of a firearm is shown to be as effective as the actual or replica gun, this can open up a variety of different settings for training to take place such as schools, daycare centers, and after-school programs where staff or teachers will not allow a gun or replica on site.

Even though interactive components (i.e., questions) were included within the website to help ensure parents consumed the information provided to them, data were not collected on parent answers (accuracy or completion). As such, it is unclear if parents read all the materials and watched the videos before implementing BST. Even though there are no data to determine that Fiona's father did not look at the website before training, anecdotal reports indicate this is the case, and likely the reason for his low treatment integrity scores. During training, Fiona's father continually asked the experimenter if he had done everything he was supposed to and where to get different materials for the training. Future research should include criteria for parent responses to the interactive components. That is, only correct responses would provide access for the parent to progress to the next portion of the website, and to gain access to the printable materials needed for training. A recent research review (i.e., Shapiro, & Kazemi, 2017) indicates this requirement would likely increase the parent's understanding of the material.

Even though Fiona's father did not include the modeling, rehearsal, or feedback components of BST, Fiona's safety score increased to 3 indicating that she engaged in all the safety skills. This finding is interesting because Fiona's father provided Fiona with an informational-only approach to firearm safety which Gatheridge et al. (2004) and Himle,

Miltenberger, Gatheridge, et al. (2004) both found was ineffective at teaching firearm safety skills. However, the lack of an interactive component to training could be why Fiona's use of the safety skills did not continue after the first assessment.

One potential limitation of the current study is experimenter-conducted IST was provided if a child did not score 3 during an in situ assessment at any point after parent-conducted BST. In situ training was immediately implemented instead of another assessment because, without additional training, the likelihood for an improvement in the child's performance was low.

Maxfield, Miltenberger, and Novotny (2018) included booster trainings in which participants received another session of small-scale simulation training if the child did not score a 3 after the first training session. Additional parent-conducted training was not provided within the period of the study because it is unlikely parents would independently conduct in situ assessments to determine if their child needed additional training. However, future research could evaluate whether booster training conducted by the parents helps increase and maintain responding. In such a case, the training website could be reconfigured to instruct parents to conduct the training multiple times to help ensure the acquisition and generalization of the skills.

Future research should also replicate this study with a larger number of children, children of different ages and ability levels, and different target behaviors (e.g., poison prevention skills) due to limited research on this method of delivering training to caregivers. Additionally, future research should include training individuals other than parents, such as teachers, daycare providers, and staff at afterschool programs. Research in these different settings would be greatly beneficial because it could allow one or two individuals to conduct training with a group of children instead of just one at a time.

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Table 1

*Expert Ratings*

Item	Expert 1	Expert 2	Expert 3	Mean
The manual clearly explains the importance of firearm safety	3	5	5	4.33
It is important to include in the manual a discussion of the importance of firearm safety	4	5	5	4.66
The manual clearly explains the background of BST	4	5	4	4.33
It is important to include in the manual a description of the background of BST	4	4	5	4.33
The manual clearly explains how parents should use the manual	5	5	4	4.66
It is important to include in the manual a description of how parents should use the manual	5	5	5	5
The manual clearly describes the instruction component	5	5	5	5
It is important to include in the manual a description of the instruction component	5	5	5	5
The manual clearly describes the modeling component	5	5	5	5
It is important to include in the manual a description of the modeling component	5	5	5	5
The manual clearly describes the rehearsal and feedback component	5	5	5	5
It is important to include in the manual a description of the rehearsal and feedback component	5	5	5	5
The videos clearly model the rehearsal and feedback component	5	5	5	5
It is important to include the videos modeling the rehearsal and feedback component	5	5	5	5
The active responding within the manual accurately address the important steps of the different components	5	4	5	4.66
It is important to include in the manual the active responding questions	5	5	5	5
The checklist included in the manual includes all the important steps of BST	4	5	5	4.66
It is important to include in the manual the checklist	4	5	5	4.66
The manual is user friendly	4	5	4	4.33

The manual will help parents teach their children firearm safety	4	5	5	4.66
The manual will help parents understand BST and implement it effectively	4	5	5	4.66

