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The effect of in vivo coaching on therapist behavior management skills

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The Effect of In Vivo Coaching on Therapist Behavior Management Skills

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FACULTY COMMITTEE:

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Abstract

Autism Spectrum Disorders impacts one in every 68 children, costing the United States between $11.5 billion to $60.9 billion per year. Among the multiple impairments that Autism causes, behavioral deficits are at the forefront of the disability and require intensive interventions such as applied behavior analysis (ABA) in order to manage. If a direct and intensive intervention is not put into place, problem behaviors can impact the individual both socially and academically. Behavior technicians, parents, and classroom assistants can all be trained as therapists and can provide services under supervision that provide significant gains in a client's behavioral functioning. Therapists currently may not be trained in the most efficient and effective way for dealing with problem behaviors. The purpose of this study is to examine the effects of coaching therapists on general behavior analytic management strategies so that the therapist's skill acquisition will lead to a positive interaction style that decreases problem behaviors and increases positive interactions and compliance in client's with autism.

Keywords: Autism Spectrum Disorder, therapist training, coaching

Introduction

Autism Spectrum Disorder

Autism Spectrum Disorder (ASD) is characterized as a disorder that produces potentially significant impairments in social interactions, impairments in communication, and repetitive patterns of behavior (American Psychiatric Association, 2013). Problem behaviors are extremely common among individuals with ASD and many of these challenging behaviors warrant intervention. Behaviors that are common in autism include physical aggression, self-injury, property destruction, pica, stereotypy, defiance, and tantrums. These challenging behaviors can be very isolating and detrimental to an individual's social development, communication skills, and educational progress. Young children with autism are significantly more likely to be at risk of developing dysfunctional behaviors. Once problem behaviors are established in an individual's repertoire, interventions addressing the function of the behavior are necessary, as children often do not spontaneously outgrow them (Horner, Carr, Strain, Todd, & Reed, 2002). Individuals can fall anywhere on the spectrum, which refers to the wide range of skills, abilities, and impairments that exist. The prevalence of ASD is currently one in every 68 children. Typically children are diagnosed around age four and early intervention is recommended to address some of the deficits that individuals face (CDC, 2010).

The Centers for Disease Control and Prevention noted that research has increased on ASD significantly in recent years, but there is still a large amount of research to be done. Autism has been deemed an important public health concern that impacts individuals, families, school systems, and communities (CDC, 2010). The total economic burden per year for children with autism in the United States is between $11.5 billion to

$60.9 billion. These costs are for a wide variety of expenses including medical needs and special education (Buescher, Cidav, Knapp, & Mandell, 2014). Intensive behavioral interventions cost families between $40,000 and $60,000 per child per year and overall medical expenses are about six times higher than the medical costs of children without ASD (Amendah, Grosse, Peacock, & Mandell, 2011).

There is not currently a cure for autism. There are, however, evidence-based treatments to ameliorate autism characteristics that insurance will cover. As of July 2014, 32 of the 50 states include insurance coverage for ASD treatment services. These 32 states all regulate which treatments qualify for coverage, with all of them specifying that behavior analysis must be the therapy chosen due to the scientific evidence supporting its efficacy (Autism and insurance coverage, 2015). With the increase in diagnoses and the increase in insurance mandates, the demand for credentialed behavior analysts is likewise increasing. This need more than doubled nationally between 2012 and 2014 and is still continuing to grow (US behavior analyst workforce, 2015).

Behavior Analysis and ASD

Behavior analysis is unique in that it is one of the few therapy services that is carried out by trained technicians, supervised by licensed professionals (Bailey & Burch, 2011). The therapists may either be hired individuals, often called behavior technicians; assistants in schools; or in certain instances, the parent is trained to be the therapist and they deliver the service. Technicians are used for a number of reasons including but not limited to: lower costs of services, more manpower that is necessary for the increasing need, and to help with treatment delivery to families in rural and underserved areas (Behavior Analysis Certification Board, BACB, 2016).   With such a widely used

therapy, the training of technicians becomes extremely important in order to provide the best quality of treatment.

BACB Guidelines

There are currently a few guidelines from the Behavior Analysis Certification Board (BACB) that provide a protocol for the hiring and training of technicians. The regulations that do exist state that the individuals should receive specific, formal training before providing treatment (BACB, 2016). The BACB also recently shifted its model to include required credentials for individuals who are technicians delivering services. These individuals, or registered behavior technicians (RBTs), are required to take a 40-hour training course (often a computer program), pass an exam, and have ongoing supervision. One final regulation states that supervision should be guided by an analysis of the needs of the client to make optimal progress in treatment (BACB, 2016). Even with this recent shift, there is still a need for more streamlined, evidence-based training protocols. Beyond these few requirements, Board Certified Behavior Analysts (BCBAs) are free to train the individuals who are providing the services directly in the best way that they see, consistent with the standards of the field.

Current Therapist Training

Poser (1967) was one of the first individuals who acknowledged the lack of structure regarding technician training and aimed to provide guidelines to help behavior analysts train therapists. He initially suggested that training should take place in the location of where the services are provided. Poser continued by noting that teaching should be broken down into two different levels. The first level consists of observing more experienced therapists carrying out their day-to-day routines. He suggested that the

observations take place either in person or by watching videotapes of sessions at an earlier time. The second level of training consists of reading literature about the behavioral principles and attending lectures on the material (Poser, 1967). These are the guidelines and suggestions that the vast majority of private, public, and in-home agencies follow today. Granpeesheh et al. (2009) were unsatisfied with the current training methods and noted that there has been little research conducted regarding the ways that therapists are trained, despite the growing number of therapists and the need for ABA therapy.

One additional method of training individuals in different capacities is by lecture. Because lecture is extremely common and one of the original methods of training, it often serves as the comparison when testing the effectiveness of newer methods of teaching (Gardner, 1972). Gardner (1972) compared lecture based methods of teaching and role-playing in order to train nonprofessionals on behavior modification techniques for individuals living in institutions for those who were intellectually disabled. There were no differences in the two groups during the pre-treatment tests. However, there were significant differences in the behavior modification proficiency during the first phase and post-treatment phase. Individuals who were trained using the role-playing technique mastered the techniques and the researcher contributed this to the fact that "performance skills are best taught within a teaching framework that emphasizes performance skills" (Gardner, 1972, p. 520). The researcher also noted that lecture does have its place in teaching, as it improved the information skills aspect of learning.

Born, Gledhill, and Davis (1972) compared multiple groups of students in a psychology of learning class. One group only experienced a lecture condition, two

groups experienced similar personalized system of instruction (PSI) conditions, and the fourth group experienced a rotation of the first three groups. The group in the PSI conditions had a specific person knowledgeable in the material that was discussed and the students also imposed their own pace for mastering the material. Researchers found that individuals in the lecture section scored significantly below the groups who experienced some or all PSI.

Many researchers have noted the weaknesses in the lecture approach to teaching (Saville, Zinn, Neef, Van Norman, & Ferreri, 2006; Saville, Lambert, & Robertson, 2011). Behavioral approaches to instruction have been available since the 1950's, but overall there has been a decline in the use of these procedures. Some possible reasons for this decline could be that educators are hesitant to adopt new, counter-traditional methods because they do not fit the current logic or setup. These methods also require preparation and resources that might discourage their use. Finally, some believe that these methods are ineffective because of their misuse or misapplication (Saville et al., 2006).

Training Research

Although not much has changed in the applied realm, there is some research regarding the training of technicians who carry out therapy. This research attempts to bridge the gap between lecture approaches that are shown to be overall ineffective and more effective methods. One of the most commonly researched methods for training therapists is video feedback. Phaneuf and McIntyre (2007) conducted a multiple baseline study across participants and their results demonstrated that providing individual video feedback to mothers who were serving as therapists helped to enhance outcomes of a training program for children with developmental disabilities. The inappropriate

behaviors that the researchers were measuring all decreased between the control condition of group training and the intervention of group training and video feedback. The video feedback consisted of supervisors watching the video with the mothers while providing feedback about both their strengths and areas that need improvement. One weakness of video feedback is the extra time that it takes to train individuals. Schools and organizations must pay BCBAs to supervise and spend this extra time in training since it requires additional resources.

Another study conducted by Reamer, Brady, and Hawkins (1998), examined the effects of video feedback on parent or therapist training. They allowed parents to watch videos of their interactions with the child, provided a narration of the interaction, then rehearsed and discussed the correct interactions seen on the tape with the investigator. The researchers examined the effects of the video intervention on the parent's social prompts, the accuracy on self-care and social skills task analyses, and the impact of the parent's interaction on the child's behavior. Ultimately, the implementation of the video feedback intervention increased the target behaviors of both the parent and child substantially.

Although the evidence regarding the efficacy of video feedback is strong, in vivo coaching allows therapists' to hear the feedback immediately and associate it with a specific behavior, rather than having to recall past experiences of behaviors within sessions (Shanley & Niec, 2010). In vivo feedback is typically conducted by an individual providing commentary on a therapist's behavior through a bug in the ear receiver, undetected by the client.

Panyan, Boozer, and Morris (1970) studied the impact that immediate feedback had on staff working and living in units in a state institution for intellectually disabled children. This study compared the baseline that consisted of traditional training methods in a four-week classroom setting to immediate feedback provided for the therapists. Researchers were measuring the staff member's ability to teach a skill using operant training. There were dramatic increases upon the initiation of the feedback system. The researchers noted that this feedback condition was a stronger reinforcer than the student's changes in behavior alone, a condition that they previously considered to be the only reinforcer operating. There is a field of research interested in how individuals operate under contingencies and this knowledge is being applied to a wide variety of topics from maximizing employee productivity to decreasing pollution and environmentally unsafe behaviors. Multiple researchers have noted that this knowledge is available and being applied elsewhere but despite our knowledge, many fail to apply these evidence-based techniques to therapist teaching methods in businesses and companies that are carrying out ABA services (Lindsley, 1992; Panyan et al*.,* 1970).

Shanley and Niec (2010) conducted a study comparing coaching and no coaching conditions in the training of parents in Parent-Child Interaction Therapy (PCIT), a behavioral parent training protocol for childhood conduct problems. A sample of 57 mother-child pairs were randomly assigned to either the coaching or no-coaching conditions. Not only did the positive parenting skills of the mothers who received coaching increase significantly, but also the positive parenting skills of mothers who did not receive coaching decreased significantly. The parents' improvements in their skills were increased significantly and nearly doubled within the first two sessions. The study

also found that increases in the positive interactions were only specific to the skills that were coached, indicating that the desired behaviors to change should be carefully considered and targeted prior to coaching.

These same coaching effects on staff members have been found across multiple disciplines. Arco and Du Toit (2006) conducted a multiple baseline across staff members and compared their traditional training method role-playing, discussion, and lecture with the immediate feedback during the staff member's interactions with the clients. The nursing home staff members' correct interactions increased significantly when the intervention was introduced, across the baselines. The problem behaviors in residents decreased and the desired behaviors that were measured increased. Both staff and client behaviors were maintained at the desired levels for up to 14 sessions after the intervention was removed.

Therapists are the main agents of change given that they carry out therapy protocols. Koegel, Russo, and Rincover (1977) showed that when therapists failed to use the behavior analytic techniques correctly, there were no measurable improvements in the behaviors of the children with autism. As one would expect, when the therapists showed high percentages of correctly using the procedures, there were significant gains in the responding of the clients. This emphasizes the importance of training therapists in the most efficient and effective way possible.

