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Effects of Teacher Training in Trial-Based Functional Analysis via Video Modeling

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ABSTRACT

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Trial-based functional analysis (TBFA) is an efficient strategy for assessing challenging behavior in the classroom and a necessary step in developing effective functional assessment-based interventions (FABI). However, researchers have identified several barriers limiting the applicability of this practice in schools, including difficulty in (a) training teachers to mastery; (b) assessing whether teachers can implement this practice independently, with fidelity, in natural settings; and (c) determining whether teachers can use functional analysis (FA) to identify functions of problem behavior and develop effective interventions. This study will address these gaps in the literature by using a novel approach for training teachers to implement TBFA and develop subsequent behavior plans. Video modeling is an evidence-based practice for helping children in school-based settings acquire new skills, and has some evidence supporting its use with teachers. This study assessed the effects of using video self-modeling in training teachers to conduct TBFA in classrooms. The primary dependent variable was treatment fidelity of teacher implementation of TBFA. Additional analyses included teachers' ability to use student data to identify the function of problem behavior and develop appropriate FABI.

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Functional behavioral assessment, or FBA, is an evidence-based process for evaluating challenging behavior (Wong et al., 2015) as well as a federally mandated course of action for intervening with at-risk learners with disabilities (IDEA, 2004). In this process, intervention agents systematically assess variables within the environment for the purpose of developing effective treatment to improve the behavior (Horner, 1994). Within FBA, interventionists may use either descriptive methods, experimental methods, or both (Alter, Conroy, Mancil & Haydon, 2008). Although there is a robust body of research documenting the efficacy of FBA with and without experimental hypothesis testing (Anderson, Rodriguez & Campbell, 2015; McCahill, Healy, Lydon & Ramey, 2014; Scott et al., 2004), the experimental method, or functional analysis (FA), may be more efficient and effective in determining function, (Hanley, Iwata & McCord, 2003) and therefore identifying relevant function-based interventions.

The evidence base documenting effective approaches for conducting FA in schools is substantial (Mueller, Nkosi & Hine, 2011); however, limited studies have focused on ways of increasing teachers' independence and accuracy with assessment procedures (Bloom et al., 2013; Kunnavatana et al., 2013; Lambert, Lopano, Noel & Ritchie, 2017). Although one approach, trial-based functional analysis (TBFA), was developed as a brief and practical way of conducting FA in schools within naturally occurring conditions (Bloom, Iwata, Fritz, Roscoe & Carreau, 2011; Rispoli, Ninci, Neely & Zaini, 2011; Sigafoos & Sagger, 1995), most studies analyzing this method have used simulated conditions rather than actual classroom contexts (Lloyd, Weaver & Staubitz, 2016). Further, few studies have focused on teacher-led implementation of TBFA procedures. Results from Bloom, Lambert, Dayton and Samaha (2013), Kunnavatana et al. (2013), Lloyd et al. (2015) and Flynn and Lo (2016) all indicated teachers reached criterion

for TBFA; yet despite these promising outcomes, few other researchers have evaluated this practice in schools (Lloyd et al., 2016).

The critical aim of conducting FA is to identify and develop FABI as a means to reduce challenging behavior (Hanley et al., 2003; Hanley, Jin, Vanselow & Hanratty, 2014). However, coinciding with limited studies of teacher-led TBFA is the absence of subsequent reports of teacher-led FABI. To date, only three known studies, Bloom et al. (2013), Lloyd et al. (2015) and Flynn and Lo (2016) have successfully included teacher-led FABI within their TBFA studies and reported positive outcomes for students. Few other teacher-led TBFA studies have incorporated interventions, thereby limiting the applicability of TBFA as a means of reducing challenging behavior (Lloyd et al., 2016). Given the degree to which maladaptive behavior can impact both teachers and students (Anderson et al., 2015) as well the federal mandate to use functional assessment procedures, it is imperative to identify effective training procedures for conducting TBFA that leads to successful development of FABI in schools.

Therefore, the purpose of this study was to examine a novel approach to training teachers in TBFA and developing FABI. The proposed intervention, video modeling, has substantial support as a training practice for children and is a potentially effective strategy for training teachers. This study addressed a gap in the literature by using a measure of treatment fidelity to assess the degree to which teachers can conduct TBFA independently upon viewing video self-models and receiving performance-based feedback. To verify the efficacy of this approach, the results of the TBFA were used to develop teacher-led FABI for students presenting with challenging behavior in the classroom, assessed using traditional direct observation data. The same procedures (i.e., video self-modeling and performance-based feedback; treatment fidelity data) were used to train and assess teachers throughout the study.

Terminology

Key terms were defined as follows for the purposes of this study:

Functional behavioral assessment: Umbrella term used to reference descriptive assessment procedures for challenging behavior that encompass both indirect (e.g., interviews, rating scales) and direct (observational) methods to identify the function of challenging behavior and develop FABI (Hanley et al., 2003).

Functional assessment-based interventions (FABI): Treatment plan based on results of a descriptive or experimental functional assessment that includes manipulation of antecedents and maintaining consequences as a means of reducing challenging behavior (Horner, 1994).

Functional analysis (FA): Specific experimental procedure for directly assessing behavior by manipulating consequences of problem behavior to identify function (Iwata, Dorsey, Slifer, Bauman & Richman, 1982/1984).

Trial-based functional analysis (TBFA): Variation of FA in which intervention agents conduct brief experimental tests of hypothesized functions during naturally occurring routines (Bloom et al., 2011).

Treatment fidelity: The extent to which an intervention (treatment plan) was implemented as intended (Perepletchikova, 2011).

Procedural integrity: The degree to which the study (baseline and experimental procedures) was conducted as intended (Baer, Wolf & Risley, 1987).

Performance-based feedback: Specific, timely information and/or reaction regarding the accuracy of implementation of a TBFA condition (Lloyd et al., 2015).

Video modeling: A training method in which a person is recorded while demonstrating a desired skill. The learner then views the video as he or she practices the skill, with the ultimate goal of demonstrating the skill independently (Franzone & Collet-Klingenberg, 2008).

Video self-modeling: A variation of video modeling wherein the learner is the person recorded performing the skill correctly. Learners watch a video of themselves as a reference during practice sessions until they can demonstrate the skill independently (Franzone & Collet-Klingenberg, 2008).

Training Teachers in Functional Analysis and Intervention

Functional analysis is an empirically validated method using systematic, experimental manipulation to determine function of challenging behavior (Hanley et al., 2003). Although the experimental method is highly effective for developing appropriate interventions in the classroom, it was developed primarily for use in clinical settings and is used less often in schools than descriptive FBA procedures (Anderson et al., 2015). Thus, teachers are seldom trained to implement this practice in schools (Lane et al., 2015) as detailed in the following overview of school-based behavioral assessment and training practices in FA for teachers.

School-Based Functional Assessment

Functional behavior assessment. The purpose of FBA is to identify functional variables relevant to a behavioral event and in doing so, determine if the behavior is maintained by positive or negative reinforcement (Skinner, 1953; Horner, 1994). In school settings, FBA often relies on a descriptive approach to understanding maladaptive behavior, wherein direct observation and interviews are used to develop a well- rounded understanding of the variables affecting the behavior (O'Neill et al., 2015). Although FBA is a widely used approach to reducing challenging behaviors within schools (Anderson, Rodriguez & Campbell, 2015; McCahill, Healy, Lydon & Ramey, 2014; Scott et al., 2004), teachers often are unable to conduct this practice independently (Freeman, Simonsen, Briere & MacSuga-Gage, 2014).

Two challenges of conducting FBA are time and complexity: FBA is a lengthy process that involves collecting, observing and analyzing data from multiple individuals and contexts, which can present barriers within school-based settings (Anderson et al., 2015; Roscoe, Phillips, Kelly, Farber & Dube, 2015). Furthermore, data gathered from descriptive methods are challenging to interpret and are often incorrect or inconclusive (Hanley et al., 2003). Due to these limitations, FA presents an appealing alternative or addition to FBA, as it is typically the more efficient and accurate method of identifying functions of behavior (Hanley et al., 2003).

Functional analysis. Functional analysis (FA) is an experimental approach used to verify the function of the behavior through a series of controlled FA test conditions relative to a control condition (Iwata et al., 1982/1994). In the test conditions for FA, the antecedent motivating operations (MO) are systematically altered to evoke the problem behavior, then positive or negative reinforcement is delivered contingent on problem behavior to assess whether the behavior is maintained by access to or escape from varied stimuli (Iwata et al., 1982/1994). Traditional conditions include testing attention, escape, tangible, and alone (sensory) functions of problem behavior, although numerous variations of those conditions have been documented within the literature (Carr, LeBlanc & Love, 2009). Some researchers recommend synthesizing contingencies within test conditions, such as assessing escape to attention as a possible function (Hanley et al, 2014). In either case, function then is verified by comparing rates of behavior across control and test conditions. For example, if a student had higher rates of problem behavior during a series of attention conditions relative to escape conditions, it would indicate the function of the behavior was access to teacher or peer attention (Hanley et al., 2003). This information would then inform an intervention to make attention contingent on an appropriate or functionally equivalent replacement behavior instead of problem behavior.

Despite empirical evidence indicating the experimental assessment approach is more precise than descriptive methods alone (Carr et al., 2009; Lane et al., 2015), interventionists face similar issues to FBA when conducting FA in schools (Anderson et al., 2015; Hanley, 2012). These issues include time, complexity of knowledge and limited understanding of behavioral principles (Lloyd et al., 2016; Lydon, Healy, O'Reilly, & Lang, 2012; McCahill et al., 2014; Freeman, Simonsen, Briere & MacSuga-Gage, 2014). A significant additional barrier with implementing traditional FA is the perceived risk associated with intentionally evoking and reinforcing maladaptive behavior (Hanley, 2012, Lloyd et al., 2016). Additionally, for novice practitioners, understanding and replicating the multitude of variations of FA conditions identified within the literature (Lydon et al., 2012) can be challenging in the classroom.

To address these barriers, Hanley (2012) developed a number of recommendations for practical implementation of FAs; including utilizing brief (e.g., five minutes or less) conditions, reducing the number of conditions, and identifying synthesized conditions specifically individualized for the learner based upon open-ended interviews. Hanley (2012) also recommended use of quicker and more efficient variations of FA that are easier for teachers to implement. Given these recommendations, several studies have subsequently reported more practical methods of conducting FA in classrooms (Rispoli et al., 2014).

Trial-based functional analysis. In recent years, classroom-friendly versions of FA, such as brief FA and trial-based FA (TBFA) have been developed and applied successfully in schools (Bloom et al., 2011; Mueller, Nkosi & Hine, 2011). TBFA is particularly suitable for classrooms as procedures allow for conditions to be conducted quickly and efficiently in naturally occurring routines within school settings (Bloom et al., 2011; Rispoli et al., 2014). This practical approach to FA is conducted within daily activities to identify the function of problem

behavior (Sigafoos & Sagger, 1995; Bloom et al., 2011). Like traditional FA, test conditions may include attention, control, escape, tangible and alone (Bloom et al., 2011). Trials are brief (e.g., 2-4 minutes) and consist of a control condition wherein the motivating operation is absent and a test condition wherein the motivating operation is present (Bloom et al., 2011). For example, in an 'escape' trial, a control condition consists of a two-minute period wherein no demands are presented and the teacher does not interact with the student. Within this time period, the teacher does not provide consequences for the challenging behavior or introduce any other stimuli. After two minutes, the test condition begins by presenting a demand (usually a task presumed to be aversive to the student). The condition ends after two minutes if no behavior occurs. If the child engages in the target behavior in either the control or test segment, the segment is ended. Several trials per day can be conducted in this manner. TBFA is embedded into typical routines within the classroom and conducted until a behavioral pattern is established and function is determined by analyzing condition(s) with the highest rates of behavior. As such, trial-based FA is considered an efficient and flexible model for implementing FA in schools (Bloom et al., 2011)

Several studies, including Bloom et al. (2013), Kunnavatana et al. (2013), Lloyd et al. (2015) and Flynn and Lo (2016), have reported positive outcomes for training teachers to conduct TBFA in schools. All four studies used measures of treatment fidelity to assess accuracy of teacher implementation of TBFA conditions and three of the studies also included implementation of FABI with students (Bloom et al., 2013, Flynn & Lo, 2016; Lloyd et al., 2015). However, Lloyd et al. (2016) and Anderson et al. (2015) reported that few other studies included teachers as intervention agents.