Table 2

*Parent Ratings*

Item	Parent 1	Parent 2	Parent 3	Parent 4	Mean
The manual clearly explains the importance of firearm safety	4	5	5	5	4.75
The manual clearly explains the background of BST	4	5	5	4	4.5
The manual clearly explains how parents should use the manual	5	5	5	5	5
The manual clearly describes the instruction component	5	5	5	5	5
The manual clearly describes the modeling component	5	5	5	5	5
It is important to include in the manual a description of the modeling component	4	5	5	5	4.75
The manual clearly describes the rehearsal and feedback component	5	5	5	5	5
The videos clearly model the rehearsal and feedback component	5	5	5	5	5
The active responding within the manual accurately address the important steps of the different components	5	5	5	4	4.75
It is important to include in the manual the active responding questions	4	5	5	5	4.75
The checklist included in the manual will be helpful when a parent conducts BST	5	5	5	4	4.75
The website is user friendly	4	5	5	5	4.75
Clicking on the links brought me to what I expected	5	5	5	5	5
It was easy to navigate the website	5	5	5	5	5
The organization of the information on the screen was clear	4	5	5	5	4.75
The manual will help parents teach their children firearm safety	5	5	5	5	5
The website will help parents understand BST and implement it effectively	4	5	5	5	4.75



Table 3

*Expert and Parent Comments*

Rater	Comments
Expert 1	<p>This looks really good, overall! I definitely like the prompts in the video (e.g., “pause”). A few minor edits:</p> <ol style="list-style-type: none"> <li>1) On the 2<sup>nd</sup> paragraph of the introduction page, I think “consist” should be “consists.”</li> <li>2) In the manual, there are 4 bullets in the instruction section but only 3 are needed for the answer.</li> <li>3) In the BST checklist, the skills are all covered. It may be good to have a prompt to repeat until 3 correct scenarios are accomplished.</li> </ol>
Expert 2	<p>I think the manual is complete, but brief, which is good. I don’t think you need to add anything. Any concern about the reading abilities of the parents? I only ask because any materials I create in the hospital setting I work in have to be at an 8<sup>th</sup> grade reading level—something about ensure that all parents can access the materials.</p>
Expert 3	<p>The phrase “safety skills” as in “engage in all the safety skills” is introduced in the modeling component. It might be clearer for the parent if this phrase were used earlier (e.g., “You will teach your child the safety skills to use if he/she ever finds a gun” in the introduction to the manual).</p> <p>The manual would benefit from careful copyediting for consistency in format and grammar.</p> <p>In the About section, you refer to the four components of BST. In the Final Thoughts section, you refer to the three components of BST.</p>
Parent 2	<p>The website is very comprehensive, is written well, and covers everything that parents need to know about teaching their children about what to do if they see a gun. The only critique I have is that it is a lot of reading. It’s definitely more along the lines of an academic website than a general one so I could see some parents being put off by the sheer amount of information to read through. I’m a teacher so I’m used to doing research and having to read through step by step processes with lots of detail but the parent side of me can see how it might be tough for some to stay engaged enough to get through all of the great information.</p>
Parent 3	<p>To me the manual is very understandable and nothing else needs to be added.</p>

*Note.* Parent Raters 1 and 4 did not provide any comments related to the web-based manual