Koegel, Glahn, and Nieminen (1978) found in their research that some training components might influence the behavior of therapists but this does not necessarily mean that the therapists' change in behavior will produce a change in the client's behaviors. Furthermore, even if the there is a change in the child's behavior because of a change in

the therapist's behavior, generalization across other behaviors and with other children might not occur. The study did not provide specific variables that influenced effectiveness that was generalizable, but they did state that it is necessary to obtain multiple measures in order to accurately assess the effectiveness of training packages. The coaching in PCIT has demonstrated to be an effective means of therapist skills, but there is a lack in the research regarding the child behavior changes that accompany the therapist changes.

Current Study

Parent-Child Interaction Therapy (PCIT) is an empirically supported treatment protocol for children who have disruptive behaviors. This program was created for children with emotional and behavioral disorders, but the problem behaviors manifested from this disability are similar to those portrayed in children with autism. This treatment program focuses predominately on reducing challenging behaviors by teaching parents effective management skills and works to improve the quality of parent-child relationships. Parents are trained in these skills, have opportunities to practice them until they meet the predetermined mastery criteria, and parents are coached throughout the therapeutic process of interacting with their child (Eyberg & Funderburk, 2011). In this case, the training is applicable to parents, therapists, classroom assistants, or anyone else in a therapeutic role with children who have challenging behaviors.

PCIT is made up of two different treatment phases, child-directed interaction (CDI) and parent-direction interaction (PDI). In CDI the parents are taught play skills to pay attention to the child's appropriate behaviors while ignoring minor misbehaviors (i.e., differential social attention). This phase provides parents and children an opportunity to

create a more positive relationship as they are interacting in a structured way that follows the child's lead in play. If this phase is effective, it should also enhance the value of the parent's social consequences as reinforcers of behavior. The second phase, PDI, provides an opportunity for the parent to learn specific techniques to implement in order to help decrease problem behaviors, i.e. instructional command sequences (Eyberg & Funderburk, 2011). The current study does not adhere strictly to the manualized protocol mandated by PCIT, but it does provide a basis for the interaction style and training materials for generalized behavior change procedures.

Barkaia, Stokes, and Mikiashvili (In press) conducted a study that measured both the therapist behaviors and the child's behaviors. Their study incorporated both the lecture-based model and the coaching model simultaneously, making it unclear as to how significant the gains were from coaching alone.

Barkaia et al. (In press) conducted a training study for therapists who were working on increasing verbalizations by children with autism. During this study, therapists were provided with 1-2 hours of didactic training before they started with in vivo coaching. The training intervention demonstrated effective increases the desired therapist and child behaviors. However, there was no difference when measuring the effects of the dyadic style of training and the coaching that occurred during this study.

The current study serves as an extension of Barkaia et al. (In press) in order to separate the effects of lecture-based training and coaching as a method of training. Additionally, the purpose of the current study is to examine the effects of in-vivo coaching on the therapist behavior, which in return impacts the child behaviors. The focus will be on the therapist's use of generalized behavior analytic skills to decrease

problem behaviors and to increase desired behaviors in individuals with autism. A variation of PCIT was the chosen protocol in order to standardize the behavior change tactics that are employed. The in-vivo coaching was delivered during in-clinic therapy sessions through a bug-in-the-ear system with the coach present, but physically removed from the direct interactions between therapists and clients. The currently used traditional method of training, lectures, has shown some improvements in therapist skill acquisition. However, the addition of in-vivo coaching may lead to further gains in skill acquisition during therapist training. In the current study, information will be gathered by separating the effects of the lecture-based model and the coaching model. Furthermore, generalization and maintenance probes will be conducted following the different training modes (Stokes & Baer, 1977).

Method

Participants

Participants in the study were therapist-client pairs who were recruited through a JMU autism clinic. The first child participant (Brodie) was an 8-year-old female with a diagnosis of Autism Spectrum Disorder. The therapist participant (Sampson) paired with this child was a 21-year-old female JMU undergraduate student. The second child participant (Duke) was a 10-year-old male with a diagnosis of Autism Spectrum Disorder. The therapist participant (Aaron) paired with this child was a 20-year-old female JMU undergraduate student. The third child participant (Rodney) was a 3-year-old boy who has a diagnosis of Autism Spectrum Disorder. Both of his parents, who were both about 30-years-old were his therapist participants (Matthew and Daisy). All of

the therapist participants had previous experience interacting with children who have autism but none of the participants had any familiarity with PCIT.

All methods and procedures were approved through the James Madison University Institutional Review Board (IRB). For consent, the therapist participants and the guardians of the child participants were given a letter describing the purpose and procedures of the study. After the letter was fully explained and questions were answered, the participants/ guardians all consented to take part in the study. They were then assigned random numbers for identification on all data forms in order to protect their confidentiality. A copy of the child participant consent form is provided in Appendix A. A copy of the therapist participant consent form is provided in Appendix B.

Setting

The sessions throughout the study took place in a 3m x 4m clinic room. Undergraduate and graduate research assistants collected data. The coach and data collectors sat on the other side of a one-way mirror. The individuals were undetected by the participants during all observations except sessions 16 and 17 of the second multiple baseline participants, where technical difficulties required one observer and the coach to sit in the clinic room, off to the side. The interactions between the parent and child were recorded through an undetected camera and sound recording system that are located in the clinic room. The clinic room had a child-size table with 4 chairs in the room where the therapist participants and child participants sat and interacted. Four play activities were provided per child, depending on the child's interests.

Dependent Variable(s)

There were two different sets of dependent variables that were measured in this study. The first was the therapist skills and their use of positive social consequences and correct command sequences. The second was the behavior and compliance of the individuals with autism.

Therapist behaviors were observed and coded as follows:

Use of command sequences (COS) was coded when the therapist issued a direct command and waited 5 sec before repeating the command or providing additional prompts. Direct commands were defined as a declarative statement that contained an order or direction. If the child did not comply with the second command, the parent gently physically guided his or her hands through the task (Witt et al., 2016).

Closing the loop (CL) was coded when the therapist delivered a positive evaluation after the child complied with a command (Witt et al., 2016). For example, "Good job putting the red block on the blue block" after the child was given the direct command of "put the red block on the blue block."

Labeled praise (LP) was coded when the therapist made a positive statement following the appropriate behaviors of a client that included both praise and a specific statement regarding the behavior that is being praised (Eyberg & Funderburk, 2011). For example, "Good job sitting at the table!"

Unlabeled praise (UP) was coded when any positive statement was made following appropriate client behavior (Eyberg & Funderburk, 2011). For example, "Good job!"

Reflection (RF) was coded when the therapist made a verbal response that imitated the appropriate verbal content of the child (Eyberg & Funderburk, 2011). For example, "Child: "I want to play horses" Therapist: "You want to play with the horses!"

Behavior description (BD) was coded when the therapist made any statement describing the appropriate behavior of the child (Eyberg & Funderburk, 2011). For example, "You put the blue block on the tower."

Positive physical touch (PTO) was coded when the therapist provided any physical consequence following the appropriate behaviors of the child (Eyberg & Funderburk, 2011). For example, giving the child tickles, high-fives, or patting him or her on the back.

Incorrect timing (IT) was coded when there was any instance of the therapist delivering a command and not waiting the full 5 sec before delivering the second or not waiting 5 sec for compliance after delivering the second command (Witt et al., 2016). For example, "Put the car in the bucket" (only waits 3 sec) "Put the car in the bucket."

Indirect commands (IC) were coded when the therapist provided a suggestion for a motor behavior to be performed that is implied or stated in question form (Eyberg & Funderburk, 2011). For example, "Will you put the red block in the bag?"

Question (QU) was coded when the coach made a verbal inquiry that is distinguishable from a declarative statement by having a rising inflection at the end and/or by having the sentence structure of a question (Eyberg & Funderburk, 2011). For example, "Do you want to play with the cars?"

Negative talk (NTA) was coded when the coach made any negative statement of the child's behavior (Eyberg & Funderburk, 2011). For example, "That's the wrong way to build the tower."

The therapist behaviors were translated to graphs in two separate ways. The first separated the skills into "Do Skills" and "Don't Skills." Use of command sequences, closing the loop, labeled praise, unlabeled praise, reflection, behavior descriptions, and positive physical touch were included in the category of Do Skills. Incorrect timing, indirect command, question, and negative talk were included in the category of Don't Skills. See Appendix C for the therapist data coding sheet.

The first method of graphing looked at intervals containing at least one Do Skill, divided this number by the total number of intervals (60), and multiplied by 100 in order to obtain the percentage of intervals containing at least one Do Skill. This was then compared to the percentage of intervals containing a Don't Skill by dividing the number of intervals containing at least one Don't Skill by the total number of intervals (60) and multiplying by 100.

The second method of graphing involved looking at the total number of both Do and Don't Skills that occurred at least once in each interval. The number of Do Skills occurring at least once in an interval was divided by the total number of Do and Don't Skills that were used. Similarly, the number of Don't Skills occurring at least once in an interval was divided by the total number of skills that were used at least once in an interval.

Child behaviors were observed and coded as follows (Fischetti, Wilder, & Myers, 2013; Eyberg et al., 2005; Roscoe, Kindle, & Pence, 2010):

Aggression (AGG) was coded when there was any instance of actual or attempted hitting, fighting, throwing, kicking, slapping, pushing, pinching, biting, or hair pulling or verbally threatening to do any of the preceding.

Yelling (Y) was coded when there were vocalizations that could be heard from 15 feet away over the typical noise from the conversation.

Destructive behavior (DB) was coded when there was a behavior during which the child damaged or destroyed an object or threatens to damage an object (verbally). Destructiveness was not coded if it was appropriate within the context of the play situation (i.e., ramming cars in a car crash).

Non-compliance (NC) was coded if the child did not initiate/ attempt to initiate task completion within 5 sec of the therapist's verbal instruction.

The number of 10-sec intervals containing at least one occurrence of the problem behavior was divided by 60 (the total number of intervals). This was multiplied by 100 in order to obtain the percentage of 10-sec intervals obtaining the percentage of intervals containing the problem behavior. See Appendix D for the child data coding sheet.

Observations were collected weekly and each therapist/ child pair attended for approximately one hour. There were two sessions conducted each time the participants attended the clinic.

Independent Variable

The addition of training on generalized behavior-analytic skills was the independent variable in the study. This independent variable had two different levels, lecture and coaching. The researcher in the study served as the lecturer and the coach who emphasized the use of positive social consequences and appropriate command

sequences during the training sessions (Barkaia et al., In Press). The researcher has 1 year of experience participating in coaching programs, including being the coach, and was supervised by a licensed behavior analyst and licensed clinical psychologist who has over 35 years of experience.

Lecture consisted of therapists being trained in the traditional, dyadic format specified by the PCIT protocol and through worksheet activities (Eyberg & Funderburk, 2011). The therapists received a 13-min lecture on CDI during the first lecture session, completed worksheets on CDI for 13 min during the second lecture session, received a 13-min lecture on PDI during the third lecture session, and completed worksheets for 13 min on PDI during the fourth lecture session. The focus of CDI in both lecture and coaching was on the use of labeled praise, unlabeled praise, reflection, behavior descriptions, and positive physical touch. The focus of PDI in both lecture and coaching conditions included the skills used in CDI as well as the addition of command sequences and closing the loop. The lecture and worksheets were adapted from Eyberg and Funderburk (2011).

