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Examining the Effectiveness of a Training Video on the Implementation and Interpretation of a Functional Analysis

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EXAMINING THE EFFECTIVENESS OF A TRAINING VIDEO ON THE IMPLEMENTATION AND INTERPRETATION OF A FUNCTIONAL ANALYSIS

by

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Functional behavior assessment (FBA), and more specifically functional analysis (FA), refer to structured assessment processes designed to identify the controlling variables for challenging behaviors across children, adolescents, and adults. The results from a functional analysis are used to match therapy techniques to unique causal variables for challenging behaviors and also to select more adaptive replacement behaviors that produce similar functions as the challenging behaviors. As functional analysis techniques, in all variations, have become more commonplace in applied behavior analysis (ABA), attention has turned to how to train practitioners to implement FAs, interpret the results, and use the FAs to inform treatment planning. In this study we evaluated a video modeling intervention in comparison to a written treatment protocol for training graduate students in this complex set of skills that are required for a comprehensive FA. The results of this study demonstrate participants varied in skill acquisition across conditions of written and video modeling, and each required additional vocal instruction to reach mastery criteria.

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INTRODUCTION

Overview

In recent years, applied behavior analysis (ABA) has been widely recognized as the treatment of choice for the skill deficits and problem behaviors that characterize autism spectrum disorder (ASD) (National Autism Center, 2015; *Applied Behavior Analysis (ABA) - Association for Science in Autism Treatment,* 2015). As prevalence of diagnoses of ASD continue to grow, the demand for Board Certified Behavior Analysts (BCBAs) delivering ABA services has increased dramatically.

One crucial component of ABA is the functional behavior assessment (FBA), and more specifically within FBA, functional analysis (FA). These procedures allow the practitioner to identify the environmental variables that maintain challenging behaviors (Cooper, Heron, & Heward, 2007). According to the Professional and Ethical Compliance Code for Behavior Analysts, functional behavior assessment is now considered best practice to create the most efficient and effective interventions within applied behavior analysis (ABA) (Behavior Analysis Certification Board, 2014). Accordingly, there is a pressing need to develop and evaluate necessary skills for FBA and FA, as a component of FBA, as well as the training materials that go beyond teaching theory and concepts to train clinical assessment and treatment skills efficiently.

The broad spectrum assessments are done to identify which behaviors should be targeted for reduction and which behaviors need to be added or strengthened in a client's current repertoire. Functional behavior assessments may include a variety of components, depending on

the case, including record reviews, interviews, observations, and lastly, functional analyses (Cooper, Heron, & Heward, 2007). The record reviews, interviews, and observations can provide useful background information about past and current treatments, as well as information about the environment in which the behavior occurs. These initial components are labeled as descriptive; however, and therefore cannot definitively conclude a function of the target behavior (Thompson & Iwata, 2007). Thompson and Iwata (2007) found these descriptive analyses' (i.e., interviews and indirect observations) results too often misrepresent the function of behavior. For example, the function of behavior will often look like attention during the descriptive analyses (largely because caregivers must attend to severe challenging behavior for safety reason), but these descriptive assessments often fail to identify additional tangible and escape functions maintaining the challenging behavior.

Supplementary to the descriptive components of a FBA, a researcher can conduct a functional analysis (FA), controlling the environment so well that he or she can determine the function of behavior with confidence (Iwata et al., 1982/1994). This type of analysis is labeled experimental, as the therapist controls all aspects of the assessment including manipulation of variables. Iwata et al. (1982/1994) were some of the first researchers to develop functional analysis technology specifically and to express its importance in not only identifying controlling variables challenging behavior, but also selecting and tailoring treatments for these unique problem behaviors. This research provided the field with a way to determine the best possible treatment for some of the most critical cases due to the potential for harm. Before this research, punishment was most often utilized to treat SIB because of its quick effectiveness (Iwata et al., 1982/1994). Researchers also found the intrusive procedures were often utilized alternatively to nonintrusive procedures. This was not because nonintrusive procedures did not work, but rather

the determined function was incorrect, or there may have been a change in function over time (Mace, 1994). Functional analysis provided a solution to this problem by allowing therapists the opportunity to determine function of behavior, and further, the necessary course of treatment, through a highly controlled assessment.

Over time, research has been conducted to better understand the necessity of functional analysis as a component of the FBA, as well as various methods for training both professionals and non-professionals on how to conduct a FA.

Research on functional analysis continued to develop by examining the particular components such as the amount of time required to prepare, conduct, and analyze each FA, and whether professional and non-professional individuals may be trained as the therapist conducting a FA. For example, the issue of time constraint has been addressed by several individuals through a variety of methods across research, including the development of brief, limited sample FAs and the development of FAs based on latency measures. (Bloom, Iwata, Fritz, Roscoe, & Carreau, 2011, Northup et al, 1991, Thomason-Sassi, Iwata, Neidert, & Roscoe, 2011, Wallace and Knights, 2003). Wallace and Iwata (1999) address the issue of time needed to conduct a valid FA through development of "brief functional analyses," during which test conditions last only five minutes, compared to analysis of the same conditions at both ten and fifteen minute lengths. The shortened, five minute conditions, yielded results that were still conclusive of the function of behavior across most participants, offering the shortened session as a possibility in many cases.

Furthermore, researchers addressed the potential of training both non-professional (caregivers) and professional individuals (teachers), who were not trained in behavior analysis, to conduct functional analyses. Najdowski, Wallace, Doney, and Ghezzi (2003) found that parents

could be taught to implement a functional analysis for food selective behavior in their own children. Later, Najdowski et al. (2008) demonstrated that mothers could be trained to complete functional analyses with high integrity and with relatively little training time for the mothers. Kurtz, Fodstad, Huete, and Hagopian (2013) further investigated caregiver conducted functional analyses. The researchers found caregiver-conducted FAs to produce more discriminated assessment results, and in turn they were able to decrease problem behaviors more effectively (Kurtz et. al, 2013). The studies (Najdowski et al, 2003; Najdowski et al, 2008; Kurtz et al., 2013) not only emphasize the importance of conducting functional analyses but also document the potential to train caregivers on how to conduct FAs and assist in the development and implementation of function-based treatment strategies.

Moreover, the Wallace, Doney, Mintz-Resudek, and Tarbox (2004) research study shows that training professional individuals without a behavior analytic background is not as difficult as previous research alluded to. This research provides us with the opportunity to train educators, as well as other individuals involved in the client's life, to conduct assessments in more natural environments. Previous to Wallace et al. (2004), Moore et al. (2002) focused specifically on teacher acquisition of functional analysis skills. The experimenters were able to teach three elementary school teachers how to conduct functional analyses to mastery on attention and demand conditions. The studies (Wallace, Doney, Mintz-Resudek, and Tarbox, 2004; Moore et al, 2002) further document the potential to train professionals, outside of credentialed behavior analysis, in conducting FAs.

