Evaluating the Use of DTT to Teach Basic Sexuality Education Skills to Children with Autism Spectrum Disorder

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by

AVERY TORBETT

Dr. Wesley Dotson and Dr. Kate Sadler, Thesis Supervisor

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The undersigned, appointed by the dean of the Graduate School, have examined the thesis entitled

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TO CHILDREN WITH AUTISM SPECTRUM DISORDER

presented by Avery Torbett,

a candidate for the degree of master of science in applied behavior analysis, and hereby certify that, in their opinion, it is worthy of acceptance.

Dr. Lisa Goran

Dr. Jessica Rodrigues

Dr. Kate Sadler

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TABLE OF CONTENTS

LIST OF FIGURES

Figure Page

Abstract

Individuals with autism spectrum disorder (ASD) experience numerous changes and challenges in their lifetime and it is critical that they have the knowledge to assist them during these experiences. Individuals with ASD engage in sexual behaviors at different stages of their life and sexual education is not always taught to individuals with ASD. Applied behavior analysis can be used to teach sexual education. As defined by Bruess and Greenberg (2004) in *Sexuality education: Theory and practice*, sexuality education is "a lifelong process of acquiring information and forming attitudes, beliefs, and values about identity, relationships, and intimacy" (p.15). This study will evaluate implementing discrete trial training (DTT) to increase skill acquisition of labeling body parts, discriminating between public and private behaviors, and labeling anatomy as public or private body parts for two children with ASD. One participant mastered all three skills, and the second participant mastered the first skill.

Introduction

There is a considerable lack of research on teaching sexuality to individuals with ASD. This is a problem because individuals with intellectual and/or developmental disabilities are at an increased risk for sexual victimization (Brown-Lavoie et al., 2014). Brown-Lavoie et al., (2014) compared the sexual knowledge and risk of victimization of 95 individuals with high functioning ASD and 117 neurotypical individuals via three surveys. Seventy-eight percent of participants with ASD reported experiencing at least "one occurrence of sexual victimization, compared to 47.4% of the comparison group" (Brown-Lavoie et al., 2014, p. 14).

Other researchers have found similar results regarding rates of abuse of individuals with ASD and an intellectual or developmental disability (IDD). Mandell et al., (2005) compared the demographic and psychosocial correlates of physical and sexual abuse among 156 children with ASD. Caregivers reported that 16.6% of the individuals with ASD had been sexually abused. This percentage is only representative of the instances of sexual abuse known by the caregivers. The results of this study determined that amongst children with a diagnosis of ASD treated in community mental health settings, one in six had experienced sexual abuse. According to their binary logistic regression analyses predicting sexual abuse, participants with a history of sexual abuse were predicted to be 81% more likely to engage in conduct problems (e.g., classroom disturbance, property destruction, etc.) compared to individuals without a history of sexual abuse. Furthermore, the predicted likelihood that an individual with no history of sexual abuse engages in suicide-related problems (e.g., suicide attempts and/or thinking about suicide) is 8% versus the predicted 31% likelihood of individuals with a history of sexual abuse to engage in suicide-related problems (Mandell, et al., 2005). Therefore, based on this data, experiencing sexual abuse increases the likelihood of engaging in additional problematic or unsafe behaviors

More research is needed to determine the current likelihood of individuals with ASD to experience sexual abuse in their lifetime. In the Brown-Lavoie et al., (2014) study described above, the data collected pertained only to victimization occurring after 14 years of age and therefore may have limited the rates of victimization reported. This limitation excludes any instances of victimization occurring before the age of 14. This is critical because there is no representation of younger individuals or children with ASD and there is therefore evidence supporting why additional research on the rate and likelihood of victimization is needed. Other authors have hypothesized that individuals with ASD are at an increased risk for victimization for two reasons: "(a) they are often unable to provide reports to parents, professionals, or law enforcement about sexual abuse due to communication deficits; and (b) they may fail to report sexual abuse because they are unaware it is wrong" (Howlin & Clements, 1995; Mansell et al., 1996). Although not stated in the article, it would be appropriate to consider that perpetrators are aware of these factors and act accordingly. For the reasons written above, there is insufficient research and reporting the increased risk of victimization is a cause for concern for all caregivers and individuals with ASD.

Ballan and Freyer (2017) argued why sexuality education is important and why applied behavior analysis, social stories, and social behavior mapping are the most effective interventions to teach it. The authors state that this education may be delayed because caregivers are concerned that talking about sexuality will increase sexual behavior. However, this education in reality has a large impact on how and when they engage in these behaviors. The authors state that "when physical maturation occurs at a greater rate than growth of emotional or cognitive skills, as it does in individuals with ASD, how well adolescents are able to adjust to this change depends largely on the support and education they receive from families and clinicians" (Ballan

and Freyer, p. 264). The real problem is that the typical sexuality programs being used lack the needed elements and modifications necessary to make them relevant to individuals with ASD (Ballan and Freyer, p. 270). Therefore, the approach to teaching sexuality concepts needs to change. This includes "approaching sexuality as a normative, positive aspect of development" (Ballan and Freyer, p. 270).

Additionally, individuals with ASD are often viewed by the public, and some caregivers, as not having any sexual desires, interests in partnership, or romantic feelings at all (Ballen, 2012). However, there are a number of medical professionals and care practitioners that emphasize the justification and importance of sexuality education. According to the American Academy of Pediatrics (2022), healthy sexuality is an important part of adolescent development and the National Commission on Adolescent Sexual Health (NCASH) states that sexuality is a natural part of life (2013). Teaching sexuality education is critical in order to support adolescents as they develop and undergo puberty.

