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Training Non-Board Certified Behavior Analyst (BCBA) Behavior Specialists to Conduct Trial-Based Functional Analyses in Residential Settings

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TRAINING NON-BOARD CERTIFIED BEHAVIOR ANALYST (BCBA)

BEHAVIOR SPECIALISTS TO CONDUCT TRIAL-BASED

FUNCTIONAL ANALYSES IN RESIDENTIAL SETTINGS

by

Devon S. Millington

A thesis submitted in partial fulfillment
of the requirements for the degree

of

MASTER OF SCIENCE

in

Special Education

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2018
ABSTRACT

Training Non-Board Certified Behavior Analyst (BCBA) Behavior Specialists to Conduct Trial-Based Functional Analyses in Residential Settings

by

Devon S. Millington, Master of Science
Utah State University, 2018

Major Professor: Dr. Thomas Higbee
Department: Education

This study examined the effect of an intervention informed by the results of a trial-based functional analysis, wherein a nonexpert behavior specialist (not possessing board certification) implemented the trial-based functional analysis (TBFA), on the challenging behavior of an adult male participant with an intellectual disability in a residential treatment setting. The intervention portion of the study yielded high levels of challenging behavior for the participant during baseline conditions with lower levels of challenging behavior present during the function matched intervention conditions. The results of this study suggest that behavior specialists not possessing a Board-Certified Behavior Analyst (BCBA) credential can be trained to conduct TBFA in residential treatment settings and that the data collected from the TBFA can be used to inform interventions that produce better decreases in challenging behavior, as compared to the business-as-usual intervention, for an adult with intellectual disabilities residing in a residential treatment facility.
PUBLIC ABSTRACT

Training Non-Board Certified Behavior Analyst (BCBA) Behavior Specialists to Conduct Trial-Based Functional Analyses in Residential Settings

Devon S. Millington

This study investigated a process for identifying the reasons why a person with an intellectual disability has problem behaviors. This process is called a trial-based functional analysis (TBFA). The researchers wanted to know if a person who was not an expert behavior analyst could be trained to perform the TBFA and if the results obtained from the TBFA could be used to create a program to reduce the problem behavior of a person with an intellectual disability living in a community-based group home for persons with disabilities. The results of this study show that a person who is not an expert behavior analyst can be trained to perform a TBFA and that the results obtained from the TBFA were useful in creating a program to reduce the problem behavior of an adult male person living in a rural area in Utah.
ACKNOWLEDGMENTS

I would like to thank Dr. Joseph Lambert for providing me with the use of his TBFA training materials. I also express my gratitude to Dr. Tyra Sellers for her relentless effort in guiding me through my master’s program and for her contributions to this document. Additionally, I thank Dr. Thomas Higbee and Kimberly Snow for their contributions to my project and for serving on my thesis committee.

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Devon S. Millington
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CHAPTER I

INTRODUCTION

Adults with disabilities living in residential service provider settings engage in problem behavior more frequently than those living independently or with familial support (Lowe, Allen, Jones, Brophy, & James, 2007). Problem behavior, including physical aggression, property destruction, and inappropriate sexual behavior, create several limitations for persons with disabilities and those who care for them. Some limitations include increased risk of abuse for participants, increased stress on caregivers, higher rates of turnover among professional staff, and disrupted family dynamics (Lowe et al., 2007). Thus, interventions seeking to decrease problem behavior should serve an integral role in residential treatment facilities. Before a behavior intervention is drafted, a preliminary investigation of the function of that behavior should be conducted. This practice is endorsed by the National Institutes of Health as Charles Mace stated that “The treatment of destructive behaviors associated with developmental disabilities recommended that treatment of severe behavior disorders be based on the results of a pretreatment functional analysis” (Mace, 1994, p. 386). The most accurate method for identifying the function of problem behavior is the functional analysis (FA; Iwata, Dorsey, Slifer, Bauman, & Richman, 1994; Mace, 1994). An FA involves the direct manipulation of antecedent and consequent stimuli or events with the intention of identifying the contingencies maintaining a particular target behavior (Iwata et al., 1994). An intervention drafted from an FA is not guaranteed to reduce the occurrence of problem behavior; however, treating problem behavior with procedures matched to its
function is widely endorsed and recommended (Mace, 1994). FBAs that rely on indirect information gathering or brief observational data as the primary sources of data collection can lead to interventions with mixed results (Alter, Conroy, Mancil, & Hayden, 2008). However, many practitioners claim that FAs take too much time, are too complex, are too risky, and are hard to sell to constituents. Some limitations to traditional FAs include limited assessment time, eliciting extreme or dangerous problem behavior that may be unsafe for both the participant and the investigator, and lack of access to controlled environments to implement the FA conditions (Hanley, 2012).

The presence of these limitations has led researchers to identify procedures that reduce the burden of performing a traditional FA, while still maintaining fidelity to the practices that make FAs valuable for practitioners. For example, Sigafoos and Saggars (1995) implemented a trial-based functional analysis (TBFA) using a discreet trial format which tested each condition of the FA against a control condition to identify the target behaviors’ potential maintaining consequence. Examining the maintaining contingencies of problem behavior in this way may lessen some of the concerns and limitations of the traditional FA outlined by Hanley (2012). More recently, TBFA research has shown that the function(s) obtained from the TBFA correspond to the function(s) obtained from a FA roughly 60% of the time (Bloom, Iwata, Fritz, Roscoe, & Carreau, 2011).

The use of TBFA technology in clinical applications is becoming more prevalent. Rispoli, Ninci, Neely, and Zaini (2014) identified 13 published research studies using TBFA technology. A total of 47 participants with various disabilities were included across the 13 studies reviewed. Of these participants, the majority were male (55%) with
ages ranging from 3-29 years old. The primary diagnosis for the participants was autism spectrum disorder (ASD) (62%), and 19 of the persons with ASD also had comorbid diagnoses of intellectual disabilities. The remaining participants had a diagnosis of a developmental or intellectual disability of some type. The behavior targets spanned 14 different behavioral topographies with aggression being the most common (47%). 13% of the studies assessed self-injurious behavior (SIB). 10% analyzed disruptive behavior, while 8% analyzed inappropriate vocalizations. 5% of the analyzed behaviors were described as stereotypic behavior. Rispoli et al. assessed the characteristics of the TBFAs addressed in the literature review and found that 10 of the 13 studies were conducted in a classroom setting, while three studies were performed in a residential treatment facility or group homes. The researchers found that a majority of the persons implementing the TBFAs were special education teachers or paraprofessionals. comprised of participants from 8 of the 13 studies. In the remaining studies, I focused on TBFAs performed by group home house managers, another used a researcher and behavior staff, graduate students and behavior therapists were the implementers in the remaining studies.

The outcomes of the reviewed studies included 36 completed TBFAs from 10 of the 13 studies. The other three studies investigated the fidelity of TBFA implementation by demonstrating the ability to train special educators or residential support staff to implement a TBFA. Three of the 13 studies investigated the validity of TBFAs by comparing them against the results of traditional FAs. Exact correspondence was found for 10/17 participants (59%). Partial correspondence was found for 12% of participants while the remaining 29% had no correspondence. For the three studies investigating the
fidelity of implementation, the fidelity of all 18 participants improved after training in both role-play and in-situ probes.

