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The Efficacy of Behavior Skills Training: A Literature Review

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THE EFFICACY OF BEHAVIOR SKILLS TRAINING: A LITERATURE REVIEW

By

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B.S., Florida State University 2012

A Research Paper Submitted in Partial Fulfillment of the Requirements for the
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RESEARCH PAPER APPROVAL

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A Research Paper Submitted in Partial
Fulfillment of the Requirements
for the Degree of
Master of Science
in the field of Behavior Analysis and Therapy

Approved by:
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AN ABSTRACT OF THE RESEARCH PAPER OF

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TITLE: THE EFFICACY OF BEHAVIOR SKILLS TRAINING: A LITERATURE REVIEW

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Behavior Skills Training (BST) is a method for training a skill. BST has been used to effectively train individuals through all age ranges and ability levels. Many varying skills have been successfully taught through the use of BST. This study highlights the wide array of types of skills researchers have successfully taught using BST. Also highlighted are a few techniques researchers used in combination with BST and their assistance in attainment of the desired outcome.

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CHAPTER 1

LITERATURE REVIEW

Behavior Skills Training (BST) is a teaching package consisting of a combination of methods, when used together these methods create an effective technique for teaching individuals. Ward-Horner & Sturmey define BST as, “an effective training package that consists of instructions, modeling, rehearsal, and feedback” (Ward-Horner & Sturmey, 2012, p. 75). The instruction component of BST can either be written or verbal. The purpose of this step is for the trainer to give the trainee an explanation of how to complete the skill or behavior to be taught. In the second step, modeling, the skill is demonstrated. Rehearsal is when the trainee is given the opportunity to practice the skill. The rehearsal component is an important part of BST. The rehearsal component allows for the last component, which is feedback. After the trainee has practiced the skill they are given feedback on correct completion of the skill or how to attain correct completion of the skill.

BST has been used to teach children, adults, and individuals with developmental disabilities a wide variety of important skills. It has also been used to teach staff and parents how to work with children and individuals with developmental disabilities. In addition BST has taught professionals and direct care staff to implement a new skill. The BST method allows for the trainee to practice the skill and provides gives the trainer an opportunity to provide corrective feedback and praise allowing for successful transfer of skill mastery.

BST is rooted in Applied Behavior Analysis. In their 1968 article titled *Some Current Dimensions of Applied Behavior Analysis*; Bear, Wolf, and Risley outline and defined the seven dimensions of Applied Behavior Analysis. One of the seven dimensions outlined was “Effective.” The article states, “If the application of behavioral techniques does not produce

large enough effects for practical value, then application has failed” (Bear, Wolf, & Risley, 1968, p 96). In other words, a training technique must be effective in order to be relevant; otherwise the application of the technique is mute. The search for techniques that produce effective change for applied problems led to the development of BST. This fundamental goal of applied researchers in Applied Behavior Analysis to find the best way to teach a skill or impart knowledge inevitably led to the study of successful components of teaching. The focus on developing an effective technology brought about the development of combining components and gave way to instructions, modeling, rehearsal, and feedback used together under the term Behavioral Skills Training (BST).

The importance of correctly using an effective method for teaching a new skill or behavior is best highlighted by Reid and Parsons, “If support personnel do not implement treatment plans proficiently, then in essence there is no treatment for challenging behavior” (Reid & Parsons 2002, p. 6). This statement is true of every type of treatment package. If those implementing a behavior plan, treatment plan, BST, or using a specific technique are not competently implementing the plan or correctly utilizing the technique it is as if there is no specific plan at all. In chapter seven Reid and Parsons outline two types of staff training methods, Competency-Based and Performance-Based. Six steps are outlined for conducting Competency-and Performance-Based staff trainings. While BST only includes four steps, each of the steps n BST are included in the Component Steps of Competency-and Performance-Based training. Competency-and Performance-Based training and BST provide the trainee with instructions or a description of the skills, demonstrate or model the skill(s), allow the trainees to perform or rehearse each skill, and provide feedback on skill completion.

BST is a behavior based method for teaching skills. It was developed through the practice of

researching the most effective method for teaching behaviors or skills in applied settings. The components of BST have been in used independently and together since the 1970's, while the term was not used until 2004 by Sarokoff and Sturmey. Several articles over the past few decades have used the four components of BST to teach a skill without identifying their training method as BST.

This paper will take a look at the evolution of the training package we know as BST. The articles that use some of the components of BST but not all four components will be reviewed. Several important concepts and articles that led to the formation of BST will be studied. The many different types of skills BST has been used to teach will also be highlighted.

Early Training Package Terms

Since the 1970's researchers have looked for the most effective training package to teach a skill. A few researchers coined a term for their training packages were given names, as BST was given a name. The overlap of terms over the years could easily cause confusion. Danish and Hauer (1973) referred to "skills training groups" which were groups that focused on teaching skills required to implement specific techniques feedback (as sited in Haffey & Levant, 1984). Outlined by Danish and Hauer were components of "skills training" which were to 1) identify behavior objectives; 2) practice skills; 3) group discussion; 4) understanding the reason for using the skills; 5) presenting the skills; 6) active participation by those being trained; 7) modeling of techniques; and 8) immediate feedback. The eight components outlined by Danish and Hauer contain several components that are similar to those of BST.