Coaching consisted of the comments made below and in accordance with the PCIT guidelines (Eyberg & Funderburk, 2011). The first two coaching sessions were on CDI skills and the second two coaching sessions were on PDI skills for all four participants. This consisted of the coach modeling the Do Skills for the therapists, correcting the intervention techniques when used incorrectly, helping the parent in knowing when not to respond to inappropriate behaviors, and helping the parent respond to challenging child behaviors. The coaching codes and guidelines closely aligned with the expectations of the therapist's behavior, providing multiple opportunities for the

coach to model these behaviors. The coach also praised the therapist as she implemented the Do Skills.

Coach behaviors were observed and coded as follows (Barnett, Niec, & Peer, 2013; Barkaia et al., In press):

Labeled praise (LP) was coded when the coach provided a positive evaluation of the therapist, specifically addressing the therapist's behavior. For example, "Really great behavior description."

Unlabeled praise (UP) was coded when the coach provided a non-specific positive evaluation of the therapist. For example, "That was great!"

Descriptive label (DL) was coded when the coach described the therapist's behavior in a non-evaluative way. For example, "That was a reflection."

Indirect command (IC) was coded when the coach provided a suggestion for a vocal or motor behavior to be performed that is implied or stated in question form. For example, "Could you be more specific?"

Direct command (DC) was coded when the coach provided a declarative statement that contained an order or direction for a particular vocal or motor behavior to be performed. For example, "Describe what Jane is doing."

Closing the loop (CL) was coded when the coach provided a positive evaluation of the therapist following through after a command was placed. For example, "Nice job describing his behavior" after the coach gave a direct command to give a behavior description.

Higher order (HO) was coded when the coach provided an evaluative statement commenting upon management issues that are general evaluations of teaching style or

actions beyond use of PRIDE skills and simple interaction consequences. For example, "Claire is really enjoying this interaction."

Critical statement (CR) was coded when the coach made a negative statement about the therapist's behavior. For example, "Stop asking so many questions."

Incorrect statement (IS) was coded when the coach made a comment that indirectly identified the therapist's behavior in any way. For example, "Great labeled praise!" (when the praise was unlabeled).

The coaching behaviors were measured through the same 10-sec partial-interval recording method for a 10-min observation. See Appendix E for the coach data coding sheet.

Data Collection

Data were analyzed and summarized across sessions in a graphical format. The data were graphed using Microsoft Excel. All of the therapist and coach data were coded live and all of the child data were coded from videos. The primary researcher trained two undergraduate psychology students and one graduate psychology student on the scoring system of the independent and dependent variables. The research assistants spent initially 4 to 5 hrs across three different days in training. Training consisted of dyadic style training, role-play, and practice coding both live situations and video recordings of interactions. These research assistants served as primary and secondary observers to establish interobserver agreement.

All three variables were scored using a 10-sec partial interval recording system, similar to the one used in Barkaia et al. (In press). If there were any instances of the specified behavior in the 10-sec interval, the behavior was coded. If there was a second

occurrence of the behavior in the same interval, the additional occurrence was not recorded. The therapist and child measures captured the entire 10-min observation. The coaching occurred for 13-min but the recorded observation of these behaviors were only 10-min in length.

Interobserver Reliability

The primary observer scored all sessions. In order to obtain interobserver agreement (IOA), additional researchers scored at least 33% of sessions during each phase of the experiment. IOA was determined for the therapist, child, and coach behavior by dividing the number of agreements by the total number of intervals. This number was then be multiplied by 100. Agreements are any time both observers had a scored or un-scored mark in the same interval. Observations that obtained 80% agreement or higher were considered adequate.

Experimental Design

Two separate multiple baseline-across-participants designs were used to analyze the data of the therapists. There were two participants in each multiple-baseline design. The focus of this study was to examine the effects of coaching on the therapists' acquisition of specific skills and interaction techniques. The study also examined the effects of the therapists' skill acquisition on the behavior changes seen in the client with which they are interacting. As a result, there were two additional multiple baselines looking at the data of the child participants. There were no condition-change decisions made based on the child participants' data; this only provided secondary information. The design that was used is similar to the multiple baseline designs conducted in Phaneuf and Mcintyre (2007) and Barkaia et al. (In press).

Once steady-state responding was established in the initial baseline across therapist behavior, the therapists were trained using the lecture-based method of teaching. Steady state responding was identified when data were not trending in any increasing or decreasing direction and when the points were not highly variable. The amount of time that each participant spent in the lecture and coaching conditions was not examined using steady state responding. In order to keep the amount of time equal in each of these two conditions, a pre-determined amount of material and time was spent in both and was kept equal across all participants. Comparisons were made between both baseline and intervention conditions as well as untreated participants still in baseline. There were no changes in untreated baselines prior to the application of the independent variable to that specific baseline. Visual analysis was the chosen method to systematically investigate when steady states of responding are achieved (Parsonson, 2003). The first baseline condition consisted of the therapist interacting as he or she normally would with the client. After the lecture sessions, the participants were examined in a second baseline condition. This was not a true baseline because there is no way to reverse back to a natural state of interacting after lecture was removed.

The coaching condition was the next phase of the research design. In order to keep the amount of time in each teaching condition the same, there were four coaching sessions, all of them also lasted 13 min. After the coaching sessions, the intervention was removed and the therapist's behaviors were examined in the third baseline condition. Again, this was not a true baseline measure but allowed the researcher to see the maintenance of the skills when coaching was no longer occurring directly before the observation. The multiple baseline design allowed for comparison

both between conditions and between participants, adding additional support that the change in responding is reliable (Johnston & Pennypacker, 2009, p. 272).

During the coaching condition, the participant received the researcher's coaching comments through a bug-in-the-ear system. The bug-in-the-ear system only transfers comments from the coach to the participant, ensuring confidentiality. The coaching comments occurred within the flow of the classroom and the amount of feedback depended on the activity that was being completed as well as the nature of the interactions.

The lecture and coaching conditions were separated as interventions in the study. The lecture/ coaching session occurred for 13-min and after it was completed, data were collected on the therapist-child interaction for a 10-min sample (Barkaia et al., In Press).

Confidentiality and Human Subjects Research

The research proposal was submitted to the JMU IRB prior to the beginning of the study. The board reviewed the proposal and confirmed that all of the techniques and technology being used maintain participant confidentiality and safety. Participants remained anonymous throughout the process and were assigned numbers and pseudonyms to ensure their confidentiality on all data forms which never contained participant's names.. All videos collected from the sessions were promptly transferred from the computer to an encrypted, password-protected external hard drive. The external hard drive was kept behind locked doors in locked file cabinets in the Baird Center. The data sheets and video archives were destroyed and deleted after the study and data analysis were completed.

Generalization

The maintenance of both the therapist and child's behavior were assessed during the second and third baseline conditions. Without coaching or lecturing prior to the interactions, the interactions were coded to assess the therapist and child's skills. Therapists were instructed to play with the child with no other guidance. The goal was to see if the therapist skills maintain over time.

Social Validity

Therapists were interviewed after the study to assess their perspectives on goals, procedures and outcomes. The therapists were asked to rate the following questions on a 5-point scale varying from agree (1) to disagree (5): using communications technology during the intervention was comfortable for me; coaching comments were heard and easily understood through the headphone; I will recommend similar training and coaching for therapists who work on problem behaviors with children who have autism; it is important to learn therapeutic skills in order to decrease problem behaviors and increase desired behaviors; I learned beneficial skills during the coaching; I felt confident implementing these skills after I had been coached; and, I will use these skills while working with other children in my future practice (modified from Barkaia et al., In press).

<div align="center">

Results

</div>

The goal of the present study was to examine whether coaching is more of an effective technique than lecture alone when training individuals on general behavior modification techniques. The therapist and child data were graphed and a visual analysis of their performance was conducted in order to determine the changes that occurred.

Therapist Behavior

Figure 1 shows the percentage of 10-sec intervals containing at least one Do Skill and the percentage of 10-sec intervals containing at least one Don't Skill for the first two participants. Sampson was observed for a total of 23 sessions, four sessions in baseline one (BL1), four sessions in lecture, four sessions in baseline two (BL2), four sessions in coaching, and seven sessions in baseline three (BL3). During the first baseline phase, Sampson demonstrated Do Skills at a stable, low level, with a decreasing trend and a mean of 16. Sampson demonstrated Don't Skills at a stable, high level, with an increasing trend and a mean of 43. After moving to the lecture condition, Sampson's Don't skills displayed an immediate decrease to a lower level that was still stable with a slight decreasing trend. After lecture her Don't Skills went from a mean of 43 to a mean of 2. She had a small increase in her Do Skills after moving to lecture with a mid-level, a slightly increasing trend, and some variability between sessions. After lecture her Do Skills went from a mean of 16 to a mean of 22. This trend maintained through the second baseline phase, Sampson had a slight increasing trend of Do Skills at a mid-level with and increasing trend and a mean of 31. During the second baseline Sampson also had slightly variable Don't Skill data at a low level. There was a slight increase in Don't Skills when lecture was removed, the Don't Skills mean during this phase was 4. After the introduction of coaching, Sampson displayed zero Don't Skills. Sampson's Do Skills increased with the introduction of coaching to an overall high level with an increasing trend and a mean of 35. There was variability seen in the second coaching data point, the client anecdotally reported feeling tired during this session. During the final baseline phase, Sampson maintained her Do Skills at a stable, high level, with no trend, and a

mean of 40. Her Don't Skills maintained at a stable, low level, with no trend and a mean of 0.4.

Aaron was observed over 23 sessions, eight in BL1, four in lecture, four in BL2, four in coaching, and three in BL3. During the first baseline, Aaron was performing Do Skills at a slightly variable, low level, with a decreasing trend and a mean of 11. She was performing Don't Skills at a variable, high level, with an increasing trend, and a mean of 35. During the lecture condition, the percent of 10-sec intervals containing a Do Skill show minimal changes. The data are slightly variable at a low level with no trend and a mean of 10. The percent of 10-sec intervals containing a Don't Skill show stable data at a mid level and a slightly decreasing trend. The mean of the percent of 10-sec intervals containing a Don't Skill during the lecture condition was 30.5. Upon the removal of the lecture condition, Aaron's data show no major changes. Her Don't Skills are stable at a mid level with no trend and a mean of 30. Her Do Skills are overall stable at a low level with no trend and a mean of 9. After coaching was implemented, Aaron's Don't Skills show a stable, decreasing trend at a mid level with an average of 21, lower than the average number of Don't Skills in the previous condition. The Do Skills during the coaching condition show stable data at a mid level with a slightly increasing trend. The Do Skills increased from nine on average during BL2 to 23 on average during the coaching condition. The Don't Skills continue a stable decrease in trend and level when coaching is removed. The mean of Don't Skills during BL3 was 9% of 10-sec intervals containing a Don't Skill. The Do Skills during BL3 show a stable decrease in trend at a mid level and with a mean of 25. The changes in the first two therapist participants' behaviors were analyzed separately and can be seen in figure 1.