The reviewers expressed that the TBFA body of research is showing promise; however, due to the small sample size (i.e., 13 studies across 47 participants) the outcome of their report should be interpreted cautiously. The reviewers made suggestions for future research including conducting TBFAs in a wider variety of settings, using persons with different diagnoses (e.g., emotional disturbance), and analyzing the decision-making process for manipulating TBFA procedures (e.g., segment length, order of segments, and which conditions to use). Of the articles reviewed, only four addressed the efficacy of the TBFA by pairing it with functionally matched interventions derived from the results of the TBFA to assess if the resulting intervention successfully reduced problem behavior. Challenging behavior was reduced for each participant across the four studies when the outcome of the TBFA data was paired with a function-based intervention.

Researchers have demonstrated that both professionals and nonprofessionals can be trained to conduct TBFAs with high levels of fidelity (e.g., Kunnavatana, Bloom, Samaha, & Dayton, 2013a; Kunnavatana et al., 2013b; Lambert, Bloom, Clay, Kunnavatana, & Collins, 2014; Lambert, Lloyd, Staubitz, Weaver, & Jennings, 2014; Rispoli et al., 2014). Researchers have generally implemented training packages consisting of lecture, role-plays, and feedback sessions. Though the body of research indicates that professionals and nonprofessionals can conduct TBFA procedures; there are fewer articles addressing the efficacy of the interventions derived from the results of the TBFA. Only six published research articles (e.g., Bloom, 2013; Lambert, 2012; Lloyd
2014; Rispoli, 2015; Schmidt, 2013; Sigaffos & Meikle, 1996) have examined the efficacy of an intervention derived from the information obtained by a TBFA. Each of these articles has been conducted in a school setting. It is important for researchers to continue to investigate the efficacy of these interventions across a broader spectrum of participants and settings to further evaluate their utility. Additional research is particularly needed for adults with intellectual disabilities residing in residential treatment facilities or group homes.
CHAPTER II

LITERATURE REVIEW

I first began my literature review by performing a search using PsychInfo and ERIC simultaneously. I used the Merrill Cazier Library database tool. Search terms included trial-based functional analysis and trial based functional analysis. The abstracts and titles of the articles were then screened to identify relevant studies. Relevant studies were those that included TBFA procedures identified by experimentally manipulated environmental variables. Relevant articles used test and control trials within a discreet trial format.

Many of the articles reviewed by Rispoli et al. (2014) cited foundational research from Sigafoos and Saggers (1995). However, much of the more recent literature displays protocols adapted from Bloom et al. (2011). Bloom et al. proposed a modified format for using TBFA s in the classroom adapted from Sigafoos and Saggers (study with three major modifications. First, Bloom et al. altered the order of the test and control segments. Sigafoos and Saggers had placed the test condition before the control condition. Bloom et al. switched the order of the trials to reduce the likelihood of any carry over effects from one segment to another. Doing this ensured that an abolishing operation (AO) was created during the control segment(s) and an establishing operation (EO) was created during the test segments. That is to say, attention was delivered during the control segment of the attention condition and then withheld during the test segment of the attention condition that immediately followed. Second, Bloom et al. extended the amount of time for each segment by 1 min. Thus, each segment was designed to last 2 min,
provided the target behavior did not occur. Bloom et al. terminated each segment on the occurrence of the target behavior, which was consistent with the procedures outlined by Sigafoos and Saggers. A third modification was made by adding ignore trials to identify possible automatic function.

The modified format for TBFAs was implemented in two schools for persons with developmental disabilities. Ten children who had been referred for the treatment of challenging behavior served as participants for the study. The ages of the participants ranged from 6 to 18 years old and each child was classified as having mild to profound intellectual disabilities. The TBFA trials were embedded throughout the student’s school day. Each trial was divided into 2 min segments. Bloom et al. (2011) conducted trials for the relevant contingencies of a traditional FA; for example, control and test conditions to identify the presence of a tangible function were used when tangible functions were anticipated but not when a tangible function for the student’s problem behavior was not anticipated. Graduate students conducted the trials to ensure high fidelity to the TBFA procedure. Data collected during the TBFAs were calculated by the occurrence or non-occurrence of the target behavior during the specified trial and then converted to a percentage of trials arranged on a bar graph. The traditional FAs measured the rate of the target behavior per minute during each session and were arranged on a line graph. As a part of the study, Bloom et al. addressed a limitation of the Sigafoos and Saggers (1995) study by assessing the correspondence between traditional FAs and TBFAs by comparing the results of the TBFA with results obtained by a standard FA (see Iwata, 1994). Correspondence data were calculated to show the extent to which the traditional FA and
the TBFA agreed with regards to the target behavior’s identified function. Bloom and colleagues found that the results of 6 of the 10 TBFAs corresponded to the results of the FAs. The researchers were able to match two more of the TBFA results after making some modifications to their TBFA procedure. The results of this study indicate that a TBFA may be a viable option for identifying the function of a problem behavior in the school setting without adding much disruption to the student’s daily schedule.

Another concern many practitioners have surrounding the use of FA technology is perception that FAs are too complex or that only highly skilled persons can implement them correctly (Hanley, 2012). Thus, researchers have investigated the extent to which nonbehavior professionals can implement TBFA technology (Kunavatana et al., 2013a, 2013b; Lambert, Bloom, et al., 2014; Lambert, Lloyd, et al., 2014; Rispoli et al., 2014). Kunavatanna et al. (2013b) extended the research of Bloom et al. (2011) by using a pyramidal training approach to train special education coordinators and teachers to conduct TBFAs, as opposed to graduate students and other professionals with extensive behavior analysis training. The researchers first trained coordinators to conduct the primary conditions of a TBFA (i.e., tangible, attention, escape, and automatic). This was done in effort to provide the teachers with additional assistance during the teacher training procedures. 10 coordinators participated in the training. Of those 10, five continued in the study to work with the teachers. Therefore, data were only collected for those 5. The primary independent variable was a training intervention, including small group role-plays with immediate feedback, test stations with delayed feedback, and didactic training. At the conclusion of the coordinator training all five were able to
accurately implement the TBFA conditions as measured by a procedural checklist. The researchers and coordinators then trained the teachers to conduct TBFA’s and subsequently calculate and graph the data. The results indicated that the teachers were able to conduct the TBFA with 85% accuracy. Additionally, the teachers achieved criterion levels for analyzing and graphing the data, as well as identifying the function of the target behavior, when presented with hypothetical data. Two TBFAs were successfully performed in the classroom setting with students who were identified as having problem behavior. The teachers’ ability to perform the TBFA in the classroom setting demonstrates that teachers can be taught to accurately perform TBFAs in this environment, as well as calculate, graph, and interpret the results of hypothetical data.