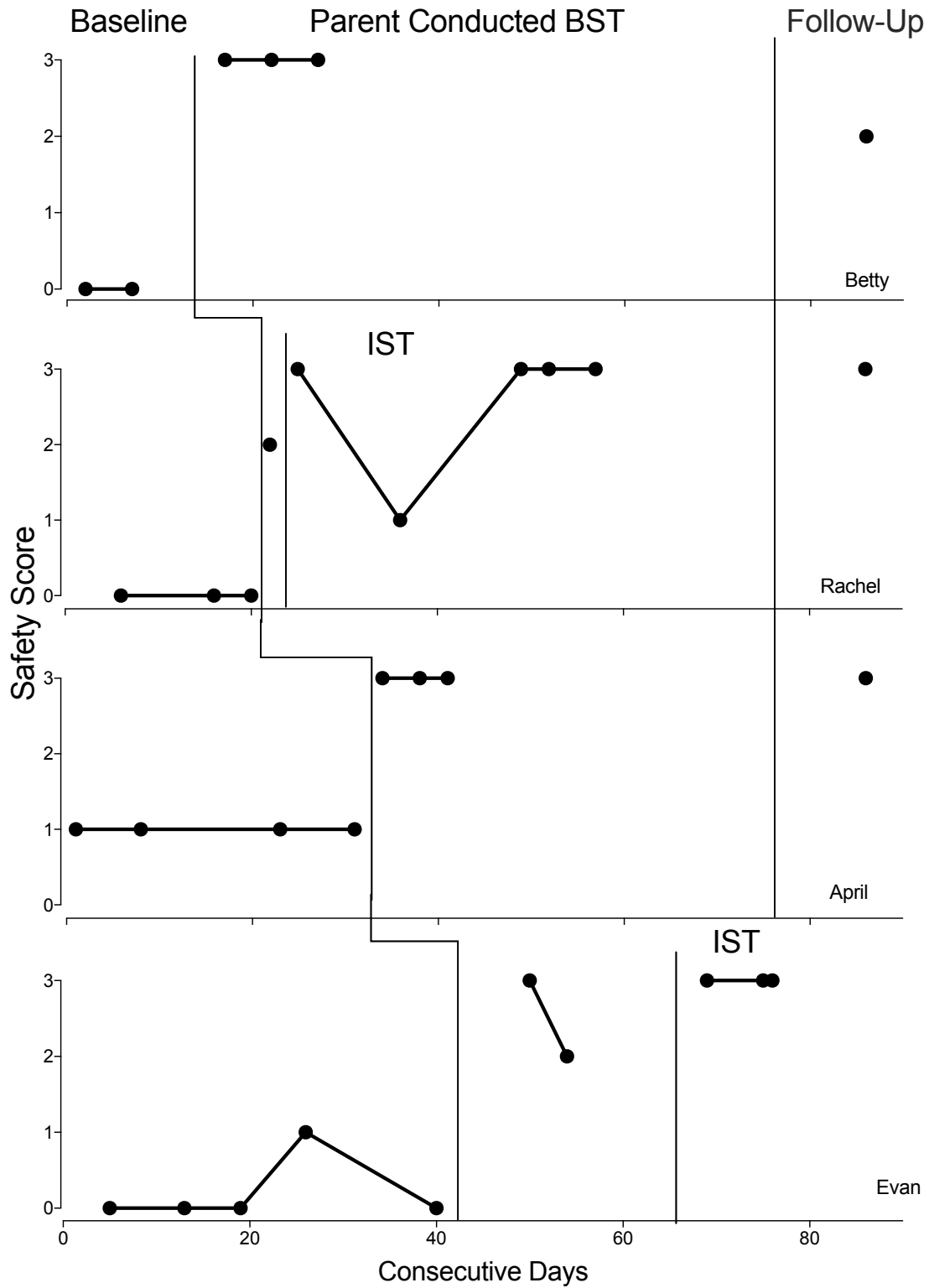


Figure 1. Safety scores during in situ assessments group 1.