Children and adolescents with ASD have the same right to learn about these subjects as every other student learning and once caregiver-buy in is established one must determine how to teach this curriculum. ABA-based interventions can be used to effectively teach sexuality education and consent skills however more research is needed to extend and refine the best methods to do so across ages, populations, and specific teaching strategies (e.g., social stories, discrete trial teaching).

When teaching sexuality skills to individuals with ASD, there are several considerations to be made independent of which intervention is used to teach them. First, is what to teach and when to teach it. This includes choices among available curriculums and ideas about topics and timing of teaching. Second is securing parent and caregiver support and buy-in. Before teaching

sexuality education, caregivers must be willing for the individuals to learn about these topics. There are a multitude of reasons why caregivers may not want the individuals to learn these skills including feeling awkward about the information, personal values, and/or cultural or religious beliefs. If parents and caregivers aren't comfortable and don't allow these subjects to be taught, then the individuals may never learn the information.

Regarding what to teach, there are several curriculums developed for use with individuals with ASD and IDD. These include "Sexuality Across the Lifespan" and "Healthy Bodies." A brief summary of each will be presented below.

Sexuality Across the Lifespan (2005) consists of an instructional manual and resource guide to assist educators address a wide range of topics on self-exploration and sexuality with individuals with developmental disabilities. The curriculum covers topics designed for kindergarteners through 12th graders. These topics include, but are not limited to, how bodies are alike or different, changes happening to or in one's body at different stages of life, becoming an adult, social skills, dating, and sexual and physical abuse

Healthy Bodies (2013) is a parent's guide on puberty for boys and girls with disabilities. Its content includes puberty, hygiene, appropriate and inappropriate public behaviors, social skills, mood swings, and body care. Body care refers to how to approach menstrual cycles, nocturnal emissions, erections, and self-care. The contents of the guides and their respective appendix are meant to be discussed with the child before puberty has begun.

While both curriculums are designed for use with people with disabilities, neither have been used in an empirical evaluation of teaching techniques related to the included content skills. In addition to what to teach, there is a need to explore how and when. The national guidelines

about sexuality education use six guiding principles including: high expectations, functional knowledge and skills, trauma-informed, social, radical, and reproductive justice and equity, intersectionality, and language inclusivity (Future of Sex Education Initiative, 2020). An explanation of and examples of the standards are written below.

National guidelines for sexuality education identify several core areas of teaching based on the age of the learner. Topics at various ages include listing anatomically correct for body parts including genitalia by the end of Grade 2, explain the varying changes that occur during puberty by the end of Grade 5, and describe how power differences may impact relationships by the end of Grade 8. By the end of Grade 12, students should be able to assess the skills needed to be an effective parent, describe the human sexual response cycle, and describe the characteristics of unhealthy relationships (Future of Sex Education Initiative, 2020).

Koller (2000) provides a list of potential topics of instruction that include "body parts, reproduction, birth control, sexual health, the sexual life cycle from birth to death, male and female socio/sexual behavior, dating, marriage, parenting, establishing relationships, abuse awareness, boundary issues, self-esteem, and assertiveness skills training" (p. 130). These topics should be taught by an individual agreed upon by team members of the child's individualized education plan (IEP).

Regarding ASD-specific considerations, Travers and Tincani (2010) presented a decision-making process for sexuality education curriculum in justification of sexuality education for children and adolescents with ASD. Decision guidelines include "(a) considering all of the IEP team, including parents in the design of sexuality education programs; (b) considering the student's involvement in his or her own sexuality education program; and (c) anticipating disagreements about sexuality education among team members" (Travers & Tincani,

p. 288-289). The authors assert that teaching sexual education to young individuals with ASD is justified because they have a universal right to learn about relationships and sexuality.

Haracopos and Pederson (1995) also provided a decision-making framework. This included: people having a right to and possibility of having a sexual life, people with autism having the right to "receive guidance and support regarding unresolved sexual problems", that learning of appropriate social behavior with regard to sexuality should occur in agreement with the social rules and norms of the person's residence, that sexuality needs to be viewed in a global context, and how when a person with ASD directs his or her sexual interest towards another person, one should decide how far to go in supporting such contact (Haracopos & Pederson, p. 21).

Ballan and Freyer (2017), list ABA as one of the most effective ways to teach sexuality education, increase communication, and appropriate social behavior for individuals with ASD. Ballan and Freyer state that, "proactive sexuality education is crucial in ensuring that normative sexual behaviors are expressed in socially acceptable and personally safe ways" and ABA is an exemplary method to teach sexuality education (p. 265). Ballan and Freyer created scenarios to describe how social stories (p. 276) and social mapping (p.269) can be used to teach skills such as menstruation hygiene and decrease instances of spontaneous, inappropriate touching.

Examples of early ABA-based Intervention in Sexuality Skills

Hingsburger (1994) provides treatment suggestions and discussion points for promoting appropriate masturbation by focusing on functional assessment of the behavior and on how "the discrimination training of public and private environments are proactive strategies in line with current best practice in behavior analysis" (Cicero, 2019). Cicero (2019) conducted a literature

review investigating behavior analytic treatments for inappropriate and ineffective masturbation. Cicero concludes that there are more articles that describe strategies to reduce problematic masturbation than shaping the behavior as a skill so that there will be less need to target it as a problem behavior. Within the review, Cicero discussed the study by Hingsburger (1994), describing how treatment strategies should be implemented based on the function of masturbation behaviors. For example, if it is "maintained by physical issues, attention from others, or escape from demands" the treatment should target that function (Cicero, p. 103).