Gordon and Davidson (1981) also created a name for their training package. They referred to "behavior skills training" as being rooted in behavioral principles and containing the goals of 1) train parents to focus on observable and measurable behavior; 2) to teach parents concepts such

as reinforcement and punishment learning theory; 3) help parents apply the concepts when working with their children (as cited in Haffey & Levant, 1984). Gordon and Davidson's use of the term "behavior skills training" is the first reference found of researchers referring to a training method as "behavior skills training." Although, this reference to the term "behavior skills training" in Gordon & Davidson (1981) is different than that of the Behavior Skills Training used in Applied Behavior Analysis research today, it represents the early attempts to find the best method to train individuals in utilizing behavior principles.

CHAPTER 2

INDIVIDUAL COMPONENTS

Instructions and Modeling

In 1983, Yeaton and Bailey analyzed the effectiveness of individual components of their previously established training model which consisted of Tell them, Show them, Ask them, Let them, with a feedback component after the Let them step. This training package contained all of the components of BST, yet was not labeled BST. In this further analysis Yeaton and Bailey looked at the effectiveness of using modeling and role-playing to teach crossing guards to teach children how to cross the street. After the training of modeling and role-playing the crossing guards performed above baseline levels. This study also found that giving only written instructions produced slight increase in performance. In the third analysis completed in this study the children were told how to complete the skill and shown how to complete the skill. It was found using the tell (instructions) and show (modeling) components did not produce a sizable change in street crossing behavior. This demonstrated that the rehearsal, feedback, and praise components used in their original study were necessary to produce effective change in street crossing behavior in children. This article demonstrated the in depth study of the individual components of their training package to evaluate the effectiveness of the individual steps. The early studies of each of the current components of BST were beneficial to the construction of the four components of BST.

Instructions and a video were used in increase correct trainer behavior and response prompting by individuals working with children with severe intellectual disabilities (van Vonderen, Didden, & Beeking, 2012). This study the trainers were given written and verbal instructions. The

trainers were then videotaped conducting a session with a child. Video feedback was then provided in the form of playing the video of the session, pausing the video to point out errors, giving positive feedback on performance, and prompting error correction. This study referred to the video as “video feedback.” However, the video also served as an incorrect model that provided the opportunity to give specific examples of incorrect points in sessions and demonstrate correct techniques. Many studies have used videos in a similar manner and referred to the practice as video modeling. The methods used in this study, instructions and video feedback, successful in increasing correct trainer behavior and correct response prompting during sessions. The skills developed in this study also maintained across a five week follow-up probe.

These studies show the independent use of instructions does not produce the change desired. It was also shown by Yeaton and Bailey (1983) that, when used together, instructions and modeling produce a small change that is not large enough to consider the two methods an effective combination. The results of the early and recent studies of the individual components of BST give light to the strength of this treatment package and the importance of the combination of all four components.

Modeling and Rehearsal

Modeling has been used to enhance skill acquisition. A video model has been used to teach children many different skills. O’Connor (1972) studied the effectiveness of modeling to teach multiple components of social interactions to nursery school children who were socially withdrawn. Children who were shown the modeling film displayed increases in “social responsivity,” level of interaction, and a slight increase in performance in the follow-up when compared to the post film assessment. O’Connor (1972) found that there was no significant difference in performance between the modeling plus shaping group and the modeling alone

group. Video modeling has also been used to teach conversation skills to children. A video of five different scripted conversations were shown to three children with autism to teach conversational speech (Charlop & Milstein, 1989). Charlop and Milstein found that the video model was very effective in teaching conversational speech to the three children with autism. During probes for generalization all of the children demonstrated generalization of the conversational skills. Each of these two studies established the efficacy of modeling in teaching social skills to children.

Video modeling was also successfully used to improve form in gymnastics skills. Four female gymnasts were shown a video model to improve execution of three gymnastics skills on the uneven bars (Boyer, Miltenberger, Batsche, and Fogel, 2009). After viewing the video model of an expert completing the skill, each of the gymnasts improved their performance of every skill. This study demonstrated the effectiveness of video modeling to teach a skill domain outside of the typical skill areas taught in behavior analysis research. Boyer et al. (2009) also used a feedback component in this study. The feedback was not verbal. The gymnasts were shown their own performance of skill next to the performance of the skill by an expert. As the video was paused in various key moments in completion of the skill disparities between the two executions of the skill could be more easily seen. This side by side opportunity to compare the individual's performance with an experts performance highlights a positive advantage to using video modeling techniques for both demonstration and correction purposes.

Modeling has been used in combination with rehearsal in order to teach a skill. In 1981, when behavior methods of prevention of child molestation had not yet been extensively studied and with no empirical evidence for the effectiveness of programs that were in place; Poche, Brouwer, and Swearingen (1981) set out to find the most effective method to teach preschool children self-

protection. Modeling, rehearsal, and social reinforcement were used to teach the child correct verbal and motor response (Poche, Brouwer, & Swearingen, 1981). The children were taught to walk away and tell the stranger no. Following the training all three children in the study responded correctly during test lures and in generality probes. The results of this study reveal the success of modeling and rehearsal when used together.