The specific training protocols and platforms for assessment of skills in Applied Behavior Analysis have evolved across time as the field continues to develop. Pence, St. Peter and Giles (2014) utilized pyramidal training to teach educators to implement functional analyses.

Pyramidal training was described as researchers directly training a subset of individuals who then train additional individuals without having the original trainers present. The pyramidal training worked well but required other individuals to have previous mastery of the necessary skills. The researchers were able to develop skills at competency levels required to implement a functional analysis with a client (Pence, St. Peter, & Giles, 2014).

One alternative technology, which continues to be utilized through training staff as well as treatment with clients, is video modeling. Video modeling has been widely documented as an effective component for many target behaviors for clients. However, very few studies have evaluated a video model approach for training individuals, including behavior analysts in training, to conduct a functional analysis. This is in contrast to other training research that has demonstrated promising outcomes with other professionally relevant skills such as stimulus preference assessment (Lavie & Sturmey, 2002; Weldy, Rapp & Capocasa, 2014; Rosales, Gongola, & Homlitas, 2015). Furthermore, Tyner and Fienup (2015) show video modeling was more effective (in comparison to text-based instruction) in training individuals in graph creation for both accuracy and timeliness. This small body of research suggests the need to further develop and evaluate the efficacy of video based training protocols as a training tool for the development of essential behavior analysis skills.

Iwata et al. (2000) conducted a study that is similar to the research reported herein. Focusing on undergraduate students, the researchers provided reading materials, as well as video modeling, competency quizzes, and vocal instruction. The research reported the development of high level functional analysis skills as a result of the training intervention; but reading materials on FA were provided prior to baseline assessment for all participants, thus preempting any comparison between reading and video modeling, two common approaches for professional skill

development. The researchers also noted the need for further assessment of interpretation of functional analysis results and treatment recommendations, again addressed in the current study.

Chok, Shlesinger, Studer, and Bird, (2012) addressed the need for further assessment by training professionals with a program for conducting, interpreting, and intervening in regards to functional analysis. However, the researchers did so after the professional participants had graduated from a master's program. The individuals were required to interpret graphs and decide on treatments as mentioned as a limitation by Iwata et al. (2000). The training package did not utilize a video training model, however.

Moore and Fisher (2007) further extended the research of Iwata et al. (2000) to specifically test different types of training videos. The results found that it was important for the video training to focus on responses not only to the targeted behavior but also to appropriate behavior, non-target problem behavior, and prompting (Moore & Fisher, 2007). One person in the study did require additional vocal instruction outside of the video modeling training. The effects of the simulated training also generalized to the assessment with actual clients.

Recently, two surveys were completed to assess the use of functional analysis in the applied setting as compared to other possible functional behavior assessment components. Roscoe, Phillips, Kelly, Farber, and Dube (2015) found that practitioners strongly endorse functional analysis as the informative component of FBA assessment. They do not, however, utilize it in their professional practice, preferring instead, descriptive assessment strategies (i.e., interviewing, indirect observation), in spite of the widely documented limitations when contrasted to functional analysis. As mentioned above, this type of descriptive assessment often leads to misconceptions of function of behavior. Researchers further inquired about barriers to conducting a functional analysis, and one of the most reported barriers for respondents was lack

of trained staff to assist in conducting the functional analysis, highlighting the need for more professionals trained in the assessment. In their survey of over 700 Board Certified Behavior Analysts, Oliver, Pratt, and Norman (2015) found that respondents did not rate functional analysis as more important than descriptive assessment. More importantly, they too did not use functional analysis as often as descriptive analysis, even though FA is clearly identified as the most reliable method for identifying the factors maintaining challenging behavior. These researchers also reported that inadequate staff training was a barrier to more wide spread utilization of functional analysis methodology.

The current study addresses this need for training individuals working in the field of ABA in skills associated with functional analysis. The current research extends the previous research by assessing the effectiveness of a training video (wmich.edu/autism/resources: Iwata, Functional Analysis of Problem Behavior video) with graduate students in behavior analysis on a multitude of dependent variables, including those skills required to perform a FA, as well as interpret results, and make treatment decisions based on these results. As such, the research extends the existing literature to a different population and expands the number of key skill components that define a functional analysis. The results of this study may be of practical benefit to the field of applied behavior analysis, specifically in the training of future practitioners.

METHODOLOGY

Participants

Participants in this study were all female graduate students enrolled in a Behavior Analysis master's program at a major research university. Two of the students were in their second year of study and four of the students were in their first year of study. It is important to note that the functional analysis (FA) skills that are the focus of this study are typically taught in the Behavior Analysis curriculum, but at a later time in the course sequence and through more standard (textbook) techniques. Further relevant information on participant background experience will be discussed more thoroughly in the results and discussions areas of this paper.

Participants were recruited through an email sent out to the entire psychology department. Students who expressed interest through email correspondence then met with a research investigator to review the informed consent document. All students were assured about confidentiality regarding access to performance data. Information about participant performance on any of the FA assessments that form the dependent variable for this study have been and will continue to be kept confidential so as to eliminate any influence of their performance on their advancement in the behavior analysis program. Neither advisors nor supervisors of the graduate students have access to specific student performance data.

Setting and Materials

The study was conducted in a small office in a university building that contained a table, two chairs, toys (ball and coloring book), distractor material, a demand matching task, and a timer. The room also had a camera for video recording each session for later data collection.

Prior to each condition, the participant was in the room with the research investigator for instructions, and then during each condition the participant and the confederate were both in the room. The confederate was the same individual, another graduate student trained in functional analysis, across participants. She wore a Bluetooth headset to receive communication from the research investigator during the conditions.

Data Collection and Training

The entire data collection and intervention process for each participant lasted no more than 5-6.5 hours during a single extended session on one day during the weekend. FA performance measures (implementation, interpretation, and treatment decision making) were taken for simulated FA sessions and written evaluation sessions during baseline (pre-training) and post training assessment sessions. Prior to data collection, the research assistants were trained to score the FA knowledge and performance measures (described later) to a 90% or greater inter-observers agreement criterion using several videos of simulated sessions.

All experimental sessions were video-recorded for later scoring of dependent measures of FA performance. Videos and other research related documents (e.g., informed consents, spreadsheets) were kept in a locked cabinet in the locked Behavioral Medicine Lab (Wood Hall Room 2704) at WMU and remain there. Any data stored in electronic form is stored on the password-protected computer of the primary investigator and on encrypted hard drives.