Cihak et al., (2007) utilized a functional analysis (FA) to identify the function of a participants inappropriate touching (i.e., touching herself in the genital region) and compared the effectiveness of an antecedent-based intervention to a response-based intervention in a public community setting using an alternating treatment design. The results of the FA indicated the function of the inappropriate behavior was in the form of escape from demands being maintained by negative reinforcement. The antecedent-based intervention consisted of using self-operated auditory prompts (SOAP) and the response-based intervention consisted of differential reinforcement of alternative behaviors (DRA). Students received a token reinforcer that could be exchanged for access to preferred item when they performed task engagement within 1 s of the end if the interval. There was an immediate decrease in occurrences of the problem behavior across both interventions however "the mean percentage of intervals of task engagement during SOAP was slightly higher than during DRA" and she maintained engaged in zero instances of inappropriate touching while the antecedent intervention was implemented (Cihak et al., p. 88) Therefore, the antecedent intervention was more effective in decreasing instances of inappropriate touching.

Discrete trial training (DTT) is another behavior analytic intervention that has been used to teach more basic skills. In 2022, Jessica Cauchi utilized DTT and behavioral skills training (BST) to teach children with autism sexuality safety skills. These skills include maintaining socially appropriate distance from others and non-physical greetings. The study used an adapted alternating treatments experimental design. Teaching using DTT involved presenting appropriate antecedent stimuli, providing a temporary prompt to ensure correct responding, waiting for the learner to engage in the target behavior, deliver reinforcement, and pause before presenting the next trial. Teaching during BST consisted of providing instruction, modeling the target skill, rehearsal of said skill, and providing feedback. Results of this study found that participants acquired both skills during teaching sessions.

In 2005, Boyle and Lutzker used a modified DTT format to teach young, neurotypical children (and in a later phase, children with ASD) to discriminate abusive from non-abusive situations. During this study one of the pretests asked participants to provide an anatomically correct label and point to body parts on a doll. Body parts that were not identified correctly were taught using the DTT format. During the sessions participants were instructed to point to body parts on the doll. If the participant responded correctly, they received praise and incorrect responses were followed with error correction. All participants met the advancement criteria of engaging on the target response for five trials for each body part trained, within twelve or fewer sessions. This article proves that DTT has been effective to teach body parts to neurotypical children, however the procedure described above has not been done with children with autism. This current study will determine if a similar procedure effectively teaches body parts to individuals with autism.

In summary, the literature on sexuality and ASD demonstrates that individuals with ASD are at increased risk for victimization and abuse. It also offers suggestions about the topics and skills that need to be taught to reduce that risk. ABA-based interventions have been effective in teaching some of those skills, but there remain limited empirical studies to inform the selection and use of specific procedures for specific targets.

Purpose and Research Question

The purpose of the current study is to contribute to the literature on teaching sexuality-related skills to children with ASD by evaluating DTT as an intervention to teach more basic discriminations related to sexuality to children in a clinic setting. Specifically, this study asks if DTT will result in the skill acquisition of labeling body parts, discriminating between public and private behaviors, and labeling anatomy as public or private body parts for two children with ASD. It is hypothesized that implementing DTT will result in children learning the target skills.

Methods

Participants and Setting

In order to participate in this study, participants had to have a diagnosis of ASD, be at least 6 years old, and have parent permission to participate. Vocal language was not required, but the child must have had experience with DTT and discrimination training programs. Participants of this study consisted of two males with autism: Ian, 9-years-old and Gavin, 7-years-old. At the time of the study, both participants were receiving ABA services at a clinic that specializes in the treatment of autism and neurodevelopmental disabilities in the Mid-western United States.

Sessions were conducted in a therapy room within the clinic. The room contained furniture including a table and chairs. Sessions were conducted at the table using physical

materials. Materials included datasheets, writing materials, pictures of targets, reinforcers, public and private board for discrimination, and any client-specific materials needed for transitions to and from the table or therapy rooms.

Dependent and Independent Variables

The dependent variable was the percent accurate responding to treatment. The independent variable consisted of table sessions of DTT to teach each participant three distinct skills. The first skill was labeling body parts in a field of four. A correct response involved the participant touching the image of the body part the therapists indicated by saying "Point to__." The second skill was discriminating between public and private behaviors. A correct response required the participant placing an image of the behavior under the "public" or "private" title when asked by the experimenter "Is _ something you do in public or private?" The third skill was discriminating between public and private body parts. A correct response involved placing a corresponding sticker on the public and private body parts of a human outline when instructed "Is the _ a public or private body part?"

Measurement and Reliability

All sessions were run by the experimenter. The experimenter and one graduate student studying to become a BCBA, or a registered behavior technician (RBT), observed the sessions and recorded data. The experimenter collected data on the accuracy of the participant's response to each trial of instruction. Across the three skills, the experimenter varied the order when presenting each target to ensure mastery of the skill rather than the participant memorizing the order of the targets and ensuring that they were not guessing. Each trial was represented on the data sheet with a "+", following an independent correct response, "-", following an incorrect

response, “NR”, following no response, “P+”, following a prompted correct response, or “P-”, following a prompted incorrect response (Ferguson et al., 2020).