Figure 2 shows the same participants' data graphed in a slightly different format. The second graph examines the proportion of total comments that were allocated to Do Skills and what proportion were Don't Skills. During the first baseline phase, Sampson demonstrated a stable, low level of Do Skills with a decreasing trend and a mean of 29. Her Don't Skills were at a stable, high level with an increasing trend and a mean of 71. After moving to the lecture condition, Sampson's Do Skills displayed an immediate increase to 92 with a stable, high level with an increasing trend. Her Don't Skills immediately decreased in the lecture condition to a stable, low level with a decreasing trend and a mean of eight. Upon the return to baseline two, Sampson's Do Skills became slightly variable with no trend at a high level and a mean of 89. Her Don't Skills remained at a low level with no trend and were slightly variable with a mean of 11. During the coaching phase of the intervention, Sampson's Do Skills were at a stable, high level with no trend and a mean of 100. Conversely, her Don't Skills were at a stable, low level with no trend and a mean of 0. These similar patterns were seen during the BL3 phase where Sampson's Do Skills remained at a stable, high level with no trend and a mean of 99. During the BL3 phase her Don't Skills were at a stable, low level with no trend and a mean of one.

During the first baseline, Aaron displayed Don't Skills at a slightly variable, high level with an increasing trend and a mean of 77. Her Do Skills were slightly variable at a low level with a decreasing trend and a mean of 23. Upon moving to the lecture condition, Aaron's Don't Skills decreased slightly but remained at a slightly variable, high level with no trend and a mean of 70. Her Do Skills remained at a slightly variable, low level with no trend and a mean of 30. During the BL2 phase, Don't Skills remained

at a slightly variable, high level with no trend and a mean of 77. Do Skills remained at a slightly variable, low level with no trend and a mean of 23. Upon moving to the coaching condition, Aaron's Don't Skills decreased to a stable, mid level with a decreasing trend and a mean of 48. Her Do Skills increased to a stable, mid level with an increasing trend and a mean of 52. During the final maintenance condition, Aaron's Do Skills increased to a stable, high level with no trend and a mean of 80. Her Don't Skills decreased to a stable, low level with no trend and a mean of 19. Aaron's Do and Don't Skill data are illustrated in Figure 2.

Figure 3 shows the percentage of 10-sec intervals containing at least one Do or Don't Skill for the second two participants. Matthew was observed for a total of 21 sessions, four sessions were in BL1, four were in lecture, four were in BL2, four were in coaching, and five were in BL3. Matthew's initial baseline Do Skills were stable at a low level with a slightly decreasing trend and a mean of 19. His baseline Don't Skills were stable at a high level with no trend and a mean of 40. During the lecture condition, Matthew's Do Skills decrease slightly and are still stable at a low level with a slightly increasing trend and a mean of 14. There is a small decrease in his Don't Skills during the lecture condition, his data show that his Don't Skills are slightly variable at a mid level with no trend and a mean of 26. During BL2, Matthews Do Skills are stable at the same low level with a slightly increasing trend and a mean of 14. His Don't Skills slightly increase when the lecture condition is removed and return to the level of the first baseline condition. His Don't Skills during BL2 are slightly variable at a high level with no trend and a mean of 41. After implementing the coaching condition, Matthew's Do Skills increase to a high level with an increasing trend and slight variability. The Do

Skill mean during the coaching condition was 31. His Don't Skills are slightly variable at a mid level with a slight decreasing trend and a mean of 29. The third baseline condition show an overall decreasing trend in Do Skills that result in a steady, low level with a mean of 23. His Don't Skills show an overall increasing trend at a stable, high level with a mean of 37. The first two data points after coaching indicate that levels of Do and Don't skills maintained but beyond these two sessions, the data do not indicate that the skills continued.

Daisy was observed for a total of 21 sessions, five sessions were in BL1, four were in lecture, four were in BL2, four were in coaching, and four were in BL3. During baseline, Daisy's Don't Skills were stable at a high level with no trend and a mean of 53. Her Do Skills were slightly variable at a low level with a decreasing trend and a mean of 16. During the lecture condition, there was an initial increase in Do Skills followed by a decrease but overall the Do Skills were slightly variable at a mid level and a mean of 22. The Don't Skills during lecture showed an initial decrease followed by an increase and overall were variable at a mid level with an increasing trend and a mean of 26. During the second baseline phase, Do Skills continued with a steady downward trend at a low level and had a mean of 13. Don't Skills in BL2 were steady at a high level with an increasing trend and a mean of 41. After the introduction of coaching, the Do Skills increased to a steady, high level with no trend and a mean of 40. The Don't Skills decreased to a slightly variable, mid level with an increasing trend and an overall mean of 23. These changes didn't maintain entirely into the BL3 condition. During this condition, Do Skills decreased slightly to a stable, mid level with no trend and a mean of 25. The mean during this condition was still higher than the initial levels of the Do Skill

measurement. The Don't Skills during the BL3 phase were stable at a mid level with no

trend. The mean of Don't Skills was 39.5, which was lower than the initial levels of

Don't Skill measurements. The second multiple baseline containing the third and fourth

therapist participants is illustrated in Figure 3.

Figure 4 represents the secondary visual analysis method of Matthew and Daisy's

Do and Don't Skills. During the first baseline session, Matthew displayed a stable, high

level of Don't Skills with no trend and a mean of 69. His Do Skills were at a stable, low

level with no trend and a mean of 31. After moving to the lecture condition, Matthew's

Do Skills remained at a stable, low level with no trend and a mean of 39. His Don't

Skills remained at a stable, high level with no trend and a mean of 61. After returning to

the baseline phase, Matthew's Don't Skills increased at a high, stable level with a slight

downward trend and a mean of 72. His Do Skills decreased to a stable, low level with a

slight upward trend and a mean of 28. During the coaching phase, Matthew's Do Skills

increased to a variable, high level with an upward trend and a mean of 53. His Don't

Skills decreased to a variable, low level with a slight downward trend and a mean of 47.

These changes did not maintain as Do Skills had a variable, low level with a downward

trend during the BL3 phase. Don't Skills increased to a variable high level with an

upward trend during this phase.

Daisy displayed Don't Skills at a high, stable level with an upward trend during

the first baseline condition. The mean of her Don't Skills was 78. Her Do Skills during

this first baseline phase were at a stable, low level with a decreasing trend and a mean of

22. Her Do Skills during the lecture phase initially increased and then ultimately

decreased to a variable, mid level with a decreasing trend and a mean of 53. Her Don't

Skills decreased initially then eventually increased with a variable, mid level with an increasing trend and a mean of 47. During the third baseline phase, Daisy's Do Skills decreased to a stable, low level with a decreasing trend and a mean of 24. Her Don't Skills increased to a stable, high level with an increasing trend and a mean of 76. During the coaching phase, Daisy's Do Skills increased to a stable, high level with no trend and a mean of 67. Her Don't Skills decreased to a stable, low level with no trend and a mean of 33. During the final baseline phase, her Do Skills decreased slightly to a stable, mid level with a slight upward trend and a mean of 42. Her Don't Skills increased to a stable, mid level with a slight downward trend and a mean of 58. Matthew and Daisy's data are illustrated on Figure 4.

Child Behavior

The child participants in the study were observed and their behaviors were coded at the same time as the therapist participant observations. Brodie was observed for 23 total sessions. There were four observations in the BL1 condition, four observations in the lecture condition, four observations in the BL2 condition, four observations in the coaching condition, and seven observations in the BL2 condition. During the first baseline session, Brodie's aggression, destructive behavior, and non-compliance were stable at a low level with no trend and a mean of zero. During baseline one, yelling was stable at a low level with a slight upward trend and a mean of 0.5. During the lecture condition, all four behaviors were stable at a low level with no trend and a mean of zero. In the second baseline condition, aggression, yelling, and destructive behavior were stable at a low level with no trend and a mean of zero. Non-compliance in this condition was slightly variable at a low level with no trend and a mean of 2.5 percent of intervals

containing the problem behavior. During coaching, all four of the behaviors were stable at a low level with no trend and a mean of zero. The behaviors during the BL3 phase were also stable at a low level with no trend and a mean of zero.

Duke was observed for a total of 23 sessions, eight of which were in the first baseline, four observations were in the lecture condition, four observations were in the second baseline condition, the next four were in the coaching condition, and three observations were conducted in the BL3 phase. Duke did not display any problem behaviors that were being observed during the present experiment. During all phases of the experiment, all of his behaviors were stable at a low level with no trend and a mean of zero. The first multiple baseline displaying the child participants problem behaviors is illustrated in Figure 5.

The second multiple baseline graph represents the data of Rodney while interacting with Matthew and Daisy. Rodney was observed with Matthew for a total of 21 sessions. Four of the observations were conducted during the BL1 phase, four were during the lecture condition, four were during the BL2 condition, four observations were during the coaching condition and five observations were during the BL3 condition. During the first baseline condition with Matthew, Rodney's aggression was variable at a mid to high level with an upward trend and a mean of 22. His yelling behavior was stable at a mid to high level with an upward trend and a mean of 22. During baseline, Rodney's destructive behavior was stable at a low level with a downward trend and a mean of seven. Rodney's non-compliance was stable at a low level with a slight downward trend and a mean of 2.

During the lecture phase, Rodney's aggression was stable at a low level with a decreasing trend and a mean of 6. His yelling during this phase was stable at a mid level with an increasing trend and a mean of 10. Rodney's destructive behavior during the lecture phase with Matthew was variable at a low level with no trend and a mean of 5. Rodney's non-compliance was slightly variable at a low level with no trend and a mean of 2.

During the second baseline session, Rodney's aggression with Matthew was slightly variable at a low level and no trend. The mean of his aggression during the BL2 phase was 2. His yelling behavior was variable at a mid level with no trend and a mean of 10. There was no destructive behavior observed during the second baseline session. Rodney's non-compliance was slightly variable at a low level with a downward trend and a mean of 5.

During the coaching phase, Rodney displayed aggressive behaviors at a stable, low level with a slight upward trend and a mean of 3. Rodney's yelling behavior was at a stable, low level with a slight decreasing trend and a mean of 8. His destructive behavior was variable at a mid level with a slightly increasing trend and a mean of 7. Rodney's non-compliance during the coaching condition with Matthew was slightly variable at a low level with a decreasing trend and a mean of 2.

During the last phase of the study, Rodney's aggression with Matthew was stable at a low level with a decreasing trend and a mean of 2. Rodney during the BL3 phase displayed stable patterns of yelling at a mid level with a slight upward trend and a mean of 6. Destructive behavior during the final phase displayed stable, low levels with a

downward trend and a mean of one. Finally, non-compliance during the BL3 phase showed slightly variable responding at a low level with a mean of 2.

Rodney's behaviors were also observed with the therapist participant, Daisy. Rodney was observed with Daisy for a total of 21 sessions. Five of these sessions were during BL1, four were during coaching, four were during the BL2 condition, four were during the coaching condition, and four were during the BL3 condition. During his interactions in baseline with Daisy, Rodney displayed low and stable levels of aggression with a decreasing trend and a mean of 0.6. Rodney's yelling behavior was variable at a mid level with a decreasing trend and a mean of 6. Destructive behavior was observed at a stable, low level with no trend and a mean of three. Non-compliance during the BL1 phase was observed at a stable, low level with no trend and a mean of two.

During the lecture phase with Daisy, Rodney displayed mid levels of aggression with variable data and an increasing trend. The mean during this phase was 4. Yelling during the lecture phase was at a stable, mid level with no trend and a mean of 11. Destructive behavior was at a low, stable level with a slightly increasing trend and a mean of 3. There were no instances of non-compliance during the lecture phase.