Some of the issues with using teacher-led FA can be seen in a study led by Lambert et al. (2017). This study specifically focused on conducting teacher-led FA in a school-based setting,

but researchers conducted FA training when school was not in session (specifically, after school on Friday and during the day on Saturday). While Lambert et al. (2017) acknowledged this as a limitation within the design, it was a concession in focusing on teacher-led implementation. This type of limitation also was noted in a meta-analysis conducted by Mueller et al. (2011), who reviewed 90 studies and concluded that FA continues to present challenges in schools, mostly due to complexities associated with implementation in classrooms. As such, many studies continue to be led by researchers regardless of the setting (Mueller et al., 2011). Affirming these findings, Lloyd et al. (2016) conducted a review of research on TBFA in schools and found that only two studies conducted conditions in classrooms. Therefore, there is limited research demonstrating both effective training approaches for teachers (Kunnavatana et al., 2013; Lambert et al., 2017) and applicability of TBFA in classrooms (Bloom et al., 2013). This gap in the literature impacts the ecological validity of TBFA as the relevance of this practice for teachers (Lloyd et al., 2016).

Training Practices in FA for Teachers

Ecological validity of training in schools. The environment where training takes place has been shown to have a significant impact on outcomes of the assessment itself as well as interventions developed for students (Schlichenmeyer et al., 2013). One of the critical factors in conducting FA is isolating behavior-consequences relations within specific environments to determine whether a functional relation is present; if FA is conducted in an isolated setting, relevant natural consequences are altered and the outcome of the FA is impacted. Specifically, if test conditions do not represent the conditions within the classroom or typical routines, the FA can produce false-negative or false-positive results (Dolezal & Kurtz, 2010; Mann & Mueller,

2009). As such, the ecological validity of FA outside of classroom setting may be limited and impact a teacher's ability to implement relevant interventions (Lloyd et al., 2016).

Conducting FA outside of classroom settings has implications for both the teacher and student. False results may lead to identification of inappropriate intervention strategies and potentially increase challenging behavior inadvertently (Iwata & Dozier, 2008; Martens & Lambert, 2014). Equally as likely is the implementation of ineffective interventions and lack of impact on student behavior (Lloyd et al., 2016). Not only are ineffective interventions potentially harmful to the student (Iwata & Dozier, 2008; Martens & Lambert 2014), but if a teacher is not able to design an effective intervention upon completion of the FA, there is little likelihood that a teacher will use FA again in the future (McCahill et al., 2014). Therefore, best practice indicates training practices in FA should be conducted in classrooms with school-based personnel during naturally occurring conditions in order to produce valid outcomes and develop effective interventions (Lloyd et al., 2016).

Current training strategies for teachers. Researchers have produced extensive documentation of approaches used to train teachers in schools, including lectures, workshops, coaching, modeling, role play, mentoring, rehearsal, feedback, modeling, and written protocols (McCahill et al., 2014; Tomlinson, Gore & McGill, 2018). Only a few approaches are reported as effective in training teachers in FA (Bloom et al., 2013; Kunnavatana et al., 2013; Lambert et al., 2017; Moore & Fisher, 2007; Ward-Horner & Sturmey, 2012). These strategies include modeling and in vivo practice, as well as performance-based feedback, which is critical to demonstrating fidelity and attaining mastery criteria (Bessette & Wills, 2007; Eldevik et al., 2013; Erbas et al., 2006; Lambert et al., 2012; Machelicek et al., 2002; Robinson, 2011; Serna et al., 2015; Wallace et al., 2004; Watson et al., 1999).

Within these studies, though, relatively few findings have included assessment of teacher-led interventions. Specifically, McCahill et al (2014) found that only 5 of 25 studies reported training measures for intervention upon completion of FA. This finding is significant as teachers' ability to conduct FA has no intrinsic value—the only purpose of a behavioral assessment is to develop FABI (Horner, 1994). Moreover, very few studies in schools have used practical FA approaches, such as TBFA (Lloyd et al., 2016), which is highly recommended by Hanley (2012) as a means of increasing use of FA in schools by practitioners. As such, examination of simplified training practices to teach use of efficient FA approaches is needed (Lloyd et al., 2016).

Evidence base of video modeling as a training practice for teachers. Video modeling (VM) is an evidence-based practice for teaching novel skills to students with disabilities (Wong et al., 2015), however, there are few investigations of its efficacy as a training tool for educators. In this method, (Allen, Wallace, Renes, Bowen & Burke, 2010), learners view a video-based demonstration of the skill to be acquired (Franzone & Collet-Klingenberg, 2008). The video can be viewed across multiple settings and as many times as needed, until the learner is able to demonstrate the skill independently (Franzone & Collet- Klingenberg, 2008).

A number of variations of VM have been developed over time, with four specific types defined by Franzone and Collet-Klingenberg (2008): Basic video modeling, video self-modeling, point-of-view video modeling and video prompting. Basic video modeling is a recording that depicts another individual performing the desired task or activity, video self-modeling is a recording of the learner performing the desired task or activity, point-of-view modeling is a recording made of the perspective of the individual who is performing the task or activity, and video prompting is a recording is made of a task or activity broken down as a series of steps with

embedded breaks to allow the individual to view each step and practice it in sequence (Wong et al., 2015; Franzone & Collet-Klingenberg, 2008).

Several meta-analyses have been conducted to synthesize the extensive research on this topic. The majority of studies provide clear and substantial agreement on the efficacy of this practice for children with autism (Ayres & Lagone, 2005; Hong et al., 2016; McCoy & Hermansen, 2007; Wang et al., 2014; Wong et al., 2015), however, little investigation of its utility for other populations has been reported. Specifically, few studies have assessed this approach as a training tool for educational staff, which is highly relevant to training teachers in TBFA given the training gaps identified in the literature.

A comprehensive review of the current literature identified 12 peer reviewed studies on VM for teachers (Haspel, unpublished MS). Analysis of these studies indicates promising results regarding outcomes for training staff in school-based settings. Specifically, all of the teachers within these studies worked with students with disabilities and the majority of the research included participants with minimal experiences or training, indicating it is a successful approach for training practitioners in novel skills. Additionally, the predominant focus of the studies pertained to interventions for supporting or intervening with behavior (Bovi et al., 2017; Deliperi et al., 2015; Digenarro-Reed et al., 2010; Lipschultz et al., 2015; Moore & Fischer, 2007; Pelletier et al., 2010; Rosales et al., 2015; Weldy et al,, 2014). Only one of these studies (Moore & Fischer, 2007) specifically focused on FA, although it did not take place in a school, nor was the intervention teacher-led.

Limited research has been conducted on VM in applied settings or public schools (Bovi et al., 2017; Nottingham et al., 2017). The lack of research in applied settings is significant, as the conditions and resources in university-based settings, private schools, and

alternative/therapeutic programs vary significantly from public schools, where the majority of students with disabilities are placed (National Center for Educational Statistics, 2018). Moreover, even within those settings, many of the interventions with VM have been conducted in simulated conditions, limiting the ecological validity of the training approach. The types of interventions developed within the teacher-based studies utilized either basic video modeling or video self-modeling, and outcomes for participants were consistent across both types of VM. Many of these studies included additional components with the video model, such as voice-over instruction, scripts, and performance-based feedback, to enhance the video models. Despite the limited scope and focus of these studies, substantial and consistent agreement was reported regarding the efficacy of this approach: All of the studies reported teacher improvement from baseline measures as well as overall efficacy of video modeling as a training strategy for teachers.

Summary and Research Questions

Training teachers in TBFA is critical to increasing teacher-led assessment of challenging behavior in the classroom. Given the efficiency of this procedure as well as the federal mandate to use function-based assessment, research on training practices that increase implementation of practical FA procedures by teachers warrant examination. To address this training need, this study examined use of video modeling as a means of improving teacher ability to conduct TBFA accurately in classrooms. This intervention also determined the degree to which teachers could use results from TBFA to develop FABI for students. Therefore, the central research questions guiding this study were:

1. What are the immediate and delayed effects of video modeling and performance-based feedback on teachers' ability to conduct TBFA procedures with fidelity in classrooms?

2. Following results of TBFA, to what extent are teachers able to identify the function of problem behavior and develop appropriate FABI for students?

Method

Participants

Teachers. Primary participants were full time teachers of students with autism in a self-contained setting. Criteria selection for teachers included: (a) currently teaching a student with autism who presented with behavioral challenges, (b) holding a current, valid New Jersey state teaching certificate and an endorsement in special education, and (c) no prior experience in conducting FA, although some exposure to descriptive functional assessment was acceptable. All three teachers were female and between the ages of 30-40 years old. Teacher A held a master's degree with 8 years teaching experience and 4 years working specifically with students with ASD. She had some prior experience and training in functional behavior assessment, but did not have any experience conducting trial-based FA. Her current class included 6 students in 4th through 6th grades and 3 support staff. Teacher B held a master's degree with 9 years teaching experience and 9 years working with students with ASD. She had some training in functional behavior assessment that consisted of online modules and BCBA-led workshops, but no experience independently conducting FBA or trial-based FA. Her class included 5 students in 4th through 6th grades and 4 support staff. Teacher C held a bachelor's degree with 7 years teaching experience and 7 years working with students with ASD. She was currently pursuing her graduate degree in education with a focus on ASD. She had no prior experience or training in functional behavior assessment, nor any experience conducting trial-based FA. Her class included 6 students in 7th through 9th grades and 5 support staff.

Students. Each participating teacher identified a minimum of one student who consistently engaged in maladaptive behavior within his/her educational placement. The maladaptive behavior was required to occur on a consistent basis and disrupt learning of the students and/or learning of others. Given the prerequisite setting described for the teachers, all students were diagnosed with ASD. To receive services under the eligibility category of autism, a medical diagnosis must be provided by a medical professional and educational eligibility must be determined by a multi- disciplinary team within a child's school district. A medical diagnosis is given if the child meets criteria under the Diagnostic Services Manual of Mental Disorders (DSM-V, American Psychological Association, 2013) for autism spectrum disorder. Diagnostic measures include structured and unstructured observations with the Autism Diagnostic Observation Schedule (ADOS, 2008) as well as interviews with the Autism Diagnostic Interview (ADI-R, 2003) or Vineland Adaptive Behavior Scale (1984). An educational classification is determined by a multi-disciplinary team that conducts psychological testing, speech language evaluations, educational testing and occupational/physical therapy evaluations to determine a child's level of functioning and eligibility for an individualized educational programming. Neither ethnic background nor age were a criteria for inclusion or exclusion within this study.

Student A was a male, 6th grade student who communicated verbally using full sentences. He had a comprehensive vocabulary but perseverated on a limited range of topics. Academically, he was on a kindergarten level for reading, writing and math. He presented with frequent vocal outbursts that interrupted his learning as well as the learning of others. These outbursts were often sustained for periods up to an hour. Student B was a male, 5th grade student who did not have any formal mode of communication, although he was currently learning PECS Phase I and could, at times, point and reach to indicate preference. Academically, he was

working on learning readiness skills such as following one-step directions, sorting and matching. He presented with frequent and severe self-injurious behavior in the form of biting; he had bandages wrapped around each wrist to minimize injury, although scarring was noted on his skin. He carried a 'comfort' object from home every day that was either a tattered piece of blanket or small stuffed animal. Student C was an 8th grade student who communicated verbally in short one- to three- word phrases. He demonstrated limited vocabulary and used the same phrases repeatedly. Academically, he was on a kindergarten to 1st grade level, with low reading abilities and relatively higher math skills. He presented with inappropriate social interactions that consistently interrupted classroom activities and frequently led to either touching inappropriately, or aggression, such as punching, hitting or kicking.

