Summer 8-17-2018

Evaluation of Real-Time Feedback via Telehealth: Training Staff to Conduct a Preference Assessment

Janelle Ausenhus
University of Nebraska Medical Center

EVALUATION OF REAL-TIME FEEDBACK VIA TELEHEALTH: TRAINING STAFF TO CONDUCT A PREFERENCE ASSESSMENT

by

Janelle A. Ausenhus

A DISSERTATION

Presented to the Faculty of the University of

the Nebraska Graduate College

in Partial Fulfillment of the Requirements

for the Degree of Doctor of Philosophy

Medical Sciences Interdepartmental Area
Graduate Program
(Applied Behavior Analysis)

Under the Supervision of Doctor William J. Higgins

University of Nebraska Medical Center
Omaha, Nebraska

July 2018

Supervisory Committee
Keith D. Allen, Ph.D., BCBA-D Joseph H. Evans, Ph.D.

Therese L. Mathews, Ph.D., BCBA-D

EVALUATION OF REAL-TIME FEEDBACK VIA TELEHEALTH: TRAINING STAFF TO CONDUCT A PREFERENCE ASSESSMENT

Janelle A. Ausenhus, Ph.D.

University of Nebraska, 2018

Supervisor: William J. Higgins, Ph.D., BCBA-D

Effective, efficient, and accessible staff training procedures are needed to meet the service delivery demand for treating individuals diagnosed with Autism Spectrum Disorder (ASD). The present study evaluated the effectiveness of delivering real-time feedback via telehealth to train staff to conduct multiple stimulus without replacement (MSWO) preference assessments. A nonconcurrent multiple-baseline- across-participants showed that remote real-time feedback was associated with short training times and minimal sessions to achieve mastery. Generalization and maintenance probes indicated these skills were transferable to other preference assessments (i.e., edible preference assessments) and learners (i.e., children diagnosed with Autism Spectrum Disorder).

Key words: real-time feedback, telehealth, staff training, preference assessments

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF ABBREVIATIONS

ABA	Applied Behavior Analysis
ASD	Autism Spectrum Disorder
BST	Behavioral Skills Training
DTI	Discrete-Trial Instruction
EIBI	Early Intensive Behavioral Intervention
FO	Free-Operant
IOA	Interobserver Agreement
MSW	Multiple-Stimulus with Replacement
MSWO	Multiple-Stimulus without Replacement
PCBT	Performance-and Competency Based Training
PS	Paired-Stimulus
RBT	Registered Behavior Technician
SS	Single-Stimulus

INTRODUCTION

Applied behavior analysis (ABA) is the application of systematically implementing function-based interventions utilizing the principles of behavior to improve socially significant behaviors (Baer, Wolf, & Risley, 1968). One of the basic principles of behavior widely utilized in behavior analysis is reinforcement. Extensive basic and applied research has evaluated the effectiveness of reinforcement (Arntzen, Brekstad, & Holth, 2006; Skinner, 1938; Skinner, 1953; Skinner, 1981; Vollmer & Hackenberg, 2001). Overall, research has found treatment success to be more likely when potent reinforcers are identified and utilized (Ringdahl, Vollmer, Marcus, & Sloane, 1997). This has led to the widespread application of positive reinforcers for increasing desirable and alternative behaviors during skill acquisition and behavior reduction programming (Hall, Lund, & Jackson, 1968; Johnston, Kelly, Harris, & Wolf, 1966; Karsten & Carr, 2009; Wallace, Iwata, & Hanley, 2006). The use of reinforcement within programming is further supported by the Professional and Ethical Compliance Code for Behavior Analysts (BACB®) recommending the inclusion of reinforcement-based procedures over punishment procedures whenever possible (Code 4.08). Given the wide application of reinforcers in the field of behavior analysis, it becomes essential to evaluate how to train staff to identify stimuli that may function as reinforcers.