Problem behavior is not restricted to the school setting. Thus, identifying researchers have applied TBFA technology in other settings. Lambert, Bloom, et al. (2014) extended the literature base by evaluating the effects of pyramidal training in residential settings. Specifically, they trained behavioral supervisors who then taught residential house managers, to conduct TBFA’s in a residential setting, as measured by fidelity to a procedural checklist. Six behavioral supervisors working for a community residential facility, along with 9 house managers, participated in the study. Two of the four behavior specialists were board certified behavior analysts (BCBA). The house managers had a high school diploma and some experience with persons with disabilities; however, none of them had formal training in ABA or FA technology. The TBFAs in this study were conducted using participants from the residential facility who had been pre identified as having challenging behavior. Nine participants were selected, one for each
of the house managers who participated in the study. Before participating in the study, each of the behavioral supervisors received pre-training where they were able to demonstrate 100% adherence to a procedural fidelity checklist for conducting a TBFA. Baseline data were collected on TBFA implementation prior to the house manager training. This was done by providing the house managers with a copy of the Bloom et al. (2011) article and asking them to read it. A data collector then visited the house manager while they were working with a specified participant and asked them to perform the TBFA as outlined in the article. Data were collected and no feedback was given. House manager performance was below 50% integrity for all participants during the baseline condition. The intervention consisted of a brief description of each condition of the FA, modeling, role-play with a feedback component, and data collection. The role play and feedback sessions were repeated until all house managers were able to show 100% fidelity across each condition. Data from the study indicate that the supervisors were able to train the house managers with a mean of 97% fidelity to a procedural checklist provided by the researchers.

A post-training session, similar to baseline conditions, was conducted; however, house managers were not required to read Bloom et al. (2011). Feedback was provided if a trial was performed incorrectly. The house manager had an opportunity to repeat missed trials. All but one house manager required additional feedback to achieve post-training criterion. However, the efficacy of the training intervention alone should be evaluated by the results of the first post training trial. The article did not publish the raw scores for the first trial after intervention; however, a visual analysis of the published data showed that
the average level of performance was 80% across all house managers. Researchers were able to demonstrate that the supervisors could train the house managers to mastery criterion after feedback was given for missed trials. Only one participant was able to achieve criterion performance without any feedback sessions during post training. This study extends the research by demonstrating that house manager and supervisors in residential settings can be trained to implement TBFAs.

The above research indicates that teachers and other professionals can be trained to implement TBFAs with fidelity across their respective settings. However, the efficacy of interventions that are derived from the TBFA outcomes is far less substantiated in the literature by comparison. For example, only four of the 13 studies reviewed by Rispoli (2014) describe outcomes of the interventions drafted from TBFA data. Researchers Bloom, Lambert, Dayton, and Samaha (2013) investigated the extent to which function-based interventions drafted from TBFA data collected by teachers in a school setting were effective at reducing challenging behavior for young persons with developmental and intellectual disabilities. Past studies (Lambert et al., 2012; Sigafoos & Meikle, 1996; Tucker et al., 1998) have resulted in reductions of problem behavior in interventions that were derived from TBFA data, a majority of which were functional communication training (FCT) interventions.

Bloom et al. (2013) addressed a limitation of past research by including TBFA trials that tested specifically for target behavior maintained by automatic reinforcement in addition to social functions (i.e., attention, escape, and tangible). The primary focus of this study was to evaluate the efficacy of interventions obtained from TBFA outcomes.
The teachers of three students were trained individually to conduct the TBFAs and collect TBFA trial data prior to conducting them in the school setting. The teachers were observed for the first trial set of each condition to ensure that the trials were implemented correctly. The participants were between four and five years old. Two had been referred for aggressive challenging behavior and one had been referred for mouthing behavior. The TBFAs included 10 trials of each condition (control, ignore, demand, and tangible) with two 2 min segments representing one trial (control, test).

The researchers in Bloom (2013) followed the procedures used by Bloom, (2011). For example, the attention trials were conducted to test for the presence of a function maintained by social positive reinforcement in the form of attention. During the control segment, the teacher provided attention by communicating with the child paired with small instances of physical touch. If problem behavior occurred during the control segment, the data were recorded and the test segment immediately began. Otherwise, the segment lasted 2 min as outlined in Bloom (2011). All test segments for all conditions ended upon occurrence of problem behavior, or when 2 min had elapsed. During the test segment, the teacher said, “I’m busy now” and turned away from the student. The teacher provided attention contingent upon the occurrence of the target behavior. During the control segment of the demand trials, the teacher did not interact with the child. Additionally, no work-related tasks were in place. During the test condition, a task was given to the student. Teachers used a three-stage prompt sequence to deliver the task. If the problem behavior occurred, the task was removed and the trial was complete. During the control segment of the tangible trials, the child has free access to preferred toys, the
teacher delivered attention at least every 30 s, and no demands were given. During the test segment, the teacher continued to interact with the child, however the preferred item was removed. The item was returned if problem behavior occurred at which point the trail was complete. Ignore trials were implemented to test for an automatic function for one of the participants challenging behavior. This was achieved by having two consecutive test segments, each lasting 2 full min. During both segments, the teacher sat roughly 1.5m away from the child. The child did not have access to preferred items and no attention was delivered. No consequences were delivered on the occurrence of problem behavior for either segment in ignore trials.

The results of the TBFA indicated social positive functions in the form of access to tangibles and social negative function in the form of escape from demands. For the third student, problem behavior occurred across all trials, including the ignore condition, indicating an automatic function. Thus, the function-based intervention for the students with a tangible and escape function was a differential reinforcement of alternative behavior using picture exchange and reinforcement for appropriate responses (break, toys) while placing inappropriate responses on extinction. The intervention selected for the third student, for whom the TBFA indicated an automatic function, was a noncontingent reinforcement procedure. A competing items assessment (Piazza et al., 1998) was conducted to identify items, which would compete with his mouthing behavior. These items were made available during intervention sessions where they were not available during baseline sessions for the third participant. Researchers utilized a multiple baseline procedure for the first two participants and a reversal design for the
third. Results from the study indicated that the interventions selected from the outcomes of the TBFA data were successful at reducing challenging behavior. In the DRA + EXT interventions, problem behavior decreased across all sessions while alternative responses increased across sessions. During the NCR intervention for the third participant, the problem behavior remained at clinically acceptable levels during treatment, which was a significant reduction from baseline and return to baseline sessions.

The number of studies demonstrating the effectiveness of interventions based on the outcomes of TBFA data has continued to grow since Rispoli et al. (2014) offered their systematic review of the literature. For example, Lloyd et al. (2014) evaluated the effectiveness of interventions derived from TBFA data in a public-school setting, whereas past research has been primarily conducted in specialized schools for persons with intellectual disabilities or in residential treatment facilities. Lloyd et al. conducted a study evaluating the efficacy of TBFA resultant interventions in the public-school setting. Four student participants were selected for this study. The students were in grade school and had a diagnosis of ASD, intellectual or developmental disabilities in addition to exhibiting high frequency problem behavior. Four paraprofessionals who worked regularly with the students were selected to serve as participants. The paraprofessionals had no experience with TBFA procedures.

The author performed a post-training interview with the students’ teacher and paraprofessional to collect descriptive data about the student’s behavior. Questions related to frequency, communication skills, preferred items or activities etc. served as talking points for the discussion. Next, researchers conducted direct observations of the
students on five separate occasions with each occasion lasting approximately 30 min. The observations allowed the researchers to ensure the problem behavior was occurring as described in the discussion. The authors then formed functional hypotheses for the students’ target behaviors from the information gathered in the interview and direct observation. Before a TBFA was performed, paraprofessionals participated in a training meeting. The training meeting discussed the results obtained from the interviews and observational assessments and explained the proposed functional hypothesis. Once the hypothesis, target behaviors, and assessments were explained, the researchers asked the paraprofessional and teacher to identify portions of the student’s school day that TBFA trials could be embedded. They also discussed ways to ensure the students would encounter situations that were typical of the school day. The authors then explained each component of the TBFA to the paraprofessionals and then conducted role-play with corrective feedback. Paraprofessionals were then allowed to perform the TBFA with coaching. The researchers provided visual cues before each trial started, verbal prompts throughout the trial, and corrective feedback after trials were completed.