Setting

This study took place in a New Jersey school district that is 99% urban and 1% rural, and 15.6 square miles. The population consists of 17,892 people. The diversity within the town is 82.39% white, 9.34% black, 6.25% Hispanic, 4.67% Asian, 2.7% two or more races, 13 % Native American, .13% Native Hawaiian and .02% Pacific Islander. The average household income is approximately $78,894 (City Data, n.d.). This county-based, public school serves students with autism in Monmouth and Ocean County, New Jersey. Per the inclusion criteria, all teachers in this study taught in an autism classroom, which is a specific designation under New Jersey state administrative code NJAC 6A:14-4.7 (2016). This designation applies to classrooms in kindergarten through twelfth grade; autism classrooms can enroll up to six students and must adhere to a 1:2 staff to student ratio. All training took place within the teachers' classrooms.

Materials

Materials for this study included: iPads with video recording capability, reinforcers for students, timers, and Microsoft Excel software. This study used video recording software on iPads for two purposes: to record video self-models during in vivo practice and to record all training sessions in intervention and maintenance phase for data collection purposes. Reinforcers for students were determined using a preference assessment and delivered during the tangible condition for TBFA. Digital hand-held timers were used by teachers during all TBFA conditions. The iPads utilized by the researcher was purchased through an existing grant and Microsoft Excel was part of the existing software on her laptop; all other materials, including classroom iPads, reinforcers, and timers were present within the classrooms.

Measures

Teacher behaviors. The primary dependent variable was treatment fidelity of teacher-based implementation of TBFA (percent of steps completed accurately). The secondary dependent variable was teachers' ability to correctly identify the function of the target behavior and develop FABI procedures that matched the identified function. Treatment fidelity checklists served as the dependent measure. The researcher developed the treatment fidelity checklist (Appendix A) based on procedures described by Flynn and Lo (2016), Lloyd et al. (2015), and Siggafoos and Saggers (1995). The checklist included five items evaluating presence or absence of teacher behaviors required to implement each of the traditional experimental conditions (e.g., escape, attention, tangible, and control) and whether each step was performed accurately. The researcher measured treatment fidelity for TBFA by dividing the number of steps performed correctly by the total number of steps and multiplying by 100. Mastery criterion for treatment fidelity was identified as 80% or greater over five consecutive trials, consisting of a control and test segment, for each relevant condition.

To answer the second research question, the researcher developed the secondary measure, the FABI planning sheet (Appendix B) based on procedures described by Sam and AFIRM (2015) and Flynn and Lo (2016). This 7-item checklist evaluated the teacher's ability to identify the function of behavior based on the TBFA data, as well as propose strategies to prevent and respond to the target behavior, an operational definition for the replacement behavior, a teaching strategy for the replacement behavior, a reinforcement plan for the replacement behavior, and a data collection plan to assess the success of the proposed behavior plan. Mastery criteria was defined as 80% accuracy or correctly identifying at least 6 items on the checklist. Accuracy was determined by if the selected intervention rendered the challenging behavior ineffective, inefficient or irrelevant (Horner, 1994).

Student challenging behaviors. To determine function of challenging behaviors, the researcher and teacher watched recordings of each trial and collected data upon completion of each session as follows: Any time a challenging behavior occurred within a test or control segment (each 1 minute in length), the researcher and teacher recorded a plus symbol (+); if no behaviors occurred, the researcher and teacher recorded a minus symbol (-) (see Appendix C). The total number of occurences was then divided by the total number of trials, and multiplied by 100 to yield a percentage. Percentages for each condition were then placed in a bar graph and visually analyzed to determine function.

Experimental Design

This study used two types of single subject designs: A multiple probe and modified multi-element. The multiple probe design was used to evaluate accuracy of teacher-led TBFA as it is ideal for a non-reversible behavior such as skill acquisition. A multiple probe is also ideal when collecting continual data indicating zero and/or low scores is inevitable (Horner & Baer,

1978). Teachers within this study had no prior experience in conducting FA procedures; therefore, no change in behavior or improvement in teacher performance during baseline conditions was anticipated. In this design, the baseline condition is maintained across participants while intervention is introduced systematically in a staggered or time-lagged approach (Horner & Baer, 1978). A functional relation is determined if data show a change in level or trend only upon introduction of the intervention. In this study, all participants initially completed a single probe to assess prior knowledge of TBFA, then baseline probes were staggered across tiers (i.e., were conducted in each tier immediately prior to introducing the intervention). The treatment for the second participant was not introduced until the first participant met criterion levels, and the treatment for the third participant was not introduced until the second participant met criterion levels (Horner & Baer, 1978). Additional probe data were gathered during the maintenance phase to demonstrate the sustained effects of the intervention across all conditions.

The researcher used a modified multi-element design (Lloyd et al., 2015) to determine function of student behavior during the TBFA. The multi-element design type is optimal to compare change across conditions when concurrent presentations of two or variables are rapidly alternated across or within sessions (Kazdin, 2010), which in this case was variations of attention, escape, tangible and for one student, alone conditions. This design was modified as trials were conducted in concurrence with naturally occurring daily routines across several days, rather than rapidly alternated as in traditional daily sessions.

Procedures

Recruitment. The researcher first contacted school districts participating in a professional development partnership agreement with Monmouth University. The agreement

included institutional review board approval as well as school board approval to conduct training-related research within district autism classrooms. Using purposive sampling, the researcher selected the first school that expressed interest in the training and had both the teachers and students that met study criteria.

The researcher presented an overview of the study via an in-person presentation during a faculty meeting and invited teachers who work with students with autism in self-contained classrooms to participate in this training. During this presentation, the researcher reviewed all components of the training process (e.g., completing data collection sheets, interviews, meeting with the researcher, identifying times for classroom observations, consent to videotaping for video modeling purposes, participation in video modeling training for TBFA, conducting TBFA and conducting interventions with students). Additionally, the researcher addressed confidentiality by ensuring no administrators were present while reviewing the voluntary consent form that included a list of all measures teachers were expected to completed, and explained that all data would be used for research purposes, but that no identifiable teacher information would be shared.

After reviewing the consent form, the researcher provided the opportunity to ask additional questions and emphasize that use of data for research purposes was voluntary. Participants then indicated if they would like to participate in the study by completing a paper consent form (Appendix D) by marking either, “Yes, I would like the data collected during this professional development used for research purposes” or “No, I do not want the data collected during this professional development used for research purposes” and placing it in an envelope that was gathered at the end of the session.

Upon completion of the training presentation, the researcher requested that teachers contact her via email to volunteer participation; she then selected the first three teachers who self-identified as having a student with behavioral challenges and met all other inclusion criteria. Upon affirming teacher consent, the researcher shared criteria for student selection for TBFA. If the teacher felt a student met criteria, consent was obtained from the student's parent in accordance with district procedures.

Pre-assessment. Once teachers were enrolled in the study, they completed a pre-assessment to confirm the need for training in TBFA beyond having access to freely available materials. First, the researcher provided the teachers with a verbal explanation of TBFA based upon procedures described by Bloom et al. (2011) as well as a packet containing several documents which the teachers completed independently prior to beginning the individualized training sessions. On completing the following measures, teachers returned the packet & emailed the researcher to schedule trainings. Each pre-assessment packet contained an overview of training procedures (Appendix E) as well as the following:

1. A paper copy of a researcher-developed demographic questionnaire (Appendix F), which was a brief measure used to identify relevant personal and professional information for each teacher. The professional information was designed to identify potentially confounding variables, such as prior experience and/or training in functional analysis.
2. The Open-Ended Functional Assessment Interview (OAFAI, Hanley, 2002/2009; Appendix G), a 20 item, open-ended interview used to develop rapport with teachers, identify putative contingencies pertaining to challenging behavior and conduct safe

and efficient analysis of behavior in classrooms; it was modified slightly for the purposes of this study to identify potential variables for students.

3. A link to the Autism Focused Intervention Resource Module (AFIRM) on Functional Behavior Assessment (Sam & AFIRM Team, 2015), a freely available online training module that was created based upon findings from a meta-analysis on evidence-based practices conducted by Wong et al. (2015) and published by the same researchers at the National Professional Development Center on Autism Spectrum Disorder. It was selected due to content within the module that specifically focuses on hypothesis testing or experimental analysis within functional assessment.
4. A blank TBFA description sheet (Appendix H). This researcher-developed measure was used to determine if teachers could select and describe appropriate conditions for students prior to training. It contained pre-identified sections (e.g., control/test) required for each condition (e.g., escape, attention, tangible); however, each condition description was blank.

Baseline. An initial probe of participants' knowledge of TBFA was conducted prior to implementing baseline procedures with the first participant; this probe was implemented by scoring each teacher's written procedures on the TBFA description sheet (Appendix H) via the steps outlined on the treatement fidelity checklist (see Appendix A). Next, teachers completed baseline probes staggered across tiers. During this condition, each teacher demonstrated understanding of TBFA by role-playing the standard test conditions while the researcher simulated the role of the selected student as outlined on their TBFA description sheet (Appendix H). At least one trial of each of the experimental conditions (attention, escape, and tangible) was conducted for baseline purposes (Flynn & Lo, 2016). Participants had access to their written

descriptions for each of the conditions as well as a timer; however, no instructions, prompting or feedback were provided during this time. Baseline data were collected by calculating percentage of steps performed accurately for each TBFA condition by scoring a + for each step completed correctly within a trial (Appendix A) and scoring a - if a step was not performed or not performed accurately.

Treatment: Video self-modeling and performance feedback. There were five components of the training process for teachers: (a) training in standard TBFA conditions, (b) developing individualized TBFA conditions for each student, (c) video self-modeling via role play with the researcher, (d) teacher implementation with the student and performance-based feedback, and (e) scoring student data.

Training in TBFA conditions: The principal investigator conducted all trainings for this study. She is a full time faculty member at Monmouth University and holds a Board Certified Behavior Analyst certification. She has substantial experience conducting FBA in schools, including numerous FA in classrooms. In addition, she has provided extensive training for teachers in the area of Applied Behavior Analysis and developed statewide guidance and professional development for school districts regarding evidence-based practices for students with ASD in public schools.

The researcher scheduled training time with teachers during prep periods or when there was sufficient staff in the classroom setting to allow a meeting of 30-40 minutes. The first part of the training for teachers included a general overview of TBFA as well as detailed explanations of how to: implement conditions within naturally occurring routines, modify teacher behaviors to implement each test condition, use the timer, use the iPad for recording each session, prepare materials in advance, administer the preference assessment (for the tangible condition), and

complete the process for collecting data at the end of each session (Appendix I). After explaining the procedures, the researcher modeled and practiced each of the general TBFA conditions with the teacher following a script (Appendix I).

In the current study, the researcher developed general test conditions in accordance with procedures reported in prior research. Each test condition consisted of 2-min trials as described by Lloyd et al. (2015) and Siggafoos and Saggers (1995) to maximize efficiency within the training process as well as minimize risk factors associated with longer testing conditions, as recommended by Hanley (2012) for practical classroom-based application of FA. Additionally, control conditions were conducted prior to the test condition, as described by Bloom et al. (2011) to reduce the likelihood of carryover of establishing operations from the test component to the control component. Lastly, the researcher used fidelity criteria based upon procedures described by Flynn and Lo (2016) and Lloyd et al. (2015) for classroom-based training in TBFA.