Preference Assessments

Clinicians and researchers have utilized both indirect and direct preference assessments to establish preferences and identify stimuli that may serve as reinforcers. Indirect preference assessments rely on opinion, and evaluate preference through surveys, checklists, or client or caregiver interviews (Dewhurst & Cautela, 1980; Fisher et al., 1996; Matson et al., 1999). Although efficient in administration, indirect assessments of preference have not been reliable at identifying reinforcers. Previous research investigating preference assessments found an overall lack of correspondence between indirect reports of preference and direct observation of preference (Green, Reid, Vanipe, & Gardner, 1991; Parsons & Reid, 1990).

Direct assessments of preference, or stimulus preference assessments, increase the likelihood of identifying potent reinforcers (Carr, Nicolson, & Higbee, 2000; Cote, Thompson, Hanley, & McKerchar, 2007; DeLeon & Iwata, 1996; Fisher et al., 1992; Pace, Ivancic, Edwards, Iwata, & Page, 1985; Roane, Vollmer, Ringdahl, & Marcus, 1998). Direct assessments of preference involve the direct observation and measurement of consumer approach or engagement responses when consumers are systematically presented with stimuli (Cooper, Heron & Heward, 2007). Approach or engagement responses are then summarized across trials to create a preference hierarchy or ranking. High correspondence has been found between the stimulus ranking and the reinforcer efficacy of the stimulus (Cannella, O'Reilly, & Lancioni, 2005; Lee, Yu, Martin, & Martin, 2010). Specifically, stimuli with higher rankings are more likely to serve as reinforcers compared to arbitrarily selected stimuli or low-ranking stimuli (Dyer, 1987; Fisher et al., 1992; Kang et al., 2013).

Pace et al., (1985) initially proposed the single-stimulus (SS) preference assessment to directly assess preferences of individuals diagnosed with developmental disabilities. Under the SS procedure, a therapist presents stimuli one at a time and collects data on approach responses (e.g., the child approaching the stimulus with their hand or body). Contingent on approach response, individuals are provided access to the stimuli for five seconds. Approach responses are then summarized across trials. Stimuli approached 80% or more of trials are generally labeled as preferred stimuli, while stimuli approached 50% or less of trials are labeled as low-preferred or nonpreferred stimuli (Pace et al., 1985). Researchers have continued to expand this assessment by varying stimulus presentation and array size. In current behavior analytic practice, single-stimulus (SS; Pace et al., 1985), paired-stimulus (PS; Fisher et al., 1992), multiple-stimulus with replacement (MSW; Windsor, Piché & Locke, 1994), multiple-stimulus without replacement (MSWO; DeLeon & Iwata, 1996), and free-operant (FO; Roane, Vollmer, Ringdahl, & Marcus, 1998) preference assessments are widely utilized.

The assortment of preference assessments allows for preference to be assessed across populations and behavioral repertoires. Preference assessments have been effectively conducted with a wide variety of populations, such as children diagnosed with developmental disabilities (Fisher et al., 1992, DeLeon et al., 1996; Roane et al., 1998), emotional and behavior disorders (Paramore & Higbee, 2005), attention-deficit hyperactivity disorder (Northup, Jones, Broussard, & Jone, 1995), preschoolers (Cote et al., 2007), students in general education classrooms (Daly et al., 2009; Resetar & Noell, 2008), adults diagnosed with schizophrenia (Wilder, Ellsworth, White, & Schock, 2003), and elderly adults diagnosed with dementia (Feliciano, Steers, Elite-Marcandonatou, McLand, & Arean, 2009) to name a few. Selecting what stimulus preference assessment to conduct with a consumer is largely a function of the individual being assessed (Tullis et al., 2011); however, the MSWO preference assessment has some practical advantages over other preference assessments.