The use of modeling and rehearsal to teach self-protection skills has been repeatedly demonstrated throughout the years. Telljohann, Everett, & Price (1997) used video demonstrations, role-plays, and discussions within their knowledge training and behavioral skills training to teach third grade students what to do if someone attempts to sexually abuse them. The term “behavior skills training” referred to the type of responses, not the treatment package. The knowledge group was tested on facts about sexual abuse and the behavior group was tested on what they believed their behavior would be given different situation. While the exact components of the training steps were not specifically outlined it is known that modeling and role-plays were used in the training. The training methods of modeling, role-plays, and discussion resulted in a statistically significant difference between pretest and post-test scores amongst the children in the training group. Telljohann et al. gave credit to the role-play portion of the training in producing a difference in responses from pretest to post-test. This article demonstrates the effectiveness of modeling and rehearsal to teach a safety skill effectively.

Whether teaching a conversational skill, a physical movement, or a safety skill modeling has been demonstrated to improve performance of the skill. Rehearsal was also shown to improve performance when used alongside modeling. The efficacy of the combination of modeling and rehearsal to teach skills has been repeatedly presented by different researchers and across drastically different skill areas.

Feedback

Feedback is a very important component of BST. Feedback has been used independently and in combination with the other components in order to train individuals. Feedback can be delivered in the form of positive feedback or corrective feedback, which is often referred to as negative feedback. However, many successful studies use both positive and corrective feedback to reinforce correct behavior and curb incorrect behavior.

Ivanic, Reid, Iwata, Faw, and Page (1981) used a meeting, prompting, and feedback to increase interactions between staff with residents during institutional care routines. The component of modeling was also used during the meeting portion of the training. The feedback consisted of individual feedback, group feedback and written feedback that was publicly posted. During an in-service meeting after the supervisor answered staff member questions the supervisor then demonstrated the target behavior, allowed the staff to come up with examples of the behavior, and gave feedback on examples generated by staff. The individual feedback took place when the supervisor supervised the staff member then gave corrective feedback and positive praise feedback following an interaction with a resident. The supervisor gave the verbal feedback immediately after the staff member gave the resident a bath. The results of this study show that following training interactions of staff with residents during care routines increased from baseline levels and maintained.

Instructions, role-plays, and feedback were used to train supervisors to give correct feedback to their staff concerning the staff's performance after teaching a client a skill using the teaching program (Parsons & Reid, 1995). There were eight components to the type of feedback the supervisors were trained to deliver. The eight components generally consisted of giving positive feedback with a positive tone, provide praise for a teaching skill, giving corrective feedback on

an error and specifying how to rectify the error in future performance, checking to see if the staff member has questions, making sure the staff member understands the questions, and ending the conversation on a positive note. The study found that staff teaching skills performance maintained as a result of supervisory feedback (Parsons & Reid, 1995).

The results of the Ivancic, Reid, Iwata, Faw, and Page (1981) study and the Parsons and Reid (1995) study demonstrate that feedback can be used to increase and maintain accurate responding. Both studies emphasized the importance of specific corrective and positive feedback. As demonstrated in these two articles, when used correctly positive and corrective feedback can assist in accurate completion of a skill and maintenance of a skill.

Multiple Components

Before the term Behavior Skills Training (BST) was coined for using instruction, modeling, rehearsal, and feedback to teach a skill there were many researchers who used the components of BST independently and together to achieve great results. Brukman, Fixsen, Phillips, Wolf, & Maloney (1974) found that reading instructions, sometimes demonstrating a behavior, allowing for practice of the behavior, and providing feedback were effective in teaching interview skills to two adolescent boys. The boys were also monetarily rewarded for their participation in the study. It was found that the entire training package was effective in increasing performance of employment interview skills. This article used all of the components of BST, and the modeling component was not used every time the other components were used. In this article Brukman et al. (1974) demonstrated the effectiveness of instructions, occasionally demonstrations, practice, and feedback in increasing performance when teaching interview skills to adolescents. While all of the components of BST were used in this study, the training package was not labeled as BST.

Bornstein, Bellack, and Hersen (1977) also used all of the components of BST to train a social skill without identifying the training package of BST. Bornstein et al. (1977) trained four unassertive children in the areas of eye contact, loudness of speech, speech duration, and requests for new behavior. In this study a probe was conducted, feedback was given, the skill was modeled, instructions were then given, and the child was allowed to rehearse the skill with additional feedback provided as needed. The treatment package used was found to be effective in teaching the skill, generalization of the skill, and achieving maintenance of the skill. This study demonstrated not only the effectiveness of the components of BST in achieving skill acquisition but also in producing skill generalization and maintenance. Minik et al. (1976) also used the components of BST to teach a social skill, without referencing a name for the training package. A rationale for the conversational skills was also given to participants, in addition to the four steps of BST. After criterion performance was reached the participants were then asked to converse with an unknown individual to test for generalization. Bornstein et al. and Minik et al. revealed the effectiveness of instructions, modeling, rehearsal, and feedback to increase assertive conversational skills and general social conversation skills.

Oei and Jackson (1982) also used many of the components of BST together before the term was used. Of the four treatment groups used in this study, the SST group received an explanation, modeling of the skill, role-plays, and feedback from therapists and group members. It was found in this study that the SST group scored the highest on the Behavior Interview Rating Score post-test given immediately following treatment. This study also found that when the components used were combined with another training method the high rating scores maintained across 3 month, 6 month, and 12 month probes. This article represents another early example of combining training components to create an effective treatment package.