Developing individualized TBFA conditions. To identify student challenging behaviors, the researcher first reviewed results of the OEFAI (Hanley, 2002/2009; Appendix G) with the teacher, then conducted observations during specific time periods identified by the OEFAI (Hanley, 2002/2009): Student A was observed upon arrival to school and transitioning to morning work, Student B was observed interacting with the teacher, transitioning within the room and using the iPad, and Student C was observed during a group work activity and transitioning to gym. The researcher and teacher then revisited the OEFAI (Hanley, 2002/2009) to refine the operational definitions (Table 1) and identify the most relevant test conditions for each student. The response classes of behaviors were labeled as verbal outbursts for Student A, self-injurious behavior (SIB) for Student B, and inappropriate social interactions for Student C. All definitions included pre-cursor and/or accompanying behaviors to the challenging behavior

in order to mitigate potential risk within the classroom, as identified on the OEFAI (Hanley, 2002/2009). For example, the operational definition for Student A included physical noncompliance because it accompanied and/or preceded the verbal outbursts, which could be prolonged and significantly disrupt the learning of other students in the classroom. The operational definition for Student B included stomping and/or aggression because it accompanied the self-injurious behavior, and the operational definition for Student C included calling out student's names because it preceded touching other students inappropriately as well as aggressing toward others.

Next, the researcher discussed the results of the OEFAI with the teacher to select appropriate TBFA conditions for each student. For Student A, he presented with challenging behavior during transitions, but it was unclear if the maintaining consequence was the loss of access to a preferred activity or being presented with a task. Furthermore, when he engaged in target behaviors during tasks, it was unclear if the behavior related to the task itself or access to the teacher, so each of these factors were incorporated into his test conditions. For Student B, his behaviors were fairly pervasive across all conditions and teacher attention was a significant variable, so two types of demand conditions were identified for comparative purposes: 1:1 instruction provided by the teacher and group instruction. Additionally, noise was a significant variable that exacerbated Student B's behavior, so an alone condition was conducted while other students were working in the room making typical noise. For Student C, it appeared that he was motivated by attention from both peers and staff, however, it frequently occurred during work activities, so it was unclear if his primary motive was to avoid work or access attention. Therefore, both peer and adult attention were assessed as well as avoidance of work.

Lastly, the researcher and teacher utilized the IISCA (Hanley et al., 2014) to isolate and/or synthesize specific variables within the environment to eliminate any unnecessary testing conditions. The IISCA included analyzing relevant variables to: (a) identify the topographies of the behavior that will or will not be assessed, (b) the conditions under which the behavior will or will not be assessed, (c) the degree to which different contingencies can be assessed together, (d) the way in which conditions will be arranged within the environment to elicit problem behaviors and (e) the types of materials and/or interactions that will be used in each condition (Hanley et al., 2014). Upon completion of the IISCA, the researcher and teacher selected the most relevant testing conditions for each student. Additionally, they identified naturally occurring routines that the student typically encountered, and were within the student's repertoire of current skills and/or activities (Table 2). Escape variables were selected based on typical work routines with existing academic activities, although the only most challenging or aversive tasks were selected for this condition. For Student A, it was math or writing, while for Student C it was money-related math work. Attention variables were selected with relevance to normal contexts of 1:1 teacher interaction, which varied significantly for each student. For example, Students A and C both enjoyed dialogue with their respective teachers, but Student A was able to have a sustained conversation about a preferred topic and Student C could not sustain conversational exchanges independently. Therefore, conversation and dialogue were part of the attention condition for Student A, while a teacher-led, language-based activity was utilized for Student C. Student B did not have any functional communication skills, so attention from the teacher was activity-based, such as tickles, putting lotion on his hands or playing on the carpet. Tangible variables were selected based student preference (as identified within a preference assessment) and existing routines. For Student A, a variety of toys as well as food items were highly reinforcing, whereas

Student B demonstrated little interest in any object or activity other than the iPad. Student C did not demonstrate any significant preferences for specific tangibles, however, he preferred play time with peers either bouncing on ball, bouncing a ball, or riding scooters in the hall. Lastly, the alone condition was selected for Student B to assess if his challenging behavior had a self-stimulatory function in response to noise within the environment.

An additional aspect of this portion of the training session was dedicated to practicing naturally occurring ways to introduce conditions as well as incorporating appropriate inter-trial intervals to avoid overlapping establishing operations. For the escape condition, the teacher and researcher discussed introducing trials at the beginning of work sessions when a control condition could be conducted while the student was seated at the table and the teacher finishing something with another student or readying materials. For the attention condition, the teacher and researcher discussed conducting a trial during a natural occurring opportunity for 1:1 interactions between the student and teacher, where the teacher could introduce the test component by going to 'check' on another student or attend to another on-going activity in the classroom. For the tangible condition, the teacher and researcher discussed interrupting access to an earned reinforcer or withdrawing an item at the end of a free access period (depending on the student and the identified relevant variables). For the alone condition for Student B, the teacher and researcher discussed 'capturing' him during downtime in the classroom when reinforcers were not available and students were working individually in separate areas in the room.

Upon selection of TBFA conditions for each student, the teacher wrote procedures independently to ensure that she was able to identify functionally relevant conditions for the student; if the teacher did not identify the same functionally relevant conditions as the researcher, the researcher provided direct feedback to assist the teacher to self-correct. The outcome of this

process included identification of individualized test conditions for the student as well as selection of naturally occurring routines within the classroom.

Video self-modeling with the researcher. Next, the researcher conducted in vivo practice and role play with the teacher. The researcher recorded a video self-model of the teacher implementing a TBFA condition accurately while the researcher simulated the behavior of the student. The teacher then viewed the video directly prior to independently implementing the first trial in each TBFA condition with the student, and the researcher answered any questions while viewing the video. Although the video was freely accessible throughout all trials, each teacher only elected to view the simulated self-modeling video one time prior to implementing each type of TBFA condition with the student. Also, once trials were implemented with students, the teacher used the video from the trial with the student as a reference, rather than the video model with the researcher.

Teacher implementation with the student and performance feedback. The teacher implemented each condition with the student, and the researcher video recorded each trial and provided performance-based feedback in between trials. The teacher conducted trials until fidelity for the condition was met, similar to procedures described by Kunnavatana et al. (2013), Flynn and Lo (201) and Lloyd et al. (2015): If an error occurred within a trial, the researcher and teacher, together, viewed the video recording of that trial to identify the error. The researcher provided feedback specific to the teacher behavior in order to correct the error in the subsequent trial. Approximately 1.5-2 minutes were allocated between sessions for performance-based feedback whether or not the teacher reviewed the video of the preceding trial (Flynn & Lo, 2016). At least 5 minutes was provided in between different types of conditions to avoid overlapping establishing operations for student behavior (Lloyd et al., 2015). This procedure

continued until the teacher attained mastery or demonstrated a minimum of 80% accuracy for each condition across 5 consecutive TBFA trials. Dependent on teacher performance and student behavior, teachers implemented trials with students during one session or across several sessions.

Scoring student data. Upon completion of all relevant conditions, the researcher sat with the teacher to view the results of the TBFA sessions to score the data for each condition. The teacher then calculated and analyzed the data, with guidance as needed from the researcher, to determine the function of the behavior. Data were scored by marking a – for the absence of a behavior and a + for the occurrence of a behavior in both control and test segments (see Appendix C). The researcher provided feedback and guidance to the teacher in scoring behaviors accurately and identifying function.

Implementation with video modeling and feedback took place across 2-3 days during 1-4 hour sessions for each teacher. The amount of time spent training as well as number of sessions conducted depended upon teacher availability, student behavior, and number of sessions to reach fidelity. For Teacher A, TBFA with video modeling and feedback was conducted over 2 days for 2 hours each session. For Teacher B, TBFA with video modeling and feedback was conducted over 2 days for 4 hours the first session and 1 hour the second session. For Teacher C, TBFA with video modeling and feedback was conducted over 3 days for 2 hours each session. On average, training to fidelity in TBFA conditions took 5 hours.

Maintenance. After meeting mastery criteria (80% accuracy for each condition across 5 consecutive TBFA trials), the researcher provided the teacher with a data sheet (Appendix C) and asked her to conduct at least five additional TBFA trials for each condition independently within two weeks to demonstrate skill maintenance. Teachers conducted TBFA with similar conditions as previous trials, but interspersed the type of trial dependent upon routines and

available conditions in the classroom. All sessions were self-recorded with a classroom iPad either by the teacher or with assistance from a staff member in the classroom. Maintenance criteria were the same as mastery criteria: 80% accuracy for each condition across 5 consecutive trials.

Debriefing with data analysis and development of FABI. Upon completing all maintenance trials, both the researcher and teacher reviewed the video recordings. The researcher independently scored student data from these videos and then compared the teacher's data to her data to measure accuracy in data collection procedures. Any disagreements were discussed and reviewed by watching the videos again. The researcher then provided the teacher with the FABI sheet (Appendix B), and asked the teacher to complete the sheet based upon the TBFA results. The researcher also completed FABI for comparative purposes. The researcher provided the teacher with guidance and feedback on any area of the FABI that did not align to the trainer's FABI. Mastery criteria for FABI was identified as 80% accuracy or independently identifying at least 6 out of 7 components of FABI correctly. In follow up to the de-briefing, the teacher completed a treatment acceptability rating form (TARF) to assess social validity.

Data Collection and Analysis

Dependent measures. For the primary dependent variable, the researcher viewed videos upon completion of each session to calculate percent of steps implemented accurately. She calculated treatment fidelity data by summing +'s and dividing by the total number of components within the treatment fidelity sheet to determine percentage of accuracy. The researcher plotted the treatment fidelity data on a line graph and analyzed it visually to identify increasing or decreasing trends.

For the secondary dependent variable, the researcher viewed the teacher responses for FABI and compared each of these responses to the ones identified by the researcher. If no assistance was provided and the answer was correct, she scored it as a '1'. If prompting was provided and the answer was subsequently correct, she scored it as a '.5'. If the answer was incorrect and/or left blank, she scored it as a '0'. Scores for each item were then summed and divided by the total number of components on the FABI sheet and multiplied by 100 to determine percent accuracy.

Procedural integrity of training. The researcher used a step-by-step checklist to ensure training was provided correctly across all phases (Appendix J). She used this checklist by checking off each item as it was completed during training sessions. There were four sections within the checklist: pre-assessment, baseline, treatment, and maintenance. Each section mirrored the training process as described in the procedures section of this study. The researcher scored procedural fidelity of each component of the training process by circling a "Y" if a step was implemented or "No" if it was not implemented; a final score was calculated by adding the number of "Y's" and dividing by the total number of steps, then multiplying by 100. Procedural fidelity for teacher training was calculated as 100%.

Reliability. The researcher measured reliability of the dependent variable through inter-observer agreement with a graduate assistant researcher who received training in both TBFA and scoring procedures for the fidelity measure. The researcher calculated IOA for teacher behavior for 50% of sessions reported in the study. IOA also was used to measure reliability of teacher accuracy in identifying the function of student behavior for 50% of trials. In this case, the teacher independently recorded student data and her scores were compared to the researchers' scores. In both cases, scored interval interobserver agreement (IOA) was used, (Cooper, Heron & Heward,

2007) where the number of exact agreements between the two observers were added and divided by the total number of intervals and then multiplied by 100.

Social validity. The researcher used a treatment acceptability rating form (Appendix K) to evaluate teacher perceptions and viability of this training protocol in public school settings. She created this form based upon a social validity questionnaire published by Alnemary et al. (2015). Questions were in a Likert scale format and she analyzed results using descriptive statistics to understand teacher perceptions of video modeling and determine future use of this training strategy in schools.

Results

Teachers

Teacher fidelity of TBFA. Visual analysis of treatment fidelity data indicated zero levels of fidelity during the baseline condition for all 3 teachers and rapid attainment of fidelity criteria for mastery during the first session of TBFA with VM + feedback (see Figure 1). Specifically, Teacher A demonstrated 0% fidelity in implementing TBFA procedures during pre-training and 98.67% accuracy (ranges from 80-100%) across all sessions of TBFA with video modeling and feedback. Subsequent data collected during the maintenance condition indicated an average of 96.25% accuracy with ranges between 80-100%. Teacher B demonstrated an average of 0% fidelity during baseline conditions, an average of 96.00% fidelity during training conditions (ranges from 80-100%), and an average of 97.33% fidelity during maintenance (ranges from 80-100%). Teacher C demonstrated an average of 0% fidelity during baseline conditions, an average of 97.33% fidelity during training conditions (ranges from 80-100%), and an average of 96.00% fidelity during maintenance (ranges from 80-100%.).

