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MOCK EXAMS

Enhancing Safety Through Behavior Analysis: Principles and Applications

Introduction

Behavior analysts within the field of applied behavior analysis (ABA) apply research as a means for creating and implementing evidence-based procedures that are effective in a multitude of settings including schools, homes, and the community. These procedures have been used to address behaviors associated primarily with autism and other developmental disorders. However, the principles that have been used within these approaches are also effective with other populations and within a variety of settings.

Children can be exposed to various safety threats that could result in harm. These threats could include abduction, poisons, and even injuries sustained from firearms. Therefore, it is important to teach children to recognize when a threat to one's safety is present and how to engage in behaviors that will increase their chances of responding to ensure their safety. Additionally, safety can be a huge concern within an organizational and community setting. Behavioral safety can contribute to safety in different ways and be applied in a variety of industries. Therefore, it is important to determine the underlying causes of injuries and intervention methods that can be implemented.

In this course, participants will learn to (1) discuss research on teaching safety skills to children, (2) identify different approaches to assessment and training of safety skills, and (3) discuss behavioral safety and the behaviors that behavior safety can be targeted and applied to.

Section 1: Types of Safety Threats

As a child progresses through life, they are constantly exposed to various safety threats that may cause harm to the child or possibly death. A safety threat often arises from the unique challenges faced by individuals that can put them at risk in

their own environment if not properly managed and monitored by others. There are some safety threats that occur on a daily basis and provide an opportunity to those that encounter these threats to practice behaviors that are safe. For example, children are reminded to wear a safety belt when they are riding in a car or a bicycle helmet when they ride their bike. Additionally, they may be told to not touch a hot stovetop and as a result the child refrains from touching a stovetop even when it is not on. There are other safety threats that occur less often and can be extremely dangerous to a child. For example, these safety threats may include abduction, sexual abuse, coming in contact with a loaded firearm, or finding items that can be poisonous such as medications or cleaning products (Miltenberger & Gross, 2011). As a result, researchers have worked to evaluate various safety threats that children may come in contact with and as a result have identified different skills that children may need to acquire and use in order to respond to these threats safely (Miltenberger & Gross, 2011; Miltenberger & Hanratty, 2013).

Research suggests that those individuals that engage in abduction are often found to use lures as a method of enticing children to leave with them (Marchand-Martell et al., 1996; Poche et al., 1988; Holocombe et al., 1995). Through this research, it was found that there are four common types of lures that are often used. These include simple, authority, incentive, and assistance lures. Nonfamily abduction has been found to occur in over 50,000 children within a one-year time span (National Center for Missing and Exploited Children, 2009). This type of abduction can lead to the death of a child, exploitation, human trafficking, or sexual abuse.

Sexual abuse can refer to a multitude of ways that adults can use children as a source of pleasure such as physical molestation (inappropriate touching to intercourse) or being photographed or filmed (Finkelhor et al., 1990). Sexual abuse is most often conducted by an individual that is known to the victim and

occurs through a process that is gradual where the child is coaxed into complying with increasingly inappropriate requests from an adult.

A second type of safety threat that a child can come in contact with is finding a loaded firearm when they are not within the direct supervision of an adult. While it may be best practice for firearms to be stored properly as this would reduce or even eliminate accidental firearm injury to children, it has been noted that approximately 21.5% of parents store their loaded firearms in an unlocked area (Stennies et al., 1999). Additionally, despite the belief that parents as it relates to firearms have regarding children, children have a difficult time being able to discriminate between a fake and a real firearm (Hardy et al., 1996). This research also indicated that when a child finds a gun, they are more likely to pick it up and play with it than to leave it alone or tell an adult. Research has shown that more than one hundred children are killed each year as a result of playing with a firearm while unattended (Eber et al., 2004).

A third type of safety threat that a child may encounter is that of coming in contact with a poison hazard. A main source of injury for children under six years of age is related to unintentional poisoning (National Capital Poison Center, 2013). Additionally, it has been found that nonfatal poisoning rates are continually increasing. There are precautions that can be taken and implemented within the home to avoid incidents of accidental poisoning in children. These precautions can include storing medications in a secure location or storing cleaning products in a safe manner out of the reach of younger children. Even though these precautions can be implemented, the possibility still exists that a child may encounter a poisonous substance in their own house or within the home of someone they are visiting.

After reading the aforementioned information, it has become clear that there are several different safety threats that children can encounter throughout their

environment. These safety threats can be both social (i.e., abduction, sexual abuse) and nonsocial (i.e., firearm injury). Despite the type of safety threat that one may encounter, research has shown the need for strategies that are effective at teaching children how to recognize when they encounter a safety threat and what to do when they are faced with these situations so that they can remain safe.

Section 1 Personal Reflection

What are some of the different safety threats that clients you have provided services to have been exposed to? What type of interventions or programs did you integrate into their services to ensure their safety or to teach them skills that they could use to limit the threat in future occurrences?

Section 1 Key Words

Safety threat - arises from the unique challenges faced by individuals that can put them at risk in their own environment if not properly managed and monitored by others

Sexual abuse - refers to a multitude of ways that adults can use children as a source of pleasure such as physical molestation (inappropriate touching to intercourse) or being photographed or filmed

Section 2: Assessment of Safety Skills

Instructors and researchers alike have primarily focused on teaching skills that are age-appropriate, observable and measurable and this aligns with how safety skills have also been taught as a response to different safety threats that an individual may encounter. While the procedures that may be implemented can differ as they

relate to the specific safety threat that is being addressed, there are still some commonalities that may exist across different training programs. One commonality of each of these training programs is that the recognition of a dangerous situation is emphasized as well as avoiding contact with the safety threat if possible. Furthermore, each of these programs also stress the importance of leaving the area of the safety threat immediately and telling an adult about the situation (Himle et al., 2004). There are also several essential safety skills that can be used in a variety of safety threats. Researchers have identified that these skills are to recognize, avoid, escape, and report when a safety threat has been encountered (Miltenberger & Hanratty, 2013). The ultimate goal of promoting safety skills research is not to have children be afraid of the people that are within their environment. Instead, the goal is to have children be able to recognize a situation that may be dangerous and how they should react or behave accordingly when confronted with that situation. Additionally, research has continuously shown that children that take part in research regarding safety skills do not experience fear or negative side effects from their participation when they are asked in questionnaires as a participant (Beck & Miltenberger, 2009).