Three new modifications to the research body research exist within this study. For example, Lloyd et al. (2014) did not expose each child to the all of the standard conditions (tangible, escape, ignore, attention) of a FA. Instead, they chose to conduct TBFA trials for the hypothesized conditions only. That is to say, each condition of the TBFA was crafted specifically for each individual. Second, Lloyd combined conditions for which the hypothesis identified a target behavior that was maintained by multiple contingencies. For example, an escape plus a tangible condition (transition) to represent
instances when a student transitioned from either a low preferred or high preferred activity. That is to say, escaping a transition in order to gain access to a tangible item (computer, toy, etc.). Last, each child was exposed to no less than five trials of each tested condition. Lloyd et al. chose to retain the order from Sigafoos and Saggers (1995), wherein the test segment preceded the control segment for each trial type which is a slight variation from more recent studies (e.g., Bloom et al., 2011, 2013). The test segments ended after 1 min or upon the occurrence of the target behavior (whichever came first). Though the order of the segments was different from Bloom et al. (2011, 2013) the basic components of each trial type were maintained. That is to say, the putative reinforcer was present during the control segments and withheld during the test segments. Similar to both Sigafoos and Saggers (1995) and Bloom et al. (2011, 2013), the occurrence of the problem behavior in either segment terminated that segment. After the TBFAs were complete, researchers collected and graphed the data. The data were then presented to the para-professionals and teachers. The researchers sought additional information to aid in drafting the interventions (e.g., identifying replacement behavior within the student’s skill set). Once an intervention was drafted, the paraprofessional and teachers were trained to implement the interventions which were largely comprised of FCT and DRA + EXT.

The results of the Lloyd et al. (2014) study indicate that the main components of a TBFA can be modified to fit cohesively within a student’s school day and be adapted specifically for circumstances that the student encounters throughout the day. Following implementation of the intervention designed using the results of the TBFA, the
researchers found reductions in target behavior and increases in alternative behaviors across the four participants to varying degrees of success. Two of the four participants demonstrated a clear reduction in challenging behavior as a result of the function-based interventions. The remaining two participants did not show a stable reduction in challenging behavior. One of the primary limitations of this study is that the paraprofessionals were not trained to fidelity prior to implementing the TBFA and the interventions were not drafted by the paraprofessionals but were drafted in collaboration with the teachers and paraprofessionals. It is not anticipated that para-professionals would draft a behavior intervention. However, there has not been a research study where the person who is trained to conduct a TBFA, for example and teacher or behavior specialist, is also responsible for writing the function-based intervention. Additionally, researchers provided coaching and corrective feedback for both TBFA implantation and the implementation of the interventions. Thus, the extent to which paraprofessionals could independently perform these tasks from the perspective of this paper remains unanswered.

Another method for evaluating the effects of interventions based on the results of TBFAs is to implement the specifically indicated intervention and compare the effects to a nonindicated intervention. Rispoli et al. (2015) evaluated the outcomes of both function- and nonfunction-based interventions, where the function-based interventions were drafted from the results of TBFA data. Additionally, researchers sought to evaluate the effects of a professional development program on teachers’ ability to implement TBFAs. Participants in this study included three Head start teachers who had children in
their classroom who engaged in challenging behavior. All three participants were female and ranged from 22 years old to 35 years old. None of the teachers were familiar with TBFA procedures. Participants were children from each classroom who were between the ages of three and four years. The teachers were trained on TBFA procedures in one on one training sessions. They were given a copy of Bloom et al. (2013), a laptop with a PowerPoint presentation, and a DVD containing video clips of each condition of the TBFA that would be used. Teachers also participated in role-plays with live feedback. The role-plays continued until the teacher could implement each condition to 100% fidelity. Researchers in this article did not test for automatic functions as teachers were only taught the escape, tangible and attention conditions. Prior to intervention, the researchers conducted an independent functional behavior assessment (FBA). The teacher and the researchers then met to discuss the how each TBFA condition would be embedded into the student’s school day. Each TBFA was comprised of 10 trials of each condition. Each trial was broken into two 1 min segments (control test). Researchers followed the outline of TBFA procedures outlined in past research (Bloom et al., 2011, 2013; Lambert, 2012; Sigafoos & Saggers, 1995) where the putative reinforcer was present during the control conditions but was withheld during the test conditions. Consistent with past research the occurrence of the target behavior terminated the segment.

The baseline condition for each student was identical, as both the FBA and TBFA identified a tangible function for the children’s target behavior. During baseline, the child was given access to a preferred item for 10s at which point the item was taken away. The
researcher did not respond to any behavior other than the target behavior. If the target behavior occurred, the child was given the tangible item for 30s and the process was repeated. Each baseline session lasted 5 min. Functional communication training was selected for all three participants. The contingency was explained to the child at the beginning of the session and then the researcher prompted the child to say “my turn” or hand the researcher a break card. Additional prompts were provided using a least-to-most procedure. Access to the item was delivered for 30s. Challenging behavior was ignored and no access to the item was provided upon its occurrence.

The researchers selected to use a positive behavior supports model as the non-function-based behavior intervention. This model was in use at the setting and was consistent with school wide positive behavior support methodology. At the onset of each session, the child was told the class expectations. If the child engaged in the target behavior, s/he was reminded of the class expectations. If the child did not engage in the target behavior during the session, they earned a token according to the protocols of the classroom contingency plan.

The researchers employed a reversal design where baseline, function based, nonfunction based, and teacher implemented function-based interventions were alternated. Data were not provided for teacher implementation of the TBFA with the children. For all three participants, rates of challenging behavior remained high in baseline conditions and nonfunction-based interventions. During FCT phases, challenging behavior decreased while the functional communication response increased. This was true for both researcher and teacher implemented interventions. The results of
Rispoli et al. (2015) indicate that teachers can implement TBFAs, as well as implement behavior interventions that are functionally matched. The results also indicate that interventions that are matched to functions obtained from TBFA data were more successful at reducing problem behavior and increasing functional communication responses for these participants.

Researchers have demonstrated that non-behavior analysts can conduct TBFAs in a variety of settings (cf., Kunnavatana et al., 2013a, 2013b; Lambert, Bloom, et al., 2014; Lambert, Lloyd, et al., 2014; Rispoli et al., 2014). In addition, there are several studies indicating that interventions derived from the outcomes of TBFAs can be effective (cf., Bloom, 2013, Lambert, 2012; Lloyd, 2014; Rispoli, 2015; Sigafoos & Meikle 1996). However, the interventions listed previously have been implemented with similar participant populations and treatment settings.