The assessment of participant FA skills was conducted using simulations in which the confederate played the role of a child or adolescent with challenging behavior and responded according to scripts to the efforts of the research participants to conduct a FA with the actors in a simulated setting. Confederates were trained through scripted scenarios adopted from Pence, St. Peter, and Giles (2014) with permission of Dr. Sasha Pence. Confederates did not perform any

property aggression behaviors that put the participants in harm's way. Treatment fidelity measures were completed to assure the confederate was acting according to the script read by the investigator.

Dependent Variables

The dependent variables included measures of functional analysis skills that were relevant to implementation, interpretation, and treatment decision making. The skills were assessed through both skill demonstration and written evaluation. The skill demonstration was assessed with the task analysis and data collection methods adapted from Pence et al. (2014) with the permission of Dr. Pence (see Appendix A for detailed scoring sheets). Each FA condition, attention, demand, and play had components scored as correct or incorrect depending on opportunities to perform designated skills during each session. Scores for each test condition were calculated as percentage correct, number of correct responses divided by total number of responses (correct plus incorrect responses). Exclusionary criteria for the baseline conditions was 80% correct and mastery criteria was 90% correct. Across all sessions and participants, the target behavior, self-injurious behavior (SIB), the length (five minutes), as well as all of the materials remained constant.

During the attention condition, the participant provided access to all of the toys and started the session with a discriminative stimulus similar to "I am going to do some work, I can't talk to you right now." Following this initial S^D, the participant provided attention to the confederate if she engaged in SIB. The attention was in the form of a reprimand or physical attention or it could be a combination of both reprimand and physical attention. Participants' performance was also measured on whether they appropriately ignored non-target inappropriate behavior (i.e., flopping, throwing, swearing) and appropriate behavior (i.e., "Why aren't you

talking to me? Will you play with me?"). Lastly, we measured whether participants delivered attention incorrectly noncontingently throughout the session at all during thirty second intervals.

During the demand condition, the participant had task materials present, all of which she could manually guide. The participant started the session with a discriminative stimulus similar to "It's time to do some work." We measured opportunities for the next several components described for each demand presented. We counted a demand as any request made by the participant to the confederate; so this could even be a request to "catch" or "high five." We measured whether the initial demand was clear (i.e., no abstract questions or requests without a clear required response). We then measured whether the participant followed the three-part hierarchy: independent (no prompt), gesture or model prompt, and lastly manual guidance each given within five seconds of no responding. Depending on opportunities during each demand, we also measured whether the person ignored inappropriate non-target behavior or appropriate behavior by continuing with the hierarchy. If the confederate engaged in self-injurious behavior at any time, the participant had to remove the demand and provide a break (escape interval) for twenty to thirty five seconds. If the participant engaged in another instance of SIB, the participant extended the escape interval by restarting the time for another twenty to thirty-five seconds. If the demand was completed correctly by the participant (independently, with a gesture prompt, or a manual prompt) the participant also provided a twenty to thirty-five second break. This break was measured to assess the importance of motivating operations during a functional analysis. The measurement of this specific component will be further addressed in the discussion. The timer was available to time these intervals but was not required to receive a correct response.

During the play condition, the participant provided the confederate access to the toys and provide a discriminative stimulus similar to "Here are some toys to play with." The participant was scored on delivery of noncontingent attention delivered every ten to thirty seconds. This was to ensure consistency and that attention was not delivered too frequently or not at all during play conditions. The timer was highly suggested here for participants to have a consistent time they were delivering attention, but again it was not marked incorrect for simply not utilizing the timer. The participant was also scored on whether she refrained from presenting any demands or asking any questions during thirty second intervals. The participant was to ignore target behavior and refrain from delivering scheduled attention until five seconds after target behavior. Ignoring target behavior as well as ignoring inappropriate non-target behavior involved continued engagement with materials (no removal) and no vocal commenting at the occurrence of the behavior. However, if the confederate engaged in appropriate behavior by asking a question or making a statement, the participant was to engage by responding vocally and/or engaging in the response requested by the confederate (e.g., confederate states "Can I have that ball?" and participant responds by saying "Sure!" and presenting the ball).

Following performance evaluation for each round of three conditions, the participant was evaluated on written answers to "What is the function based on this graph?" and "Based on the function you choose what would you do for assessment, treatment, both or either?" The participants were presented with one graph at a time, three graphs total for each set of three conditions. Graphs were developed based on visual displays from the training video. Initially, the participants were going to receive a graph following each condition (one graph for each condition), but the primary student research investigator missed this during the first participant run through, and so we made this adjustment for all participants for consistency and control

purposes to have all written evaluation follow each set of three skill demonstration conditions. Participants were scored based on whether they identified the function appropriately (correct or incorrect) and whether they identified the appropriate treatment and or assessment (correct or incorrect). The score was calculated as percentage correct, amount of correct responses divided by total number of opportunities (6, 2 for each graphic display). There were four graphs that were rotated, and the first graph showed the function of escape (see Figure 1).

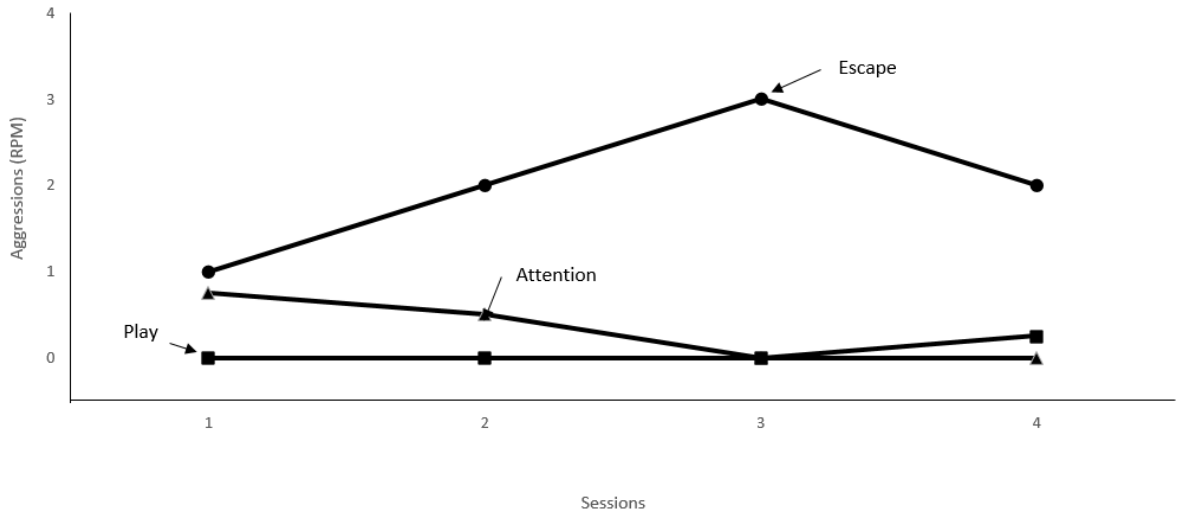

Figure 1. Escape Function Graph. One of four graphs used to assess whether participants could interpret graphs and make treatment decisions based on the function displayed.