The skills that are being taught as a part of abduction and sexual abuse prevention programs is the same because the child is learning to respond to a threat that is coming from another person. This other person is most often an adult. In these situations, the child is instructed to say “no” when they encounter a potential lure, to get away, and then to tell an adult that they can confide in or trust. This combination of behaviors is important. Research has shown that by saying “no”, the child is clearly indicating and refusing the lure that has been presented by the perpetrator and reduces their chance of coming in contact with this situation in the future (Miltenberger & Hanratty, 2013). As the child is able to get away from the situation, this will create distance between the child and the perpetrator

which will in turn also decrease the likelihood that the perpetrator will engage in force or coercion toward the child as a method of getting the child to engage in the behavior that is being requested of them. Lastly, telling an adult that the child trusts warns the caregivers of the safety threat. This allows the caregivers the opportunity to ensure the safety of the child and take precautions to prevent the situation from occurring again in the future.

When a nonsocial safety threat is encountered such as an unattended firearm or poison hazard, the child does not need to state a verbal refusal as they are not responding to a danger that is occurring within the physical environment. When these safety threats arise, the child is required to refrain from engaging in, approaching, or touching the safety threat so that any life threatening injuries can be prevented. The child is then required to leave the environment where the safety threat is immediately so that they can reduce the time that they are being exposed to the threat and dangerous situation. Lastly, the child should report this occurrence to a trusted adult or someone they can confide in so that this individual can take any necessary precautions that are needed to eliminate the safety threat in the current moment as well as future moments. Regardless of the type of safety threat, either social or nonsocial, it is important for the child to learn to discriminate the occurrence of the safety threat so that they are able to engage in these safety skills. As a result, the safety threat should function as the discriminative stimulus that then evokes the safety skills that will be exhibited by the child.

Assessment

There are three types of assessments that are included within the literature that is discussed concerning safety skills. These three assessments are verbal report assessments, role-play assessments, and in situ assessments.

Verbal Report Assessment

When a verbal report assessment is being implemented, this type of assessment is used to describe a scenario that includes a safety threat and then asks the child to identify how they would respond or behave when they are faced with that situation (Miltenberger & Hanratty, 2013). For example, if an individual would like to assess a child's knowledge of safety skills regarding abduction, the individual may ask the child to pretend that they were outside playing in their yard when a man walks up to them, asking them to help him find his lost kitten. Then, they may say to the child, "what would you do?" The child would then describe what they believe their response or behavior would be in this situation. As the child is describing their response, the individual that is assessing the child's knowledge would not provide the child with any praise or feedback for their answer. Instead, the individual would thank the child for their response.

The Personal Safety Questionnaire (PSQ) and What If Situations Test are two types of verbal report assessments. The PSQ is a questionnaire that asks a child to respond with either "yes," "no," or "I'm not sure" regarding various safety threat situations. The What If Situations Test assesses a child's answers to various questions that align with inappropriate sexual requests that can be made by an adult (Saslawasky & Wurtele, 1986). Another verbal report assessment, What I Know About Touching Scale, includes yes, no, and I don't know responses for questions that pertain to sexual abuse (Hazzard et al., 1991).

Research has evaluated the effectiveness of verbal report assessments. For example, one study evaluated the effectiveness of a teacher-directed group training of abduction prevention skills with younger children (Carrol-Rowan & Miltenberger, 1994). Children's verbal reports of how they would respond to various abduction scenarios were scored using a scale of 0-4. Within this scale, a 0 indicated that the child would have went with the abductor, 1 indicated the child

would have stayed near the abductor but did not refuse, 2 indicated that the child stayed near the abductor but said no, 3 indicated that the child ran away from the abductor, and 4 indicated that the child ran away from the abductor and told a parent about the situation. Additionally, other research has evaluated the effectiveness of verbal reports to assess firearm safety (Gatheridge et al., 2004) and sexual abuse preventions skills (Harvey et al., 1988). Although these research studies indicated improvement when the results of responding were compared to responding rates in baseline, each of these studies did not necessarily assess the child's use of these safety skills in situ. Therefore, without an actual measurement of the child's response or behavior in specific situations when exposed to a safety threat, it is difficult to determine the effectiveness of these verbal report assessments. It is with caution that we rely on verbal report assessments to indicate mastery of safety skills. As research has indicated, while most children are able to identify the safety skills that should be implemented within a verbal report assessment, they are often not able to demonstrate these same skills during in situ assessments (Himle et al., 2004).

As there are ethical concerns that are associated with presenting a child with a sexual abuse lure in a real life situation, verbal report assessments are often used within the literature surrounding sexual abuse (Miltenberger & Hanratty, 2013). As researchers rely on verbal report assessments, this can become problematic because of the poor correspondence that exists between verbal report assessments completed by children and how they would appropriately use safety skills in a real life situation (Miltenberger et al., 1990). Therefore, it is important for future research studies that will be conducted on teaching sexual abuse prevention skills to include and develop assessment strategies that are better and not reliant on verbal reports.

Role-Play Assessment

Another type of assessment that is discussed within the safety skills literature is a role-play assessment (Gatheridge et al., 2004). These types of assessments are used by researchers to evaluate safety skills by providing children with a scenario and then asking them to act out or demonstrate what they would do in the situation provided to them. For example, the child might be asked to pretend that they are in their dining room, and they see a gun on the table. At this point in the scenario, a disabled firearm is placed on the table. Then, the child is told to pretend that the person telling them this scenario is their mother who is in another room of the house. This adult then tells the child that they want them to show them exactly how they would respond if they found this gun on their table at home. The "mother" then walks across the room so that they are the "mother" in the other part of the house. As this role-play assessment progresses, the researcher will record the response of the child but will not provide the child with any corrective feedback or praise. Once the child has completed their demonstration, the child will be thanked for their participation in the scenario.