Multiple-Stimulus without Replacement Preference Assessment

The MSWO preference assessment is characterized by presenting a variety of stimuli in a semi-circle or line and asking the consumer to select a stimulus from the array (DeLeon & Iwata, 1996). After a stimulus is selected from the array, the consumer is provided access to engage with or consume the stimulus. The remaining stimuli are rearranged and the selected item is removed from the array following engagement or the reinforcement interval. This process continues until no stimuli are left or the consumer stops making selections. Presenting stimuli in this manner allows for the identification of a hierarchy of potential positive reinforcers in an efficient manner (DeLeon & Iwata, 1996; Hagopian, Long, & Rush, 2004). When compared to the PS preference assessment, implementation of the MSWO preference assessment was reported to take half the time (DeLeon & Iwata, 1996). The efficiency of the MSWO preference assessment may be appealing for practitioners due to the ability to conduct frequent assessments of consumer preference more regularly. This appeal can be further substantiated when considering the idiosyncratic and dynamic shift in consumer preferences, (Ciccone, Graff, &

Ahearn, 2007; Hanley, Iwata, & Roscoe, 2006) as well as practitioner service delivery time constraints (Roane et al., 1998). Although the MSWO preference assessment has limitations (e.g., positional bias, consumer ability to choose between stimuli), it has been recommended that practitioners begin with the MSWO preference assessment when initially trying to identify preferred stimuli for consumers, (Karsten, Carr, & Lepper, 2011) because of the relative ease and efficiency of identifying preferred stimuli.

Brief MSWO Preference Assessments

Although the MSWO preference assessment is already brief in nature, an abbreviated MSWO preference assessment was proposed to further improve assessment efficiency. Carr et al., (2000) extended the MSWO literature by developing and evaluating the brief MSWO preference assessment. The brief MSWO employs the same procedures as the MSWO preference assessment (DeLeon & Iwata, 1996), but reduced the iterations of running five MSWO sessions to running three MSWO sessions. Following the completion of brief MSWO preference assessments, Carr and colleagues (2000) conducted a reinforcer evaluation. Stimuli identified as highly preferred in the brief MSWO preference assessments, produced higher rates of responding than moderately preferred and low preferred stimuli. Specifically, rates of responding were increased from baseline levels of responding, lending support to the identification of reinforcers using the brief MSWO preference assessment. Further evaluation of the brief MSWO preference assessment found a partial replication of these results when the highest preferred stimuli served as a reinforcer for six out of the nine participants (Higbee, Carr, & Harrison, 2000). When presented in a concurrent arrangement, highly preferred stimuli identified through daily brief MSWO preference assessments were selected more frequently by consumers compared to highly preferred stimuli identified through an initial extended PS preference assessment (DeLeon et al., 2001).

Evidence-Based Staff Trainings

Research has shown highly preferred stimuli identified through stimulus preference assessments can reliably serve as reinforcers (Canella et al., 2005; Kang et al., 2013; Tullis et al., 2011). However, effective assessments are only as strong as the practitioners conducting the assessments. In order to develop strong practitioners, staff training procedures must emphasize the delivery of effective services with high treatment integrity. Evidence-based staff training procedures emphasize the trainee's demonstration of the skill until mastery or competency (Reid et al., 2003). Specifically, performance-and competency-based training (PCBT) involves a (a) description of the target skill, (b) written instruction, (c) model of the skill, (d) rehearsal of the skill, (e) feedback based on performance, (f) and repetition until mastery (DiGennaro Reed & Henley, 2015; Parson et al., 2012). One type of PCBT frequently used in behavior analysis is behavioral skills training (BST).

BST has been used to effectively train staff to conduct a variety of behavioral procedures including preference assessments (Lavie & Sturmey, 2002; Roscoe & Fisher, 2008; Roscoe, Fisher, Glover, & Volkert, 2006), functional analyses (Iwata et al., 2000), mand training (Nigro-Bruzzi & Sturmey, 2010), and discrete-trial instruction (DTI: Lafasakis & Sturmey, 2007; Sarokoff & Sturmey, 2004). Research shows that staff trained using BST both maintain (Bolton & Mayer, 2008) and generalize these skills to other students and teaching programs (Sarokoff & Sturmey, 2008). Although BST is an effective, evidence-based training procedure, it can also be a lengthy process (Parsons et al., 2012) with reports of training sometimes taking up to 25-40 hours (Fisher et al. 2014; Koegel et al., 1977) per trainee. Time intensive staff training methods can be difficult and cumbersome for organizations to deliver. High demands for services, budget restrictions, and high staff turnover rate may prevent agencies from delivering a time intensive, effective staff training procedure (Jacobson & Mulick, 2000). This may inevitably lead organizations to use ineffective staff training procedures or place inexperienced trainees with consumers. Therefore, efficient and economical alternatives are needed to sustain the necessary practitioners for service delivery (Baer, Wolf, & Risley, 1987).