Figure 1 was one of the more correctly identified graphs for function and treatment decision making. Participants had to identify the function as escape and then describe the treatment including information about continued presentation of demands, extinction of problem behavior, and mention either functional communication training (FCT) or differential reinforcement of an alternative behavior (DRA). DRA could also be described without specific terminology by detailing how another appropriate response will be taught to replace the aggression in terminating (or escaping) a demand. The second graph showed the function of attention (see Figure 2).

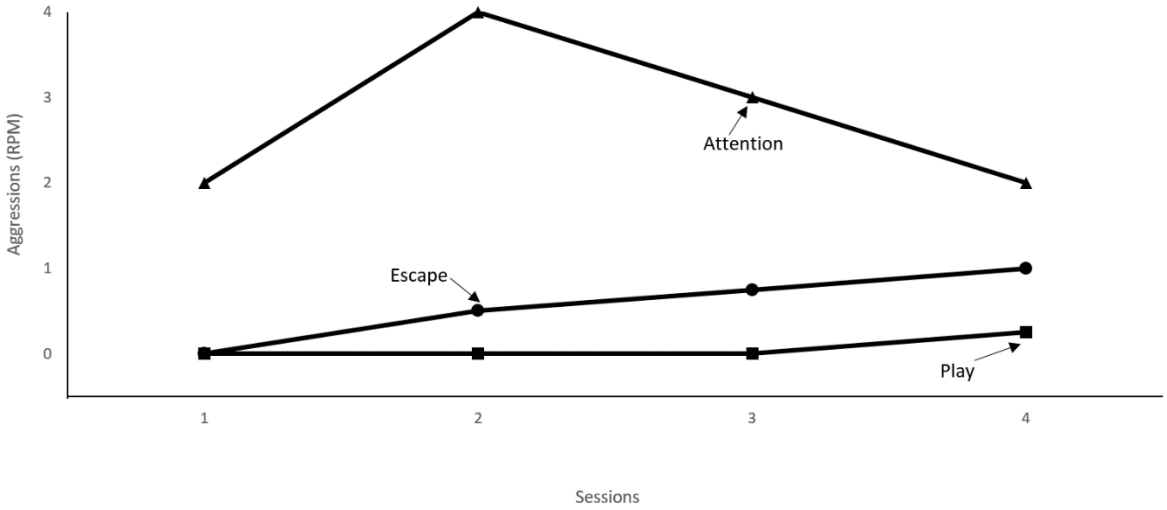

Figure 2. Attention Function Graph. Second of four graphs used to assess whether participants could interpret graphs and make treatment decisions based on the function displayed.

Figure 2 was the other graph of the four that also resulted in more correct responses from participants compared to figures below. Participants had to identify the function as attention and then describe the treatment that would follow discovering this function. The participant had to mention two main components and the first component needed to either include non-contingent reinforcement or extinction, and the second component needed to mention DRA or FCT, similar to the escape function described above. The DRA or FCT procedure would now teach an appropriate way to ask for attention instead of asking for a break. The third and fourth graphs resulted in several more errors for participants. The third graph was identified as undifferentiated high as the function (see Figure 3).

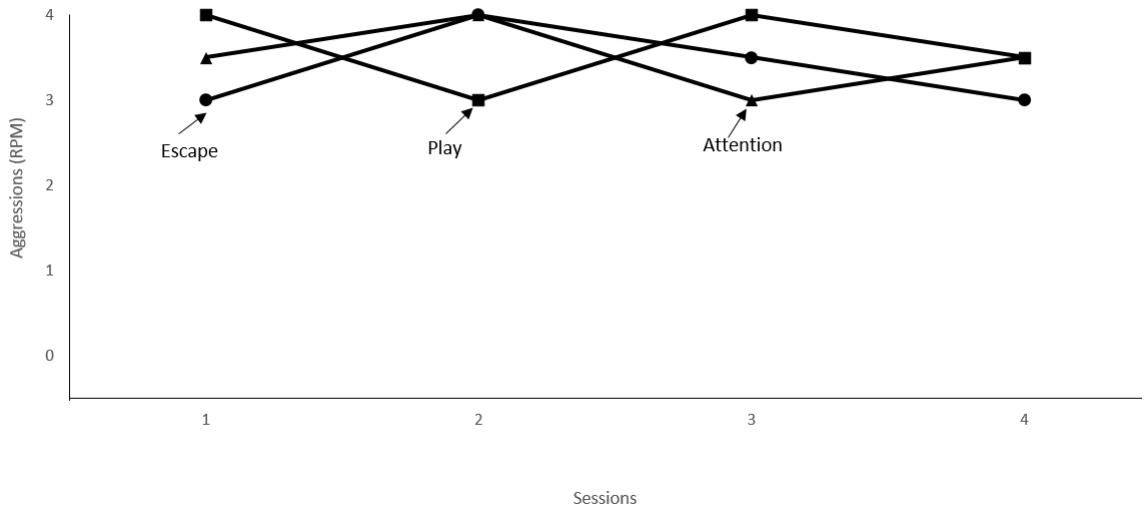

Figure 3. Undifferentiated High Graph. Third of four graphs used to assess whether participants could interpret graphs and make treatment decisions based on the function displayed.

Figure 3 was the third of four graphs and resulted in quite a bit of trouble for the participants. Participants had to identify the function as undifferentiated high or unclear, and then describe the appropriate assessment to follow. The behavior was occurring at such a high frequency that the function of behavior was undifferentiated or unclear across the conditions. In the description, the participant had to mention something about rerunning the conditions and that this may need to occur due to the individual not discriminating across the conditions. She also had to mention a possible automatic function and that an alone condition might have to be run to determine if the function is truly automatic. The final and fourth graph was identified as undifferentiated low or unclear (see Figure 4).