Interobserver agreement (IOA) was conducted for 51% of sessions. Point-by-point agreement was calculated by dividing the total number of trial agreement by the total number of trials and multiplying that number by 100. Agreement was operationally defined as both observers scoring the trial in the same way (e.g., independent, prompted correct, etc.). The mean agreement for Ian was 100%. The mean agreement for sessions for Gavin was 98.7% (range 91.67%-100%).

Experimental Design

This study was implemented using a multiple baseline across skills design. This design was used because it allowed for the intervention to be staggered across multiple skills, rather than only conducting it on one skill. In this design, the intervention was first implemented for identifying body parts, then for discriminating public/private, and finally for public/private behaviors. Intervention began for the next skill once the previous skill had hit mastery criteria (100% correct responses across three probes). The participant was considered to have acquired the skill once they met mastery criteria.

The therapists first conducted baseline probes of all three target skills for each participant. Baseline sessions involved probes of each target across the three skills. For body parts, the probe involved instructing the participant to “Point to (body part).” For discrimination of public and private behaviors, the probe involved handing the participant a picture of a behavior and asking, “Is this something you do in public or private?” For probing discrimination between public and private body parts, the probe involved asking the participant, “Is the _ a public or private body part?” while placing the corresponding icons down on the table in front of

the participant. During baseline probes, the observer recorded the correct or incorrect responses provided by the participant but did not deliver any reinforcement for specific responses.

After the initial baseline, but before teaching, a multiple stimulus without replacement (MSWO) preference assessment was conducted to identify the reinforcers that were used during sessions. Procedures for the MSWO were identical to those described by DeLeon and Iwata (1996) with the exception that the participants were given access to the selected leisure item for 30 s before removing the item. Items included in the assessment were selected by the researcher based on the participant's case managers' or board-certified behavior analysts' (BCBA) opinion. Items included things they saw the participant playing with most frequently during their sessions. Prior to starting the assessment, the participant received a sample of the edible items and access to the leisure items for 30 s each. The researcher placed seven items in a straight line within the participant's reach in order by assigned letter on a table. The participant was then told "It's time to go to the table.," transitioned to the table, and was instructed to "Pick your favorite." The participant had access to the chosen reinforcer for 30 s during which time the researcher rearranged the remaining items. All the items to the participant's left were shifted down one position to the right and the last item on the right was moved to the furthermost place on the participant's left. After 30 s had elapsed the researcher removed the item from the participant, placed it out of sight, or did not replace the edible item, and represented the instruction "Pick your favorite." These steps were repeated until there were no items left in the array or the participant did not select an item for 30 s from the start of the trial. The hierarchy of the participant's preferences were determined by adding up the trial numbers at which the item was selected. The participant's highest/most preferred item was the item with the lowest total and

their least preferred items were those with the highest totals. The participant's highest preferred reinforcer was delivered to the participant after transitioning to a one-on-one therapy room.

Following baseline, the intervention sessions were introduced for one skill at a time. Each session per skill lasted roughly 5 min and included 4 baseline probes, 4 DTT trials (1 of each of the four individual stimuli of a single target skill) and 4 post-intervention probes. The participant was instructed to "come to the table" and the participant's transition protocols were followed as in the clinical setting. Ian's protocol consisted of receiving an edible reinforcer, a small piece of a chip, after he sat down at the table. Gavin's consisted of bringing his iPad with him to the table and giving it to the researcher upon arrival. After the participant transitioned to the table, the experimenter conducted one probe of each skill, four targets per skill, prior to conducting trials. At the end of the session the participants received their edible reinforcer and a break from the table. Sessions were conducted at a minimum of two per two-hour clinical appointment.

A standard DTT trial for each target behavior is described below.

For teaching body parts, the therapist presented a picture of one of four body parts and the participant was instructed to label the body part by the experimenter giving the discriminative stimulus (SD), "Point to__." A correct response led to enthusiastic praise. An incorrect response led to error correction and neutral praise upon completion. The specific target stimuli for this target included "head," "knee," "penis," and "buttocks." Once this target has met mastery, baseline probes continued but DTT trials were discontinued.

When teaching the participants to discriminate between public and private behaviors, the researcher put out a board with two rectangular areas, one titled "public" and one titled "private."

When the intervention was in place the experimenter provided the statement, “Something that you do in public is an action that you can do in front or anyone and something you do in private is something that’s only appropriate to do when you’re alone or at home.” The experimenter then handed the participant a labeled picture of a cartoon person engaging in a behavior and delivered the SD, “Is this public or private?” A correct response led to enthusiastic praise. An incorrect response led to error correction and neutral praise upon completion. The specific target stimuli for this target included “eating,” “scratching your arm,” “getting dressed,” and “scratching your behind.” Once this target had met mastery, baseline probes continued, but DTT trials were discontinued. The mastery criteria was 100% accuracy across three probes.

When teaching the participants to discriminate between public and private body parts the researcher placed an outline of the front and back of the human body correlating with the participant’s gender in front of the participant and delivered the SD, “Is the _ a public or private body part?” A correct response led to enthusiastic praise. An incorrect response led to error correction and neutral praise upon completion. The specific target stimuli for this target included green circles placed on public body parts and red circles placed on private body parts. The mastery criteria was 100% accuracy across three probes. Once mastery criteria was met, maintenance probes began.