There were no instances of aggressive behavior during the second baseline condition. Yelling during this condition was stable at a low level with no trend and a mean of one. Destructive behavior during BL2 was stable at a low level with a slightly increasing trend and a mean of 1. Non-compliance during this condition was observed at a low, stable level with a slightly decreasing trend and a mean of 1.

During the coaching condition, there were no observed instances of aggression. Rodney's yelling with Daisy during the coaching condition was seen at a stable, low level

with no trend and a mean of 2. Destructive behavior during the coaching condition was seen at a stable, low level with a slight increasing trend and a mean of three. Finally, non-compliance was slightly variable at a low level with no trend and a mean of 4 during the coaching condition.

No instances of aggression were observed during the BL3 phase of Rodney's interactions with Daisy. Yelling was observed at a stable, low level with no trend and a mean of 1. Rodney's destructive behavior was observed during this phase at a stable, low level with no trend and a mean of one. Non-compliance during the BL3 phase occurred at a stable, low level with a slight upward trend and a mean of 1. The child participant graphs with Rodney's behaviors can be seen in figure 6.

Coach Comments

The coaching content as well as the number of 10-sec intervals containing at least one coaching skill were also examined. The therapist provided comments that were personalized to each situation however, the average percentage of 10-sec intervals containing the specific coach skill were comparable across each participant. Due to technical difficulties, participants Matthew and Sampson were both missing data from one coaching session. As a result, they only have three days of coaching data averaged while Aaron and Daisy have all four days of coaching data.

The mean percentage of 10-sec intervals containing at least one labeled praise (LP) for Sampson was 25. The coach also had on average 0.5% of intervals containing a closing the loop comment (CL), 6% descriptive label (DL), 4.5% indirect commands (IC), 0.5% direct command (DC), 6% higher order (HO), and 0.5% critical statements (CR). There were no incorrect statements made while coaching Sampson.

The mean percentage of 10-sec intervals containing at least one labeled praise for Aaron was 24. The coach had on average 7% of intervals containing an unlabeled praise, 0.5% descriptive label, 7.5% indirect commands, 0.5% direct command, 6.5% higher order, and 0.8% critical statements. There were zero incorrect statements or closing the loop statements.

The mean percentage of 10-sec intervals containing at least one labeled praise for Matthew was 27. The coach had on average 7% of intervals containing an unlabeled praise, 13% indirect commands, 0.5% direct command, 7% higher order, and 1% critical statements. There were zero incorrect statements, descriptive labels, or closing the loop statements made while coaching Matthew.

The mean percentage of 10-sec intervals containing at least one labeled praise for Daisy was 31. The coach had on average 5% of intervals containing an unlabeled praise, 7.5% indirect commands, 0.4% direct command, 5.5% higher order, and .8% critical statements. There were zero incorrect statements, descriptive labels, or closing the loop statements made while coaching Matthew. The coaching data are presented in figure 7.

Interobserver Agreement

Interval-by-interval IOA was obtained across all different phases and participants in the study. For Sampson, IOA was measured for 40% of sessions resulting in 99% agreement for Do and Don't Skills that were coded. IOA was calculated for 45% of sessions for Aaron and 99% agreement was obtained. For Daisy, IOA was calculated for 55% of sessions with 99% agreement. For Matthew, IOA was calculated for 33% of sessions resulting in 98% agreement. All of the therapist IOA met the adequate level of agreement.

For the child data, IOA was calculated for each behavior separately. The agreement for Brodie's data was 100% for all child behavior (aggression, yelling, destructive behavior, and non-compliance). IOA was calculated on 40% of all of Brodie's sessions. For Duke, IOA was calculated on 35% of the sessions. The observers obtained 100% agreement for all four behaviors. IOA was calculated for Rodney when he was interacting with Daisy on 40% of sessions. The agreement for Rodney's data was 98% for all four child behaviors. IOA was also calculated for Rodney's scored behaviors when he was interacting with Matthew. The IOA for all four behaviors was 90% and IOA was taken on 55% of all sessions. All of the child IOA measurements met the adequate level of agreement.

IOA was obtained for the coaching comments made as well. For coaching comments made towards Sampson, IOA was only calculated on 25% of sessions due to technical difficulties with the recording equipment. The IOA for comments made to Sampson was 99%. IOA was recorded on 50% of coaching comments made towards Aaron and the observers scored 99.5% reliably. Similarly, 50% of coaching sessions with Matthew were scored with 99.5% reliability. There was no reliability data taken on the coaching sessions with Daisy to due to technical difficulties.

Social Validity

At the conclusion of the study, therapists were asked to complete a social validity questionnaire. The questionnaire is attached as Appendix F. All four participants agreed with the following statements: coaching comments were heard and easily understood through the head phone, I would recommend similar training and coaching for therapists who work on problem behaviors with children who have autism, it is important to learn

therapeutic skills in order to decrease problem behaviors and increase desired behaviors, I learned beneficial skills during the coaching, and I will use these skills while working with other children in my future practice. Two out of the four agreed that using the communications technology during the intervention was comfortable for them while the other two of the four somewhat agreed with this statement. Three of the four participants agreed that they felt confident implementing these skills after they had been coached while one of the four only somewhat agreed with this statement.

Discussion

The present study demonstrated the effectiveness of a coaching-based method of training in comparison to a lecture-based method of training. Previous literature demonstrated the effectiveness of lecture and coaching when they were combined, but their separate contributions were not evaluated. Additionally, many studies have shown that lecture is not the most effective method of teaching but have not offered realistic alternatives. Specifically, the current study examined the effect of coaching in order to decrease interaction techniques that are shown to be ineffective and increase interaction techniques that are shown to be effective with children who have autism.

Figure 1 and figure 2 demonstrated the changes in the Do Skills and Don't Skills of the first two therapist participants. Both Sampson and Aaron displayed the highest levels of Do Skills and the lowest levels of Don't Skills in the coaching condition. These results maintained and even improved during the maintenance condition. Sampson and Aaron's data suggest that coaching, when following lecture, is a more effective training technique than lecture alone. Sampson especially displayed mastery over the measured skills and was fluently incorporating these techniques into her interactions with Brodie.

The data from the child participants paired with these therapist participants are presented in figure 5. Both Brodie and Duke displayed very few problem behaviors throughout the course of the study. Upon anecdotal review, the problem behaviors that were included accurately captured the interactions and there were no other problem behaviors that the children were displaying that should have been included. The only times that Brodie displayed problem behavior was during the baseline phases of the study.

Figures 3 and 4 displayed the data for therapist participants Matthew and Daisy. The highest level of Do Skills and the lowest level of Don't Skills for Matthew were seen during the coaching phase of the study, indicating the intervention was effective. The changes seen in Matthew's behavior did not maintain once the coaching intervention was removed. Researchers of the current study suggested that additional coaching sessions for Matthew would be beneficial in order to improve the maintenance of the skills. Daisy's Do Skills were also highest and her Don't Skills were the lowest during the coaching phase, indicating that the intervention was effective for her as well. Daisy's Do Skills maintained when the intervention was removed but not at the same level as during coaching.

Figure 5 displayed the data of the third child participant. Overall with both Matthew and Daisy, the problem behaviors all decrease throughout the phases of the study. This decrease in problem behaviors that was observed parallels the therapists' implementation of more effective management techniques. As the researchers predicted, the problem behaviors of the children decreased as the therapists were interacting

therapeutically. The measure of child behavior is an area that is typically left out in therapist training research.

Major changes, similar to the changes seen from coaching, were seen for Sampson during the lecture phase of the study. Despite these changes, the Do Skills still continued to increase and the Don't Skills continued to decrease throughout the remaining phases of the study, indicating there was still room for improvement despite high levels of performance during lecture. It is a possibility that the changes in Sampson's performance was due to a practice effect rather than the changes in the phases. She could have learned then effective management skills during the lecture phase and improved throughout the duration of the study because she was provided with more opportunities to practice the skills. An initial change was also seen in Daisy's Do and Don't Skill data during the lecture phase but by the third session of lecture, she returned to baseline levels. Lecture had no effect on the Do and Don't Skill data of Aaron and Matthew.

Collectively, coaching after lecture showed changes in the behaviors three of the four participants and only very small changes for the fourth participant. Lecture showed changes in the behaviors of only one participant but not for the remaining three participants. The three of the four participants who did not decrease their Don't Skill repertoire to zero overwhelmingly struggled with decreasing their amount of questions. The patterns seen in the data combined with this observation might suggest that coaching is effective in increasing novel skills but not as effective in decreasing interaction comments that already exist in an individual's repertoire.

The current study supports research that suggests lecture is not the most effective method of training. Many other studies have found that active-based methods of learning provide more changes in behavior than passive-based methods of learning (Gardner, 1972; Born, Gledhill, & Davis, 1972; Saville, Zinn, Neef, Van Norman, & Ferreri, 2006; Saville, Lambert, & Robertson, 2011).

The current study found comparable results to Phaneuf and McIntyre (2007). Instead of coaching, they used video feedback as their training method and similarly saw changes in the behavior of both the mother participants and child participants. Arco and Du Toit (2006) found the same results using these active-based methods of teaching in order to train staff at a nursing home facility. The methods of training they used were immediate feedback and role-playing scenarios. Providing coaching as a method of training might be beneficial in similar settings. Coaching is often more resource effective than video feedback or role-playing because it can be done while the staff is interacting rather than using time before or after interactions take place.

Shanley and Niec (2010) conducted a larger participant study comparing coaching to no coaching conditions within PCIT. They found that the parenting skills of the group of mothers overall increased after receiving coaching. There were limitations within this study relating to the research design and many of these weaknesses were addressed within the current study. Shanley and Niec (2010) also noted that increases in positive interactions were only seen in specific, coached skills. Anecdotally, the researcher of the present study noted similar findings. Interaction techniques that were not involved in the training did not change, indicating the importance of carefully considering what we are teaching to therapists.

In their study, Barkaia et al. (In Press) introduced the lecture and coaching condition simultaneously. The present study included the same training methods but demonstrated the effects when separating these two conditions. There are parallels seen between the therapist and child behavior changes in both of the studies. Barkaia et al. (In Press) spent 1-2 hr using the lecture method of training before moving to coaching. In order to conserve resources and maximize effectiveness, future researcher examining similar behaviors might consider decreasing the amount of time spent in lecture since minimal behavior changes were seen after its introduction in the present study.

In the present study, a multiple baseline design was implemented. In this design, the same changes are made at different times across each baseline. The method seeks to confirm that it is likely the change in the dependent variable occurred only because the independent variable is introduced. Researchers hope to see steady responding until the intervention is introduced in that specific baseline. If there is variability in the responding prior to the intervention, we can conclude there are extraneous factors influencing the data (Johnston & Pennypacker, 2009, p. 272). In the present study, each baseline was operating independently of the others and changing in responding only occurred because of a change in intervention phase. This suggests that there is strong experimental control. There are also substantial differences between the averages of each phase. Baseline two in both graphs continued on the same path of responding despite the changes made in baseline one. The sensitivity in the baseline changing only when moving conditions also demonstrates control.

In order to strengthen the design of the study, researchers could have continued the length of the baseline and intervention phases. Better control could have been

demonstrated if Daisy had stayed in the BL1 phase for a longer period of time after Matthew moved to the lecture phase. Including more overlap of the phases also would have strengthened the design. Although the researchers were under constraints to keep the amount of time in coaching and lecture equal, making decisions based on steady state responding during these conditions could have strengthened the design. More time in these two phases would have allowed the path of responding to continue and strengthen the argument that the independent variables were responsible for the change. Additional time in the baseline two and three phases would have also tested the maintenance of the changes. Currently, Sampson is the only participant with a sufficiently long third baseline.