Researchers have begun to examine providing efficient and economical staff training alternatives by improving and evaluating the effects of single components of BST. In particular, research has evaluated how to maximize the effects of written instructions (Arnal et al., 2007; Fazzio et al., 2009; Severtson & Carr, 2012; Thompson et al., 2012), self-instruction packages (Graff & Karsten, 2012; Shapiro et al., 2016), video modeling (Catania et al., 2009; Deliperi, Vladescu, Reeve, Reeve, & DeBar, 2015; Delli Bovi, Vladescu, DeBar, Carroll, & Saraokoff, 2017; Lipschultz, Vldescu, Reeve, Reeve & Dipsey, 2015; Moore & Fisher, 2007), and feedback (Leblanc, Ricciardi, & Luiselli, 2005; Machalicek et al., 2010; Roscoe, Fisher, Glover & Volkert, 2006). A component analysis of BST found feedback to be the most effective component in staff acquiring the skills to implement functional analysis conditions (Ward-Horner & Sturmey, 2012). When provided a social validity questionnaire, two out of the three participants indicated that they both liked feedback the best and found it to be the most effective training component.

Feedback

The delivery of feedback alone has been found to be effective at increasing appropriate behaviors in consumers and training staff. Leitenberg, Agras, Thompson, and Wright (1968) assessed the effects of feedback on two participants' exposure to phobic stimuli using a reversal design. During the feedback condition, participants were given a stopwatch to check their progress of time they were in the room with the phobic stimuli. Results indicated improvements in duration of time spent in the room during the feedback only conditions compared to the no feedback conditions. With regards to staff training, Roscoe and colleagues (2006) evaluated the effects of feedback alone on training staff how to conduct MSWO and PS preference assessments. Using a multiple-baseline-across- participants design, they compared the impact of performance feedback versus contingent money on staff skill acquisition of preference assessment procedures. Following baseline, an immediate increase was found in the performance feedback conditions across preference assessments. Skills exposed to the contingent money condition only increased following the introduction of performance feedback. The results of this study demonstrated that staff could quickly obtain the skills needed to implement preference assessments by using feedback alone.

It is not surprising that feedback is an effective component. Feedback has a longstanding history within the field of behavior analysis and is one of the most frequently used components in staff training (Jahr, 1998), supervision (Reid, Parson, & Green, 2011; Turner, Fischer, & Luiselli, 2016)), and behavior change programs within organizations (Prue & Fairbank, 1981). Feedback has more evidence than any other strategy for improving and maintaining daily staff performance (Reid et al., 2011). According to Alvero et al., (2001), more than half of the research published in the *Journal of Organizational Behavior Management*, the journal producing the highest frequency of articles on behavior analytic staff training procedures (Reid, O'Kane, & Macurik, 2011), included some form of feedback. The incorporation of feedback within staff training programs is further supported by the ethical obligation of behavior analysts to deliver feedback to improve supervisee performance (BACB®, 2014, Code 5.06).

Feedback is appealing to use in a staff training procedure, because it only requires time and effort as a resource (Reid et al., 2011). Although time is a precious practitioner resource, providing feedback does not require extensive tangible and monetary resources other staff training procedures require (e.g., video modeling, didactic presentations, etc.). Instead, the trainer discusses what the individual performed well (i.e., positive feedback) and what could be improved upon in the future (i.e., corrective feedback) based on observed behavior. Feedback has been found to be essential for maintaining acquired skills (Adkins, 1996; Fleming & Sulzer-Azaroff, 1989; Reid, Parsons, & Jensen, 2015; Realon, Lewallen, & Wheeeler, 1983; Ryan & Hemmes, 2005), as well as acquiring skills when other BST components have failed to meet mastery criteria (Bishop & Kenzer, 2012; Roscoe et al., 2006; Shapiro et al., 2016).