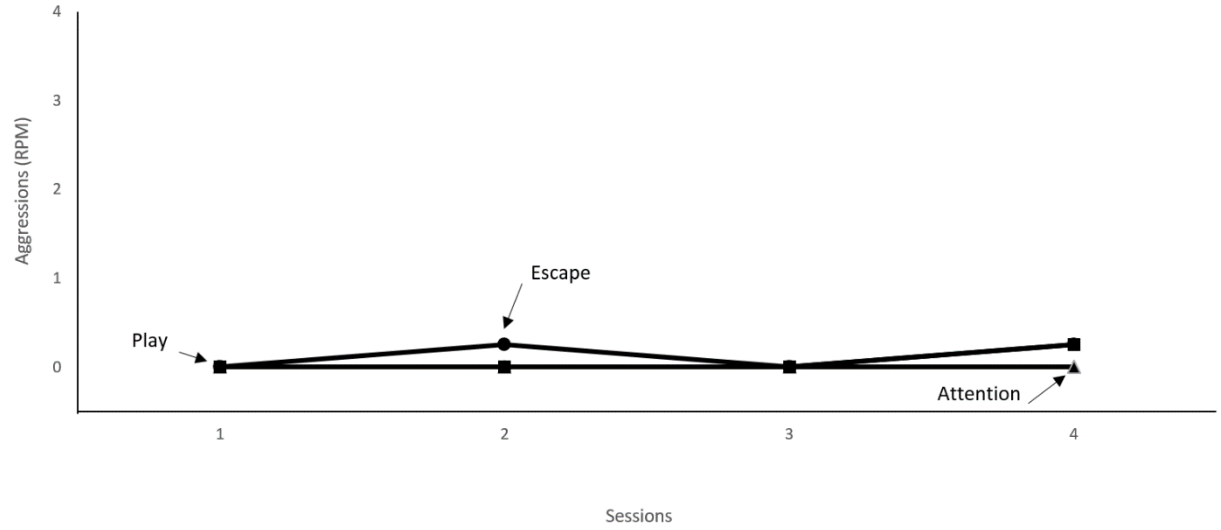

Figure 4. Undifferentiated Low Graph. Fourth of four graphs used to assess whether participants could interpret graphs and make treatment decisions based on the function displayed

Figure 4 was the fourth of four graphs and also resulted in quite of a bit of trouble for the participants. Participants had to identify the function as undifferentiated low or unclear, and then describe the appropriate assessment to follow. The behavior was occurring at such a low frequency that the function of behavior was undifferentiated or unclear across the conditions. In the description, the participant had to mention either something about there not being long enough exposure in conditions or that the assessors may need to rerun the conditions to provoke the behavior. The participant could have also alternatively spoken of alternative assessments including interviewing to help determine the function.

Interobserver Agreement

As mentioned above, inter-observer agreement data was collected through viewing of the video recordings by another trained investigator for 33% of the sessions (ranging from 84.8% to 100% with an average of 95.56% across sessions). Interobserver agreement was completed for conditions by calculating agreements (correct, incorrect, or not applicable) divided by total opportunities multiplied by 100%.

Independent Variables

The three independent variables in this study included the written material (manual), training video, and vocal instruction. Prior to any training conditions, one or two baseline conditions were run.

Baseline Sessions

Baseline sessions involved simply presenting instructions to the participant for each test condition and then collecting data on performance. The participant was not given any training materials prior to the test conditions. Three participants went through one baseline and three participants went through two baselines to test for practice effects.

Manual

The manual was the methods section from the Iwata et al. (1982/1994) article. Participants in both groups were given as much time as needed, not exceeding forty five minutes. The participants were alone while they read the manual; so they had to answer three questions about the page location of certain topics to show proof of reading.

Training Video

The training video was the "Functional Analysis of Problem Behavior" training video (wmich.edu/autism/resources: Iwata, Functional Analysis of Problem Behavior video). The participants were given two hours to finish the one hour and forty-two minute video. During the time the participant was watching the video, the investigator again left the room, and so to assess whether the participant watched the video we had them identify the approximate time three specific components were mentioned while they were watching the video.

Vocal Instruction

Vocal instruction, which consisted of the same content across participants, was provided to participants following completion of both written and video training conditions. The vocal instruction condition consisted of the research investigator going over each test condition of the functional analysis based on the data collection sheets (see appendix A) and then she went over each graphical display (figures 1-4) to explain function and assessment.

Procedure and Design

The study was a non-concurrent multiple baseline additive design across participants. Participants were assigned to two groups that differed in terms of the sequence of experimental conditions. The first group (manual, video, vocal instruction) consisted of two second year students, and two first year students. The participants in this group received the manual condition first, followed by the video condition, and finally the vocal instruction condition. The second group (video, manual, vocal instruction) consisted of two first year students. The participants in this group first received the video condition, and then the manual condition, and finally the vocal instruction condition. The first group consisted of four participants to identify potential differences between first and second year participants. It was intended to replicate this with group two, but due to time constraints of the university semester, the second year students obtained too much relevant information on functional analyses during their coursework to participate.

As described earlier, participants were recruited via email from a list of currently active master's students. Those who expressed interest through a reciprocal email were scheduled for meeting with the research investigator to review informed consent and answer any questions about the study. If the participant signed the informed consent, we set a date to run sessions and email correspondence of the details went out to the participant.

When participants arrived at the experiment location they placed their belongings in a separate room. During skill demonstration conditions they were specifically asked to conduct brief functional analyses (five minute conditions) for each of the three commonly used test conditions (i.e, attention, demand, and play). The same instructions were provided before each test condition. The instructions described the name of the test condition, the materials, the target behavior and what to do if the participant needs to stop the session. The sequence of test conditions was randomly rotated for each training condition. Following each set of three conditions, participants were asked in an open-ended design to write down the predicted function of behavior based on the graphic display, as well as to write recommendations for treatment.

The first session was baseline for each participant, and prior to performance assessment the primary student investigator read through the survey questions about FA experience with the participant. Once she read through the survey and received answers, she began reading the directions for the first condition. The investigator then left the room and the confederate entered and gave a countdown warning that the condition was to begin. The primary student investigator was in the other room and provided scripted directions to the confederate via Bluetooth headset. The confederate was trained on how to appropriately exhibit behaviors (i.e, flop to the floor and engage in self-injury without harming herself or the participant) mentioned in the script and how to manipulate materials (i.e, play with toys, and throw materials without injuring the participant) during test conditions prior to running participants. Once each condition was over, the confederate then left, and the research investigator repeated the instructions for the next condition. Criteria were set for participants, so that if anyone were to demonstrate mastery level performance on 80% or more of the essential steps in conducting a FA during baseline assessment, and answer yes to at least two of the three questions on the questionnaire, they

would have been excused from the study and compensated for participating in the initial assessment (i.e. $20). However, this did not occur for any of the participants.

The interventions were implemented in a multiple baseline across participants research design that allowed some of the participants to have one baseline session and others to have two baseline sessions before any active treatment components were introduced. This was done in an effort to assess any practice effects that might have emerged from repeated assessments and to verify that intervention effects were associated with the introduction of each treatment. Following baseline, be it one or two sessions, participants were then moved to a treatment condition. The treatment condition, manual or video, was dependent on the group, but vocal instruction was delivered only during the vocal instruction phase and never during the other two treatment phases (manual and video). Participants all completed all phases of the study and were compensated with a $100 gift card for their time.