Error Correction

Error correction consisted of a three-step prompting procedure. Following the first error made by the participant the researcher removed the stimuli, represented the materials and demand, and provided a gestural prompt by pointing to the correct area. The researcher then gave the participant another independent opportunity to engage in the target response. If the client responded incorrectly again the researcher followed the same steps mentioned previously

however, they then prompted the participant by guiding them by the elbow to engage in the correct response. The researcher then gave the participant another independent opportunity to engage in the target response. If the client responded incorrectly again the researcher followed the same steps mentioned previously, however this time prompting the participant hand over hand. The researcher presented the demand, placed their hand over the participants hand, engaged in the target response, released the participant's hand, and provided a neutral statement of "That's (target response)." The participant was not given an additional independent opportunity following this prompt.

Social Validity

The experimenter asked about social validity in the form of a questionnaire. The experimenter distributed the questionnaire to the participant's caregivers after the study was completed to assess their perceptions of the value of the intervention. Using a Likert Scale, the questionnaire asked caregivers to mark to what level they agreed or disagreed with the provided statements. Caregivers could mark that they strongly disagreed, somewhat agreed, agreed, or strongly agreed with the following statements: "I wanted my child to participate in this study.," "The skills taught in the study are important to learn.," "The skills taught in this study will be important for my child to know in the future.," "I would recommend this study to other caregivers.," "Discrete trial training helps my child learn new skills," "Overall, this intervention was beneficial for my child."

Results

Summary of the MSWO

Three sessions were conducted with Ian and Gavin. The top three selections made by Ian were playing with toy people, playdoh, eating a piece of chocolate. The top three selections made

by Gavin were eating a fruit snack, playing with a toy pirate ship, and playing with a mini golf toy. Ian's top three reinforcers were all very close in score and based on previous knowledge of this participant's reinforcers, problem behavior, and table protocols the edible reinforcer was most likely to be the most motivating over time. Additionally, both participants used edible reinforcers when working at the table during their clinical sessions therefore, the decision was made to use edible reinforcers during this study.

Summary of experimental results

Figure 1 and Figure 2 display the percentage of correct responses during DTT probes, DTT training, and post-intervention sessions for each participant. The results of the DTT procedures for Ian are presented in Figure 1. Ian scored low during baseline probes across all three skills. On average, he scored 17% correctly (25%, 0%, 25%) on ROL probes, 33% on DT probes (50%, 25%, 25%), and 17% (25%, 25%, 0%) on PVP probes. In all but one instance, Ian's scores improved immediately following the introduction of the intervention and met mastery criteria across all skills within seven sessions. However, due to an experimenter error, the interventions across skills were not staggered (see "Limitations"). During maintenance probes, Ian scored 100% across all trials in skills one and two.

The results of the DTT procedures for Gavin are presented in Figure 2. Gavin scored on a decreasing trend across baseline probes on Skill 1. Baseline probes on Skill 2 were more variable but decreased after three probes. Baseline probes on Skill 3 were variable across the majority of the probes until the last five probes on which he consistently scored 50% correct. Following the intervention on Skill 1 there was an immediate increase in frequency of correct responses. Gavin met mastery criteria within a few sessions and scored 100% across all sessions following the intervention. There was not an immediate increase during or following the intervention during

Skill 2 and Skill 3. During Skill 2 Gavin's results were varied and low overall and after 14 trials the decision was made to proceed to Skill 3. During Skill 3, Gavin scored 50% across sessions during the intervention. The mastery criteria was not met therefore the experimenter did not conduct maintenance probes following the intervention in Skill 3.

Summary of Social Validity Results

Ian's mother responded to the social validity survey. The social validity score was 36 out of 36. She answered strongly agree to each of the six questions. Ian's caregiver strongly agreed that she wanted her child to participate in this study, the skills taught in the study were important to learn and they would be important for her child to know in the future, that DTT helped her child learn new skills, that she would recommend this study to other caregivers, and that the intervention was beneficial for her child. The social validity survey demonstrated, according to the mothers, that these behaviors are critical to learn.

Gavin's mother responded to the social validity after her son's participation in the study was concluded. The social validity score was 28 out of 36. Gavin's mother agreed that the skills taught in the study were important to learn and they would be important for her child to know in the future, that DTT helped her child learn new skills, and that the intervention was beneficial for her child. She somewhat agreed that she wanted her child to participate in this study and that she would recommend this study to other caregivers. There is a possibility that the lower scores could be due to a history of trauma and therefore the context of this study was difficult for the caregiver. Overall, the questionnaire demonstrated that it is important to teach these skills because both individuals will be important in the participant's futures and that they both benefited from being in this study.

Discussion

The current study asks if DTT will result in the skill acquisition of labeling body parts, discriminating between public and private behaviors, and labeling anatomy as public or private body parts for two participants with ASD. As a result of this study, each participant demonstrated the ability to label body parts for multiple sessions following the intervention. Ian mastered all three skills within 4 sessions. Ian began engaging in minor problem behavior when experimenter conducted error correction. Ian engaged in noncompliant behaviors including defiance and property destruction in the form of swiping and tearing materials. When Ian engaged in said problem behavior the experimenter reminded him of what he earned for answering the questions correctly. This was an effective strategy and following the first instance of error correction he did not engage in these behaviors again.