The following study uses all of the components of BST long before the conception of the term. In *The Differential Effectiveness of Two Models of Skills Training for Working Class Parents* the individuals in the training group had the skills presented, modeled, role played the skills, practiced the skills, and received feedback on their completion of the skills (Haffey & Levant, 1984). It was found that the methods used to teach the two skills focused on in this study were effective in teaching the skills and that each of the two skills taught had their own unique results in improving the parents how to work with their children (Haffey & Levant, 1984). Just a few years before Haffey and Levant the components of BST were also used by Yeaton and Bailey in 1978 to teach pedestrian safety skills. In 1978, Yeaton and Bailey taught children how to safely cross the street using the four step “Tell them, Show them, Ask them, Let them” model. After the “Let Them” phase the children were given immediate feedback on their accurate and inaccurately completed steps of correct crossing of the street. This treatment package essentially contained each step of BST, with the addition of a quiz phase. The history of the use of the components of BST with and without extra components existed far before a title was created.

The components of BST with an added component of praise were used by Wurtele, Kast, Miller-Perrin, and Kondrick (1989) to teach safety skills to children to sexual abuse. Instruction, modeling, rehearsal, praise and feedback were used to teach the steps of the two prevention programs. One prevention program was called the “Behavioral Skills Training Program” and the second was called the Feelings Program; both programs used instructions, modeling, rehearsal, praise, and feedback to teach the steps of what the child was to do in order to discriminate between appropriate and inappropriate touch. According to Wurtele et al. attainment of positive results from both treatments provided additional support for the efficacy of modeling, practice, and reinforcement in teaching safety skills to children.

Iwata et al. (2000) focused on skill acquisition when teaching undergraduate students how to implement a functional analysis. The students were first given a written description of each condition and how to run a functional analysis session then a graduate student reviewed the components of each condition a video model of each condition. In the last two steps the students took a quiz and practiced running a functional analysis. If a student did not meet the criterion level of performance on the quiz or the practice trials the student was shown the model video, given feedback, and given the quiz trial or running a functional analysis trial again. This process of repeating the model, feedback, and application of the skills was repeated in both the quiz and practice session portions of training until criterion was reached. The feedback given in this study consisted of feedback on correctly completed items and incorrectly completed items. The results suggest that the methods used, while extensive, successfully increased performance above baseline levels. This study gives an example of how instructions, modeling, rehearsal, and feedback were successful in teaching a complex skill when combined with a fifth component of testing through a quiz.

In 2002, Lavie and Sturmey used all of the components of BST without using the term BST to train staff. The methods used in the study *Training Staff to Conduct a Paired-Stimulus Preference Assessment* used all of the components of BST but also added extra steps which were included in Competency- and Performance-Based Training. The added steps were those of providing verbal and written instructions as well as repeating the steps of modeling, rehearsal, and feedback until the steps were performed to criterion. This study highlights the similarity between BST and Competency- and Performance-Based trainings. The only differences are the added steps listed above. Competency- and Performance-Based training extends the methods of BST to be practiced until a criterion is reached and provides both a written and verbal description

along with a rationale for the skills before they are taught.

In 2004 the first article using the term Behavior Skills Training (BST) to define the training package of instructions, modeling, rehearsal, and feedback was published. The study titled *The Effects of Behavioral Skills Training on Staff Implementation of Discrete-Trial Teaching*, by Sarokoff and Sturmey cited its predecessor studies that used similar packages of behavioral skills training without labeling the training as BST. Sarokoff and Sturmey (2002) gave recognition to the training packages of their predecessors Iwata, Lavie & Sturmey, and the work of Reid & Parsons which greatly contributed to the development of an effective method of training individuals. Sarokoff and Sturmey (2004) found that the BST package of instructions, modeling, rehearsal, and feedback were successful in teaching 3 teachers to use discrete-trial teaching.

CHAPTER 3

IMPLEMENTATION OF BST

Teaching Child Safety

For years researchers have used BST to teach children safety skills. In 1995, Holcombe, Wolery, and Katsenmeyer evaluated teaching children abduction prevention techniques and attaining maintenance of those techniques. This study used the four components of BST to teach the children the skill. All of the children learned and maintained the skill except for one who required in situ training in order to perform the skill correctly. Whether teaching a child to walk away from a stranger and seek help or to handle the situation correctly when they come across a gun, BST with and without in situ training has been effective in teaching these safety important skills.

The process of giving feedback on the correct completion of a skill has been shown to be especially useful when teaching children. Specifically, in situ feedback was often shown to be necessary for skill acquisition and maintenance with children. Pan-Skadden et al. (2009) used BST followed by in situ training to teach children to seek help from the proper personnel when lost. There were three steps that the children were taught to do when lost. The first was to calmly walk to the front counter of the store, tell the cashier their name and their caregiver's name, and tell the cashier that they are lost. The children needed to complete the three steps within 20 seconds of realizing that they were lost. This study included praise for appropriate responses along with the components of BST. If the child did not complete the three steps the experimenter gave the child in situ training while in the store. The participants in this study were pre-school and kindergarten age children between 4 and 6 years of age. All of the three participants required

in situ training along with BST. Two of the participants required incentives along with BST and in situ training. As a result of BST, in situ training, and incentives all three children responded with the appropriate steps after realizing that they were lost during in situ tests (Pan-Skadden et al., 2009).