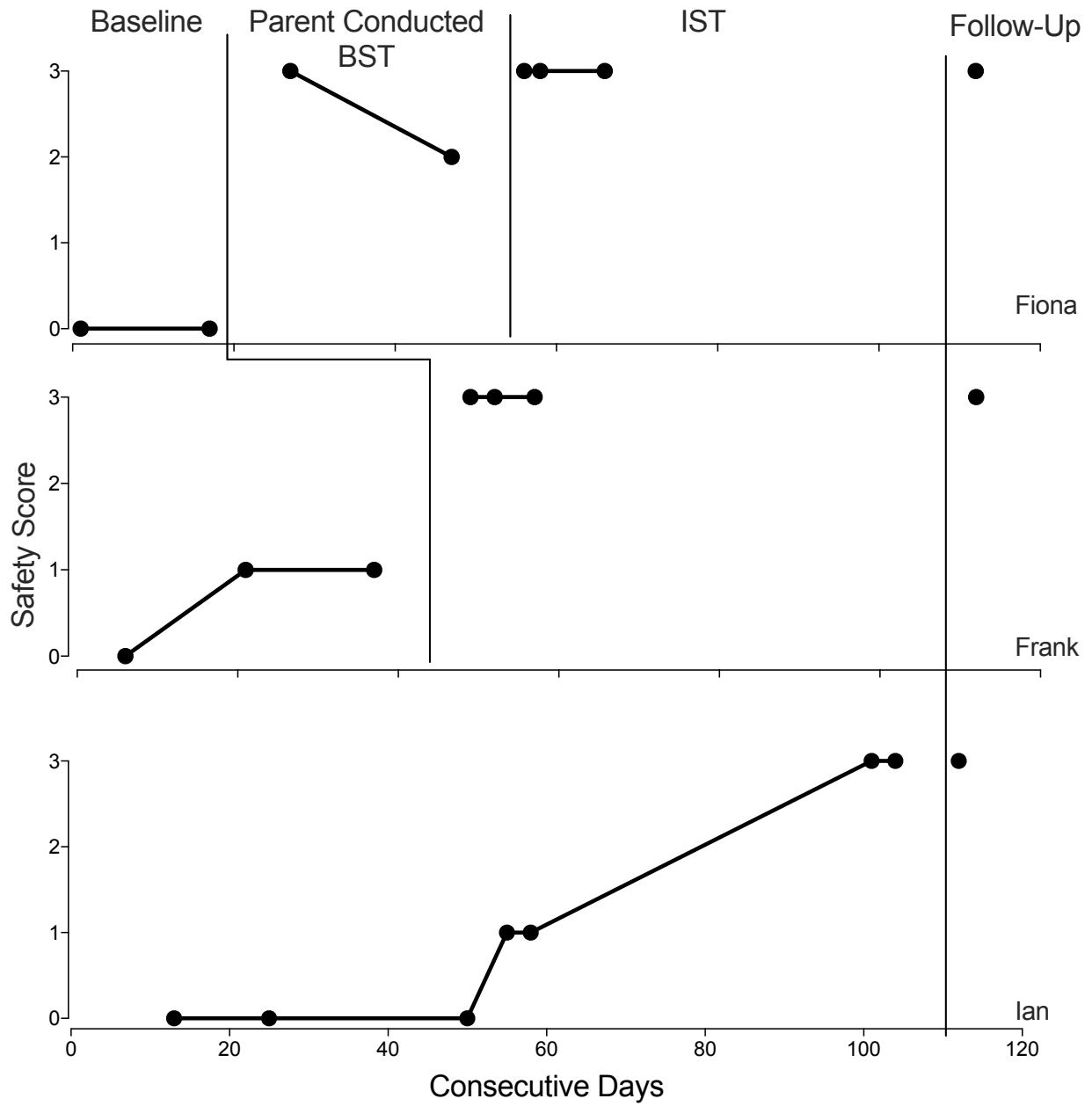


Figure 2. Safety scores during in situ assessments group 2.

## **Appendices**

## Appendix A: Expert Questionnaire

1. The manual clearly explains the importance of firearm safety

1	2	3	4	5
strongly disagree	disagree	neither agree or disagree	agree	strongly agree

2. It is important to include in the manual a discussion of the importance of firearm safety

1	2	3	4	5
strongly disagree	disagree	neither agree or disagree	agree	strongly agree

3. The manual clearly explains the background of BST

1	2	3	4	5
strongly disagree	disagree	neither agree or disagree	agree	strongly agree

4. It is important to include in the manual a description of the background of BST

1	2	3	4	5
strongly disagree	disagree	neither agree or disagree	agree	strongly agree

5. The manual clearly explains how parents should use the manual

1	2	3	4	5
strongly disagree	disagree	neither agree or disagree	agree	strongly agree

6. It is important to include in the manual a description of how parents should use the manual

1	2	3	4	5
strongly disagree	disagree	neither agree or disagree	agree	strongly agree

7. The manual clearly describes the instruction component

1	2	3	4	5
strongly disagree	disagree	neither agree or disagree	agree	strongly agree

8. It is important to include in the manual a description of the instruction component

1 strongly disagree	2 disagree	3 neither agree or disagree	4 agree	5 strongly agree
---------------------------	---------------	-----------------------------------	------------	------------------------

9. The manual clearly describes the modeling component

1 strongly disagree	2 disagree	3 neither agree or disagree	4 agree	5 strongly agree
---------------------------	---------------	-----------------------------------	------------	------------------------

10. It is important to include in the manual a description of the modeling component

1 strongly disagree	2 disagree	3 neither agree or disagree	4 agree	5 strongly agree
---------------------------	---------------	-----------------------------------	------------	------------------------