Researchers have used role-play assessments to evaluate the effectiveness of the Eddie Eagle GunSafe Program and behavioral skills training (BST) with young children (Gatheridge et al., 2004; Himle et al., 2004). The responses provided by the children were evaluated using a 4-point scoring scale where 0 indicated that the child touched the gun, 1 indicated that the child did not touch the gun but did not move away from it either, 2 indicated that the child did not touch the gun and moved away from the gun but did not report the situation to the adult, and 3 indicated that the child did not touch the gun but was able to leave the area and tell the adult.

Additionally, role-play assessments have been used to evaluate the acquisition of sexual abuse prevention skill within young children (Miltenberger & Thiesse-Duffy,

1988). Since research indicates that inappropriate sexual requests typically are made from an adult that is known to the child, role-play assessments would need to include an example of a sexual abuse lure that is made from an individual that the child knows (Kopp & Miltenberger, 2009). The content of these role plays could be controversial. As a result, researchers have assessed the validity and social acceptability of these situations with known individuals that could be used for these potential role-play assessments (Kopp & Miltenberger, 2008). For example, the following scenario could be used: A teacher at your school asks you to stay after school because they have some important information to tell you. When the teacher and you are alone in the classroom, the teacher tells the child that they are doing really well in their class and asks if they can hug and kiss them. The scenarios that were used within this research were all regarded as being socially acceptable by child protection workers for use in role-play scenarios.

In Situ Assessment

In-situation or in situ assessments are used by researchers to evaluate a child's response to a safety threat within the natural environment. Since research has shown that there is a disparity between a child's behavior or response during a role-play scenario when they are being observed and what the child would actually do in the presence of an actual safety threat, in situ assessments are able to be conducted without the child being aware that they are being done (Carrol-Rowan & Miltenberger, 1994). This type of deception occurs as a method for ensuring that the child is able to respond with respect to the actual safety threat and not to the environment or people that they are in the presence of (i.e., researcher, parents).

In these types of assessments, the safety threat that the child encounters must feel real to them so that the assessment is able to accurately measure the child's response and behavior as it would occur in a real life situation. In order to

conduct an in situ assessment, (1) the safety threat must occur within the natural environment, (2) the child cannot be aware that the assessment is taking place, and (3) an adult that is trusted by the child should not be within proximity to the safety threat (i.e., the child should be alone; Miltenberger & Hanratty, 2013). In situ assessments have been used by researchers as a method for evaluating in situ training (IST) and the Stranger Safety abduction prevention program (Beck & Miltengberger, 2009). Within this research, two types of abduction situations were evaluated. One situation involved a knock at the child's door at home, and the other situation involved the child being approached by a stranger in a public place. In the scenario that involved the door-knock, a confederate was used to knock on the front door three times when the child was in a room that was located near the door and while the parent was in a different room of the house. Within this scenario, the expectation was for the child to find the parent in the other room of the house and tell them that a knock occurred at the door. In the other scenario involving being approached in a public place, a confederate was used to approach the child in a public place, getting within 1 m of the child, and then talking to the child. The expectation was that the child would get away from the confederate and find their parent that was nearby to inform them of the situation. In scenarios that involve the evaluation of abduction prevention skills, a researcher or other adult is nearby but out of sight, and the confederate never leaves the location with the child. If at any point the child is unable to demonstrate the appropriate safety skills, the confederate should make up an excuse and leave the situation.

Since a safety threat can occur in a multitude of environments, in situ assessments have been conducted in different settings such as schools or after school programs (Miltenberger et al., 2004), community settings (Gatheridge et al., 2004) and the home environment (Gross et al., 2007). These types of assessments have also been used to evaluate different programs relating to prevention of firearm injury

(Gatheridge et al., 2004), abduction (Miltenberger et al., 2013), poisoning (Dancho et al., 2008), and sexual abuse (Miltenberger et al., 1999). Additionally, these types of assessments have also been used to evaluate different safety skills while in the presence of peers. For example, in one study, both a participant and a peer found a gun (Miltenberger et al., 2009). In this scenario, the peer had been trained previously to entice the participant into playing with the gun that was found. This peer interaction increased the realness of the situation as children often find firearms when they are playing with each other.

In order for a realistic simulation to occur when evaluating sexual abuse safety threats, a known individual must present the sexual abuse lure since research has shown that a majority of sexual abuse cases are a result of a known individual to the victim (Miltenberger & Hanratty, 2013). However, even though this may be the case and as ethical concerns are noted, in situ assessments have not used a known person delivering a sexual abuse lure within the child sexual abuse literature. Research has suggested possible solutions to this. One such solution is to use a similar procedure that was used with adults with intellectual disabilities (Miltenberger et al., 1999). In this research, BST and IST were used as methods for teaching sexual abuse prevention skills. During in situ assessments, a confederate was introduced into the group home residence as a staff member and built rapport with the residents for approximately 15 min. After this time had elapsed, the confederate presented an inappropriate sexual request. This confederate became a known person to the residents since he spent time building rapport with them. Until there is able to be some type or variation of an in situ assessment that can be conducted to evaluate different sexual abuse prevention programs for children, there will be no evidence that supports the effectiveness of these training programs for teaching safety skills. Therefore, further research is needed in this area of safety skills and program development.

Although there are several different types of assessments (i.e., self-report, role-play, in situ) that have been used to evaluate the effectiveness of training conducted regarding safety skills, in situ assessments are the most valid assessment that can be used. Assessments that rely on verbal reports have limitations because they are only able to assess the verbal responses of the child or the child's knowledge of safety skills. Additionally, role-play assessments are limited because the child performs or demonstrates their behavior and actions in the presence of a researcher. Therefore, it is not known if the child would be able to perform the same behavior if they were in a situation with the same safety threat. As a result, an in situ assessment is the only type of assessment that is able to provide this type of information. The recommendation is that both researchers and practitioners will continue to use these types of assessment for evaluating safety skills and to find additional ways to assess the learning of these skills.

Section 2 Personal Reflection

Which type of assessments are you most familiar with and which ones have you used within your own practice? Have you found that one method of assessment is easier to implement when compared to the other assessments, why?