The literature base for TBFA technology, as it relates to residential treatment facilities, is limited, as only one study has been implemented with adults in group home settings (Lambert, 2013). However, Lambert did not investigate the effectiveness of an intervention derived from the results of the TBFA, and only tested that TBFAs could be performed by nonexpert persons working in that setting. There is only one instance in the research body (Schmidt, 2013) where the effectiveness of a TBFA informed intervention was investigated in a residential treatment facility; however, that study focused on young individuals. Thus, while the research body indicates that TBFAs show practical application in school settings with youth as participants, there remains a fairly large gap in the research body as it relates to adults with disabilities residing in group home
settings. Therefore, there remains space within the literature for demonstrating the utility of TBFA technology. Structured single-case studies conducted in an applied setting may be used for initial investigation into this area. The purpose of the current investigation was to evaluate the extent to which a TBFA informed behavior intervention was effective at reducing challenging behavior for an adult with intellectual disabilities residing in a group home setting.
CHAPTER III
METHODS

Stage 1: Training the Behavior Specialists

Behavior Specialist Training Multiple Stimulus Without Replacement

The Behavior specialists, who were employees at a residential service provider agency in Utah, received training from the primary researcher and his advisor to conduct a brief Multiple Stimulus Without Replacement (MSWO) reinforcer assessment (Carr, Nicholson, & Higbee, 2000; see Appendix C) according to the training outline contained in Appendix A. This was done to ensure that the behavior specialists could identify preferred stimuli that are necessary for certain TBFA test conditions (tangible, attention, and the control condition).

The MSWO training included a PowerPoint lecture with video models as well as a role-play with corrective feedback sessions. The role-play and feedback sessions continued until the behavior specialists completed three independent MSWOs with 100% fidelity as measured by adherence to a performance scorecard (see Appendix D).

Behavior Specialist Training Trial-Based Functional Analysis

The TBFA training utilized didactic training deployed through a Power Point presentation and was conducted on the same day as the MSWO. The training material was modified from Lambert, Bloom, et al. (2014). Specifically, the training material described each condition of the TBFA (alone, tangible, escape, attention) and showed
videos of graduate students performing the TBFA conditions. As the slides progressed, questions regarding the correctness or incorrectness of graduate student actor’s performance were asked. Feedback was provided for correct and incorrect answers. The slides did not advance until the behavior specialists provided a correct answer. Role-play scenarios followed the video modeling. The role plays were embedded throughout the Power Point. The role-play was paused, and corrective feedback was given if an error was made. After the initial training was completed, additional role-plays were performed by the behavior specialists. The role-playing scenario was repeated until the behavior specialists could accurately perform three trials of each condition of the TBFA with 100% fidelity as measured by adherence to the performance score-card displayed in Appendix B. This scorecard was modified from past research (Bloom, 2011, 2013; Lambert, 2013; Kunavatanna, 2013a).

**Stage 2: Selecting the Participant**

After the behavior specialists were trained, the researcher requested a list of persons from the residential service provider. The persons referred where those who had not been responsive to past behavior intervention, engaged in high rate problem behavior and whose behavior was not excessively dangerous. The residential service provider referred 18 persons who met the criteria for the study. The researcher visited with the potential participants and obtained consent and or assent as needed. Of the 18 persons referred, 12 of them gave consent and or assented to participate. The researcher then reviewed each of the participant’s current behavior support plans (BSP) and viewed
monthly behavior data collected by the residential service provider. The data analysis was performed to verify that the referred participants met the criteria for inclusion in the study. This process yielded a single adult male participant. Once the participant was identified, the behavior specialist, who was the primary case manager for this participant, was recruited to serve as the behavior specialist who would perform the MSWO, TBFA, baseline and intervention phases of this study.

The participant selected was an adult male participant receiving services through The Division of Services for People with Disabilities (DSPD) and residing in a group-home setting in the Uintah Basin of Utah. The participant is referred to as JA. JA is biologically a 26-year-old male who identifies as a female and chooses to be addressed by preferred feminine pronouns. Therefore, JA will be referred to using feminine pronouns throughout the remainder of this manuscript. JA has a diagnosis of Mild Intellectual disability with a full-scale IQ of 64. Additionally, she is impacted by other mental health disorders including, Gender Dysphoria, Personality Disorder NOS and a loss of residential placement in the past. JA was selected to participate, because she engaged in high rates of challenging behavior (inappropriate verbal statements) and was not responsive to the in-place behavior intervention.

Examples of past inappropriate verbal statements include, making demonstrably false accusations of various types such as; being sexually perpetrated upon, being neglected, and being subject to physical abuse. JA has also engaged in physical aggression and verbal aggression, including threatening others. JA’s existing behavior support plan was developed following a descriptive functional behavioral assessment
(e.g., observations, antecedent-behavior-consequence data). However, that plan was not effective at reducing the challenging behavior to clinically acceptable levels. JA consented to participate in this study by signing an informed consent document that was pre-approved by the University Institutional Review Board and the Utah Department of Human Services Institutional Review Board.

**Stage 3: Development of a Web-Based Application**

The researchers and participant did not live in close proximity. Thus, a web-based application was created to collect the data for this study. The IOA data, treatment integrity data, as well as the frequency and duration of participant problem behavior were collected using this web-based application (see Appendix E). Its use allowed for instantaneous transmission of data from the behavior specialist to the researcher. Persons collecting data logged into a website using their mobile device where the participants behavior intervention plan was embedded. The necessary steps to perform the behavior intervention were listed and questions relating to the necessities of the behavior intervention were asked.

In instances wherein IOA data were collected, the person observing would input data from their mobile device as well. In instances wherein treatment integrity data were collected, the observer would measure the degree to which the interventionist performed the steps as outlined in the web-based application. All data were held in a secured database whereby the researcher could collect, analyze, interpret or make available to persons involved in the project at will.
Stage 4: Conducting the MSWO and TBFA

Setting

The group home setting was arranged to reflect the living arrangements of a typical home. Items included beds, tables, couches, televisions etc. The participant lived with a roommate. The day treatment facility was an open concept program where participants of varying levels of intellectual capacity learn vocational and life skills. The building was roughly 3,000 square feet with a large room for group activities and three smaller rooms. The facility was equipped with a kitchen, large tables, desks, computers, arts and craft supplies and various items common to day treatment centers with similar objectives.

MSWO with participant

A pre-interview with individuals familiar with the participant was conducted to identify items that may serve as reinforcers for the participant. The behavior specialist then completed an MSWO with the participant in the day program setting. This was done to ensure that appropriate stimuli were available for the relevant conditions of the TBFA. The researcher or a trained assistant observed the MSWOs to ensure they were performed correctly (via a treatment integrity score card; see Appendix D).

During the MSWO the participant sat across from the behavior specialist who presented five stimuli and instructed the participant to “pick one.” After one stimulus was selected, the remaining four stimuli were presented in a new arrangement. If the selected item was edible, the participant was allowed to eat the item. If the item was a tangible
object, the participant was afforded the opportunity to interact with the item for a pre-determined amount of time. The prompt to “pick one” was issued again. This process was repeated until all items had been selected. The order in which the stimuli are selected is then recorded and assigned a value commensurate with the order. For example, the stimulus that is selected first is assigned a value of one. After the MSWO was completed the values for each stimulus were totaled and the stimuli were ranked according to that value (Carr et al., 2000).

**Observation**

A 30-min observation was conducted by the behavior specialist to refine the operational definition of the target behavior before the TBFA was performed. Additionally, the Functional Assessment Screening Tool (FAST) was done with the participants residential manager to identify potential factors that may influence the target behavior.