11. The manual clearly describes the rehearsal and feedback component

1 strongly disagree	2 disagree	3 neither agree or disagree	4 agree	5 strongly agree
---------------------------	---------------	-----------------------------------	------------	------------------------

12. It is important to include in the manual a description of the rehearsal and feedback component

1 strongly disagree	2 disagree	3 neither agree or disagree	4 agree	5 strongly agree
---------------------------	---------------	-----------------------------------	------------	------------------------

13. The videos clearly model the rehearsal and feedback component

1 strongly disagree	2 disagree	3 neither agree or disagree	4 agree	5 strongly agree
---------------------------	---------------	-----------------------------------	------------	------------------------

14. It is important to include the videos modeling the rehearsal and feedback component

1 strongly disagree	2 disagree	3 neither agree or disagree	4 agree	5 strongly agree
---------------------------	---------------	-----------------------------------	------------	------------------------

15. The active responding within the manual accurately address the important steps of the different components

1 strongly disagree	2 disagree	3 neither agree or disagree	4 agree	5 strongly agree
---------------------------	---------------	-----------------------------------	------------	------------------------

16. It is important to include in the manual the active responding questions

1 strongly disagree	2 disagree	3 neither agree or disagree	4 agree	5 strongly agree
---------------------------	---------------	-----------------------------------	------------	------------------------

17. The checklist included in the manual includes all the important steps of BST

1 strongly disagree	2 disagree	3 neither agree or disagree	4 agree	5 strongly agree
---------------------------	---------------	-----------------------------------	------------	------------------------

18. It is important to include in the manual the checklist

1 strongly disagree	2 disagree	3 neither agree or disagree	4 agree	5 strongly agree
---------------------------	---------------	-----------------------------------	------------	------------------------

19. The manual is user friendly

1 strongly disagree	2 disagree	3 neither agree or disagree	4 agree	5 strongly agree
---------------------------	---------------	-----------------------------------	------------	------------------------

20. The manual will help parents teach their children firearm safety

1 strongly disagree	2 disagree	3 neither agree or disagree	4 agree	5 strongly agree
---------------------------	---------------	-----------------------------------	------------	------------------------

21. The manual will help parents understand BST and implement it effectively

1 strongly disagree	2 disagree	3 neither agree or disagree	4 agree	5 strongly agree
---------------------------	---------------	-----------------------------------	------------	------------------------

If you responded strongly disagree for any questions please describe why:

Do you believe anything more could be added to the manual:



## Appendix B: Parent Questionnaire

1. The manual clearly explains the importance of firearm safety

1 strongly disagree	2 disagree	3 neither agree or disagree	4 agree	5 strongly agree
---------------------------	---------------	-----------------------------------	------------	------------------------

2. The manual clearly explains the background of BST

1 strongly disagree	2 disagree	3 neither agree or disagree	4 agree	5 strongly agree
---------------------------	---------------	-----------------------------------	------------	------------------------

3. The manual clearly explains how parents should use the manual

1 strongly disagree	2 disagree	3 neither agree or disagree	4 agree	5 strongly agree
---------------------------	---------------	-----------------------------------	------------	------------------------

4. The manual clearly describes the instruction component

1 strongly disagree	2 disagree	3 neither agree or disagree	4 agree	5 strongly agree
---------------------------	---------------	-----------------------------------	------------	------------------------

5. The manual clearly describes the modeling component

1 strongly disagree	2 disagree	3 neither agree or disagree	4 agree	5 strongly agree
---------------------------	---------------	-----------------------------------	------------	------------------------

6. It is important to include in the manual a description of the modeling component

1 strongly disagree	2 disagree	3 neither agree or disagree	4 agree	5 strongly agree
---------------------------	---------------	-----------------------------------	------------	------------------------