Section 2 Key Words

In-situation or in situ assessments - used by researchers to evaluate a child's response to a safety threat within the natural environment

Role-play assessment - used by researchers to evaluate safety skills by providing children with a scenario and then asking them to act out or demonstrate what they would do in the situation provided to them

Verbal report assessment - used to describe a scenario that includes a safety threat and then asks the child to identify how they would respond or behave when they are faced with that situation

Section 3: Methods for Teaching Safety Skills

There are two main approaches that have been the primary focus of teaching safety skills to children. These two approaches are informational and active learning. An informational (i.e., passive) learning approach involves an instructor that will provide information about the safety threat as well as describe or model a response that is correct for the threat that is provided. Within this type of approach, the learner does not rehearse the skills that are being taught but can practice the response that is correct verbally. For example, the learner can state, "If I come across a loaded firearm on a table, I will not touch it. I will leave the area and tell a trusted adult." The other approach, known as the active learning approach, involves the learner practicing a response that is correct as it applies to the safety threat while the instructor delivers reinforcement and/or corrective feedback on the learner's response. The main difference between these two types of approaches is that the active approach allows the child an opportunity to continually engage in an actual safety skill while simultaneously receiving feedback and reinforcement for their response to a safety threat that is simulated.

Informational Approaches

Informational approaches can be used to teach a variety of safety skills including gun safety, abduction prevention, and sexual abuse prevention. These types of approaches can utilize various media to effectively deliver information as well as provide a model of the correct and appropriate responses for those individuals that are trying to learn the skill. The different types of media that can be employed include in-person (Hardy et al., 1996), books (Miltenberger & Thiesse-

Duffy, 1988), and videos (Beck & Miltenberger, 2009). Even though these types of approaches are widely used, most of the studies that evaluate the effectiveness of these approaches only have used verbal report assessments. As a result, an increase in the individual's safety threat knowledge has been demonstrated as well as one's ability to delineate correct responses (Kenny et al., 2012). These results are concerning, though, since verbal report assessments have been shown to demonstrate a lack of correspondence between an individual's verbal report and the behaviors that are observed during in situ assessments (Himle et al., 2004). Even though these types of assessments have shown an improvement in one's safety skill knowledge, verbal report does not necessarily assess or measure how the individual will behave when they are confronted with a real safety threat.

Research studies that have used in situ assessments as a method for evaluating informational approaches have indicated that informational approaches are not an effective means of teaching an individual different safety skills. One researcher evaluated the effects of two different informational programs that were used to teach gun safety skills. In one program, the children were provided with instructions from the researchers and a police officer on what they should do if they found a gun. After listening to these instructions, the children were then prompted to sign a certificate that indicated they would promise to not touch the gun (Hardy et al., 1996). The other informational program evaluated the effectiveness of the STAR program which is often used to teach children about the dangers associated with firearms, how to make informed decisions, and methods for preventing conflicts (Hardy, 2002). In situ assessments that were conducted after completion of these informational programs indicated that the individuals involved in the programs were not able to demonstrate any safety skills even though they had engaged in the correct verbal responses in the training that they had completed.

Additionally, similar results have been demonstrated when informational approaches that have taught other safety skills such as abduction prevention and sexual abuse prevention have been evaluated. In one research study (Beck &

Miltenberger, 2009), the Safe Side Stranger Safety program that teaches children appropriate abduction prevention skills was evaluated. This particular program includes a DVD that delivers instructions as well as various models of responses that could be used when faced with an abduction threat. In situ assessments were then conducted to evaluate the performance of the children with these safety skills within one week after having undergone the training program. Results indicated that these children were not able to exhibit the safety skills that they were taught in the DVD. Furthermore, this study was replicated, and twelve out of thirteen children were unable to demonstrate the safety skills during an in situ assessment (Miltenberger et al., 2013).

Throughout the research on this topic, it has been found that informational or passive learning approaches are not as effective at teaching safety skills to children. This has been indicated in research studies that have assessed children in situations where the child has been asked to demonstrate the skills as a response to a safety threat during in situ assessments. While these programs do have the potential to increase access to different trainings that are associated with safety skills, they are not a successful alternative to approaches that involve active learning as a method for teaching safety skills.

Active Learning Approaches

Passive or informational approaches are limited as they involve providing information and modeling skills. On the other hand, active learning approaches require participants to rehearse the safety skills that are being taught to them. As a result, these types of approaches offer an advantage over informational approaches. Active learning approaches have the participant exhibit the safety skill while they are in the presence of the discriminative stimulus so that the person that is training is able to provide reinforcement for correct responses and feedback for responses that are incorrect or only partially correct. This allows the individual that is training to ensure that the participant is acquiring the safety skills that are being taught. There are two active learning approaches that are

used to teach safety skills. These approaches are behavioral skills training (BST) and in situ training.

Behavioral Skills training (BST)

BST includes several components. First, this method involves the instructor describing the safety threat as well as safety skills that are appropriate to the threat (i.e., instruction). Then, the instructor demonstrates the targeted safety skill to the participants (i.e., modeling). Next, the participant practices the safety skills that have been taught (i.e., rehearsal) and praise is provided to the participant for responses that are correct (i.e., feedback). Additional instruction is also provided to the participant as a method for improving performance with additional opportunities provided for further rehearsal. In order for participants to be able to respond appropriately to safety threats that they encounter, it is important that the participant rehearses the safety skills while they are in the presence of the simulated safety threat (Miltenberger & Hanratty, 2013). As multiple rehearsals occur, the participant's responding is more likely to come under the control of the targeted safety threat. This will then allow it to function as the discriminative stimulus while in the presence of which the correct safety skill will be able to be exhibited and reinforced.

Research has demonstrated the importance of including the rehearsal component of BST while training different safety skills (Poch et al., 1988). This research study extended the findings of other research (Poch et al., 1981) where it was shown that BST was effective as a method for teaching abduction prevention skills. This was demonstrated through the responses of the children during in situ assessments. This study evaluated the effectiveness of a 60 min safety presentation delivered from a police officer, a 25 min videotape that modeled safety skills and the children verbally rehearsed these safety skills, a videotape plus behavioral rehearsal group, and a control group that did not receive any training regarding the safety skills. Within this study, the participants were expected to say "no" and remove themself from the situation when they

encountered an abduction lure. The in situ assessments revealed that 12.5% of the participants that were in the 60 min safety presentation group were able to remove themselves from the lure, 47.4% of the participants in the videotape group were able to remove themselves from the lure, and 73.7% of the participants in the videotape pulse behavioral rehearsal group were able to remove themselves from the lure.