Gavin mastered Skill 1 within the first 5 sessions following the introduction of DTT. Gavins scores were low and variable across Skill 2 therefore modifications were made to try to increase his engagement. First, the experimenter offered the contingency of if he got all four trials correct during a session, he received two fruit snacks (compared to 1 fruit snack) and if he answered one question incorrectly, he received one fruit snack. This eventually led to Gavin engaging in problem behavior prior to the start of session when he would demand two fruit snacks and begin to tantrum if his request was not confirmed. Redirecting him was successful in some but not all instances. Due to the lack of consistency in his responding in Skill 2 the decision was made to terminate DTT sessions in Skill 2 and introduce Skill 3. Gavin was repeating the same answers to the four trials in Skill 3 regardless of the order they were presented. Each body part was labeled the same way every time during the last baseline probes and session in which the intervention had been introduced. Gavin's behavior contributed to his

failure to mastery in the following ways: tantrum behavior (e.g., screaming, crying), non-compliance, eloping, property destruction, and aggression. Future work with Gavin will require that greater control is established before instruction begins.

Limitations

There were several limitations within this study. First, the introductions of the intervention components were not staggard. Once a baseline was established for Skill 1, baseline probes should have continued for Skills 2 and 3. When Skill 1 demonstrated experimental control, Skill 2 should have been introduced, while Skill 3 baseline probes continued. Once experimental control was established for Skill 2, Skill 3 should have been introduced.

Second, Gavin's problem behavior impeded his overall progress and success during this study. These behaviors resulted in the termination of sessions for Skills 2 and 3. Additionally, there were instances in which Skill 3 could not be done due to the presence of problem behavior. Lastly, there was a lack of experimental control during Skills 2 and 3 for Gavin, which were eventually terminated for due problematic behavior. This decision was made because there was no experimental control due to the variability of accuracy in responding. Similarly, the experimenter terminated Skill 3 after five sessions because there was no control over responding.

Alternatively, a similar study may be more successful using an errorless learning approach. By the time DTT was introduced for Skill 3 Gavin had seemingly already created a rule for himself and displayed a reoccurring pattern of responses that he answered every time. Therefore, implementing an errorless learning approach may prevent these patterned responses from becoming established. Future research should evaluate using additional interventions to

teach individuals with ASD to discriminate between public and private behaviors and public and private body parts.

Conclusion

This study has the potential to impact multiple areas of study including human anatomy, sexuality education, and differentiating between public and private behaviors. Sexuality education has been an ongoing area of research within applied behavior analysis and teaching sexuality education to individuals with autism spectrum disorder (ASD) needs to be a growing, and ever-evolving area of research that needs further investigation. This is critical because individuals with ASD are at an increased likelihood of victimization. Moving forward, using principles of applied behavior analysis will play a crucial role in teaching consent and furthering the sex education for individuals with autism spectrum disorder (ASD).

Following this study, the participant will need to learn how to discriminate between who can and cannot touch the private parts of their body, if the touch is clinical or nonconsensual, and who to tell if it is nonconsensual or a sexual assault. This may include a participant-friendly task analysis that the participant can follow to determine if the touch qualifies as appropriate or inappropriate. Further research is needed on how DTT, and other ABA procedures, can be used to teach consent skills to individuals with ASD. Including appropriate/inappropriate touching, steps for reporting sexual assault, how to say "no" to others when requesting to be touched, etc.

The current study evaluated the effectiveness of DTT on teaching labeling body parts, discriminating between public and private behaviors, and labeling anatomy as public or private body parts in a clinic setting to four individuals with ASD. Both participants quickly mastered Skill 1, labeling body parts. Ian mastered the three skills simultaneously quickly following the

introduction of DTT. Gavin did not master Skill 2 or Skill 3 and there was a lack of experimental control overall. The findings of this study showed that due to a lack of experimental control, DTT was not consistent in increasing the skill acquisition of discriminating between basic discriminations related to sexuality across all participants. This study appears to be this first to evaluate the effectiveness of DTT in combination with the "Healthy Bodies" materials with children with ASD. This study adds to the literature implementing ABA procedures to teach sexuality education as advocated for by Ballan and Freyer (2017). This study specifically added to literature on skill acquisition of sexuality education by implementing DTT, a procedure commonly used in ABA. Future studies should continue to evaluate ways that ABA procedures can increase the acquisition of sexuality education across individuals with ASD.

References

American Academy of Pediatrics. (2022, November 9). *Adolescent sexual health*. Retrieved February 12, 2023, from https://www.aap.org/en/patient-care/adolescent-sexual-health/

Ballan, M. S., & Freyer, M. B. (2017). Autism spectrum disorder, adolescence, and sexuality education: Suggested interventions for mental health professionals. *Sexuality and Disability, 35*(2), 261-273. https://doi.org/10.1007/s11195-017-9477-9

Baxley, D., & Zendell, A. (2005). *Sexuality across the Lifespan for Children and Adolescents with Developmental Disabilities An instructional guide for EDUCATORS of individuals with developmental disabilities*. http://flfcic.fmhi.usf.edu/docs/Educator_LowRes_English.pdf

Boyle, C. L., & Lutzker, J. R. (2005). Teaching young children to discriminate abusive from nonabusive situations using multiple exemplars in a modified discrete trial teaching format. *Journal of Family Violence, 20*, 55-69.

Brown-Lavoie, S. M., Viecili, M. A., & Weiss, J. (2014). Sexual knowledge and victimization in adults with autism spectrum disorders. *Journal of autism and developmental disorders, 44*, 2185-2196. https://doi.org/10.1007/s10803-014-2093-y

Bruess, C. E., & Greenberg, J. S. (2004). *Sexuality education: Theory and practice* (4th ed.). Jones & Bartlett Learning.

Cauchi, J. (2022). *Teaching Component Skills Related to Sexuality Safety for People with Autism Spectrum Disorders* (Order No. 29164975). Available from ProQuest Dissertations & Theses Global. (2658847524). https://www.proquest.com/dissertations-theses/teaching-component-skills-related-sexuality/docview/2658847524/se-2

Cicero, F. R. (2019). Shaping effective masturbation in persons with developmental disabilities: a review of the literature. *Sexuality and Disability*, *37*, 91-108.