7. The manual clearly describes the rehearsal and feedback component

1 strongly disagree	2 disagree	3 neither agree or disagree	4 agree	5 strongly agree
---------------------------	---------------	-----------------------------------	------------	------------------------

disagree

or disagree

agree

8. The videos clearly model the rehearsal and feedback component

1  
strongly  
disagree

2  
disagree

3  
neither agree  
or disagree

4  
agree

5  
strongly  
agree

9. The active responding within the manual accurately address the important steps of the different components

1  
strongly  
disagree

2  
disagree

3  
neither agree  
or disagree

4  
agree

5  
strongly  
agree

10. It is important to include in the manual the active responding questions

1  
strongly  
disagree

2  
disagree

3  
neither agree  
or disagree

4  
agree

5  
strongly  
agree

11. The checklist included in the manual will be helpful when a parent conducts BST

1  
strongly  
disagree

2  
disagree

3  
neither agree  
or disagree

4  
agree

5  
strongly  
agree

12. The website is user friendly

1  
strongly  
disagree

2  
disagree

3  
neither agree  
or disagree

4  
agree

5  
strongly  
agree

13. It was easy to navigate the website

1  
strongly  
disagree

2  
disagree

3  
neither agree  
or disagree

4  
agree

5  
strongly  
agree

14. It was easy to find the information, videos, and needed materials within the website

1	2	3	4	5
strongly disagree	disagree	neither agree or disagree	agree	strongly agree

15. Clicking on the links brought me to what I expected

1	2	3	4	5
strongly disagree	disagree	neither agree or disagree	agree	strongly agree

15. The organization of the information on the screen was clear

1	2	3	4	5
strongly disagree	disagree	neither agree or disagree	agree	strongly agree

16. The manual will help parents teach their child firearm safety

1	2	3	4	5
strongly disagree	disagree	neither agree or disagree	agree	strongly agree

17. The website will help parents understand BST and implement it effectively

1	2	3	4	5
strongly disagree	disagree	neither agree or disagree	agree	strongly agree

If you stated strongly disagree for any questions please describe why:

Do you believe anything could be added to the manual:

### Appendix C: Treatment Fidelity Checklist

		Step	Yes	No	N/A
Instruction	1	Tell the child how to respond when they find a gun (Don't touch, Run Away, Tell an Adult)			
	2	Tell the child when they should engage in each of the behaviors (Whenever you see a gun)			
	3	Tell child the different adults they may have to report the gun to			
	4	Tell the child why it is important for them to engage in each step			
Modeling	1	Show the child the video models			
	2	Tell the child how the peer in the video responded correctly			
	3	Pause video to allow child to respond			
Rehearsal and Feedback	1	Provide child with a scenario that is realistic to their own environment			
	2	Ask child to act out the safety skills in response to the scenario			
	3	Provide praise for correct responding for each scenario			
	4	Provide behavior specific feedback for each scenario if child responds incorrectly or misses a step			
	5	Have child practice scenario again if they respond incorrectly or miss a step			
	6	Have child practice until they respond correctly for three different scenarios			

## Appendix D: Social Validity Questionnaire

### 1 Social Validity Questionnaire

1. This manual prepared me to implement BST with my child

1	2	3	4	5
strongly disagree	disagree	neither agree or disagree	agree	strongly agree

2. I would recommend this manual to other parents.

1	2	3	4	5
strongly disagree	disagree	neither agree or disagree	agree	strongly agree

3. It was easy to implement BST with my child

1	2	3	4	5
strongly disagree	disagree	neither agree or disagree	agree	strongly agree

4. Training did not take up too much of my time.

1	2	3	4	5
strongly disagree	disagree	neither agree or disagree	agree	strongly agree

5. I liked the procedures used to teach my child.

1	2	3	4	5
strongly disagree	disagree	neither agree or disagree	agree	strongly agree

Additional Comments regarding the study:

6. What is your age?

7. What is the age of your child?
  
8. What is the highest level of education you have achieved?
  
9. Have you taken any firearm training in the past that may have influenced how you taught your child?
  
10. Have you ever used the Internet to access materials for accomplishing a DIY project or any other training?

## Appendix E: Side Effects Questionnaire

1. Compared to before this study my child now appears scared: afraid to go into rooms that they found guns

much more scared	a little more scared	no change	less scared	much less scared
---------------------	-------------------------	-----------	----------------	---------------------

If a change occurred, please describe briefly.

2. Compared to before this study my child now appears cautious: hesitant to go into rooms alone

much more cautious	a little more cautious	no change	less cautious	much less cautious
-----------------------	---------------------------	-----------	------------------	-----------------------

If a change occurred, please describe briefly.

3. Compared to before this study my child now appears upset: concerned about the issue of firearms, personal safety, etc.

much more upset	a little more upset	no change upset	less upset	much less upset
--------------------	------------------------	--------------------	---------------	--------------------

If a change occurred, please describe briefly.