Other research has also evaluated the effectiveness of using BST to teach different safety skills to children. (Miltenberger, 2008). Two different variations of BST were evaluated on their effectiveness to teach abduction prevention skills. One intervention used instructions and modeling that was delivered through video and then followed up with behavioral rehearsal and feedback from the instructor. The other intervention used instructions and modeling that were delivered by the instructor and were followed up with behavioral rehearsal and feedback from the instructor. Results indicated that for both of these groups, safety skill performance by the participants during in situ assessments was better than that of the performance by the participants in the control group (Carrol-Rowan & Miltenberger, 1994).

Although this aforementioned research has indicated that BST may be effective at teaching safety skills to some participants, it may not be effective for teaching safety skills to all children. One study integrated the use of BST with groups of two to children ages four and five years of age (Himle et al., 2004). This study used BST to teach the child participants how to respond appropriately if they were to encounter a gun. After BST was conducted, ten out of ten child participants were able to demonstrate the correct response while assessed during a role-play situation. When these child participants were also assessed using in situ assessments, only two out of ten child participants were able to demonstrate a correct response. This study was replicated using children that were six and seven years of age. The group of child participants that received BST were able to score higher during the in situ assessment than those child participants that received the informational approach or the control group (Gatheridge et al., 2004). These

results indicate that BST can be an effective method for teaching safety skills to some children. However, not all children are able to demonstrate these skills with each opportunity provided.

The effectiveness of BST has also been evaluated when used to teach children how to avoid poison hazards (Dancho et al., 2008). During BST, the child participants were taught that they should ask an adult prior to eating or drinking anything and were provided with a snack as an alternative option. Once training was completed, in situ assessments were conducted. Within these assessments, the child participants were situated in a room that provided access to containers that resemble various poison hazards that people may encounter within their own environment (i.e., pill bottles, liquids). Results indicated that BST was able to be somewhat effective at decreasing the child participant's frequency of opening containers that were unknown to them when compared to baseline levels and that further instruction through in situ training was needed in order for unsafe behavior to reach near zero levels.

Research has indicated that BST can be an effective method for teaching safety skills for a variety of safety threats such as abduction (Poche et al., 1981, 1988), firearms (Gatheridge et al., 2004), and poison hazards (Dancho et al., 2008). While the results of this research indicate that BST is a better approach for teaching safety skills than informational approaches, the results also indicate that some children are not able to demonstrate the safety skill with 100% accuracy after implementation of BST alone. Additionally, teaching of safety skills often require the inclusion of an in situ training component (Dancho et al., 2008; Himle et al., 2004; Jostad et al., 2008; Miltenberger et al., 2004).

In Situ Training

In situ training involves a training session that occurs in the actual context of where a safety skill should be exhibited. In these situations, a safety threat is simulated during an in situ assessment. If the individual involved in the

assessment does not engage in the correct safety response required for the safety threat, then the trainer will intervene and engage in a BST session with the individual. In situ training allows for the active learning components that are involved within BST to be incorporated. It also increases generalization of the effects of BST as it occurs within the natural environment and while the participant is in the presence of an actual safety threat that they encounter when they are alone. There have been a multitude of studies that have evaluated the effectiveness of in situ training for training safety skills to children either after or in conjunction with BST (e.g., Dancho et al., 2008; Himle et al., 2004; Johnson et al., 2005; Jostad et al., 2008), following informational approaches (e.g., Beck & Miltenberger, 2009; Gatheridge et al., 2004), or as a procedure that can be implemented on its own (Miltenberger et al., 2013).

One research study used in situ training with children ages six and seven years of age who were not able to demonstrate appropriate safety skills after the implementation of BST (Gatheridge et al., 2004). In order to implement in situ training, an in situ assessment was interrupted when the participant was unable to correctly implement the response while in the presence of the safety threat. This interruption was followed by the implementation of instruction, modeling, rehearsal, and feedback. Results indicated that after the in situ training was conducted, all participants were able to demonstrate the correct safety skill response in follow up in situ assessments. Similar results were indicated in additional research studies (Himle et al., 2004; Miltenberger et al., 2004). These additional studies used participants that were between four and seven years of age. Results showed that half of the participants were able to engage in the correct safety skill following BST; however, all of the participants were able to engage in the correct safety skill response once in situ training had been implemented.

There were also studies that evaluated the effectiveness of in situ training when it occurs in conjunction with BST as a method for teaching safety skills. One study examined the effectiveness of BST with in situ training to teach abduction

prevention safety skills to participants that were four and five years of age (Johnson et al., 2005). Additionally, this research also assessed the maintenance of these safety skills once the program was completed. There were three BST sessions that involved the participants being taught to say no to the lure that was provided by the stranger, getting away, and telling an adult. These safety skills were recorded based on a four-point scale. BST and in situ training were implemented concurrently. In situ assessments were conducted after the completion of each training session. In situ training was conducted every time the participant was unable to demonstrate the correct safety skill. Results of this study indicated that all children were able to exhibit the correct responses after training. The number of training sessions that were required did vary among all participants in the study. Additionally, most of the participants were able to demonstrate the correct safety skills when follow-up assessments were conducted. Similar results were also indicated in studies that evaluated BST and in situ training for teaching correct firearm safety skill responses (Miltenberger et al., 2005). Furthermore, other research has compared the effectiveness of BST alone and BST in conjunction with in situ training for the teaching of abduction prevention safety skills to participants (Johnson et al., 2006). Results indicated that both approaches were effective at teaching the safety skills to participants, but that BST plus in situ training produced significantly better performance rates at the follow-up that was conducted at three months.