Johnson et al. (2005) also taught children safety skills using BST. In 2005, Johnson and colleagues taught preschool age children to say “no” when confronted by a stranger, immediately move away from the person, and to immediately tell an adult about the stranger who was trying to lure them. The children were given BST training along with in situ training. The in situ component was present during training and follow up phases. The follow up performance of most of the children presented at levels higher than in baseline sessions. This study demonstrated that BST and in situ training can result in preschool children acquiring and maintaining a skill during stressful situations. Johnson et al. (2006) furthered the research by evaluating the use of BST used independently compared to the use of BST with in situ training to teach abduction-prevention skills to schoolchildren. This study was able to show the effects of an in situ component added to BST when working with school aged children. The BST program in this study included praise along with all of the other components of BST. The responses trained were the same as the Johnson et al. 2005 study. The BST combined with in situ training was the same as the BST alone condition except for that another session was added that included in situ training. A control group was also used in this study which differed from the Johnson et al. 2005 study on this topic. During the initial posttest there was not a significant difference between the scores of the BST alone group and the BST with in situ training groups. This suggests that the in situ component may not add to the efficacy of teaching abduction-prevention skill acquisition. It was found that at the 3-month follow-up the BST with in situ group score was statistically

significantly higher than the BST alone group. The results were only significant at the 3-month follow up. The participants in the BST alone and BST with in situ scored higher than the participants in the control group. This study supports the assumption that children may need training in the natural setting in order to maintain the skill over time and points out the need for further research on these two methods.

In the study titled *Teaching Safety Skills to Children to Prevent Gun Play* Himle, Miltenberger, Flessner, and Gatheridge (2004) used BST to teach safety skills to children in order to prevent injuries from firearm play. This study taught eight children between the ages of four and five years old. The children were taught to not touch the firearm, leave the immediate area of the firearm, and tell an adult about the firearm. An in situ component was added for children who did not meet the criterion for safety skills performance in the assessment sessions. Six of the eight children required in situ training in order to meet the criterion for safety skills performance. In 2004, Himle, Miltenberger, Gateridge, and Flessner also evaluated the effects of BST in comparison to the NRA's Eddie Eagle GunSafe Program. The children were taught the same three steps as in *Teaching Safety Skills to Children to Prevent Gun Play*. *An Evaluation of Two Procedures for Training Skills to Prevent Gun Play in Children* found that both the NRA's program and the BST program were effective at teaching children between the ages of four and five years old to state the gun-safety message (Himle, Miltenberger, Gateridge, & Flessner, 2004). However, only BST was found to be effective in teaching the children to perform the correct responses during a role play scenario. When an in situ assessment was done neither of the training methods were effective in producing the correct responses in the four to five year old children. BST was found to be more effective than the current method used by the NRA but the BST program was not effective in all scenarios. The results of this study suggest that when

working with children an additional in situ training component used with BST may be needed for in situ skill acquisition, especially when safety skills are concerned.

A second evaluation of multiple programs was done in 2004 by Gathridge et al. titled *Comparison of Two Programs to Teach Firearm Injury Prevention Skills to 6- and 7-year-old children*. There were a few differences between this program and the program listed above. In this study an in situ training session was done with all children who did not exhibit the skill as a result of training. The children in this study were one to two years older than the children in the study previously listed. The children were taught the same three steps as in the previous programs and the same two programs were evaluated as in the previously listed study. The children in the BST group performed at higher levels than the children who were taught using the NRA program during the self-report, role-play, and in situ assessments. In the in situ assessments the children did not know that they were being assessed. During the in situ assessments the children in the BST group performed the skill more completely than the children in the NRA group. Children in both the BST group and the NRA's program required in situ training. Out of the children who were trained using the NRA's program, three children out of fifteen required in situ training. Of the BST group only four of the fifteen children needed in situ training. BST plus one in situ training session was effective in teaching all of the children in the BST group to correctly perform the firearm safety skills (Gathridge et al., 2004).

Miltenberger et al. (2005) evaluated the use of in situ BST in order to teach gun safety skills. The same in situ training procedures were used as in Himle, Miltenberger, Flessner, and Gatheridg (2004). In this study BST was only conducted in the in situ environment where the gun was present. All children correctly followed the steps in the assessment phase across two settings. All of the children also performed the steps correctly at the three month follow up

probe. This study represents a further analysis of how to combine an in situ component with BST to evaluate the effect on the efficacy when teaching children safety skill.

In the many studies listed above BST alone has been used in combination with in situ training and BST has been compared to other methods of teaching. Each of the skills children were been taught in these studies have been important safety survival skills in dangerous moments. Miltenberger et al. (2009) specifically looked at the effectiveness of BST with and without an in situ training when used to teach safety skills to children. This study further valuated results found by Johnson et al. (2005), Miltenberger et al. (2004), and Miltenberger et al. (2005). Similar methods were used as in previous studies with the exception of a training video and practice in situ assessments as well as an included scenario where another child attempted to peer pressure the child to play with the gun. The added elements in this study may have made the testing phase more difficult in this study than others. It was found that that the BST with in situ training was as effective as the BST alone training (Miltenberger et al., 2009). Many of the previous studies listed above looked at using in situ training after BST was used. This study concluded that an in situ training component for teaching children safety skills when they encounter a gun may be an essential component. These results may lend to the idea that the nature of the setting may determine the need for an in situ component, especially when training children.