Treatment fidelity data were analyzed in relation to errors for each student in order to

understand challenges teachers faced in implementing TBFA conditions in the classroom (see Table 3). The most common error was responding too slowly to a target behavior. This happened most frequently in the attention condition if the teacher's back was turned, or she did not see the onset of the behavior. The second most common error was not responding to a student behavior to end a trial during a test condition, which was typically due to classroom noise and/or having to attend to another student. Further analysis indicated that Teacher A responded too quickly to student behavior during two test segments and ended the trial pre-maturely, and Teacher B exhibited initial difficulty in ignoring the self-injurious behavior during the control segment, and made statements such as "It's ok" in an attempt to soothe the student.

This study included all trials, which meant that there were no failed trials due to potentially confounding variables. However, variables that may have affected onset of behavior were identified for each student. The most significant confounding variable was awareness of the researcher and/or iPad being used to record TBFA conditions. The initial student that Teacher A identified did not exhibit any target behaviors in the presence of the researcher/iPad and, as a result, another student was selected for the study. Student C also demonstrated awareness of the both the researcher and district behaviorist, and engaged in the identified challenging behavior during control segments for the attention condition. Similarly, Student A was aware of being ignored in the control component for the escape condition, and engaged in vocal outbursts. Lastly, Student B obtained access to a juice box during a control segment for an escape trial, which provoked a target behavior. Additionally, noises from other students were present within the environment during several of the control conditions for Student B, which was identified as a trigger to his behavior within the alone condition.

TBFA results. Results of TBFA differed for each student (Figure 2). Data for Student A

showed vocal outbursts occurred during 100% of tangible trials and 60% of escape and attention trials, indicating that the primary function of the behavior was denied access to preferred objects/activities. Additional analysis of student behavior during different test conditions revealed strong distinctions in the topography of the behavior: In the tangible condition, the student immediately engaged in loud vocal outbursts, whereas in the escape and attention conditions, the student in engaged in physical noncompliance, such as drawing on the table, or low level verbal protests, such as asking repeated questions, which preceded the vocal outbursts. It is also important to note that this student demonstrated awareness of the implementation of conditions during two control segments for the escape condition— he repeatedly yelled, “Why is everyone ignoring me?” and became agitated. Each of these occurrences of behavior met criteria identified in the operational definition and were scored as such.

Data collected on challenging behavior for Student B indicated self-injurious behavior occurred during 100% of escape/group trials, 80% of attention trials and 60% of tangible and alone trials; the behavior did not occur during escape/1:1 trials. These data indicate that the primary function of the behavior was avoidance of group-based activities; however, attention from the teacher was a secondary function to his behavior and both tangible and alone conditions provoked the same severity of the self-injurious behavior, albeit to a lesser extent. These data indicated the self-injurious behavior was generalized across functions, which correlated with this student’s lack of functional communication skills.

Data collected on challenging behavior for Student C indicated inappropriate social interactions occurred during 100% of attention trials, and 40% of trials for the tangible condition; the behavior did not occur during escape trials. These data indicate that the primary function of the behavior was access to attention; however, further analysis of these data indicated that the

student primarily called out student names though during the attention component, indicating a stronger motivation for peer interaction.

Development of FABI. The FABI planning sheet (Appendix B) was reviewed with each teacher upon completion of TBFA analysis. Within the review process, each component of the FABI sheet was explained and the teacher was asked to identify or respond to that component verbally and write down her response. Explanations or prompts for each of the components included the following: (a) descriptions: “In looking at the videos, can you describe what the challenging behavior looked like?”; (b) function: “Based upon your data, what is the function of the behavior?”; (c) preventative strategies: “How would you prevent the behavior from occurring in the future?”; (d) response strategies: “How would you respond to the challenging behavior in the future to avoid reinforcing it?”; (e) replacement behaviors: “What behavior or skill would you like to see the student demonstrate instead of the challenging behavior?”; (f) teaching strategies: “How would you teach this skill to the student?”; (g) reinforcement: “How would you reinforce the replacement behavior once it was taught?”; (h) data: “What kind of data would you use to keep track of student progress and evaluate your plan?”

Table 4 shows teachers’ responses to each of these components. All teachers were successful in identifying critical elements of FABI; however, all three teachers needed additional explanation and/or guidance in selecting correct interventions for at least some components. For example, Teacher B needed additional guidance and prompting in identifying preventative strategies, response strategies, and a replacement behavior. The primary challenge with this student was that he did not have any existing independent communication skills; the teacher was able to identify that he needed to communicate with her; however, she wasn’t sure of the most appropriate modality. Although he was beginning to use PECS, the immediacy of the skills that

needed to be taught were not conducive to the PECS system nor his current skill level. Therefore, the researcher provided some treatment options and the teacher identified which would be the most appropriate for this student. Once the teacher determined these components, she was able to identify appropriate teaching, reinforcement and data collection strategies. Additionally, she wanted to address the noise variable identified within the conditions, but previous strategies, such as headphones, were unsuccessful. Therefore, she asked what else could be used to potentially decrease his sensitivity to noise. She was prompted to consider the types of noises that he tolerates or enjoys and she identified music; therefore she identified trialing music as a way to decrease his sensitivity to noises from other students. Additionally, Teacher A and C needed additional feedback/correction in identifying appropriate consequence strategies for the challenging behavior. As such, accuracy in FABI development was scored as 85.71% for Teachers A and C, and 64.28% for Teacher B (M=78.57%). While all three teachers correctly identified the primary function of the behavior, only Teachers A and C attained accuracy criteria in developing FABI.

Student data reflecting FABI implementation were beyond the scope of the current study, however, the researcher, with the district BCBA, discussed, modeled, and practiced FABI implementation with the teacher. Additional elements were suggested by the researcher to enhance efficacy of FABI, and an implementation plan was created upon conclusion of the training process.

Reliability

IOA data were gathered for 50% of teacher training sessions; IOA for teacher implementation of TBFA for Teacher A was 92.0% (range 88-96%); IOA for Teacher B was 94.67% (range 88-100%); and IOA for Teacher C was 96.00 (range 92-100%), indicating

acceptable levels of agreement and good reliability within the training process.

IOA was also conducted for 50% of student behavioral data to assess teacher ability to score challenging behaviors accurately and determine function. IOA for Teacher A was 83.33% (range 70.0-100%); IOA for Teacher B was 92.5% (range 70.0-100%); and IOE for Teacher C was 83.33% (range 70.0-90.0%), indicating acceptable levels of agreement and affirming teacher ability to correctly identify function of behavior upon completion of TBFA.

Social Validity

All teachers strongly agreed ("5") that video self-modeling was a helpful method for learning trial-based FA procedures (M=5). Similarly, all three teachers either strongly agreed ("5") or agreed ("4") that the skills learned were valuable to the population served, and that they would be able to implement trial-based FA as well as develop FABI in the future (M= 4.67, range 4.0-5.0). Teachers A and C strongly agreed or agreed that video self-modeling was easy to use in the classroom (M=3.67, range 2.0-5.0) and Teachers A and C also strongly agreed or agreed that they would participate in video modeling in the future (M= 4, range 3.0-5.0) and recommend it to colleagues (M= 4, range 3.0=5.0). Teacher B disagreed (2) that video-modeling was easy to use in the classroom, and was unsure ("3") if she would participate in video modeling training in the future or recommend it to colleagues. In regard to technical issues, Teachers A & B both disagreed ("3") that there were limited, if any difficulties with video self-modeling while Teacher C strongly agreed ("5") that there were limited difficulties with video self-modeling (M=3.67; range 3.0-5.0).

Teacher responses to open ended questions indicated that they found it to be a helpful or beneficial experience that increased their understanding of student behavior, but had several salient recommendations to enhance training in the future. Teacher A stated that she liked having

the researcher work with her from the beginning, that she liked watching the video trials and discussing [it afterward], but recommended using a more discreet modality to collect the video samples in the classroom. Teacher B said she loved being able to watch the videos to see what happened when she controlled the environment as well as seeing the behavior from a different perspective. However, she said it was difficult to take her own videos [during the maintenance phase] and suggested using a tripod in the future. Teacher C said she like being able to see her student in situations that could cause the behaviors and suggested more time for training in the future.

Discussion

The primary purpose of this study was to evaluate the efficacy of video modeling and performance feedback as a training strategy for teachers in TBFA. This study also sought to determine the extent to which teachers could identify the function of problem behavior and develop appropriate FABI for students following TBFA training. Results indicated that: (a) VM was a successful strategy for accurately training teachers in TBFA, (b) VM is a practical and efficient tool for classroom training, (c) TBFA could be conducted in an ecologically valid way in applied settings, and (d) teachers demonstrated accuracy in identifying function of student behavior, and success in developing FABI.

Data from the current study showed a functional relationship between video self-modeling and teacher ability to implement TBFA with fidelity. Although all three teachers could identify maintaining consequences for some of the conditions during baseline, they could not implement any of the procedures for TBFA. Subsequent treatment fidelity data indicated they could independently implement TBFA conditions upon completion of training with video modeling, as well as sustain and generalize the practice with at least 96% accuracy.

Second, this study demonstrated a practical way of implementing FA in applied settings. In order to make the training process as efficient as possible, all training was conducted per availability of teachers during regular classroom hours. This detail is significant, as it demonstrates that video modeling allows practitioners to acquire and apply novel skills quickly within an applied setting; all three teachers could implement each condition with at least 80% accuracy after viewing the video model only one time. These findings support video modeling as an effective training tool for teachers in implementing TBFA, which is an important contribution to the literature on teacher training.

Third, this study demonstrated ecological validity of assessment procedures through the following means: (a) it successfully utilized the OEFAI (Hanley, 2002/2009) and IISCA to develop the most relevant maintaining contingencies for each student and run only the necessary test conditions, (2), it minimized risk factors associated with conducting FA procedures in the classroom by keeping operational definitions broad enough to intervene with pre-cursor and/or accompanying behaviors, and (3) results from all three TBFAs identified functionally relevant variables from the classroom environment that may not have been identified in simulated or clinical conditions. As such, this study addresses a significant gap in the literature, as identified by Lloyd et al. (2016) and Hanley (2012), in developing practical FA assessment procedures for classrooms.

Lastly, a unique aspect of this study was the use of video self-modeling as the primary training tool. Although there were direct benefits of video self-modeling that were valuable, such as allowing teachers to see themselves implementing conditions successfully, as well as readily see errors after implementing conditions with students, there were also indirect benefits to viewing the videos. These benefits included allowing teachers to easily recognize relevant

variables within the environment in relation to the student behavior, as well as see clear differences in behaviors across conditions. For example, Teacher A saw clear distinctions in the topography of the behavior across conditions and differentiated interventions based upon those conditions (e.g., more time for tangible and asking for help appropriately during demands). Similarly, Teacher B observed that 1:1 work demands did not provoke behavior, which was significant as the student's current programs were on hold due to perceived association with work and severity of the behavior. As such, his academic programs were re-instated with success. Moreover, further analysis of Student B's videos revealed that noises from other students served to provoke and exacerbate behaviors, which was addressed within his FABI. Teacher C was able to observe that her student was highly motivated by attention, but lacked the social skills to initiate and sustain an interaction, which helped her prioritize social skills training within the FABI as well as identify an appropriate modality for instruction (e.g., video modeling with peers). While these FABI are not as comprehensive as those developed by a behavior analyst or someone with behavioral training, they do represent significant growth for each of the teachers who, prior to this study, had not independently conducted any type of functional assessment nor developed FABI.