Furthermore, another research study evaluated the effectiveness of in situ training for teaching abduction prevention safety skills (Beck & Miltenberger, 2009). In situ training was implemented after the participants viewed the Stranger Safety DVD and failed to perform the safety skills presented in the video during in situ assessments. Parents were instructed to implement in situ training, and the participants exhibited the safety skills after one or more sessions. Results that were similar were also demonstrated in another research study which also evaluated the Stranger Safety DVD and in situ training that was conducted by parents (Miltenberger et al., 2013). Results from this study indicated that in situ training was effective at teaching the safety skills after implementation of the

Stranger Safety DVD was not effective.

Most of the studies within the literature that have implemented in situ training after BST have not been effective at teaching a particular safety skill or after a passive training approach. This limits the conclusions that can be made about its effectiveness to be a procedure that can be implemented on its own. There are a few studies, though, that have evaluated in situ training independently of BST or informational approaches. The results of these studies indicated that in situ training was an effective procedure on its own (Miltengberger et al., 2009; Miltenberger et al., 2013).

Even though research has not thoroughly evaluated the behavioral processes that are primarily responsible for the effectiveness of in situ training, it has been suggested that a combination of positive punishment and positive and negative reinforcement may be responsible (Miltenberger & Gross, 2011; Miltenberger & Hanratty, 2013). With this being said, it may be possible that the notion of being caught exhibiting the incorrect behavior or response during an in situ assessment may act as an aversive event. This may then decrease the likelihood that the participant will exhibit an incorrect behavior or response in future occurrences when the safety threat occurs within the environment or situation. Furthermore, avoidance of an aversive event may also act to negatively reinforce engagement in the correct safety skill. Lastly, the praise that a participant receives may reinforce the exhibition of the safety skill and therefore increase the likelihood of the participants exhibiting those behaviors and responses in future incidents (Miltenberger & Hanratty, 2013).

Increasing Availability of Effective Approaches

Since active learning approaches have been recognized as effective interventions for teaching a variety of safety skills, the focus is now on increasing the availability of these approaches (Miltenberger & Gross, 2011). This focus is important since most studies that are successful utilize trained researchers to implement the BST

and in situ procedures with the participants. While this approach has proven to be successful, it is not the most efficient approach as it requires a significant amount of time and professional resources to conduct appropriately. Through research, it was noted that due to the time that is required for individual rehearsal, it would take approximately 20 hours to train one safety skill through implementation of BST to an average elementary school (Vanselow & Hanley, 2014). As a result of this information, several studies have evaluated the efficacy of active training approaches as methods for teaching safety skills without the use of researchers for implementation of these training procedures.

Group Training

One method that has been discussed within the literature for reducing the cost and resources that are needed to teach safety skills to participants is to implement group training in place of individual training. Even though it has been demonstrated that training that is individualized is better than group training, several studies have evaluated group trainings as a means of increasing availability of training approaches that are effective (Miltenberger & Olsen, 1996). In one study, researchers found that BST that was implemented in a classroom environment was an effective intervention at teaching abduction prevention skills to participants (Olsen-Woods et al., 1998). Another study demonstrated that group-implemented BST was an effective strategy for teaching participants to exhibit appropriate responses to finding a firearm (Gatheridge et al., 2004).

Although research findings have been inconsistent as far as the effectiveness of group BST, this approach to teaching safety skills still may be a beneficial first step that can be implemented in a classroom or in a group setting. When group training is utilized, the individual that is conducting the training should make sure that all participants are paying attention to the instructions and the modeling, everyone is able to have an opportunity to rehearse the skills with feedback being able to be provided until the skill can be demonstrated correctly, and all participants are able to observe the rehearsals and feedback that is provided to all

of the other participants (Miltenberger, 2012). There are limitations to this approach, though. Since it is not able to be determined which children will be able to benefit from group BST in advance, in situ assessments should be conducted after the group training so that participants that require more individualized training with in situ training are able to receive it. As a result, researchers should focus on evaluating strategies that are effective at increasing the effectiveness of BST with groups of participants.

Training Implemented by Parents

Training can be made more available through the use of caregivers or parents as they may be able to also conduct the training. Researchers have evaluated the effectiveness of a program where parents were asked to teach gun safety skills to their own child (Gross et al., 2007). Within this study, the parents were asked to read a training manual and then watch a video so that they would be able to learn how to implement BST and in situ training sessions. The parents that were involved in the study then implemented BST and in situ training without receiving any additional training from the researchers to teach gun safety skills to their own child. For three out of four participants within this study, results indicated that the parent-implemented BST and in situ training were effective and were scored as being favorable by the parents with regard to ease of implementation and satisfaction with the intervention. In an additional study, researchers evaluated the effectiveness of the Stranger Safety DVD and parent-implemented in situ training for teaching abduction prevention safety skills to participants. Instructions, both verbal and written, were used as well as modeling, rehearsal, and feedback to instruct the parents on how to implement in situ training sessions. An instructor observed the first in situ training session and was able to deliver feedback to the parent. The parents were then able to implement in situ training if the child was not able to provide a correct response to a stranger's approach in a public place or to a knock on their door at home. Results of this study indicated that the participants were not able to provide correct responses following the Stranger Safety DVD; however, all of the participants were able to

demonstrate the safety skills correctly after receiving parent-implemented in situ training. Each of these participants were also able to maintain the safety skills when follow-up assessments were conducted anywhere from four to 22 weeks after training had been conducted. These results were later extended by other researchers. Researchers used a control group and a group that watched the Stranger Safety DVD with both receiving parent-implemented in situ training (Miltenberger et al., 2013). Video modeling and BST were implemented to teach the parents how to conduct in situ training. Results indicated that there was no significant difference in the safety skills in the Stranger Safety DVD group when compared to the control group prior to in situ training. Once the parent-implemented in situ training, both the control and treatment groups demonstrated significant improvements in regard to safety skills. Furthermore, no significant differences were demonstrated between the two groups. As a result, the findings from this study indicated that parents are able to learn to conduct BST and in situ training and that their parent-implemented BST and in situ training are effective in regard to teaching safety skills with fidelity. Further research should be conducted to determine the type and amount of training that is needed for parents to be able to teach safety skills to their own child effectively.