To conclude, when teaching firearm injury prevention and abduction prevention to children BST was effective in teaching skill acquisition. When teaching children a vital skill in order to ensure their safety only the most effective teaching strategy will suffice. BST has been found to be an efficient and effective training method when teaching children safety skills. BST with the in situ component has also been found to be effective in teaching children safety skills and maintaining safety skills. In situ training may be required when teaching children dependent on

the type of skill and nature of the setting, this has been extensively researched and could be further supported by additional study. When teaching a skill that could impact the safety of the child's life BST was found to be most effective at skill acquisition, generalization, and maintenance when combined with an in situ component.

Teaching Professionals

BST has also been used to efficaciously teach professionals how to teach and work with students. Several studies have used BST to teach the implementation of a program with children. Nigro-Bruzzi and Sturmey (2010) evaluated the use of BST to teach six staff to use mand-training. The four components of BST were used to teach staff to implement an eight step mand-training task analysis. The use of BST to teach staff members how to conduct mand-training brought about an increase in unprompted mands from children and better training performance from staff. One of the strengths of this study's results is that it was replicated across settings with the trained staff. BST was effective in this study in teaching staff to teach a skill to children with autism spectrum disorder. BST was also efficient in teaching the staff in a short period of time. This study may point to the efficiency of BST when teaching professionals.

Rosales, Stone, and Rehfeldt (2009) used BST to teach phase 1-3 of the Picture Exchange Communication System (PECS). In this study BST was effective in teaching two undergraduate students and one graduate student the implementation of the first three phases of PECS. This study also tested generalization and maintenance of the skill after the participants were taught the skill through BST. All three participants showed generalization of the skill through mastery performance of implementing PECS when teaching a novel learner and demonstrated maintenance during a probe one month after the study. When the results of Rosales, Stone, and Rehfeldt are compared to the results found by Barnes, Dunning, and Rehfeldt (2011) it is evident

that all four of the steps of BST are necessary to train implementation of the PECS to criterion levels. Barnes et al. used verbal instructions and an instructional video to teach phases 1-3 of the Picture Exchange Communication System (PECS) to direct care staff. In their evaluation it was found that using verbal and video instructions were not successful in teaching the direct care staff how to implement phases 1-3 of PECS to criterion levels. Barnes et al. demonstrated the need for additional components, in addition to instructions, to develop a successful training package and produce the desired training results.

Homlitas, Rosales, & Candel (2014) also used BST to teach teachers to properly implement PECS with children with autism who had never used PECS. Three teachers who had limited to no experience with implementing PECS were trained. The teachers were taught Phases 1, 2, and 3A. In situ and follow up probes were conducted after mastery criterion was reached. All three teachers maintained criterion level performance or higher during the in situ and follow up probes. This study demonstrates that BST is an efficacious method of teaching the use of PECS.

BST has also been used to teach the use of the Natural Language Paradigm (NLP). Gianoumis, Seiverling, and Sturmey (2012) trained three teachers to implement the NLP with three children. When giving feedback to the teachers in this study the experimenter first gave positive feedback followed by feedback on steps performed incorrectly. As a result of BST each of the three teachers reached criteria performance which means that they performed 90% of the steps correct across two probes. The teachers were able to perform the correct steps of the NLP not only with the one child they were trained in the steps with but their implementation of the NLP generalized to working with other children as well. The teachers were also successful in increasing appropriate vocalizations for four of the six the children in the study. This study demonstrated the use of BST to teach implementation of a program developed to increase vocalizations in

children with autism.

Whether implementing mand-training, PECS, or teaching how to increase appropriate vocalizations; BST has been shown to be a very effective method for training professionals to teach children. The professionals in the studies above had very limited experience with implementing the skill taught through BST. All of the professionals were able to meet criterion levels in the short duration of the study. In conclusion, BST was an efficacious methods of teaching professionals to implement a training or communication skill with children.

BST has also been used to teach oral care providers how to train compliance in children using behavior analytic techniques (Graudins, Rehfeldt, DeMattei, Baker, & Scaglia, 2012). In this study oral care providers were trained on the use of positive reinforcement, differential reinforcement, and escape extinction to increase compliance during a dental procedure among children with autism. The oral care providers in the study had no previous training in applied behavior analysis. As a result of the behavioral skills training oral care providers successfully used behavior analytic techniques to facilitate compliance when working with children with autism spectrum disorder. As a result of this study the staff knew how to correctly and most effectively work with the children in order to use the least restrictive methods to provide oral care.

BST has also been used to teach staff how to correctly assist students when they walk. In *Using Behavior Skills Training to Promote Safe and Correct Staff Guarding and Ambulation Distance of Students with Multiple Physical Disabilities*, Nabeyama and Sturmey (2010) looked at the effects of self-recording with behavior skills training to teach staff six guarding and posture responses for working with students with multiple disabilities as they walked. The six components involved the staff member sitting on a rolling stool, their placement in relation to the

student while on the stool, the staff member's lower back alignment, the placement of the staff member's left hand, the placement of the staff members right hand, and specific praise given to the student by the staff member. The effects of self-recording and behavior skills training were shown to generalize to when the staff members worked with different students. The mean correct responses from staff after training were all above 85% and during generalization mean correct responses stayed above 70% for the three staff members. This study demonstrated that BST effectively taught staff how to correctly assist the students.