Limitations and Suggestions for Future Research

There were a few limitations within this study. First, the use of iPads created heightened awareness of the researcher and assessment procedures being conducted. This awareness affected students differently, with one student not exhibiting any behaviors in the presence of the researcher/iPad, and another student attempting to interact with the researcher and looking into the iPad. Other students within the setting also noted the use of the iPad and made statements such as, "Cheese" or asked, "What are you doing?" which could be heard in the recordings of the

videos.

Moreover, the iPads presented challenges for the teachers to use as recording devices during the maintenance phase of the study. Two of the three teachers felt that the iPad was challenging within the classroom setting; Teacher A felt that something more subtle would have been easier to utilize independently, and Teacher B felt that a device such as a tripod would have made it easier. While video modeling does not necessarily require recording all student behaviors, all three teachers stated it was helpful to see the behaviors on the videos afterward when scoring the student data. As such, it would be recommended to use a smaller, more discreet device, such as an iPod, for future research.

There were also the presence of potentially confounding variables present within the environment during many of the trials. While this is an inherent aspect of conducting research in applied settings, it is important to acknowledge of the presence of these variables as it was observed to influence onset of behaviors in several of the conditions.

The last limitation within this study was the lack of data evaluating the effectiveness of FABI developed by the teachers. The primary purpose of any type of functional assessment is to develop effective interventions for students; it is difficult to evaluate the effectiveness of an intervention without student data. While teachers developed FABIs and those interventions were discussed and modeled within the scope of this study, student data was not incorporated. As such, future research should incorporate FABI data to evaluate outcomes for students as well as validate applicability of TBFA as an assessment procedure.

Conclusions

The findings from this study contribute to the growing literature on practical ways to conduct FA in classrooms. Results indicated that video modeling was a successful approach to

training teachers quickly, and efficiently in TBFA, and that the use of videos allowed teachers to accurately identify function and develop FABI. Additionally, integration of modified FA conditions demonstrated how to minimize risk factors associated with experimental analysis of problem behavior, and conduct ecologically valid assessments that result in meaningful outcomes for students. That said, additional investigation is warranted to identify easier ways to utilize technology in the classroom. The video self-models were instrumental in enabling teachers to quickly replicate TBFA conditions, however, the recording devices (e.g., iPads) were distracting, at times, in the classroom. Additionally, teachers identified challenges in subsequently using the iPads, which could hinder independent implementation of TBFA in the future. As such, this study offers promising results regarding use of video self-modeling and performance feedback as a training strategy for teachers, specifically in conducting behavioral assessment procedures, but further investigation is needed regarding the types of technology that can be successfully integrated in classrooms, as well as the ways in which teachers can use the video models effectively.

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Table 1

Overview of Students and Behaviors

	Age	Gender	Diagnosis	Topographical description of challenging behavior
Student A	11y5m	Male	ASD	Verbal outbursts characterized by loud vocal utterances significantly above normal speaking range that typically include repeated (2 or more times) communicative protests that begin with “Why” or “No”; preceded or accompanied by physical noncompliance such as refusing to leave a classroom area or property destruction (e.g., defacing instructional materials)
Student B	10y1m	Male	ASD	Self-injurious behavior characterized by forcefully opening and closing his jaw with upper and lower teeth coming into contact with his wrist or hand; typically accompanied by banging, stomping/jumping and loud guttural vocalizations; may be followed by aggression toward others such as pulling hair, scratching and grabbing
Student C	14y6m	Male	ASD	Inappropriate social interactions characterized by repeatedly calling out student and/or staff names above normal speaking volume during classroom activities and may be followed by verbal taunting, touching others without permission, and/or aggressive acts such as punching, hitting or kicking

Table 2

Selection of TBFA Conditions

Identified conditions from OEFAI	Synthesized variables using IISCA			
	Escape	Attention	Tangible	Alone
Student A Transitioning between preferred and non-preferred activities Work avoidance	*Context* 1:1 instruction *Control* Alone in seat *Test* Teacher presents math or writing task	*Context* 1:1 teacher directed neutral activity *Control* 1:1 conversation/ dialogue *Test* Teacher says, "Let me go check on…" attends to another student	*Context* Free play prior to instruction OR reinforcement in between work sessions *Control* Access to tangible toy/food item *Test* Teacher says, "Can I have__? It's time for work"	*N/A*
Student B Access to preferred items Teacher attention Transition to work	*Context* 1:1 instruction and group activity *Control* Alone in seat *Test* (1:1) Teacher presents matching/sorting (Group) Teacher requests student to join group activity	*Context* Free time *Control* 1:1 teacher attention with tickles/lotion/flo or play *Test* Teacher walks away to put item back or check on another student	*Context:* Free play *Control* Access to iPad *Test*: Teacher says "My turn" or "Let's take a break" and removes iPad	*Context* Down time *Control* Sitting quietly in seat; peers and staff are in room, no attention is being provided; a mat is blocking access to toys and teacher *Test* Same
Student C Teacher/ peer attention Work avoidance	*Context* 1:1 instruction *Control* Alone in seat *Test*: Teacher presents math (money) problems	*Context* 1:1 teacher directed neutral activity *Control* 1:1 teacher directed dialogue *Test* Teacher says "Stay here, I'll be back" and checks on another student	*Context* Free time *Control* Access to peers playing with scooter/ball *Test* Teacher says, "Can you put that away and come over here?"	*N/A*

Table 3

Analysis of Treatment Fidelity

	TBFA post-training		TBFA maintenance	
	Weaknesses in Fidelity	Potentially Confounding Variables	Weakness in Fidelity	Potentially Confounding Variables
Teacher A	Responded too slowly when initiating test trial (1x)	Presence of researcher (for initial student)	Responded too quickly and ending trial in test segment (2x) Did not respond to behavior and end trial in test segment (1x)	Awareness of control component being implemented (2x)
Teacher B	Provided attention for behavior during control segment for attention (2x) Responded too slowly to behavior during test segment (1x)	Noise from other students in room during trials Gained access to a preferred item in control segment for escape (1x)	Responded too slowly to behavior during test segment (2x)	N/A
Teacher C	Responded too slowly to behavior during test segment (2x)	Awareness of researcher and/or district behaviorist recording during control segment for attention (3x)	Did not respond to behavior and end trial in test segment (1x) Responded too slowly to behavior during test segment (2x)	N/A

Table 4

Development of FABI by Teachers

	Teacher A	Teacher B	Teacher C
Function [primary]	Tangible	Escape [group]	Attention
Preventative Strategies	Timer (tangible) "I need help" card [for demands]	Prompt to leave room [if noise is high] Trial music [to compete with noise]	Structured social play/social skills activity
Response Strategies	Reminder [of card]	Model and reinforce [appropriate communication skill]	Show appropriate behavior via video modeling
Description of Replacement Behavior	Ask for more time [tangible] Ask for help [escape]	Ask for a break when noise level is high Ask for help with signal switch	
Teaching Strategies for Replacement Behavior	Practice appropriate requests	Hand over hand modeling to touch signal switch	Greetings, asking questions appropriately, gaining attention from peers [appropriately]
Reinforcement Plan	Positive reinforce appropriate requests	The minute he touches switch reinforce immediately	Peer attention
Data Collection Plan	Self-monitor number of times he puts marbles in [Marble system-marbles for independently asking for help or more time]	Clickers [frequency count]	Cold probe 1x daily

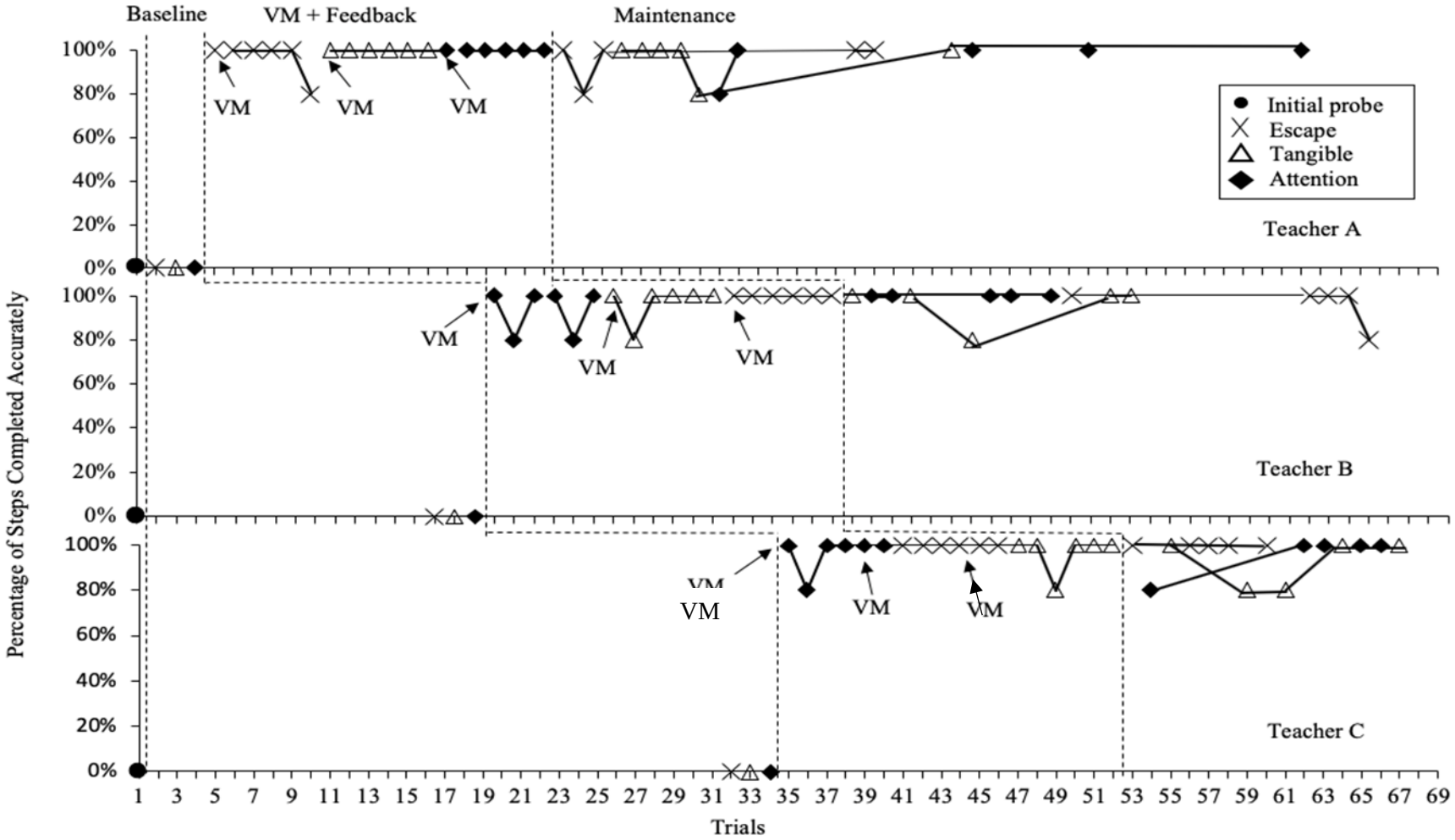

Figure 1. Treatment fidelity of teacher implementation of TBFA. An initial written probe assessed knowledge of all TBFA conditions following general instruction via an online pretraining module. Baseline assessed teachers' correct implementation in role playing TBFA procedures with the researcher. The treatment phase included one trial of video self-modeling with the researcher until the teacher met initial performance criteria, followed by trials with performance-based feedback on independent teacher implementation with students for five consecutive trials with at least 80% of steps completed accurately. Maintenance assessed sustained independent implementation, without performance-based feedback, of at least 5 additional trials for each TBFA condition with at least 80% of steps completed accurately.