**Response Definition and Measurement**

The target behavior varied greatly with regards to topography thus a name of “Inappropriate verbal statements” was selected. The target behavior was defined as “telling false/elaborate stories or falsely accusing others (i.e., saying another person did something which trespassed on JA’s rights/autonomy/individuality that did not actually happen), engaging in verbal aggression (elevated tone, threats, use of expletives directed towards another, or derogatory and/or demeaning speech directed at another), refusing to comply such as refusing to come to the day service setting, and refusing to eat while
using verbal aggression. Inappropriate verbal statements could include faking or pretending to be injured (e.g., saying that her right hand got hurt today with no visible injury or limitation on use). Non-examples of inappropriate verbal statements would be using expletives or threats not directed towards another person, refusing to comply with a task politely (without verbal aggression as defined), or staff being able to confirm that an injury did occur requires another individual for its occurrence.”

The instances wherein the target behavior occurred were tracked by frequency and by the total duration the target behavior lasted within 1-hour sessions. For example, if the target behavior happened 3 times and the duration of each time the target behavior occurred were 10 min, 15 min, and 3 min, respectively; then the total for that session would be a frequency of 3 with a total duration of 28 min. These measurements served as the dependent variable for this study. The independent variable was the intervention described in this document.

**TBFA Implementation**

The TBFA consisted of 10 trials of the attention and 10 trials of the escape condition. The results of the pre-interview and observation indicated that the target behavior was not engaged in to receive access to tangible items or that the target behavior was maintained by automatic reinforcement. Therefore, only the escape and attention conditions were completed for the purposes of this study. Each trial consisted of up to 2 min control and 2 min test segments. Each segment was terminated upon the occurrence of problem behavior, or when the time elapsed. During the control segment the environment was arranged in order to create an abolishing operation (AO) to reduce the
likelihood that the target behavior will occur. Additionally, the environment was arranged as to create an establishing operation (EO) for the target behavior during the test segments.

During the control segment, the participant was asked to engage in a mildly preferred task or activity that was identified during the MSWO. For JA, the MSWO indicated that sewing, crafts and games or journaling were moderately preferred. The Behavior specialist provided attention in the form of a praise statement every 5 s. After 2 min elapsed the test segment ended with the behavior specialist saying: “I need to do some work now.” The Behavior specialist turned away. Attention was withheld for 2 min or until the target behavior occurred. As a matter of note, the first 5 trials of the attention were performed with the participant engaging directly with the behavior specialist while no other persons were present in the room. These 5 trials did not evoke the target behavior. Thus, the researcher and behavior specialist implemented a divided attention condition for this portion of the TBFA. The divided attention condition was deployed in the day service setting where the participant was performing the moderately performed tasks as described. The target behavior occurred during each of the 5 subsequent trials where other persons were present in the room.

During the control segment of the escape condition, the participant was told she could take a break, play, rest or any other mildly preferred activity. No demands were placed during this time. After 2 min elapsed, the behavior specialist asked the participant to engage in a task that is nonpreferred but typically present in their daily routine. For JA, these tasks included academic tasks, routine chores in the home or hygiene related tasks.
The behavior specialist prompted the participant every 10 s using a least to most prompting strategy. If the participant completed the task, the behavior specialist delivered a praise statement and began a new task using the same strategy. If the participant engaged in the target behavior, the demand was immediately taken away. This segment terminated after 2 min or until the problem behavior occurred.

**Interobserver Agreement and Treatment Integrity**

Data were collected for the purpose of calculating interobserver agreement (IOA) during the MSWO (100% of trials) and during the TBFA (33% of trials). The percentage of IOA during the TBFA sessions was 100%. This was calculated by measuring the number of trials that the behavior specialist recorded a problem behavior and the researcher also recorded a problem behavior during that trial. The number of trials where both the researcher and the behavior specialist agreed were divided by the total number of trials where IOA data were collected. The IOA data were collected in real-time by either the behavior specialist or the researcher. Data collected regarding the occurrence of the target behavior during the TBFAs were calculated as a percentage of trials where problem behavior occurred during each test and control segment of the attention and escape conditions.

Treatment integrity data were collected during the MSWO and TBFA. The researcher measured the degree to which the behavior specialist adhered to the steps outlined in a task analysis for performing a MSWO and a TBFA. In both cases, the number of correct responses was then divided by the total number of possible correct responses and expressed as a percentage. The percentage of steps correct was 100% for
the MSWO and 100% for the TBFA.

**Stage 5: Evaluation of the TBFA-Informed Intervention**

**Experimental Design**

This study used a modification of an ABAB research design. The modification included replacing the “return to baseline” condition found in a typical reversal research design with a probe condition. This probe was performed for ethical concerns as the results obtained during the first session of the probe showed high rates of the behavior target. Thus, continuing to provide reinforcement for this problem behavior would have caused potential harm to the participant and strengthened the target behaviors resistance to intervention. For the purposes of this study, the modified research design (ABCB) was used to evaluate the effects of an intervention developed from the function identified following the TBFA.

**Condition A—Baseline**

Condition A served as a baseline condition wherein the behavior intervention in place at the onset of the study for JA was present. Baseline data were collected for the participant in order to assess the current duration and frequency of the target behavior. During baseline data collection, treatment integrity for the existing behavior service plan (BSP) that met the status quo for this setting was collected. The status quo for this setting is that the behavior support plan includes a functional assessment of some type, that it utilizes positive behavior supports and that there is a description and a list of steps for the interventionist to perform if the person engages in the target behavior or some other crisis
type behavior. The treatment integrity data were collected during 83% of all baseline trials. The treatment integrity for this portion of the intervention was 97% as measured by adherence to a performance checklist hosted on the web-based application. The performance checklist was a description of the steps outlined in the BSP. As a matter of note, the baseline BSP did identify the same function (attention) as the TBFA. However, the intervention was not functionally matched per se and loosely defined multiple behavior targets with interchangeable replacement behaviors the interventionist could prompt the participant to perform.

**Condition B—Function-Based Intervention**

Condition B included a function-based intervention derived from the results of the TBFA. The Behavior specialist, in conjunction with the researcher, used a treatment selection guide to ensure that the selected interventions were research based and functionally matched. The guide was a composite of treatment selection models in the research literature (i.e., Carr, Grow & Leblanc, 2009; Geiger, Carr, & Leblanc, 2010). Additional information was taken from Hanley (2018). Feedback was provided as necessary; however, the primary author of the plan was the behavior specialist as informed by the TBFA, observation data and treatment selection form. The intervention consisted of a functional communication training (FCT) role play exercise between the participant and the intervening staff combined with extinction of the problem behavior (EXT) and differential reinforcement of an alternative behavioral response (DRA). This same intervention would be removed and later implemented a second time according to the experimental design used in this study.
**Condition C—Probe**

Condition C functioned as a return to baseline. Specifically, due to the ethical concerns described above, we conducted a probe wherein instances of the alternative response were placed on extinction (removal of the DRA procedures), the FCT role-play was removed, and occurrences of problem behavior occasioned reinforcement. An example of this included acknowledging her false stories and giving her the type of attention that the problem behavior would normally have occasioned during the baseline phase.

**Condition D—Return to Intervention**

After the probe session, the treatment package consisting of FCT, DRA and EXT were implemented for the second time. This treatment package remained in place until the target behaviors duration and frequency fell to clinically acceptable levels. In this instance, clinically acceptable meant zero instances of the target behavior (see Figure 2 in Results section).