BST has been used in a wide variety of situations and settings in order to help adults better meet the needs of the children they are working with. Nigro-Bruzzi and Sturmey (2010) taught staff how to implement mand –training, Rosales, Stone, and Rehfeldt (2009) taught staff how to implement PECS to assist in student communication, Graudins, Rehfeldt, DeMattei, Baker, & Scaglia (2012) taught oral care providers behavior analytic techniques to provide oral care to children with autism, and Nabeyama and Sturmey (2010) taught staff how to correctly assist children with multiple disabilities when they walk. In all of the above listed studies staff were taught how to implement a skill, taught how to use a system, or were taught the most effective and safe method to use when working with children. The behavior skills training used was effective at teaching the staff and resulted in the desired responses from the children.

Teaching Parents

We have shown that BST is an effective training method for directly teaching a skill to children and teaching professionals and staff how to effectively work with children. Teaching parents to implement a skill with their own children may be a more difficult task than teaching professionals due to the existing relationship the parent shares with the child and the emotional ties that may interfere with accurate implementation. Highlighted below are some of the articles

which taught parents to work with their children through BST and where BST was used by parents to teach a skill to the children.

BST has been shown to be effective in teaching parents how to use behavior analytic feeding techniques (Seiverling, Williams, Sturmey, & Hart, 2012). In *Effects of Behavioral Skills Training on Parental Treatment of Children's Food Selectivity* parents with children with autism spectrum disorder and food selectivity were taught using BST to use repeated taste exposure, escape extinction, and fading while in their own homes (Seiverling, et al. 2012). Previous studies had been successful in teaching parents interventions for their children with food selectivity but none had evaluated the teaching method used with the parents. This study demonstrated that BST was not only effective in teaching parents to implement the feeding treatment package but was also rated as excellent by the parents in the study. All of the parents in the study reported that the most helpful component of BST was modeling.

Mueller et al. (2003) also taught parents pediatric feeding protocols using BST. The skills the parents were taught were the use of correct prompts and consequence during feeding. They evaluated the treatment integrity of the components of their treatment package in their first part of their study in order to evaluate whether or not of the components were not needed. As a result of the Study 1 the parents were able to correctly deliver the feeding treatment. The use of verbal and written instructions, modeling, rehearsal, and feedback in Study 1 resulted in mean treatment integrity of 94.4% for the three parents in this study. Feedback was shown to be a necessary component for one of the three parents for proper implementation of feeding treatment. Although the multicomponent treatment package was not referred to as BST it contained all four of the components of BST. In the second half of their study it was found that at least two of the components of the multicomponent training package are needed for successful results.

Gross, Miltenberger, Knudson, Bosch, and Breitwieser, (2007) furthered the research on teaching safety skills to children through the use of BST and in situ training. The safety steps used in this study were the ones created by Himle, Miltenberger, Flessner, & Gatheridge (2004). This study was different in that the parents trained the children in this study using BST and in situ training when needed. Two of the four children in this study performed all of the skills correctly after BST training. The third child required BST and in situ training. The fourth child needed BST, in situ training from the parent, and finally in situ training from the researcher. For three of the four participants BST and in situ training were effective in teaching the proper safety steps of leaving the room, not touching the gun, and telling an adult.

Guided Compliance is another skill that was taught to parents through BST. Miles and Wilder (2009) pointed out that BST had not yet been used to combat the issue of noncompliance. Guided compliance was taught to caregivers of noncompliant children. Each caregiver participant was required to repeat the rehearsal phase until they reached 100% performance across three consecutive trials. Following an instance of incorrect rehearsal multiple models by the experimenter were given with feedback given on the incorrect components completed by the participant. All of the parents in the study increased their number of correct responses of guided compliance to between 95% and 99% in posttraining tests. Of the children in the study it was found that two of the three children showed improved compliance after guided compliance was used. BST proved to be very helpful in teaching the many responses of correct implementation of guide compliance.

BST was used on parents or by parents in each of the studies listed above to achieve the desired result of the correct responses from the children. Each of the studies showed that despite the capacity BST was used, it was effective in producing the desired response from the parents

and the children. BST with and without in situ training was demonstrated to fully teach the skill with very little variation in treatment integrity.

CHAPTER 4

GENERALISATION & FURTHER RESEARCH

Generalization

“The frequent need for generalization of therapeutic behavior change is widely accepted, but it is not always realized that generalization does not automatically occur simply because a behavior change is accomplished” (Stokes & Baer, 1977, p.350). Generalization as pointed out by Stokes and Baer is something that needs to be carefully considered and programmed into the process of teaching a skill. Stokes and Baer list and define nine methods of programming for generalization. Many BST studies have programmed for generalization by using one of these nine methods. It was found that the most commonly used generalization technique when teaching others to use interventions when working with individuals with developmental disabilities was the Train Common Stimuli method (Gianoumis & Sturmey 2012). Mueller et al. 2003; Sarokoff & Sturmey 2004; Rosales, Stone, & Rehfeldt 2009; Lafasakis & Sturmey 2007; Roscoe & Fisher 2008; Lavie & Sturmey 2002; and Iwata et al. 2000 all used Train Common Stimuli to program for generalization (Gianoumis & Sturmey 2012). Zero examples of the use of the generalization methods of training loosely, natural contingencies, using indiscriminable contingencies, and training to generalize were found in the literature when training individuals to implement interventions with persons with developmental disabilities (Gianoumis & Sturmey 2012). There is a need to extend the literature on the most effective strategy to promote generalization when using BST to teach an individual a skill.