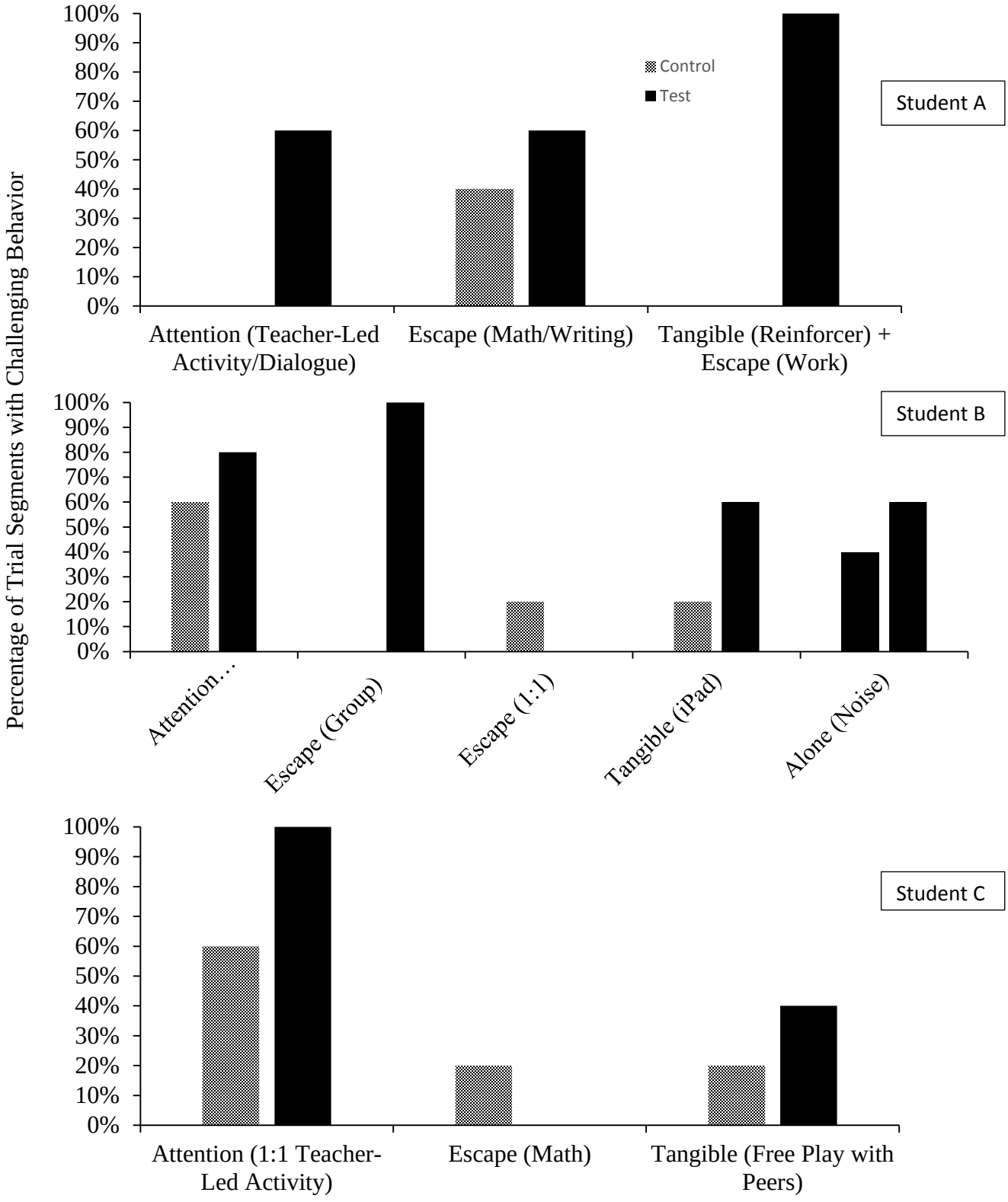

Figure 2. Results of trial based functional analyses for students

Appendix A

Treatment Fidelity Checklist for Teacher Implementation with Students

Condition	Segment	Teacher Integrity	Trial 1	Trial 2	Trial 3	Trial 4	Trial 5
Attention	Control	Provided non-contingent attention	Y N	Y N	Y N	Y N	Y N
		Did not respond to challenging behavior (OR introduce additional EOs)	Y N	Y N	Y N	Y N	Y N
		Withdrew attention at the end of 1 minute	Y N	Y N	Y N	Y N	Y N
	Test	Provided attention only upon occurrence of target behavior (OR did not provide attention for non-occurrences of target behavior)	Y N	Y N	Y N	Y N	Y N
		Ended trial at 1 minute (OR upon occurrence of behavior)	Y N	Y N	Y N	Y N	Y N
		Percent correct	/5	/5	/5	/5	/5
Demand	Control	Did not place demands	Y N	Y N	Y N	Y N	Y N
		Did not respond to challenging behavior (OR introduce additional EOs)	Y N	Y N	Y N	Y N	Y N
		Introduced demands at the end of 1 minute	Y N	Y N	Y N	Y N	Y N
	Test	Withdrew demand only upon occurrence of target behavior (OR did not withdraw demand for non-occurrences)	Y N	Y N	Y N	Y N	Y N
		Ended trial at 1 minute (OR upon occurrence of behavior)	Y N	Y N	Y N	Y N	Y N
		Percent Correct	/5	/5	/5	/5	/5
Tangible	Control	Provided access to preferred item	Y N	Y N	Y N	Y N	Y N
		Did not response to challenging behavior (OR introduce additional EOs)	Y N	Y N	Y N	Y N	Y N
		Withdrew preferred item at the end of 1 minute	Y N	Y N	Y N	Y N	Y N
	Test	Provided access to preferred item upon occurrence of target behavior (OR did not provide access for non-occurrences of target behavior)	Y N	Y N	Y N	Y N	Y N
		Ended trial at 1 minute (OR upon occurrence of behavior)	Y N	Y N	Y N	Y N	Y N
		Percent Correct	/5	/5	/5	/5	/5

Appendix B

FABI Planning Sheet

Date:_____Student:_____Teacher:_____	
Function of Challenging Behavior	
Preventative Strategies for Challenging Behavior	
Response Strategies for Challenging Behavior	
Description of Replacement Behavior	
Teaching Strategies for Replacement Behavior	
Reinforcement Plan for Replacement Behavior	
Data Collection Plan	
Scoring: *1= Correct + Independent; .5= Correct + Prompted; 0= Incorrect/Blank* ___Function___Preventative___Response___Replacement___Teaching___Reinforcement___Data Add all items and divide by max score (7); then multiply by 100=_____% accuracy	

Appendix C

Trial-Based Functional Analysis Data Sheet

Teacher:					**Student:**						**Observer:**			
TBFA Condition	**Trial 1**		**Trial 2**		**Trial 3**		**Trial 4**		**Trial 5**		**Total Control**	**Total Test**	**% Control**	**% Test**
	Control	*Test*	*Control*	*Test*	*Control*	*Test*	*Control*	*Test*	*Control*	*Test*				
Escape											/5	/5	%	%
Attention											/5	/5	%	%
Tangible											/5	/5	%	%
Alone											/5	/5	%	%
Scoring: Place a + if a behavior occurred within a control or test segment														

Appendix D

Monmouth University I.R.B.
Monmouth University
West Long Branch, NJ 07764
Department of Special Education

Teacher Informed Consent for:
Educating Students with Autism Spectrum Disorder:
Assessment of Need for Professional Development within the State of New Jersey

Mary Haspel
(732)293-4611
mhaspel@monmouth.edu

I am engaged in a research study focusing on the professional development needs for teachers of students with autism within the state of New Jersey. The purpose of this research is to obtain information related the use of evidence based practices (EBPs) within self-contained classrooms for students with autism spectrum disorder (ASD). In addition, we aim to train teachers to implement evidence-based practices for students with autism using video-based instruction, performance feedback and coaching (as needed). To help gain further insights into this topic, I will ask you to complete measures related to your use and knowledge of evidence-based best practices for students with ASD and view instructional videos related to implementation of evidence-based practices. You will then be asked to engage in performance feedback which entails video recording of the implementation of chosen evidence-based practices, the completion of a procedural integrity checklist, and performance feedback provided by the principal investigator or district coach. You will work with the principal investigator (PI) and coaches for approximately 20 hours over a 2-3 month time span.
Measures to be completed and used for research purposes: Open Ended Functional Assessment Interview Form (OEFAI (Hanley, 2002/2009)), Procedural integrity checklists, Treatment Acceptability Rating Form (TARF).

The data you provide and anything you say or do during the session will be held in the strictest confidence. By University regulations, this informed consent statement will be filed separately from your responses, so no one will know that the answers/responses you provide are yours. The study involves minimal risk to the participant. You may experience mild disappointment when being presented with potential areas of improvement for your classroom and mild frustration when learning to implement the chosen evidence-based practices. The benefits related to this study, however, are that you could gain a feeling of professional accomplishment when hearing the positive aspects of your classroom and improve as professionals by becoming familiar with evidence based practices for students with ASD. You may also feel relief in being able to share your areas of need in terms of job satisfaction.
The data collected could be presented in the following formats: state of national conferences and/or peer-reviewed publications.

You can ask questions about the research study or about being a participant at any time or by calling me at (732) 293-9611 or via e-mail at mhaspel@monmouth.edu. In addition, for any research questions, please contact Deborah Smith of the Monmouth University Institutional Review Board (IRB) by phone at (732) 263-5726 or via e-mail at irb@monmouth.edu.

Your participation in this study is voluntary and you may withdraw at anytime. You may refuse or discontinue participation at any time without consequence or prejudice.
If your participation in our research has caused you to feel uncomfortable in any way, or if our research prompted you to consider personal matters about which you are concerned, we encourage you to contact the Monmouth County crisis center at (732) 923-6999.
Signing your name below indicates that you have read and understand the contents of this Consent Form and that you agree to participate in this study.

Consent

Yes, I would like the data collected during this professional development used for research purposes.
No, I would not like the data collected during this professional development used for research purposes.

I have read the above information and I fully understand the nature of my participation. I understand that my involvement in this study will be confidential, and that if a summary of the results is used for educational or publication purposes, my individual results will not be identified. I also understand that I have the right to terminate my participation at any time during the study. Lastly, I understand the risks of participating in the study, including the self-consciousness I may feel while participating and I certify that I am over 18 years of age.

_____	_____
Participant's Signature	Researcher's signature after reading the consent statement
_____	_____
Printed Name	Printed Name
_____	_____
Date	Date

Appendix E

Overview of Training Process for Trial-based Functional Analysis

Training Component	Steps	Time Frame	Follow up
Pre Training	Complete pre-assessment packet Complete consent forms Complete OEFAI Complete AFIRM FBA module (print out results from post assessment) Complete descriptions on TBFA sheet	2 weeks	Place all completed forms in folder Email to schedule first training session (allocate 30 minutes to meet at the beginning of session)
Training	Conduct baseline TBFA session Conduct 30 minute TBFA training with Mary Conduct 5-10 TBFA sessions with student	2-3 days (2 hrs/session)	Review video-taped sessions Complete FABI form Email to schedule maintenance sessions
Maintenance	Conduct 5-10 additional TBFA sessions with different student within 1-2 weeks post training	2-3 days (2 hrs/session)	Fill out satisfaction survey and email back
Important information Link to AFIRM module is here: https://afirm.fpg.unc.edu/functional-behavior-assessment			

Appendix F

Teacher Demographic Survey

1. How many years of experience do you have in your current position?
2. How many years of experience do you have in the field of education?
3. How many years of experience do you have working with students with autism?
4. How many students with autism have you worked with in your career?
5. How many hours of professional development have you had in the past year?
6. How many of these professional development hours related specifically to students with autism?
7. If you have received professional development related to students with autism within the last year, what form has it taken (choose all that apply):

    - On campus college course
    - One-to-one coaching or mentoring
    - National Conference
    - Online college courses
    - Printed materials (books, practice guides, etc.)
    - State Conference
    - Teacher Study Group
    - Summer Institute (week long)
    - Webinar (web-based presentation)
    - Website
    - Workshop

8. What levels of students with ASD have you served (choose all that apply)?

    - Pre-k
    - Elementary
    - Middle
    - High
    - Across levels

9. School District Locale in the State of NJ:

    - North
    - Middle
    - South

10. School District Local

    - Urban
    - Urban Fringe
    - Town
    - Rural

11. Describe any training you have completed on functional assessment:

12. Describe any experience you have had in <u>independently</u> conducting functional assessment:

13. Describe any experience you have had in conducting trial-based functional analysis:

Appendix G

Open Ended Functional Assessment Interview Form

Date of Interview: Interviewer:
Respondent: Respondent's relation to child/client:

QUESTIONS TO INFORM THE DESIGN OF A FUNCTIONAL ANALYSIS

To develop objective definitions of observable problem behaviors:

1. What are the problem behaviors? What do they look like?

To determine which problem behavior(s) will be targeted in the functional analysis:

2. What is the single-most concerning problem behavior?

3. What are the top 3 most concerning problem behaviors? Are there other behaviors of concern?

Determine the precautions required when conducting the functional analysis:

4. Describe the range of intensities of the problem behaviors and the extent to which he/she or others may be hurt or injured from the problem behavior.