An additional limitation of the study was that the coaching and the lecture conditions were not entirely consistent across participants. One solution to this problem might be video taping the lecture portion of training. Coaching is difficult to standardize because it is intended to be an individualized training method. However, coaching comments being slightly different between participants might lead to differences that were seen in the data and how the participants responded to this intervention. Sampson might have seen the biggest changes in responding because something the coach was doing on the days they were coaching her was very effective. This is not hypothesized to be the case in the present study as the coding results are comparable across coaching comments made to all the different therapists. However, this should be a consideration for future research.

An additional limitation of the present study is that we can only say coaching is effective when it occurs after lecture. Future suggestions include examining the

effectiveness of coaching when it occurs before any other prior training. The present researchers predict that there will be an effect seen even without lecture occurring prior. Conducting a performance discrepancy analysis in order to compare the participants to individuals who have mastered the CDI and PDI skills would also strengthen the present study. Researchers were able to note anecdotally whether or not the participants had mastered the CDI and PDI skills but incorporating a mastery criteria would have allowed for data driven decisions in this area.

It might also be interesting to examine whether the child participant or therapist participant was steering the feedback cycle. The therapist responded in one way to the child depending on their behaviors but the child's behaviors are also changing in response to the therapist's interactions. Future research examining this relationship within the feedback cycle would provide interesting information to the field.

The current investigation adds to the literature on coaching as a method of training therapists. This research shows that coaching, when occurring after lecture, increases the desired interaction techniques and decreases the ineffective interaction techniques for therapist participants. Additionally, positive changes in child problem behaviors were observes as the therapists were interacting therapeutically.

Figure 1.
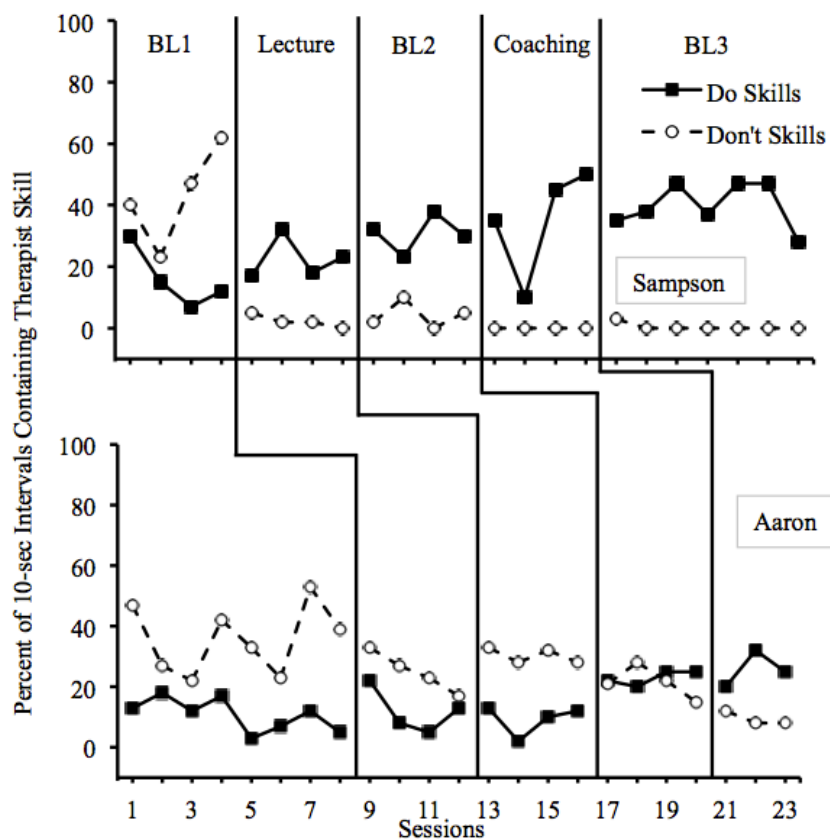
Figure 1 represents the percent of 10-sec intervals that contained at least one Do Skill and at lest one Don't Skill during each 10-min observation for Sampson and Aaron. The first and second sessions in the lecture and coach condition focused on CDI skills and the third and fourth sessions in the lecture and coach condition focused on PDI skills.

Figure 2.
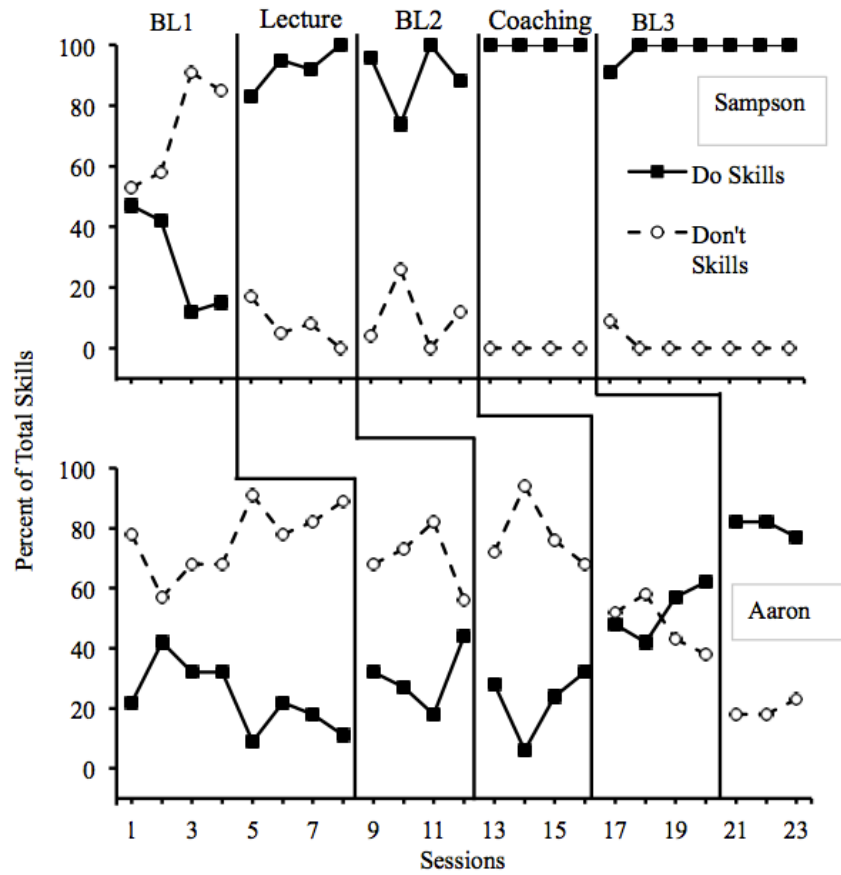
Figure 2 represents the same two participants' data in a slightly different format. The

patterns of trend, level, and variability are the same, however the Do and Don't Skills are

represented by the percent of Do/ Don't Skills out of all the skills that were used by the

therapist. The first and second sessions in the lecture and coach condition focused on CDI

skills and the third and fourth sessions in the lecture and coach condition focused on PDI

skills.

Figure 3.
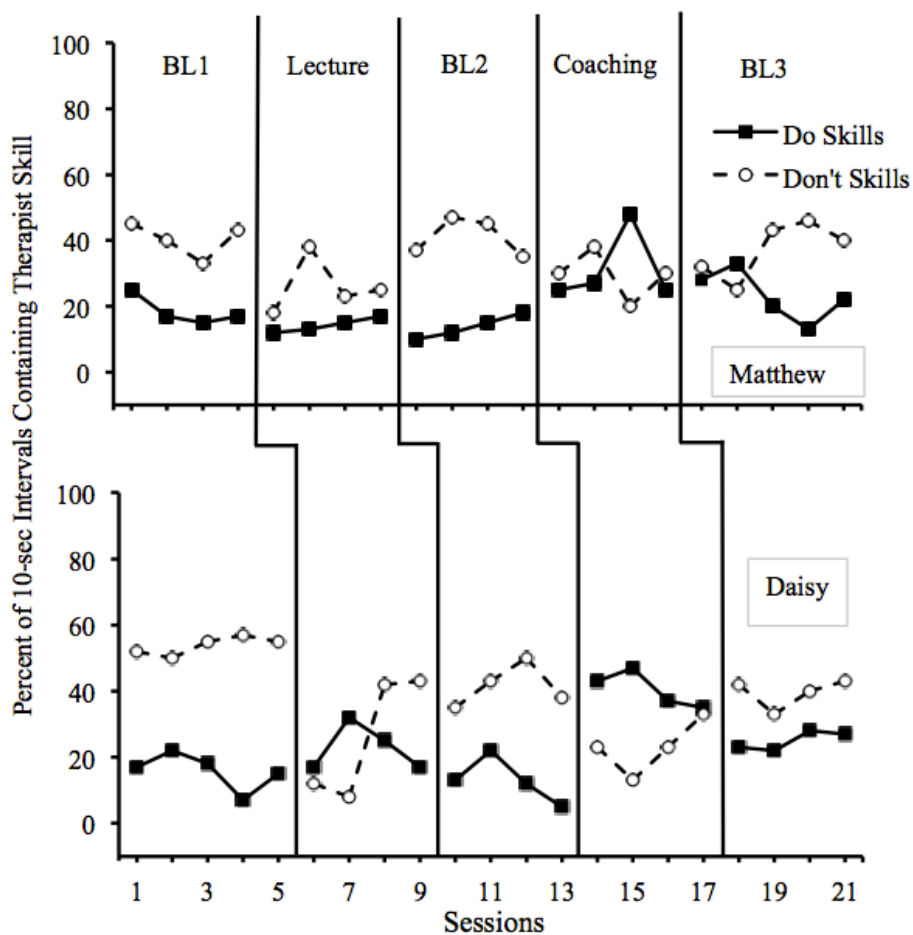
Figure 3 represents the percent of 10-sec intervals that contained at least one Do Skill and

at lest one Don't Skill during each 10-min observation for Matthew and Daisy. The first

and second sessions in the lecture and coach condition focused on CDI skills and the

third and fourth sessions in the lecture and coach condition focused on PDI skills.