RESULTS

The results of the current study are both graphically displayed and verbally described throughout this section. Results will be discussed according to the groups the participants were placed in. Group one (manual, video, vocal instruction) is split below into group one second year students and group one first year students. Group two (video, manual, vocal instruction) consists of two first year students only.

Both participants in the group one second years had minimal experience with functional analysis based on their answers to the pre-assessment survey. The participants noted only having read literature on functional analyses, not having observed or having participated in one. The results for the first and second participant are shown in figure 5 below. This participant scored below 80% for all three performance conditions and during the written component and thus did not meet exclusionary criteria. Play and attention conditions were quite high though for this participant during baseline (78.43% and 70.90% respectively). Following the manual condition, the participant's scores increased for both the demand and attention conditions and decreased minimally for the play condition. Following the video, the participant scored 100% in the attention condition but decreased slightly in the demand and play conditions. During the vocal instruction condition, the participant reached mastery criteria for all conditions at or above 90%. The written evaluation remained similar across the trainings until vocal instruction, and this may be due to the random assignment of graphs (see figures 1-4) for each condition and varied difficulty of these graphs.

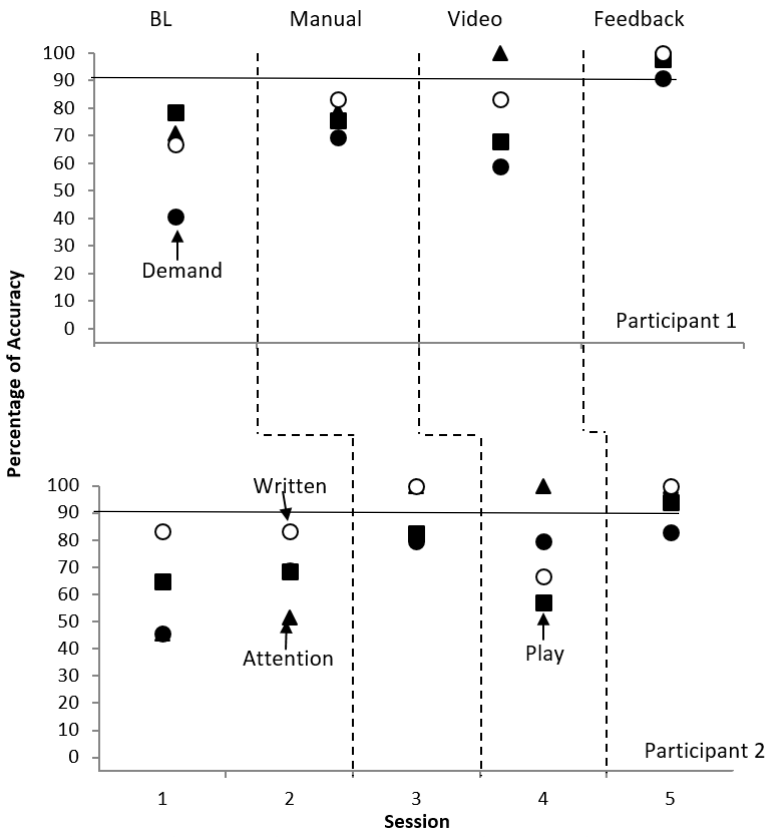

Figure 5. Group One Second Year Results. The upper display represents the performance of participant one and the lower display represents the performance of participant two.

The second participant went through two conditions of baseline. The scores for attention and play remained relatively unchanged across baseline but increased slightly for demand. It is to be noted that the participant began to attend to the target behavior during the second baseline by removing the demand, which was not done during baseline one. However, the demand was still not removed for a long enough interval and several other of the necessary performance skills were still not at mastery criteria (90% or above). Following the manual condition, scores increased across the conditions and reached 100% during the attention condition. Following the video, attention and demand remained at the same levels but play decreased. Following vocal instruction, the participant was able to maintain mastery criteria for attention (90% or above) and reached mastery criteria for play but was only at 82.75% for the demand condition. The written

evaluation again remained similar across the trainings with the exception of the drop in the video condition, and this may be due to the random assignment of graphs (see figures 1-4) for each condition and varied difficulty of these.

The group one first year participants had various experience levels. Participant 3 reported only having read literature on functional analyses not having participated or observed one, while participant 4 had stated she had participated in a functional analysis and read literature on them but had not observed one either. The graphic display of performance for these participants is located below in Figure 6. Participant 3 scored very low during baseline across the conditions of play, attention, and demand (42.31, 25.00, and 30.61 respectively). After the manual condition, the participant's scores increase greatly for the attention condition to mastery criteria (90% or above) and then increase slightly for both the demand and play conditions. After the video condition the participant's score remained the same for attention, increased slightly for demand, and increased greatly for play. This was quite different from the previous group where the participants decreased in the play conditions after the video. Following the vocal instruction participant 3 remained at mastery level (90% or above) for the attention condition but stayed below mastery for the demand and play conditions (86.96%, and 84.00% respectively). The written evaluation scores increased during the video condition slightly and reached mastery criteria again during the vocal instruction condition.

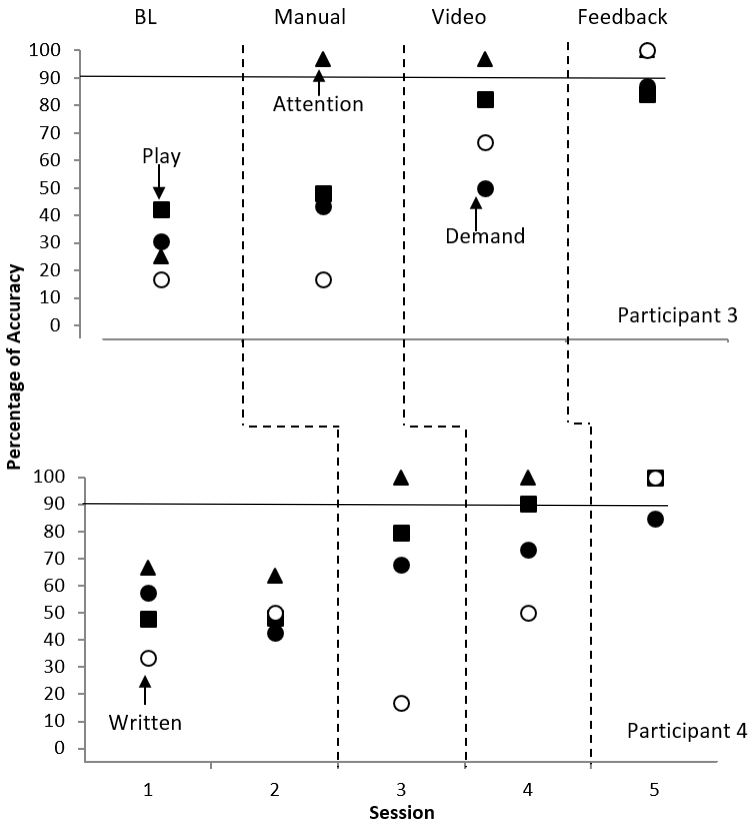

Figure 6. Group One First Year Results. The upper display represents the performance of participant three and the lower display represents the performance of participant four.