To assist in identifying precursors to dangerous problem behaviors that may be targeted in the functional analysis instead of more dangerous problem behaviors:

5. Do the different types of problem behavior tend to occur in bursts or clusters and/or does any type of problem behavior typically precede another type of problem behavior (e.g., yells preceding hits)?

To determine the antecedent conditions that may be incorporated into the functional analysis test conditions:

6. Under what conditions or situations are the problem behaviors most likely to occur?

7. Do the problem behaviors reliably occur during any particular activities?

8. What seems to trigger the problem behavior?

9. Does problem behavior occur when you break routines or interrupt activities? If so, describe.

10. Does the problem behavior occur when it appears that he/she won't get his/her way? If so, describe the things that the child often attempts to control.

To determine the test condition(s) that should be conducted and the specific type(s) of consequences that may be incorporated into the test condition(s):

11. How do you and others react or respond to the problem behavior?

12. What do you and others do to calm him/her down once he/she engaged in the problem behavior?

13. What do you and others do to distract him/her from engaging in the problem behavior?

In addition to the above information, to assist in developing a hunch as to why problem behavior is occurring and to assist in determining the test condition(s) to be conducted:

14. What do you think he/she is trying to communicate with his/her problem behavior, if anything?

15. Do you think this problem behavior is a form of self-stimulation? If so, what gives you that impression?

16. Why do you think he/she is engaging in the problem behavior?

Appendix H

Trial-Based Functional Analysis Description Sheet

TBFA Condition	Control Component	Test Component
Escape		
Attention		
Tangible		
Describe each component for each condition as clearly as possible		

Appendix I

Training Script for Teachers

Researcher: In TBFA, there are four different conditions that are tested to determine the function of the student's behavior: attention, escape, tangible and alone. I am going to go over each of these conditions to provide you with a clear picture of what to expect when conducting these procedures in the classroom.

First, it is important to clarify the components of TBFA. In TBFA, there are two components: the control and the test component. Together, these components are considered the 'trial.' but if a behavior occurs at any point within either component, the trial ends. In the control session, you will provide free access and ignore the behavior- so lots of attention, no demands or free access to a preferred item. However in the test condition reinforcement is withheld until the problem behavior is demonstrated. So no attention until a behavior occurs, demand is given until behavior occurs and tangible is withheld until behavior occurs. So what do you think you'll do with your student?

[*Pause to allow for affirmation or questions*]

Researcher: The first condition that we will review is the attention condition. In the attention condition, you will begin with the control component by providing attention for 1 minute. If the target behavior occurs at any point within the minute, you will ignore it. At the end of the minute, you will begin the test condition by withdrawing attention; you can do this by moving away or turning from the child. However, during the test condition, if the child demonstrates the target behavior, you will immediately *provide attention for at least 5-10 seconds* and end the trial. If no target behavior occurs, allow the timer to run for 1 minute.

Now let's practice: I'll be the teacher first and you can be the student- we can use the target

behavior that we have identified for your student, does that sound good? Let's talk about specific attention components that are relevant for your student and integrate them into the practice session

[*Allow time to identify relevant attention variables based on the OEFAI (Hanley, 2002/2009)*]

Researcher: Good! Now, let's get started- I'll control the timer first to allow you to see when it is stopped and started, and then you can control the timer when you practice being the teacher. Mark your data on the sheet provided and we will compare afterward.

[*Allow time to role play the attention condition*]

Researcher: The second condition we will review is the escape condition. In the escape condition, you will begin with the control component again, but this time, you will provide no demands for one minute. Just like before, if a behavior occurs during the control component, you will not respond to it. At the end of the minute, you will begin the test condition by introducing a non-preferred activity or work demand. If the child engages in the target behavior during the test condition, you will remove the *remove the non-preferred activity or work for 30 seconds* and end the trial. If no target behavior occurs, allow the timer to run for 1 minute.

Now let's practice again: Similar to last time, I'll be the teacher first and you can be the student. Before we begin let's talk about specific escape components that are relevant for your student and integrate them into the practice session.

[*Allow time to identify relevant escape variables based on the OEFAI (Hanley, 2002/2009)*]

Researcher: Good! Let's begin. Just like before, I'll control the timer first to allow you to see when it is stopped and started, and then you will control the timer when you are the teacher. Mark your data on the sheet provided and we will compare afterward.

[*Allow time to role play the escape condition*]

Researcher: The third condition we will review is the tangible condition. In the tangible condition, you will begin with the control component by conducting a quick preference assessment and then providing access to the identified preferred item for one minute. If the target behavior occurs at any point within the minute, you will ignore it. At the end of the minute, you will begin the test condition by withdrawing the preferred item; you can do this by saying "My turn" or "Can I see_____?" However, during the test condition, if the child demonstrates the target behavior, you will immediately *provide access to the preferred item or activity for at least 5-10 seconds* and end the trial. If no target behavior occurs, allow the timer to run for 1 minute. Now let's practice one more time: Similar to the other conditions, let's discuss specific tangible components that are relevant for your student and integrate them into the practice session.

[*Allow time to identify relevant tangible variables based on the OEFAI (Hanley, 2002/2009)*]

Researcher: Good! Just like the other sessions, I'll be the teacher first and you can be the student and we will use the same procedures with the timer and data collection.

[*Allow time to role play the tangible condition*]

Researcher: The last condition we will review is the alone condition. We will not role play this condition, but I want to explain it to you so that it is clear how this condition is run in the classroom. There is no difference in the control versus the test condition, so it is simply run in two minute sessions during classroom time. When running the alone condition, it is important to ensure that the student has no access to toys or attention and that there are no demands. Also, it is very important to ensure that you run the alone condition in an area of the classroom apart from other students with no access to instructional materials, toys or staff. Any questions?

[*Allow time to discuss the alone condition*]

Appendix J

Procedural Integrity for Teacher Training

Training Phase	Participant 1	Participant 2	Participant 3
PRE-ASSESSMENT			
Provided demographic survey, OEFAI (Hanley, 2002/2009), link to AFIRM module and TBFA data sheet	**Y N**	**Y N**	**Y N**
Received completed demographic survey, OEFAI (Hanley, 2002/2009), AFIRM post assessment and TBFA data sheet	**Y N**	**Y N**	**Y N**
BASELINE			
Simulated conditions conducted by teacher (attention, escape and tangible)	**Y N**	**Y N**	**Y N**
No feedback, prompting or feedback provided during baseline data collection	**Y N**	**Y N**	**Y N**
Baseline data on treatment fidelity with TBFA collected	**Y N**	**Y N**	**Y N**
TREATMENT			
TBFA Training: In Vivo Practice			
Explanation and practice w/TBFA for escape including: *Materials preparation for escape condition* *Teacher response for escape control condition* *Teacher response for escape test condition* *Procedure for terminating escape conditions* *Procedure for recording data*	**Y N**	**Y N**	**Y N**
Explanation and practice w/TBFA for attention including: *Environmental preparation for attention condition* *Teacher response for attention control condition* *Teacher response for attention test condition* *Procedure for terminating attention conditions* *Procedure for recording data*	**Y N**	**Y N**	**Y N**
Explanation and practice w/TBFA for tangible provided: *Materials preparation for tangible condition* *Procedure for conducting preference assessment* *Teacher response for tangible control condition* *Teacher response for tangible test condition* *Procedure for terminating tangible conditions* *Procedure for recording data*	**Y N**	**Y N**	**Y N**
Explanation and practice w/TBFA for alone including: *Environmental preparation for alone condition*	**Y N**	**Y N**	**Y N**

Teacher response for alone control condition *Teacher response for alone test condition* *Procedure for terminating alone conditions* *Procedure for recording data*			
Development of TBFA Conditions			
OEFAI (Hanley, 2002/2009) and IISCA (Hanley et al., 2014) used to identify appropriate conditions for individual students	**Y N**	**Y N**	**Y N**
Video Self-Modeling w/Researcher			
In vivo practice conducted with TBFA and video self-model created	**Y N**	**Y N**	**Y N**
Explanation of performance-based feedback provided	**Y N**	**Y N**	**Y N**
Teacher Implementation w/Students			
Video self-model viewed directly prior to implementation with student	**Y N**	**Y N**	**Y N**
1.5-2 minutes provided in between trials for performance-based feedback	**Y N**	**Y N**	**Y N**
Feedback provided in between trials- Verbal praise will be provided for implementing TBFA conditions correctly Corrective feedback will be provided for implementing TBFA conditions incorrectly	**Y N**	**Y N**	**Y N**
Access to video self-model provided in between trials as needed	**Y N**	**Y N**	**Y N**
Feedback sessions terminated upon teacher attaining 80% accuracy across 5 consecutive sessions	**Y N**	**Y N**	**Y N**
Scoring Student Data			
Video recording of TBFA sessions will be viewed with teacher; data will be collected by teacher on TBFA data sheet while viewing	**Y N**	**Y N**	**Y N**
MAINTENANCE			
Data collected on implementation on each of the TBFA conditions	**Y N**	**Y N**	**Y N**
Maintenance sessions terminated upon teacher attaining 80% accuracy across 5 consecutive sessions	**Y N**	**Y N**	**Y N**
De-Briefing/FABI Development			
Review of teacher-recorded data and results of TBFA will be used to guide teacher in reviewing their current FABI plan and ensuring appropriateness for each of the following components: *Description of Challenging Behavior* *Function of Challenging Behavior* *Description of Replacement Behavior* *Preventative Strategies for Challenging Behavior* *Response Strategies for Challenging Behavior* *Teaching Strategies for Replacement Behavior*	**Y N**	**Y N**	**Y N**

Reinforcement Plan for Replacement Behavior *Data Collection Plan*			
Feedback provided within de-briefing as needed- *Verbal praise will be provided for identifying intervention components correctly* *Corrective feedback will be provided for identifying intervention components incorrectly*	**Y N**	**Y N**	**Y N**
Total Correct *Circle "Y" for correct implementation, "N" for incorrect or lack implementation*			
Percent Correct *Total # correctly implemented components x 100* *Total # applicable components*	**/22**	**/22**	**/22**

Appendix K

Treatment Acceptability Rating Form

	Strongly Agree	**Agree**	**Unsure**	**Disagree**	**Strongly Disagree**
Video modeling is a helpful method for learning trial-based FA procedures					
Video modeling was easy to use within the classroom setting					
There were limited, if any, technical difficulties with video modeling					
The skills I learned were valuable to the student population I serve					
Based upon this training, I will be able to implement trial-based FA in the future					
Based upon this training, I will be able to develop FABI in the future					
I would participate in video-modeling training in the future					
I would recommend video-modeling to my colleagues					
What do you think worked well in this training?					
What would you change or add to this training in the future?					