**Interobserver Agreement and Treatment Integrity**

During the baseline and intervention phases of the study, the frequency and duration data that were recorded by the staff were compared against the frequency and duration data recorded by the behavior specialist. The degree to which the frequency and duration data agreed were divided by the total number of opportunities in which IOA data were collected. This correspondence was then expressed as a percentage. IOA data collected during the baseline and intervention phases was 94% across 55% of the
sessions.

Treatment integrity data were collected during 55% of the baseline and intervention sessions. These data were collected by the behavior specialist whilst observing the staff performing the behavior intervention called for during the respective conditions. A separate outline of the behavior intervention was created and placed in a web-based application for both the baseline and intervention conditions. The Behavior specialist then measured the degree to which the intervening staff followed the steps in the outline and recorded them in the web-based application. The correct responses were divided by the total number correct responses in the outline. Treatment integrity data were then expressed as a percentage of steps correct. The percentage of steps correct for baseline and intervention phases were 97% for the baseline condition and 98% during both phases of the intervention condition. As a matter of note, the behavior specialist conducted the probe session.
CHAPTER IV

RESULTS

Figure 1 presents the outcomes of the TBFA gathered by the behavior specialist. A function of access to attention was indicated by seeing a higher percentage of trials with the target behavior during the test phase. The attention test condition showed target behavior occurred during 50% of the time. It is important to note that the target behavior occurred exclusively in settings where the divided attention condition was present, particularly in the day treatment program. Additional data showed that there was 1:1 correspondence for target behavior occurring during the attention test condition when JA was in a group of divided attention format. Furthermore, the target behavior did occur during 10% of the escape test trials and 20% of the attention control trials.

Figure 1. Results of the nonexpert conducted TBFA for participant JA. The results indicate that, when JA was placed in the divided attention condition, she engaged in the target behavior.
As shown in Figure 2, the total duration of challenging behavior was high for the first two baseline sessions lasting 30 min for the first session and 25 min for the second sessions. JA displayed target behavior that decreased dramatically for the following 2 sessions. However, an increasing trend was identified during the last two sessions of the baseline condition. Because of the high duration of challenging behavior shown in the first two sessions, and the increasing trend during the last three sessions of the baseline condition, the intervention phases began. During the intervention condition, the duration of time the participant spent engaging in the target behavior showed an increasing trend during the first three sessions. A reduction in the target behavior to 0 occurrences with total duration of 0 min. for the remaining 5 sessions of the intervention was observed. After JA displayed 0 occurrences of the target behavior, the reversal probe was implemented. The probe session yielded a total of 3 instances of the target behavior.

![Inappropriate verbal statement (JA) 9/4/18](attachment:figure2.png)

*Figure 2.* The effect of a functionally matched intervention informed by the information gathered in a TBFA compared against a “status quo” intervention where the intervention was not informed by a TBFA.
where the total duration lasted 31 min of the 1-hour session. This level of the target behaviors duration was similar to those seen at the onset of the baseline condition. When the intervention was implemented for a second time, JA showed similar levels of the behavior target during the first session as was seen during the first three sessions during the initial intervention phase. The 2nd and 3rd session of the reintroduction of the intervention condition showed a return to 0 target behaviors. The 4th session showed a slight increase in the target behavior (frequency of 1 and duration of 3 min.). Thus, a 5th session was conducted wherein JA did not engage in any target behavior.
CHAPTER V
DISCUSSION

The results of this study provide additional evidence that behavior specialists not possessing a BCBA credential can be trained to conduct TBFAs in group home and day treatment settings. Past researchers have shown that persons not possessing a BCBA credential can be trained to conduct TBFAs in educational settings (Bloom et al., 2013; Kunnavatana et al., 2013a, 2013b). However, group homes and day treatment settings are distinctly different than school settings in the number of persons present, size, location, and relative age of participants.

In addition to supporting the research literature for training professionals not possessing a BCBA credential to conduct TBFAs, this study demonstrated that interventions informed by TBFA outcomes produced better outcomes in treating participant challenging behaviors in residential and day treatment settings relative to interventions that are not informed by TBFA outcomes and are considered the “status quo” for these settings. With the exception of this study, only one study in this literature addressed the efficacy of interventions informed by TBFA outcomes in group home settings (Schmidt et al., 2013). Although this study included only one participant, the results may provide additional evidence to support the claim that interventions drafted from the outcomes of a TBFA are superior to interventions not informed by TBFA outcomes and only contain a file review, indirect information gathering or observation. Past studies have shown that interventions drafted from TBFA outcomes can reduce challenging behavior for children in school settings (Bloom et al., 2013; Rispoli, 2015).
However, there remains a void in the research literature with regard to adult persons with intellectual disabilities residing in group home setting. Although the results of this study are limited to a single case, when the results are combined with the existing literature it may be the case that the common practice of relying on indirect behavior assessments in residential treatment facilities should be exchanged for more favorable FA technology, such as the TBFA.

Due to resource constraints, only one participant was able to participate in this study. The nature of this study, because of its single subject research design, is only appropriate for displaying that this process of drafting a TBFA informed behavior intervention is effective for this participant. Future researchers should include multiple participants receiving various interventions as informed by the results of TBFAs. As it stands, this project is limited in its scope due to its lack of generalizability to similar populations. The interventions effectiveness does, however, provide additional data to suggest that TBFA informed behavior intervention plans are effective at reducing participant problem behavior. However, the strength of the claims this study makes should be evaluated accordingly.

The functional assessment used to draft the BSP was in place during the baseline condition. It identified that the function of the target behavior was maintained by attention. However, there was not a functional assessment performed for each of the target behaviors listed in the BSP. The BSP that was drafted based on the results of the TBFA targeted a specific target behavior with one intervention. Thus, it is possible that the effectiveness of the intervention was due to the fact that the behavior intervention was
drafted using a more advanced behavior analytic technology. Further research should investigate the value of using a treatment selection guide and tighter controls on the quality of BSP’s administered in residential and day treatment settings.

The research design used in this study was limited in its power because the most efficient behavior intervention for reducing JA’s target behavior included Functional Communication Training. FCT has shown that it can be effective at reducing problem behavior as Ghaemmaghani, Hanley, and James (2016) have shown. However, using it in this intervention made it impossible to have a true ABAB reversal design. An ABAB reversal design is the most powerful with regards to demonstrating experimental control for a single subject research project (Cooper, Heron, & Heward 2007). However, removal of the FCT portion of the intervention was impossible because the skills that have been developed during FCT cannot be removed as they are learned skills. The modification selected included temporarily reinforcing the target behavior with the type of attention that was maintaining the target behavior during the baseline condition. When the results of the first session were accounted for, the researcher and behavior specialist agreed that continuing to reinforce the target behavior would prove unethical as this behavior had not been responsive to behavior intervention before the onset of this study. The high rates of target behavior seen during the probe session that was conducted is indicative that behavior intervention that was informed by the TBFA was effective and does show some measure of experimental control. However, the results this study displays and the experimental controls it appears to demonstrate should be interpreted with this limitation considered.
More research is needed in the area of conducting TBFAs for adults with intellectual disabilities as this study will only be the third with this population and was only conducted with one participant. The presence of the researcher, and the researcher’s assistance in drafting the functionally matched behavior intervention, may have led to greater reduction in the participant’s challenging behavior than might be achieved under conditions where the researcher was not present and the primary interventionist is not a board-certified behavior analyst. That is to say, the presence of the researcher and the additional feedback from the researcher may have positively impacted the treatment effects observed. Future research should address the extent to which interventions drafted solely by behavior specialists not possessing BCBA credentials that are informed by the outcomes of a TBFA can generate meaningful behavior change for persons living in residential and other treatment settings. This research could also be extended to other populations in other applied settings.
REFERENCES