4. Other changes I noted in my child's behavior are:

Please describe or mark N/A if no change was observed.

5. How pleased are you that your child participated in the study?

very pleased          pleased          neutral          disappointed          very disappointed

7. Did you terminate your child's participation in the study? Yes or No

If yes, please explain why.



## Appendix F: Consent Form



# Consent to Participate in Research & Parental Permission for my Child to Participate in Research

Pro # 35103

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The following information is being presented to help you and your child decide whether or not you would like to be a part of a research study. Please read this information carefully. If you have any questions or if you do not understand the information, we encourage you to ask the researcher.

We are asking you to take part, and to allow your child to take part, in a research study called: **An Evaluation of Parent Implemented Web-Based Behavior Skills Training for Firearm Safety Skills.**

The person who is in charge of this research study is Marissa Novotny. This person is called the Principal Investigator. However, other research staff may be involved and can act on behalf of the person in charge. She is being guided in this research by Dr. Raymond Miltenberger.

The research will be conducted at within your home.

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## Purpose of the study:

The purpose of this study is to determine the ease and efficacy of parent conducted behavioral skills training (BST) to teach your child gun safety skills You will be provided

with information on how to conduct behavioral skills training through a website developed by the primary investigator.

## **Why are you & your child being asked to take part?**

We are asking you and your child to take part in this research study because your child is between the ages of 4 to 7 and you have access to the Internet.

## **Study Procedures:**

If you and your child take part in this study, you will be asked to:

- Go to a website developed by the primary investigator using Wix.com called “Keeping Kids Safe” and read the information and watch the videos that are on the website. You will also be asked to answer questions such as “What are the four steps to complete in the instruction component.” The training will take about 1-2 hours to complete.
- After you have visited the website and completed all the question you will be asked to train your child on how to respond when they come across a gun (don’t touch, run, and tell). This will be completed during one to two sessions depending on how quickly your child demonstrates the skills.
- During the training your child will be asked to watch a video showing them how to respond when they find a gun. During the training you will tell your child to pretend they found a firearm and to engage in the behaviors (don’t touch, run, and tell) that they saw in the video. You will provide them with feedback and have them practice until they show all the different skills. Training will take last for one to two 30 min sessions.
- Before and after training is complete you will be asked to meet with the primary or co-investigator without your child present in order to set up a situation in which your child will come across a disabled firearm to test to see if they acquired the necessary safety skills. In order to disable the pistol the firing mechanism has been welded and the barrel is filled with metal. The gun cannot be loaded or fired. During the meeting you and the investigator will determine a place in your home that your child often goes into in which the disabled firearm and camera can be placed. Once this area is determined the investigator will set up the disabled firearm and you will be asked to instruct your child to go into the room with disabled firearm and their behaviors will be videotaped. After training if your child does not respond correctly the investigator will conduct training on the spot. If your child responds correctly you and the investigator will praise your child and the gun will be removed. Assessments will take approximately 10 minutes and take place 2 to 10 times.
- If your child does not respond correctly a second training similar to the first will be conducted to determine if the on the spot training conducted by the investigator

was effective. These additional trainings will take approximately 10 minutes to complete.

- Children will be told that the parents will go make sure the guns are taken care of but besides that we are not planning on discussing the guns with the kids because we do not want to make them aware that the assessments are fake because if for some reason they come into contact with guns in the future we don't want them to think it is fake and want them to treat all guns in the future as if they are real.
- After training is complete you will be asked to complete a side-effects questionnaire at your home.

## **Total Number of Participants**

About 40 individuals will take part in this study at USF.

## **Alternatives / Voluntary Participation / Withdrawal**

If you decide not to let your child take part in this study and you do not participate, that is okay. Instead of being in this research study you and your child can choose not to participate.

You and your child should only take part in this study if both of you want to. You or your child should not feel that there is any pressure to take part in the study to please the study investigator or the research staff.

### **If you or your child decide not to take part:**

- You will not be in trouble or lose any rights you would normally have.

You can decide after signing this informed consent form that you no longer want your child or yourself to take part in this study. We will keep you informed of any new developments which might affect your willingness to participate or allow your child to continue to participate in the study. However, you and your child can decide to stop taking part in the study for any reason at any time. If you and/or your child decide to stop taking part in the study, tell the study staff as soon as you can.