Training Implemented by Peers

Peer tutoring can also be used to increase the availability of BST and in situ training. Research has used peer-implemented training to teach gun safety skills to participants ages four and five years of age (Jostad et al., 2008). First, participants ages six and seven years of age participated in BST so that they could learn how to implement BST and in situ training with younger participants. They then used BST and in situ training successfully with minor assistance to teach these safety skills to the younger participants. All younger participants who were trained by older peers were able to demonstrate the skills learned during in situ assessments. The results confirm that peer training of skills may be both a feasible and practical way to teach safety skills. In other research, consistent findings were demonstrated (Himle et al., 2004). This research involved half of

the participants demonstrating the skill after the completion of BST and the other half of the children being able to demonstrate the skills after completion of in situ training. Furthermore, these results have been extended to include the teaching of abduction prevention skills (Tarasenko et al., 2010). Within this study, two participants were able to effectively train three of their peers to say "no," remove themselves from the area, and tell an adult when a stranger presented a lure. Even though the research surrounding peer-implemented training is limited, the research indicates that peer-implemented training procedures may be an effective and practical method for teaching safety skills. This topic does require further research, though.

Simulated Training

Another method that can be used to increase the availability of safety skills training is through the integration of computer simulations into the training. The advancements that have occurred within the field of technology have provided the means for computer simulations to be integrated. Virtual reality can allow participants to engage in targeted behaviors and allow for the teaching of safety skills such as street-crossing (Arbogast et al., 2014; McComas et al., 2002; Schwebel & McClure, 2014). Researchers have evaluated the effectiveness of a computerized version of BST that can be used to teach safety skills. This computerized version of BST involves the use of a computer game where the participants are asked to complete modules that integrate BST components. This computer game was able to provide information to the participant regarding the safety threat, show videos that coincided with correct and incorrect responses to the safety threats, and provide situations for the participants to be able to rehearse the correct responses in specific contexts available during the virtual simulation. This type of approach may be more suitable and appropriate when compared to traditional video modeling approaches since the participant is able to control the character in the simulation as the character is able to practice the correct response. In situ assessments were used to evaluate the effectiveness of this computerized version of BST for the teaching of abduction prevention skills,

poison prevention skills, and lighter safety skills. Generalization for some skills that were not trained by researchers directly were also assessed using in situ assessments. Results indicated that only a few of the participants were able to learn the skill after computerized BST was implemented solely. When computerized BST was used in conjunction with in situ training, then correct demonstration of the safety skills and generalization of these skills to different categories of safety threats were able to be performed. As a result, computerized BST may be able to be used to increase the availability of various training programs that are effective, specifically for skills that may be difficult to simulate within role play situations (i.e., pedestrian safety, fire safety). It is important to note, though, in situ training may still be needed for those that are not able to benefit from computerized BST. Therefore, future research is needed to determine the effectiveness of virtual reality training programs as well as the validity of virtual reality assessments for a larger array of safety skills.

As the research within the field has indicated, an active learning approach is more successful than other approaches at teaching safety skills to younger individuals. It has been shown that younger individuals that engage in programs that are informational are not able to perform the safety skills when evaluated during an in situ assessment after the completion of training. Those younger individuals that are able to learn the safety skills instruction and modeling and then are able to practice those safety skills several times with feedback as a response to simulated threats are more likely to be able to perform the safety skill when assessed during an in situ assessment. BST has been shown to be effective in several situations, but it is not effective with all participants. Some individuals are able to demonstrate the requested safety skill after completion of BST alone. However, there are other individuals that also require in situ training after BST to be able to demonstrate the safety skill appropriately. Researchers should continue to focus on determining ways to make safety skill training programs more available so that more individuals are able to benefit. Several of the approaches mentioned (i.e., group-implemented BST, parent-implemented programs, peer-implemented programs, computer-assisted programs using virtual reality) have demonstrated

promise and should be evaluated further. In the meantime, educators, parents, and instructors should refrain from using informational approaches that have been shown to be ineffective as a method for teaching safety skills to younger individuals.

Section 3 Personal Reflection

Which type of active learning approach that was discussed as helping to increase availability would be the easiest and most effective approach to use within your own clinical practice? Is there an approach that you have previously used that was successful? What do you think can be attributed to the success of this approach?

Section 3 Key Words

Active learning approach - involves the learner practicing a response that is correct as it applies to the safety threat while the instructor delivers reinforcement and/or corrective feedback on the learner's response

Behavioral skills training - consists of instruction, modeling, rehearsal, and feedback as it relates to skill acquisition

Computerized BST - involves the use of a computer game where the participants are asked to complete modules that integrate BST components

Informational learning approach - involves an instructor that will provide information about the safety threat as well as describe or model a response that is correct for the threat that is provided

In situ training - involves a training session that occurs in the actual context of where a safety skill should be exhibited

Section 4: Behavioral Safety

The application of behavior analysis to safety, or behavioral safety, has a long history. This behavioral approach to safety was acknowledged and made well-known through the conceptual works of B.F. Skinner that helped to set the state for research in this area to be conducted (Skinner, 1953). Initial publications discussed the importance of positive reinforcement and how it can be used to improve safety within organizations (Smith et al., 1978). Since these early articles, research has been used to develop specific approaches that include behavioral techniques for operationally defining both safe and unsafe performances, observing and collecting data within the natural environment, and providing feedback on performances that are deemed to be safe.

Targeted Behaviors for Improvement in Behavioral Safety

There have been a number of behaviors that behavior safety researchers and practitioners have identified for improvement. There are three categories, though, that the applications of behavioral safety can be arranged into: applications that focus on improvement in posture or position, applications that focus on wearing personal protective equipment (PPE), and applications that focus on the use of safety belts or other restraint systems.

Applications to Improve Position or Posture

The scientific discipline that is centered around understanding the interaction that occurs among humans and other elements of a system is known as ergonomics. It is important to have proper ergonomic design so that muscle strain that could occur as a result of repetitive movements can be prevented (International Ergonomics Association, 2014). Behavioral safety has been used within this area in a multitude of ways including teaching employees how to perform their job duties while maintaining a safe position. This can include maintaining a safe

posture while sitting, using safe wrist posture, and determining the variables that contribute to safe ergonomic postures (Fante et al., 2007; Fante et al., 2010; Yu et al, 2013).