Many studies that used BST to teach a skill programmed for generalization or tested for generalization then added training to promote generalization if it was not established through

BST. In 1978, Yeaton and Bailey used a different street for training trials and a “generalization street” where no guard was present and no prompts had previously been given to test for generalization of the pedestrian safety skills taught in their study. Several studies have conducted an in situ probe followed by in situ training if generalization was not found during the probe; these studies include but are not limited to Holcombe et al. (1995), Pan-Skaden et al. (2009), Johnson et al. (2005), Johnson et al. (2006), Himle et al. (2004), Miltenberger et al. 2005, Miltenberger et al. 2009, Homilitas et al. 2014, and Gross et al. 2007. A further analysis of how what type of skill, what type of setting, and what type of population most often required the in situ training may assist researchers in programming for generalization when working with those circumstances.

The results of generalization when BST was used to teach a skill may vary depending on the population being taught and the type of skill. More research in this area could further strengthen the generalization of outcomes when BST is used. The type of setting may also need to be considered. A high stress situation or a busy setting may interfere with generalization. More research is needed to pinpoint when BST does not result in generalization and what is needed to promote generalization in those situations. If a set of circumstances where a fifth step may be needed to assist with generalization when BST is used, the effectiveness of BST could be further strengthened.

Further Research

Component analyses have been a useful tool to evaluate the effectiveness of each component of BST. Ward-Horner and Sturmey (2012) found that feedback was the most effective component when using BST to teach direct care staff to conduct a functional analysis. Ward-Horner and Sturmey also found that at times modeling was as effective as feedback. Their study

added to the literature which demonstrates that modeling and feedback are effective both on their own and when used in a training package. This study was not able to outline the necessity of the individual components of BST, it rather assisted with extending the literature toward an eventual evaluation of the necessity of each component. Further research on this topic is needed. The study of the most effective component given different settings, skills and populations could prove paramount to further strengthening BST.

CHAPTER 5

CONCLUSION

The many articles above speak to the efficacy and durability of BST in teaching a wide array of skills to all populations across many different settings. In a majority of the articles BST alone was effective in teaching a skill. In other instances, specifically safety skills training, in situ training was also needed. The instances where in situ training was most often needed was in safety skills training with young children. The nature of the in situ settings and the age of the children may account for why in situ was needed in several of the studies. The nature of the setting could be a factor in determining if in situ training should be added to BST.

The foundations of Applied Behavior Analysis as outlined by Bear, Wolf, and Risley (1968) point out the importance of discovering effective technologies to be applied to all aspects of services. Emphasis on the use and execution of effective technologies was further underscored by Reid and Parsons (2002) when they eloquently stated the results if one does not adhere to the details of a carefully constructed technology. This movement towards precision naturally lead to the development of many training packages from the 1970's until today. BST is one of the many combinations of components that evolved and survived over the years to eventually be formally named in 2004 by Sarokoff and Sturmey. Through the course of the test of time and the scrutiny of many research studies the components of BST were evaluated and their utility was supported.

Many early training packages used similar titles to BST but their similarity in title did not translate to a similarity in composition. The early training packages that shared the similar namesake to BST were named based on their foundation in a behavioral approach or because they were formulated to address behavior. As early as 1978, Yeaton and Bailey developed an effective training package that contained three of the four components of BST. Over the years

many studies studied the separate components of BST individually and in groups with other techniques. These studies that focused on one, two, or three components of BST unwittingly added to the volume of research supporting the composition of BST.

While their modeling component was not always used, Braukmann et al. (1974) constructed one of the first examples of the components of BST in use together. The work of Reid and Parsons, Iwata, Sarokoff and Sturmey, and Lavie and Sturmey were paramount to gathering the components of BST, creating one concise package of components, and placing a concise title on the training package. The number of studies that have supported and evaluated the effectiveness of BST since the conception of the training package continues to grow.

The individual concentrations of teaching child safety, teaching professionals, and teaching parents have each produced numerous studies which utilize BST. Specifically, the field of teaching child safety skills has uniquely revealed the possibility of a need for additional support to BST components, given certain settings and skill types. Many child safety studies found it necessary to conduct rehearsal sessions in the natural environment. The in situ training aspect may prove to be more necessary with children than other populations. Regardless, the utility of the added component could be an interesting evaluation for future research.

Further evaluation of the necessity of each existing component of BST, while interesting, may not be needed. The universal effectiveness of BST had been demonstrated numerous times over the past few decades. Additional components such as an in situ training, mastery criteria, generalization strategies, and written or verbal quizzes have been evaluated and may prove to be beneficial given certain situations. The further study of temporary or enduring components may be evaluated for years to come, as this area could be exponentially evaluated and strengthened. As for the usefulness of each one of the original four components, their necessity has been

solidified.

Overall BST was shown to be an efficacious method of teaching a novel skill. In many cases when tested the skills taught through BST generalized to the in situ environment. Along with the many benefits of BST, when surveyed many of the participants, parents, and staff gave preferable ratings regarding their satisfaction with BST. The robust nature of BST is evident through the application of this training method across training children, individuals with developmental disabilities, medical professionals, parents, and staff members to successfully implement a skill.

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THE EFFICACY OF BEHAVIOR SKILLS TRAINING: A LITERATURE REVIEW

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