Figure 4.
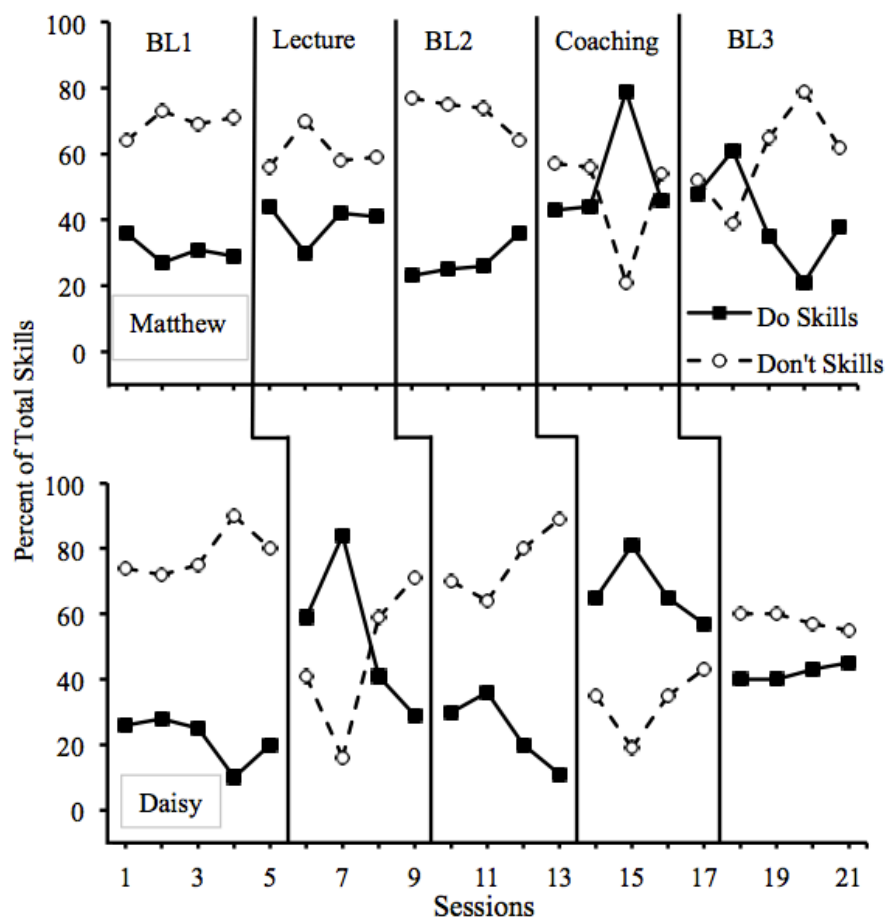
Figure 4 represents Matthew's and Daisy's data in a different format. The patterns of trend, level, and variability are the same, however the Do and Don't Skills are represented by the percent of Do/ Don't skills out of all the skills that were used by the therapist. The first and second sessions in the lecture and coach condition focused on CDI skills and the third and fourth sessions in the lecture and coach condition focused on PDI skills.

Figure 5.
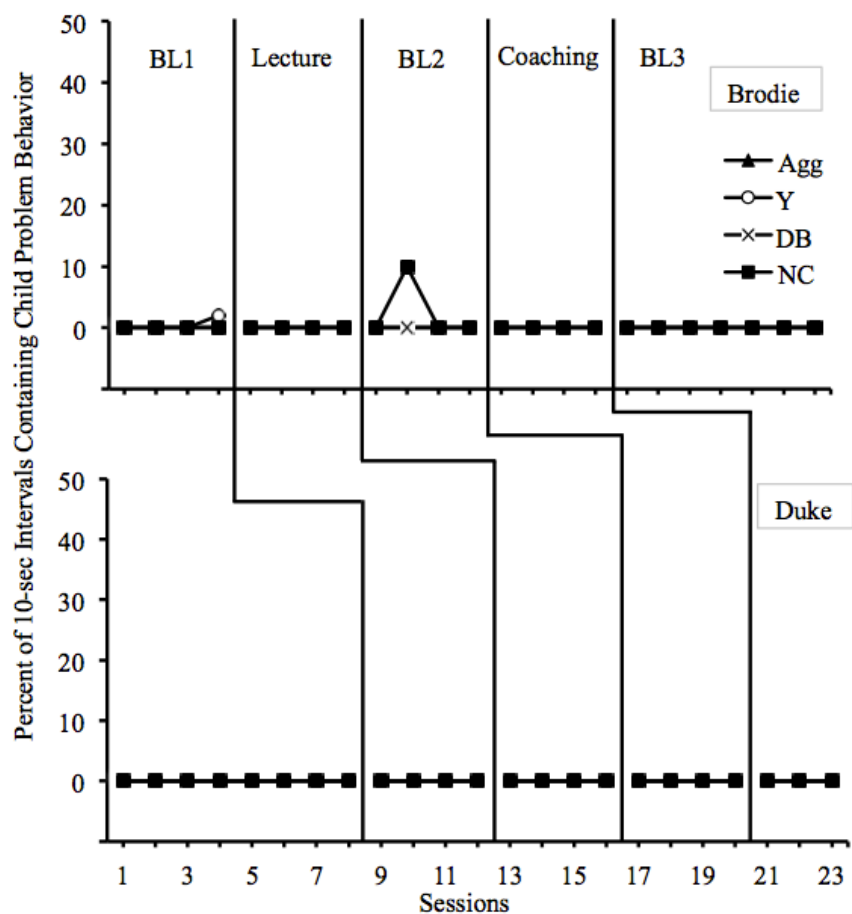
Figure 5 represents the percent of 10-sec intervals containing the child problem

behaviors. The child problem behaviors included were aggression (Agg), yelling (Y),

destructive behavior (DB), and non-compliance (NC). The first and second sessions in

the lecture and coach condition focused on CDI skills and the third and fourth sessions in

the lecture and coach condition focused on PDI skills.

Figure 6.
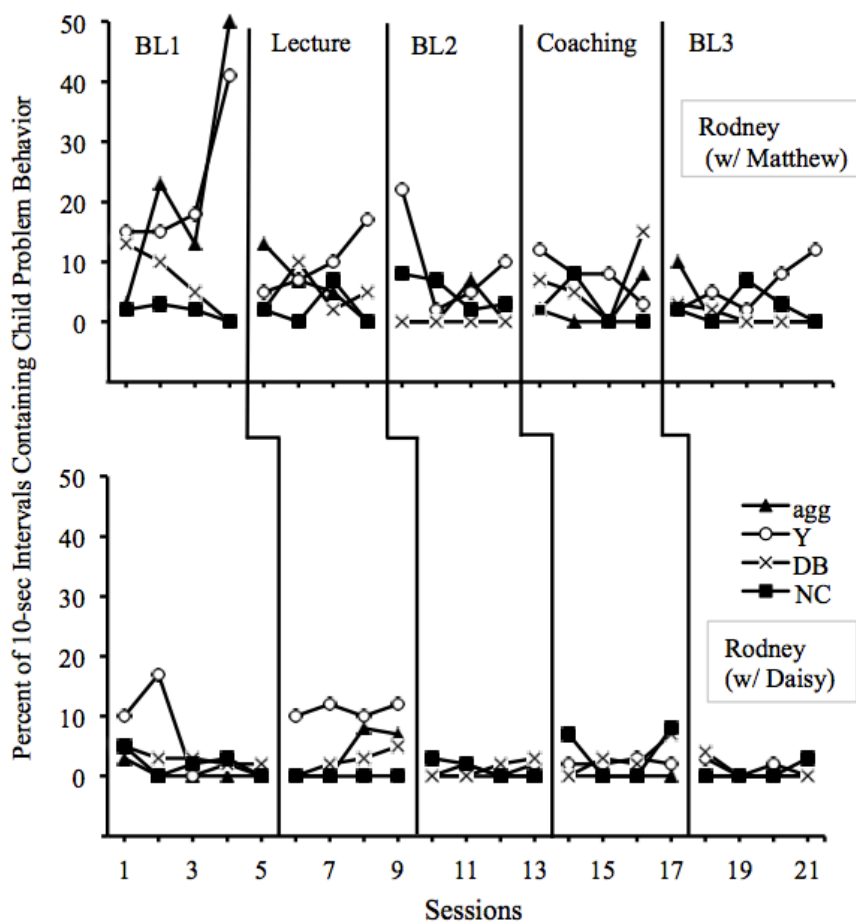
Figure 6 displays the percent of 10-sec intervals containing the child problem behaviors.

The child problem behaviors included were aggression (Agg), yelling (Y), destructive

behavior (DB), and non-compliance (NC). The first and second sessions in the lecture

and coach condition focused on CDI skills and the third and fourth sessions in the lecture

and coach condition focused on PDI skills.

Figure 7.
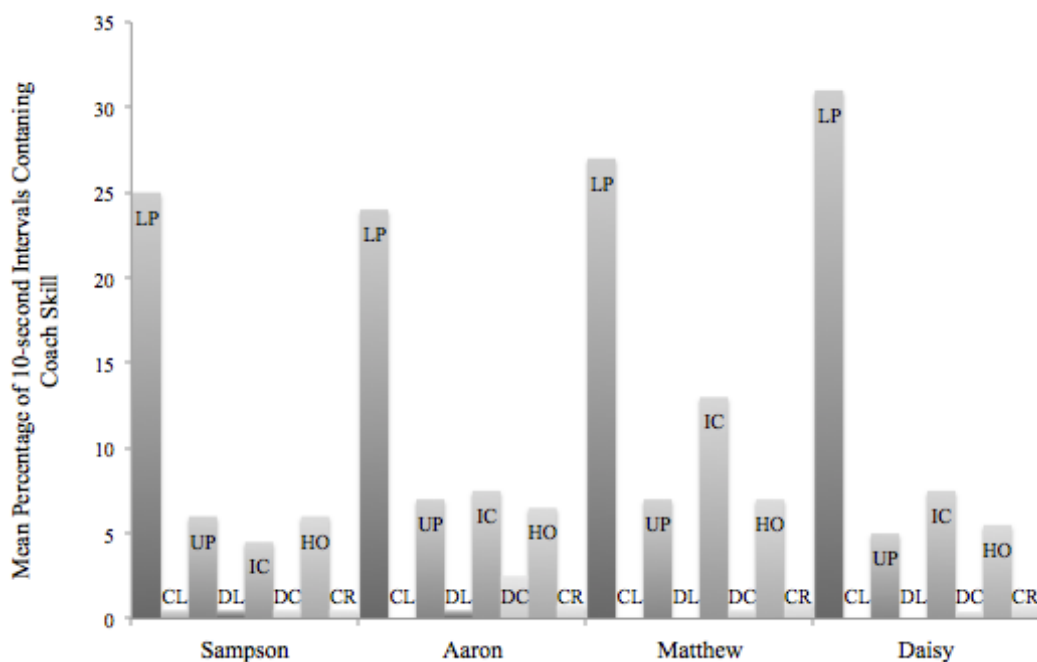
Figure 7 represents the average percentage of 10-sec intervals containing the coach skill for all four participants. Labeled praise (LP), closing the loop (CL), unlabeled praise (UP), descriptive label (DL), indirect command (IC), direct command (DC), higher order (HO), and critical statements (CR).

Appendix A: Child Consent Form

Using Coaching of Therapists and Caregivers to Enhance Verbalizations and Functional Skills by People with Autism and Brain Injury

Principal Investigator: Leslie Brittain, Brittale@dukes.jmu.edu

Identification of Investigators & Purpose of Study

You are being asked to participate in a research study conducted by Leslie Brittain with the Alvin V. Baird center and faculty from James Madison University. The purpose of this study is to investigate effectiveness of coaching on developing mastery skills of therapists and enhancing client outcomes across skill sets. This study will contribute to the researcher's completion of her master's thesis.

Research Procedures

Should you decide to participate in this research study, you will be asked to sign this written consent form after all your questions have been answered to your satisfaction. Interactions between you and your therapist will be observed and recorded using secure, confidential videoconferencing communication. Your performance will be observed. All investigators will be in Harrisonburg, Virginia. You will be provided a detailed report on your performance after this study is completed.

Time Required

Participation in this study may require extra time for you. You will be observed for a maximum 50 sessions.

Risks

The following possible risk arising from your involvement in this study is related to transferring video records.
- Your interactions with your therapist will be observed and videotaped.
- Video records first will be downloaded onto an encrypted hard-drive from the videoconferencing platform and stored in a secure location (locked filing cabinet in a locked office at the Baird Center) in order to score target behaviors for the current assessment.