Cihak, D., Alberto, P. A., & Fredrick, L. D. (2007). Use of brief functional analysis and intervention evaluation in public settings. *Journal of Positive Behavior Interventions*, *9*(2), 80-93. https://doi.org/10.1177/10983007070090020501

DeLeon, I. G., & Iwata, B. A. (1996). Evaluation of a multiple-stimulus presentation format for assessing reinforcer preferences. *Journal of Applied Behavior Analysis*, *29*(4), 519-533. https://doi.org/10.1901/jaba.1996.29-519

Ferguson, J. L., Milne, C. M., Cihon, J. H., Dotson, A., Leaf, J. B., McEachin, J., & Leaf, R. (2020). An evaluation of estimation data collection to trial-by trial data collection during discrete trial teaching. *Behavioral Interventions*, *35*(1), 178-191.

Future of Sex Education Initiative. (2020). National Sex Education Standards: Core Content and Skills, K-12 (Second Edition).

Haracopos, D., & Pederson, L. (1992, May). Sexuality and autism: Danish report. Retrieved March 10, 2023

Hingsburger, D. (1994). Masturbation: a consultation for those who support individuals with developmental disabilities. Can. J. Human Sex. 3, 278–282

Howlin, P., & Clements, J. (1995). Is it possible to assess the impact of abuse on children with pervasive developmental disorders?. *Journal of autism and developmental disorders*, *25*(4), 337-354.

Koller, R. (2000). Sexuality and adolescents with autism. *Sexuality & Disability*, *18*(2), 125-135.

Mandell, D. S., Walrath, C. M., Manteuffel, B., Sgro, G., & Pinto-Martin, J. A. (2005). The prevalence and correlates of abuse among children with autism served in comprehensive community-based mental health settings. *Child abuse & neglect*, *29*(12), 1359-1372.

Mansell, D. S., Wilgosh, L., & Zawallich, A. (1996). The sexual abuse of young people with disabilities: Treatment considerations. International Journal for the Advancement of Counseling, 19, 293–302.

National Coalition for Sexual Health. (2013). *The Sexual Health of Youth in the United States*. https://nationalcoalitionforsexualhealth.org/data-research/audience-profiles/document/AdolescentBackgrounder-final.pdf

Travers, J., & Tincani, M. (2010). Sexuality education for individuals with autism spectrum disorders: Critical issues and decision making guidelines. *Education and Training in Autism and Developmental Disabilities*, 284-293.

Weitlauf, A., White, S., Yancey, O., Rissler, C., Harland, E., Tran, C. V., Brown, J., Newson, C., & Vanderbilt Kennedy Center. (2013). *Healthy Bodies A Parent's Guide on Puberty for Boys with Disabilities*. https://vkc.vumc.org/HealthyBodies/files/HealthyBodies-Boys-web.pdf