APPENDICES
Appendix A

TBFA Training Meeting Outline
TBFA TRAINING MEETING OUTLINE

Basics of functional assessment technology and the Functional Analysis (10-15 minutes)
Preference Assessment, MSWO (15-20 minutes)
  MSWO Roleplay and data collection
  • Procedural Integrity for MSWO at 90% - put in pairs and they score each other
  • IOA for the data from a video and then master data sheet that they score. 100%
Intro to TBFA (20 minutes)
  Attention,
    Description
    Knowledge Test
    Video Model/Live Model
    Role play/Skills Test
  • Take turns role-playing and collecting data and partner can do procedural integrity check
  • 80% mastery to move forward

Escape,
  Description
  Test
  Video Model/Live Model
  Role play

Tangible,
  Description
  Test
  Video Model/Live Model
  Role play

Alone/Ignore
  Description
  Test
  Video Model/Live Model
  Role play

Review
  Protocol
data collection
  Skills test with Feedback
    Retest until mastery - 100%
run 2 sets of each trial type for 1min/segments
Appendix B

TBFA Treatment Integrity Data Sheet
## TBFA Treatment Integrity Data Sheet

<table>
<thead>
<tr>
<th></th>
<th>Attention</th>
<th>Escape</th>
<th>Tangible</th>
<th>Ignore</th>
</tr>
</thead>
<tbody>
<tr>
<td>Did they have a data sheet?</td>
<td>Yes No</td>
<td>Yes No</td>
<td>Yes No</td>
<td>Yes No</td>
</tr>
<tr>
<td>Is the initial information for the trial filled in correctly?</td>
<td>Yes No</td>
<td>Yes No</td>
<td>Yes No</td>
<td>Yes No</td>
</tr>
<tr>
<td>Was the trial embedded during appropriate activities, or did they create an appropriate opportunity for trials?</td>
<td>Yes No</td>
<td>Yes No</td>
<td>Yes No</td>
<td>Yes No</td>
</tr>
<tr>
<td>Did they have the correct items for the condition or did they ensure absence of HP items as the condition requires?</td>
<td>Yes No</td>
<td>Yes No</td>
<td>Yes No</td>
<td>Yes No</td>
</tr>
<tr>
<td>Did they start the control timer?</td>
<td>Yes No</td>
<td>Yes No</td>
<td>Yes No</td>
<td>1st Test Yes No</td>
</tr>
<tr>
<td>Did they engage in the correct behavior during the control trial behavior?</td>
<td>Yes No</td>
<td>Yes No</td>
<td>Yes No</td>
<td>1st Test Yes No</td>
</tr>
<tr>
<td>Did they respond correctly to target behavior during control trial?</td>
<td>Yes No</td>
<td>Yes No</td>
<td>Yes No</td>
<td>1st Test Yes No</td>
</tr>
<tr>
<td>Did they end the control segment correctly?</td>
<td>Yes No</td>
<td>Yes No</td>
<td>Yes No</td>
<td>1st Test Yes No</td>
</tr>
<tr>
<td>Did they start the timer for the test trial?</td>
<td>Yes No</td>
<td>Yes No</td>
<td>Yes No</td>
<td>2nd Test Yes No</td>
</tr>
<tr>
<td>Did they begin the test trial correctly?</td>
<td>Yes No</td>
<td>Yes No</td>
<td>Yes No</td>
<td>2nd Test Yes No</td>
</tr>
<tr>
<td>Did they respond correctly to targeted behavior during test trial?</td>
<td>Yes No</td>
<td>Yes No</td>
<td>Yes No</td>
<td>2nd Test Yes No</td>
</tr>
<tr>
<td>Did they ignore occurrences of non-target problem behavior?</td>
<td>Yes No</td>
<td>Yes No</td>
<td>Yes No</td>
<td>2nd Test Yes No</td>
</tr>
<tr>
<td>Did they correctly score occurrence or non-occurrence in control and test conditions?</td>
<td>Yes No</td>
<td>Yes No</td>
<td>Yes No</td>
<td>2nd Test Yes No</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number Yes/Total Items</th>
<th>/13</th>
<th>/13</th>
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<tbody>
<tr>
<td>% Correct</td>
<td></td>
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<tr>
<td>1/13 = 8%</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>2/13 = 15%</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>3/13 = 23%</td>
<td></td>
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<tr>
<td>4/13 = 31%</td>
<td></td>
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</tr>
</tbody>
</table>
Appendix C

MSWO Data Collection Sheet
# MSWO Data Sheet

**Participant:** __________________________  **Date:** __________________________

**Assessed by:** __________________________  **Time:** __________________________

<table>
<thead>
<tr>
<th>Rank by Trial</th>
<th>Items/Edibles</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>Sum of 1, 2, &amp; 3</th>
<th>Overall Rank (Item with smallest sum is rank #1)</th>
</tr>
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<tbody>
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**Participant:** __________________________  **Date:** __________________________

**Assessed by:** __________________________  **Time:** __________________________
Appendix D

MSWO Procedural Integrity Checklist
**Trial 1**

**MSWO Procedural Integrity Checklist**

<table>
<thead>
<tr>
<th>Correct/Incorrect</th>
<th>Correct Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>+ -</td>
<td>Lay out five items/edibles in a row on the table in front of the client.</td>
</tr>
<tr>
<td>+ -</td>
<td>Tell the client to “pick one” and wait five 5s.</td>
</tr>
<tr>
<td>+ -</td>
<td>If the client touches an item/edible, remove all other items/edibles immediately.</td>
</tr>
<tr>
<td>+ -</td>
<td>Let the client interact with chosen item for 15 s. If item is an edible allow client to eat the edible</td>
</tr>
<tr>
<td>+ -</td>
<td>After 15 s, remove item from client by saying “all done”. If item is edible move on to next step</td>
</tr>
<tr>
<td>+ -</td>
<td>Record the client’s choice on the datasheet by writing the number the item was chosen (i.e. first one chosen write 1, second item chosen write 2).</td>
</tr>
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<td>+ -</td>
<td>Once data is marked, present the unchosen items/edibles in front of the client making sure to change the order of presentation.</td>
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**Number of Correct Steps**

<table>
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<th>Total Number of Steps</th>
<th>Percent Correct:</th>
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<td>30</td>
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**Percent correct from trial 1:**

**Percent correct from trial 2:**

**Percent correct from trial 3:**

**Average of all three trials:**

**Is average above 90%?**
Appendix E

Screenshots of Web-Based Application
A. Initiate Planned Ignore Protocol

**DID THE STAFF RESPOND VERBALLY TO:**

**DID STAFF HAVE A OBSERVABLE PHYSICAL REACTION:**

**IF BEHAVIOR DID NOT CEASE, DID STAFF LEAVE THE IMMEDIATE AREA:**

**INITIALS:** Initials