Participant 4 went through two conditions of baseline and remained consistent across skill demonstration for both baseline conditions with a slight increase in the written evaluation. This again may be due to the variation in difficulty of the graphic displays for participants. After the manual condition, the participant's scores increased for all but the written evaluation. The participant reached mastery criteria for the attention condition and had significant increases for the demand and play conditions. After the video, the participant remained at mastery criteria for the attention condition and she increased to mastery criteria for the play condition. The demand condition remained relatively unchanged. Following vocal instruction, the participant increased in her scores across conditions but still did not meet mastery for the demand condition. The

written evaluation was low for the manual condition and increased slightly during the video condition and to mastery during vocal instruction.

Group two participants were two first year students. The order of the training conditions was reversed to determine if this would have any effect on the participant performance. The experience of participants, based on the survey answers varied again for group two. Participant 5 reported only having read literature on functional analysis, not having participated or observed one, while participant 6 stated she had participated in one condition of a functional analysis (described as an attention condition) but reported never observing one and never reading literature on functional analyses. The graphic display of the participants is located below in Figure 7. Participant 5 went through one session of baseline and scored below exclusionary criteria across conditions but did score quite high during the play condition (75.51%). After the video, her scores went up to mastery criteria for the attention condition and went up significantly for the demand condition (from 41.79% to 66.67%). The play condition score following the video decreased significantly (53.06%). Following the manual condition the play score went back up. The attention condition remained the same after the manual and the demand condition decreased slightly but not significantly. After vocal instruction, the participant reach mastery criteria for the play condition but remained slightly below mastery criteria for the demand condition. The written evaluation scores increased slightly after the video but remained stable and did not reach mastery until the vocal instruction condition.

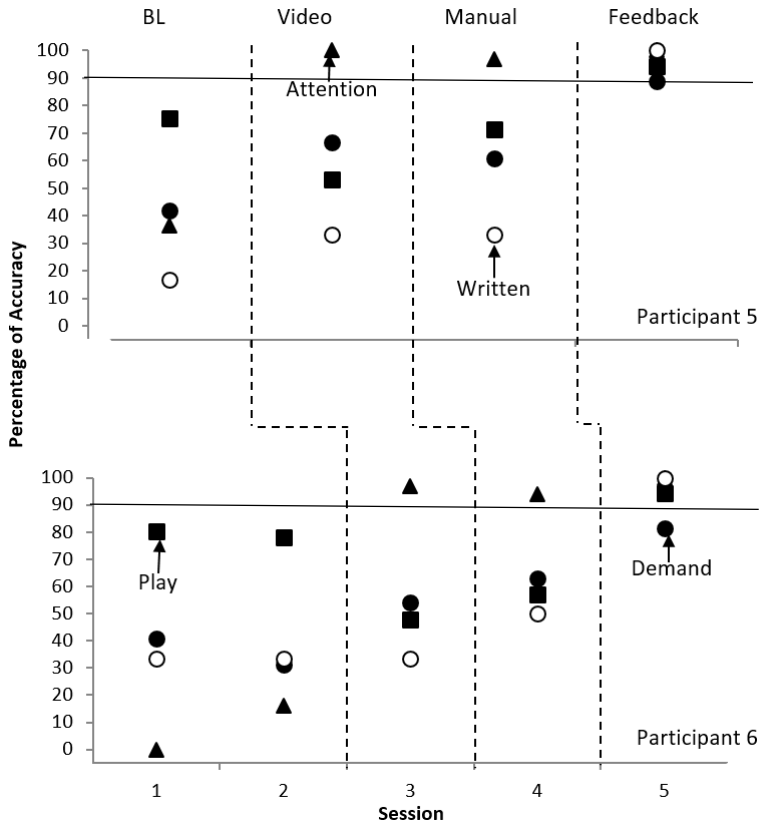

Figure 7. Group Two Results. The upper display represents the performance of participant five and the lower display represents the performance of participant six.

Participant 6 again scored below exclusionary criteria across conditions but did score quite high in the play conditions during both baseline sessions (80.39%, and 78.00%). The attention and demand conditions remained low and stable across baseline sessions. After the video condition, the participant reach mastery criteria (90% or above) for the attention condition and her demand score increased, however her score in play decreased significantly. Following the manual, scores for the demand and play conditions increased slightly. The attention condition remained at mastery and had a very slight decrease due to one instance of not providing a reprimand or physical attention for the SIB. After vocal instruction, the participant reached mastery criteria for the play condition and reached above 80% for the demand condition. The written evaluation

had a slight increase during the manual condition but remained stable during other conditions until vocal instruction.

Overall, we can report that although both the manual and video were most often effective in increasing performance and written skills for conditions across participants, the play and demand conditions always required additional vocal instruction in an attempt to meet mastery criteria. Even the vocal instruction did not allow all participants to reach mastery for play and demand conditions. The next section will discuss some of our possible conclusions, limitations, and future directions.

DISCUSSION

The results reported herein support the following tentative conclusions. First, none of the six participants displayed baseline performance levels that indicated mastery level skills. This is not surprising as the participants were first and second year students who had not yet completed academic or practicum training activities that focused on functional analysis. The levels of performance suggest that absent of specific training, graduate students do not have sufficient skills to conduct a functional analysis and interpret the results in a manner that leads to the development of a function-based treatment plan. This underscores the need for effective training in functional analysis, a widely recognized core skill for practicing behavior analysts, and for the development of assessment packages to document the mastery of these crucial skills.

Second, during baseline no significant practice effects were observed thus, without some sort of training condition, students do not gain mastery in functional analysis skills. Finally, all three training interventions produced some gains in competency measures but no intervention, by itself was sufficient to insure mastery across all crucial performance measures. Even the implementation of vocal instruction did not insure mastery level performance for all participants across test conditions. Additionally, feedback sessions or alternative consequences (i.e, academic credit contingent on mastery) for demonstrating mastery criteria may be necessary to obtain these results.