## **Benefits**

The potential benefits to you and your child include:

- Learning how to respond appropriately when they come across a gun in their natural environment.

## **Risks or Discomfort**

Children of similar age ranges who have participated in studies that utilize similar assessments in which children come find guns in the home and training have not experienced severe adverse effects. Although a few participants were reported to be "more cautious" after participating, the majority of parents in most studies reported being satisfied with their child's participation and would do it again. If your child has never been exposed to a gun before your child may become more interested in guns. Previous research has not shown this to be likely. As with any study there is a risk for breach of confidentiality but to lower this risk all information will be kept under false identities and locked in a cabinet.

## **Compensation**

You and your child will receive no payment or other compensation for taking part in this study.

## **Cost**

It will not cost you anything to participate and to let your child take part in the study.

## **Conflict of Interest Statement**

The person leading this research study might benefit financially from this study. Specifically, Marissa Novotny is the author of the training being evaluated in this study. Research studies like the one you are thinking about joining are done to determine whether the new training is safe and effective. If research shows the new training is safe and effective, Marissa Novotny would receive a part of the profits from any sales of this training.

The Institutional Review Board that reviewed this study and a committee at the University of South Florida have reviewed the possibility of financial benefit. They believe that the possible financial benefit to Marissa Novotny is not likely to affect your involvement or the scientific quality of the study. If you would like more information, please ask the researchers or the study coordinator.

## **Privacy and Confidentiality**

We will keep you and your child's study records private and confidential. Certain people may

need to see your study records. Anyone who looks at your records must keep them confidential. These individuals include:

- The research team, including the Principal Investigator, study coordinator, research nurses, and all other research staff.
- Certain government and university people who need to know more about the study, and individuals who provide oversight to ensure that we are doing the study in the right way.
- Any agency of the federal, state, or local government that regulates this research.
- The USF Institutional Review Board (IRB) and related staff who have oversight responsibilities for this study, including staff in USF Research Integrity and Compliance.

We may publish what we learn from this study. If we do, we will not include you or your child's name. We will not publish anything that would let people know who you are.

## **You can get the answers to your questions, concerns, or complaints.**

If you have any questions, concerns or complaints about this study, call Marissa Novotn at 507-828-4260.

If you have questions about you or your child's rights, complaints, or issues as a person taking part in this study, call the USF IRB at (813) 974-5638 or contact by email at [RSCH-IRB@usf.edu](mailto:RSCH-IRB@usf.edu).

### **Consent to Participate and Parental Permission for My Child to Participate in this Research Study**

I freely give my consent take part and to let my child take part in this study. I understand that by signing this form I am agreeing to take part in and to let my child take part in research. I have received a copy of this form to take with me.

\_\_\_\_\_  
Child's name

\_\_\_\_\_  
Signature of Person and Parent of Child Taking Part in Study

\_\_\_\_\_  
Date

---

Printed Name of Person and Parent of Child Taking Part in Study

## **Statement of Person Obtaining Informed Consent**

I have carefully explained to the person taking part in the study what he or she can expect from their participation. I confirm that this research subject speaks the language that was used to explain this research and is receiving an informed consent form in their primary language. This research subject has provided legally effective informed consent.

---

Signature of Person Obtaining Informed Consent

---

Date

---

Printed Name of Person Obtaining Informed Consent

## Appendix G: 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

7/20/2018

This letter supersedes the letter dated 7/10/2018

Marissa Novotny  
ABA-Applied Behavior Analysis  
Tampa, FL 33612

**RE: Full Board Approval for Initial Review**

IRB#: Pro00035103

Title: An Evaluation of Parent Implemented Web-Based Behavior Skills Training for Firearm Safety Skills

**Study Approval Period: 6/15/2018 to 6/15/2019**

Dear M. Novotny:

On 6/15/2018, 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):**

[Protocol 35103 Version 1 6-24-18 No TC.docx](#)

**Consent/Assent Document(s)\*:**

[35103\\_Parental Consent Form V1 6.24.18 No TC.docx.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.

The Board accepted the COI Management Plan.

**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) business 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,

A handwritten signature in black ink, appearing to read 'Kristen Salomon', with a long horizontal line extending to the right.

Kristen Salomon, Ph.D., Chairperson  
USF Institutional Review Board