Figure 1

Ian's results of the DTT to teach basic sexuality skills

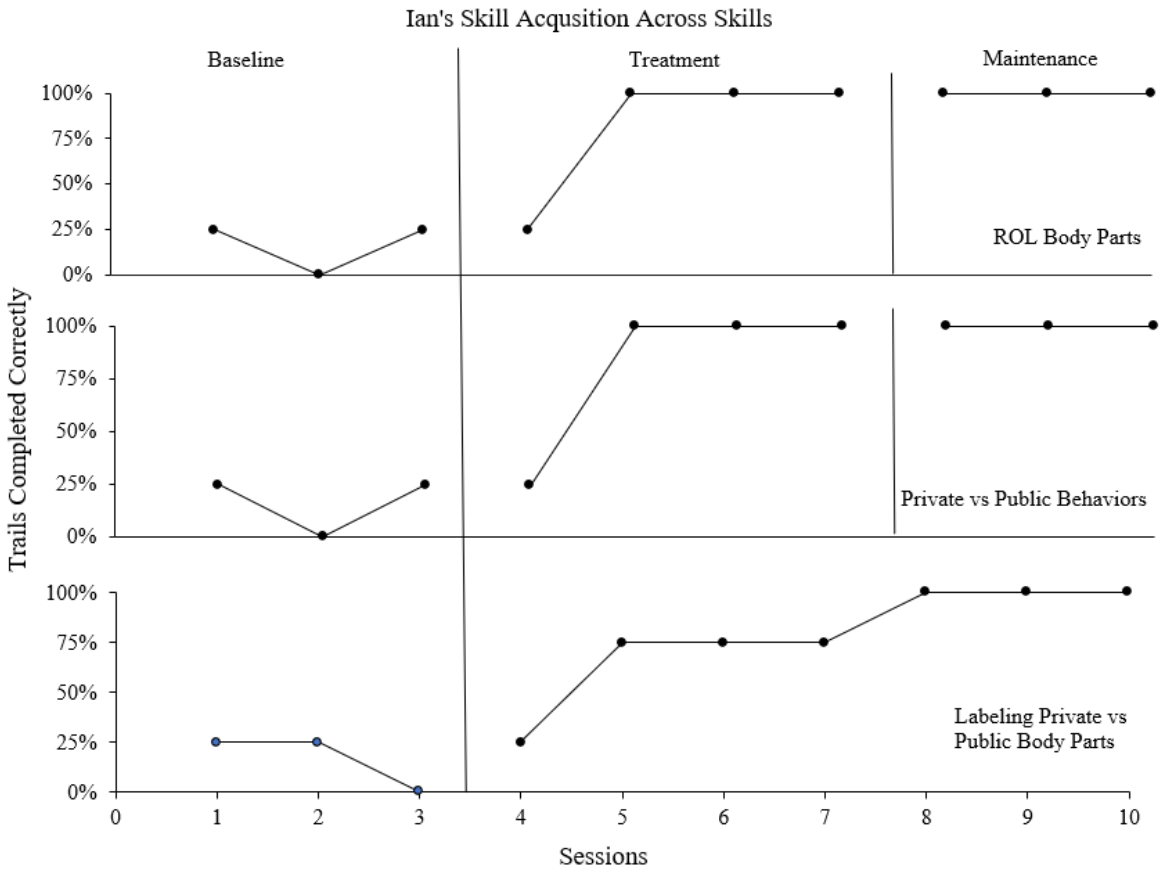

Figure 2

Gavin's results of the DTT to teach basic sexuality skill

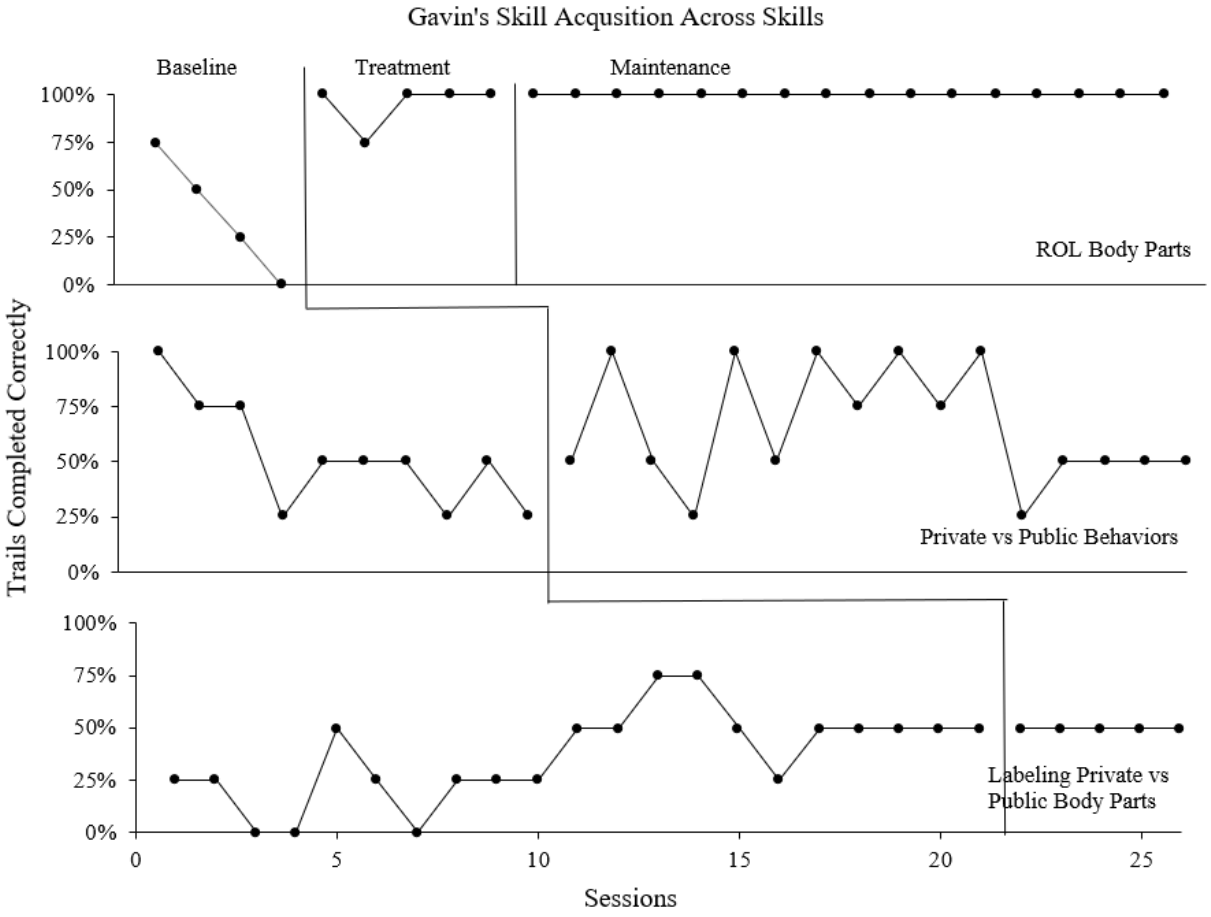

Figure 3

Social validity survey

Follow Up Survey

How much do you agree with each of the following statements? Place a checkmark under the corresponding box for each statement.

	Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
I wanted my child to participate in this study.						
The skills taught in the study are important to learn.						
The skills taught in this study will be important for my child to know in the future.						
I would recommend this study to other caregivers.						
Discrete trial training helps my child learn new skills.						
Overall, this intervention was beneficial for my child.						

Reminders:

- The 3 skills taught were
  - labeling body parts (head, arm, buttocks, penis)
  - Identifying the difference between public and private activities (scratching arm, eating, scratching bottom, getting dressed)
  - Identifying the difference between public and private body parts (head, arm, buttocks, penis)
- Discrete trial training is teaching skills one at a time and rewarding the child with his favorite item when answering questions correctly