- Once this transfer occurs, then the video will be deleted from the videoconferencing platform. Faces and voices of you and your caregiver, as well as first names will be identifiable in these records. To protect your confidentiality, we will use strong password protected computers and beyond this, all files and documents will be stored on an encrypted or additionally password-protected folders.

Benefits

The main potential benefit from participation in this study is to improve your functioning and to enhance your therapist's mastery of therapeutic skills. The research will also help JMU and the Baird center provide research-based support for the use of coaching to improve access to behavioral services.

Confidentiality

The results of this research will be presented at the investigator's thesis committee meeting in which the thesis will be defended, and will be presented at the Psychological Sciences Symposium. The research may be presented and published at academic conferences and journals. The results of this project will be coded in such a way that the participant's identity will not be identified. All data will be stored in a secure location without names attached and accessible only to the research team members.

Participation & Withdrawal

Your participation in this study is entirely voluntary. You are free to choose not to participate. Should you choose to participate, you can withdraw at any time without consequences of any kind.

Questions about the Study

If you have questions or concerns during the time of your participation in this study, or after its completion or you would like to receive a copy of the final aggregate results of this study, please contact:

Leslie Brittain   Dr. Trevor Stokes
Baird Center, James Madison University   Baird Center, James Madison University
(540) 588-6190   (540) 568-8829
brittale@dukes.jmu.edu   stokestf@jmu.edu

Questions about Your Rights as a Research Subject

Dr. David Cockley
Chair, Institutional Review Board
James Madison University
(540) 568-2834
cocklede@jmu.edu

Giving of Consent

I have read this consent form and I understand what is being requested of me as a participant in this study. I freely consent to participate. I have been given satisfactory answers to my questions. The investigator provided me with a copy of this form.

☐ I certify that I am at least 18 years of age.

OR

☐ I certify that I am 18 years of age and the legal guardian of the individual for whom consent is being given.

☐ I give consent to be videotaped during their participation_____ (client's initials and/or guardian's initials)

_____ _____
Name of Participant (Printed)   Date

_____ _____
Name of Participant (Signed)   Date

_____ _____
Name of Witness (Signed)   Date

Appendix B: Therapist Consent Form

Using Coaching of Therapists and Caregivers to Enhance Verbalizations and Functional Skills by People with Autism and Brain Injury

Principal Investigator: Leslie Brittain, Brittale@dukes.jmu.edu

Identification of Investigators & Purpose of Study

You are being asked to participate in a research study conducted by Leslie Brittain with the Alvin V. Baird center and faculty from James Madison University. The purpose of this study is to investigate effectiveness of coaching on developing mastery skills of therapists and enhancing client outcomes across skill sets. This study will contribute to the researcher's completion of her master's thesis.

Research Procedures

Should you decide to participate in this research study, you will be asked to sign this written consent form once all your questions have been answered to your satisfaction. This study consists of reviewing goals and procedures. First, the researcher will observe and record your interactions with the client. You will be asked to participate in a one-day training and will include role-playing of procedures. After completing this training, the coaching process starts. You will be receiving coaching comments through a bug-in-the-ear-system, which will be provided by us. You will be able to review your performance at the end of each session.

Time Required

Participation in this study may require extra time for you. Coaching will last for 15 minutes per session and maximum number of coaching sessions will be fifty.

Risks

The investigator perceives that this research involves no more than minimal risk. The following are possible risks arising from your involvement in this study:
- You may be uncomfortable with observation in the beginning of the study, as it is related with extra technologies, but research in this field has shown that such discomfort is usually temporary.
- Your interactions with the person with autism will be videotaped, and both video and audio recordings will be made in this study. Needed equipment, such as video cameras and computers, will be provided by Alvin V. Baird Center. Video records will be downloaded onto an encrypted hard-drive from the videoconferencing platform and stored in a secure location (locked filing cabinet in a locked office in Alvin V. Baird Center) in order to score target behaviors for the current assessment.
- Once this transfer occurs, then the video will be deleted from the videoconferencing platform. Your faces and voices will be identifiable, so to protect your confidentiality, we will use strong password protected computers. All files and documents will be stored on an encrypted hard drive and/or additionally password protected folders within the drive.
- All video and audio recordings will be destroyed after the completion of data analysis and the study.

Benefits

The main potential benefit from participation in this study is to improve therapeutic interactions between you and the person with autism. The person with autism will also improve their functional skills. The research will also help JMU and The Baird Center to develop collaborative goals for consultation programs to help meet the needs of clients and therapists.

Confidentiality

The results of this research will be presented at the investigator's thesis committee meeting in which the thesis will be defended, and will be presented at the Psychological Sciences Symposium at JMU. The research may be presented and published at academic conferences and journals. The results of this project will be coded in such a way that the participants' identity will not be identified. All data will be stored in a secure location without names attached and accessible only to the research team members.

Participation & Withdrawal

Your participation is entirely voluntary. You are free to choose not to participate. Should you choose to participate, you can withdraw at any time without consequences of any kind.

Questions about the Study

If you have questions or concerns during the time of your participation in this study, or after its completion or you would like to receive a copy of the final aggregate results of this study, please contact:

Leslie Brittain   Trevor Stokes
Baird Center, James Madison University   Baird Center, James Madison
University
(540) 588-6190   (540) 568-8829
brittale@dukes.jmu.edu   stokestf@jmu.edu

Questions about Your Rights as a Research Subject

Dr. David Cockley
Chair, Institutional Review Board
James Madison University
(540) 568-2834
cocklede@jmu.edu

Giving of Consent

I have read this consent form and I understand what is being requested of me as a participant in this study. I freely consent to participate. I have been given satisfactory answers to my questions. The investigator provided me with a copy of this form. I certify that I am at least 18 years of age.

☐ I give consent for me to be videotaped during my participation_____
(therapist's initials)

_____   _____
Name of Participant (Printed)   Date

_____   _____
Name of Participant (Signed)   Date

_____   _____
Name of Witness (Signed)   Date

Appendix C: Therapist Data Sheet

Date (of session): _____   **Client**: _____
Observer ID: _____   **Observer for IOA**: Primary _____   Secondary

Minute 1		Parent Codes										
		COS	CL	LP	UP	RF	BD	PTO	IT	IC	QU	NTA
	1											
	2											
	3											
	4											
	5											
	6											

Minute 2		Parent Codes										
		COS	CL	LP	UP	RF	BD	PTO	IT	IC	QU	NTA
	1											
	2											
	3											
	4											
	5											
	6											

Minute 3		Parent Codes										
		COS	CL	LP	UP	RF	BD	PTO	IT	IC	QU	NTA
	1											
	2											
	3											
	4											
	5											
	6											

Minute 4		Parent Codes										
		COS	CL	LP	UP	RF	BD	PTO	IT	IC	QU	NTA
	1											
	2											
	3											
	4											
	5											
	6											

Minute 5		Parent Codes										
		COS	CL	LP	UP	RF	BD	PTO	IT	IC	QU	NTA
	1											
	2											
	3											
	4											

5										
6										
Behavior Total Page 1										

		Parent Codes										
		COS	CL	LP	UP	RF	BD	PTO	IT	IC	QU	NTA
Minute 6	**1**											
	2											
	3											
	4											
	5											
	6											

		Parent Codes										
		COS	CL	LP	UP	RF	BD	PTO	IT	IC	QU	NTA
Minute 7	**1**											
	2											
	3											
	4											
	5											
	6											

		Parent Codes										
		COS	CL	LP	UP	RF	BD	PTO	IT	IC	QU	NTA
Minute 8	**1**											
	2											
	3											
	4											
	5											
	6											

		Parent Codes										
		COS	CL	LP	UP	RF	BD	PTO	IT	IC	QU	NTA
Minute 9	**1**											
	2											
	3											
	4											
	5											
	6											

		Parent Codes										
		COS	CL	LP	UP	RF	BD	PTO	IT	IC	QU	NTA
Min												

	1											
	2											
	3											
	4											
	5											
	6											
Behavior Total page 2												
Behavior total page 1												
Total for both pages												

Appendix D: Child Data Sheet

Child Behavior Interval Coding Sheet	
Date (of session): _____	Client: _____
Observer ID: _____	Observer for IOA: Primary Secondary
Video Time: _____	Video time: _____

Minute 1

	AG	Y	DB	NC
1				
2				
3				
4				
5				
6				

Minute 2

	AG	Y	DB	NC
1				
2				
3				
4				
5				
6				

Minute 3

	AG	Y	DB	NC
1				
2				
3				
4				
5				
6				

Minute 4

	AG	Y	DB	NC
1				
2				
3				
4				
5				
6				

Minute 5

	AG	Y	DB	NC
1				
2				
3				
4				
5				
6				
Behavior Total column 1				

Minute 6

	AG	Y	DB	NC
1				
2				
3				
4				
5				
6				

Minute 7

	AG	Y	DB	NC
1				
2				
3				
4				
5				
6				

Minute 8

	AG	Y	DB	NC
1				
2				
3				
4				
5				
6				

Minute 9

	AG	Y	DB	NC
1				
2				
3				
4				
5				
6				

Minute 10

	AG	Y	DB	NC
1				
2				
3				
4				
5				
6				
Behavior Total column 2				
Behavior total column 1				
Total for both columns				

Appendix E: Coach Data Sheet

Date (of session): _____   **Client**: _____

Observer ID: _____   **Observer for IOA**:   Primary
Secondary

Video Time: _____

Minute 1

	LP	CL	UP	DL	IC	DC	HO	CR	IS
1									
2									
3									
4									
5									
6									

Minute 2

	LP	CL	UP	DL	IC	DC	HO	CR	IS
1									
2									
3									
4									
5									
6									

Minute 3

	LP	CL	UP	DL	IC	DC	HO	CR	IS
1									
2									
3									
4									
5									
6									

Minute 4

	LP	CL	UP	DL	IC	DC	HO	CR	IS
1									
2									
3									
4									
5									
6									

Minute 5

	LP	CL	UP	DL	IC	DC	HO	CR	IS
1									
2									
3									
4									
5									

6									
Behavior Total Page 1									

Minute 6		LP	CL	UP	DL	IC	DC	HO	CR	IS
	1									
	2									
	3									
	4									
	5									
	6									

Minute 7		LP	CL	UP	DL	IC	DC	HO	CR	IS
	1									
	2									
	3									
	4									
	5									
	6									

Minute 8		LP	CL	UP	DL	IC	DC	HO	CR	IS
	1									
	2									
	3									
	4									
	5									
	6									

Minute 9		LP	CL	UP	DL	IC	DC	HO	CR	IS
	1									
	2									
	3									
	4									
	5									
	6									

Minute		LP	CL	UP	DL	IC	DC	HO	CR	IS
	1									
	2									

3									
4									
5									
6									
Behavior Total page 2									
Behavior total page 1									
Total for both pages									

Appendix F: Social Validity Questionnaire

Social Validity Questionnaire

Name:_____   Date:_____

Questions for therapist	agree	Somewhat agree	Neutral	Somewhat disagree	disagree
	5	4	3	2	1
1. Using communications technology during the intervention was comfortable for me					
2. Coaching comments were heard and easily understood through the headphone					
3. I will recommend similar training and coaching for therapists who work on problem behaviors with children who have autism					
4. It is important to learn therapeutic skills in order to decrease problem behaviors and increase desired behaviors					
5. I learned beneficial skills during the coaching					

6. I felt confident implementing these skills after I had been coached					
7. I will use these skills while working with other children in my future practice					

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