Applications to Increase Wearing of PPE

Another area where behavioral safety has been used is within the efforts of increasing the use of PPE by employees. PPE is known as the clothing and equipment that can be used to protect an employee from workplace hazards. Even though the government regulates the use of PPE by employees, several employees still refrain from proper wearing of PPE. As a result, employees are then at an increased risk of being exposed to workplace hazards. Therefore, research has evaluated different methods for increasing the wearing of PPE including moving the location of PPE, such as gloves and safety glasses, so that it is more accessible to the employee (Casella et al., 2010; Abellon & Wilder, 2014).

Applications to Increase the Use of Safety Belts

Behavior analysis has been used to help contribute to safe driving practices through various programs and applications. Some applications that have been used include eligibility to be entered into a raffle for a gift certificate, prompts of wearing safety belts upon exiting a building, and manipulation of a gear shift to not allow the shifting of gears until a seat belt was worn (Rudd & Geller, 1985; Engerman et al., 1997; Van Houten et al., 2005). This research indicates that a variety of behavioral procedures can be used, from prompting to negative reinforcement, and also be effective at increasing the use of safety belts.

Behavioral Safety Process Components

There are several features that are common within the behavioral safety processes. These common features include: the development of safety committees, conducting safety observer training, and implementing safety

observations. There are also several behavior change strategies that are common within the behavior safety processes. These include: safety training, feedback, praise, rewards, recognition, and goal setting (Wirth & Sigurdsson, 2008).

Safety Committee

In an effort to provide support for a behavior safety process, a committee should be formed that includes representatives from safety personnel, management, supervisors, and employees (McSween, 2003). These committees can be used to provide feedback on the process as well as input on any policy changes that are related to safety. Additionally, these committees can be used to analyze data regarding workplace injuries, near misses, and identify any challenges that are present through this data.

Safety Training

Safety training is a vital component as it guides employees on how to discriminate between safe and at-risk behaviors. This type of training is also typically a part of an intervention package (Fante et al., 2007; Lebbon et al., 2012). Research has indicated that training alone is not typically effective in increasing behaviors that are safe and that additional components such as motivational strategies were also needed to improve safety behaviors. A safety training package may include pictures that show safe and at-risk behaviors and a discussion regarding the reasoning as to why or why not the pictures show safe or at-risk behavior.

Employee Observer Training and Safety Observations

Another component that is vital to a behavioral safety process is that of regular safety observations by personnel that are onsite at the workplace or organization (McSween, 2003). These observers may take on the roles of safety staff, experimenters, employees, or even managers. Some research has indicated that it is beneficial if managers are involved in the observations and verbal feedback as this may be effective since these individuals are those that are in charge of

valuable outcomes within the organization (Stajkovic & Luthans, 1997).

A benefit of training employees so that they are able to conduct observations is that the observers may act in a safer manner as a result of conducting these peer observations (Alvero & Austin, 2004). This is known as the observer effect. Observers can also be trained on how to deliver immediate and specific feedback to employees that is based on a checklist of items that are scored during the peer observations. It is recommended that the observers place emphasis on delivering praise for items on the checklist that are scored as safe (Komaki et al., 1978), and corrective feedback is delivered as it is needed (Hermann et al., 2010). The data that are gathered from the checklists are collected by the safety committee and help to form the basis of interventions.

Feedback

There are two types of feedback that are primarily delivered when used within a behavior safety process. These types of feedback include immediate verbal feedback that is delivered after a safety observation has been conducted and graphed feedback that summarizes the data that are gathered from a safety observation over a span of time (Fante et al., 2007). The feedback that is graphed often is used as the basis of safety-related discussions that occur at regular site safety meetings. Social praise is also used in conjunction with feedback interventions. Praise can be delivered immediately after the exhibition of safe behavior (Komaki et al., 1978) or when trends are improving within the graphed feedback. It can also be used with managers for safety improvements (Zohar, 2002).

Goal Setting

Goal setting can be used to determine the desired outcomes for process measures (i.e., number of observations, number of safety interactions; Komaki et al., 1978), or behavioral measures (i.e., percentage of safety observations that are

scored as safe; Harper et al., 1996). Although research has not been able to determine if participative goal setting versus supervisor-assigned goals are more effective as the results did not favor one approach over the other, it has been shown that practitioners prefer participative goal setting (Harper et al., 1996).

Incentives

It is important to note that incentives should be used with caution when concerning behavioral safety. Often, incentives have been found to motivate employees to underreport injuries as financial incentives are provided for the absence of these injuries (Mathis, 2009). An alternative strategy that can be used is to provide incentives for improvements that are made in process measures (i.e., conducting observations, acting on safety suggestions; Lebbon et al., 2012).

Management-level Interventions

One criticism that has been made in regard to behavior safety is that it places blame for the injury on the worker and absolves management within the organization of any responsibility for safety (Mathis, 2009). Recent behavior safety interventions include the use of tracking and accountability for management safety support behaviors. Behavioral principles have been utilized to manage behavioral safety process responsibilities and the safety responsibilities of managers (Hermann et al., 2010).

Behavior analysis can be applied to safety and has become an ever growing field with a long history. This area may provide opportunities for individuals that want to pursue jobs as safety specialists. Behavioral safety also provides an evidence-based method to manage safety concerns within an organization. As a result, this area of development will create various new opportunities for individuals that are in the field of behavioral safety.

Section 4 Personal Reflection

Which component within the behavior safety process do you find would be the most beneficial to integrate into your organization? What are some ways that your organization can benefit from this approach? Do you see any limitations with trying to integrate this approach into your organization?

Section 4 Key Words

Behavioral safety - application of behavior analysis to safety

Ergonomics - the scientific discipline that is centered around understanding the interaction that occurs among humans and other elements of a system

Observer effect - observers may act in a safer manner as a result of conducting peer observations

Participative goal setting - employees are consulted when deciding goal levels

Personal protective equipment - clothing and equipment that can be used to protect an employee from workplace hazards.

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