Limitations

It is first noted that the study did not include a tangible condition as was included in the Pence, Peters, and Giles (2014) study. The video interview (wmich.edu/autism/resources: Iwata,

Functional Analysis of Problem Behavior video) with Dr. Iwata combined tangible into a type of social reinforcement along with attention, and so it was not tested separately. Throughout the study there were several other considerations to be made based participants' scores. The video alone was a factor to consider, as it was approximately one hour and forty two minutes in length. The amount of time required to sit and stare at a screen may have altered the performance following it. The length of the day in general may also have caused this effect, as although breaks were offered throughout, the day lasted around six hours for each participant. The entire time was not spent in assessment, and food was offered, but it was still a long assessment period.

As evidenced throughout the results section, the play condition specifically presented many considerations. The participants often scored lower after the video or decreased from baseline to a training condition. We found that participants often made changes in frequency of attention, and they did not refrain from placing demands. The participants often provided constant attention to the confederate, which would lead to a non-representation of appropriate natural play or control environment. Requests from participants were often in the form of "Catch! or Match! or What character do you like?" After vocal instruction and clarification of these components, most participants were able to better perform during play.

A majority of the participants, however, did not meet mastery criteria for the demand condition, even after vocal instruction. As mentioned in the description of the data collection, the inter-response time component proved most problematic. Participants often did not provide a twenty second or more break following compliance with a demand. We made this change to the data collection sheets prior to running participants to account for motivating operations associated with the condition. This component is to be addressed in future research with a validity survey to address importance of assessment components.

Reviewing the written components, we also experienced a lot of variation in answers for participants. The graphs were randomly assigned after each condition, and so participants often scored higher with the attention and escape graphs and much lower for the undifferentiated high and undifferentiated low graphs. Participants often assigned an automatic function to these more difficult displays when no alone condition had been run to determine this for certain. Participants also changed their answers across baseline conditions for the same graphs. Again, once the graphs were explained and reviewed, all participants were able to meet mastery criteria.

Future Directions

Functional analysis research has come so far over the years and continues to grow as we develop new technologies. Training in functional assessment is necessary for the workforce, but the time it takes and the effectiveness of such training is of utmost importance. Following the current study, we plan to create a validity survey to assess the importance of each of the components we assessed in the functional analysis. The survey may provide answers to some of the considerations, specifically for the play and demand conditions. We also suggest future research investigate the different types of feedback possible. We provided one to one vocal instruction sessions to review all essential components, but more specific video feedback sessions following performance may help and save time. The videos would not only be utilized for modeling but also for participants viewing their own behavior and receiving direct feedback. The more we continue to conduct research of the efficiency and effectiveness of these technological advances, the more we can produce efficient and effectively trained practitioners.

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APPENDIX A

Scoring Sheets

Low Attention Data Collection Sheet

Data should be obtained at the end of the session for the general session data and based on each opportunity during the session for the opportunity data.

(+) = Trainee performed the skill correctly
(-) = Trainee made an error (skill performed incorrectly)
(0) = No opportunity to demonstrate this skill

General Session Data

1-2 moderately preferred toys	
provided free access to toys	
Provided initial SD ("I'm sorry, but I can't talk to you right now.")	

Opportunity Data

	1	2	3	4	5	6	7	8	9	10	Overall
Provides **reprimand** when S. engages in target bx											
Provides **physical attention** when S. engages in target bx											
Continues to be "busy" and refrains from comment when S. engages in **non-targeted inapp bx**											
Continues to be "busy" and refrains from comment when S. engages in **appropriate bx**											
INTERVAL 30 Seconds Refrains from delivering attention **noncontingently**											

Demand Data Collection Sheet

Data should be obtained at the end of the session for the general session data and based on each opportunity during the session for the opportunity data.
(+) = Trainee performed the skill correctly
(-) = Trainee made an error (skill performed incorrectly)
(0) = No opportunity to demonstrate this skill

General Session Data

Task materials present	
Able to manually guide all demands used	
Provided initial SD ("It's time to do some work now.")	

Opportunity Data

	1	2	3	4	5	6	7	8	9	10	Overall
Provides clear **initial directive**											
Provides **gestural (or model) prompt** within 5 s if no response or incorrect response											
Provides **manual guidance** prompt within 5 s if no response or incorrect response											
Provides **verbal praise** with compliance before manual guidance prompt											
Removes demand and materials with break-related statement when S. engages in **target behavior**											
Provides appropriate **Inter response escape interval** for target behavior (**20s-35s)**											
Provides appropriate **inter response interval for compliance or manual guidance (20s-35s)**											
Continues with prompt hierarchy or escape interval if S. engages in **non-targeted inapp bx**											
Continues with prompt hierarchy or escape interval if S. engages in **appropriate bx**											

Play Data Collection Sheet

Data should be obtained at the end of the session for the general session data and based on each opportunity during the session for the opportunity data.

(+) = Trainee performed the skill correctly
(-) = Trainee made an error (skill performed incorrectly)
(0) = No opportunity to demonstrate this skill

General Session Data

2-3 high/moderate preferred toys present	
Provided free access to toys	
Provided initial SD ("Here are some toys to play with.")	

Opportunity Data

	1	2	3	4	5	6	7	8	9	10	Overall
Delivers **attention non-contingently (every 10-30 seconds)**											
INTERVAL – 30S Refrains from asking questions or making demands.											
Waits until **5 s** free if **target bx occurs at the exact time** of scheduled attention **delivery**											
Ignores (refrains from comments or removal of items) when S. engages in **target behavior**											
Ignores (refrains from comments or removal of items) when S. engages in **non-targeted inapp bx**											
Engages with/answers S. if S. engages in **appropriate bx**											

APPENDIX B

HSIRB Approval Form

Date: October 26, 2015

To: Wayne Fuqua, Principal Investigator
Alissa Conway, Student Investigator for thesis

From: Amy Naugle, Ph.D., Chair

Re: HSIRB Project Number 15-10-10

This letter will serve as confirmation that your research project titled "Examining the Effectiveness of a Functional Analysis Training Video on Implementation and Interpretation of a Functional Analysis" has been **approved** under the **expedited** category of review by the Human Subjects Institutional Review Board. The conditions and duration of this approval are specified in the Policies of Western Michigan University. You may now begin to implement the research as described in the application.

Please note: This research may **only** be conducted exactly in the form it was approved. You must seek specific board approval for any changes in this project (e.g., ***you must request a post approval change to enroll subjects beyond the number stated in your application under "Number of subjects you want to complete the study***)." Failure to obtain approval for changes will result in a protocol deviation. In addition, if there are any unanticipated adverse reactions or unanticipated events associated with the conduct of this research, you should immediately suspend the project and contact the Chair of the HSIRB for consultation.

Reapproval of the project is required if it extends beyond the termination date stated below.

The Board wishes you success in the pursuit of your research goals.

Approval Termination: **October 25, 2016**