While the acquisition and maintenance of skills is essential, behavior analysts must also consider how skills taught during staff trainings might generalize. Programming for generalization during training can encourage the implementation of the learned skills across consumers, settings, and behaviors (Stokes & Baer, 1997). Feedback might promote the generalization of skills by two different generalization strategies: making the instructional setting similar to the generalization setting and by maximizing contact with reinforcement in the generalization setting (Cooper, Heron, & Heward, 2007). As previously stated, feedback is commonly used when initially training skills, as well as in the continued supervision of acquired skills. The prevalent use of feedback across settings increases the likelihood that the skills learned in the instructional setting may meet similar feedback contingencies within the generalized setting. Specifically, the delivery of feedback as a consequence to observed performance may serve as a reinforcer (Miltenberger, 2001) and shape high treatment integrity overtime (Alavosius & Sulzer-Azaroff, 1990).

Timing is an important consideration for consequence delivery. Consequences that immediately follow behavior will have the greatest impact on behavior (Sidman, 1960). If feedback is to serve as a reinforcer, it should be provided immediately after the targeted behavior occurs. Specifically, feedback that is immediate, positive, specific, and corrective has been found to be effective (Scheeler, Ruhl, & McAfee, 2004; Van Houten, 1980). Immediate feedback, or real-time feedback is feedback delivered within moments of the observed behavior (Coulter & Grossen, 1997; O'Rilly, Renzaglia, & Lee, 1994; Sigurdsson & Austin, 2008; Scheeler, McKinnon, & Stout, 2012). Real-time feedback has been utilized to train teachers how to implement three-term contingencies (Scheeler, McAfee, Ruhl, & Lee, 2006; Scheeler et al., 2012) and functional analysis conditions (Machalicek et al., 2010). The demonstrated success of feedback, coupled with the readily available means to improve performance, support staff, and promote an enjoyable workplace (Reid et al., 2011) makes the use of real-time feedback in a staff training procedure appealing.

Telehealth

Research training staff how to conduct MSWO preference assessments have relied heavily on providing training using face-to-face contact (Lipschultz et al., 2015; Pence, St. Peter, & Tetreault, 2012; Roscoe et al., 2006; Roscoe & Fisher, 2008; Weldy, Rapp, & Capocasa, 2014). However, relying on face-to-face contact limits the individuals able to receive training to those who reside in proximity to training facilities. Telehealth is one modality that can increase accessibility when travel to clinical sites or home is not viable for training staff. Telehealth is the delivery of healthcare services through telecommunication technologies (e.g., audio, video) from a distance (Jennet et al., 2003). Although relatively new for training providers in behavior analytic procedures, telehealth has been used within healthcare since the 1960's (Bashshur & Shannon, 2009). An advantage of this service delivery modality is that training can be provided to any person who has Internet access (Fisher et al., 2014). Widespread internet access is more obtainable than ever (File, 2013). Per the U.S. Census Bureau, (2012) approximately 75% of U.S. households are able to access the Internet. Accessibility to the Internet means that service delivery and training is no longer dependent on location. As long as there is secure internet connection, there is no limit to who can receive staff training; allowing providers to deliver training and treatment from anywhere, at any time (Baggett et al., 2010).

Fisher and colleagues (2014) evaluated a comprehensive behavior analytic training program using a 40-hour virtual BST staff training program to implement behavior reduction and skill acquisition protocols during play and DTI. Participants exposed to the virtual training program rated the training as socially acceptable and made statistically significant improvements in their implementation of behavior reduction and skill acquisition programming compared to the waitlist-control group. This research is a big step in demonstrating that behavior analytic staff trainings can be delivered via telehealth. Research studies using single-subject designs have also found telehealth to be effective at training staff how to conduct functional analyses (Barretto et al., 2006; Frieder et al., 2009; Machalicek et al., 2009a; Machalicek et al., 2010; Wacker et al., 2013a), functional communication training (Suess, Wacker, Schwartz, Lustig, & Detrick, 2016; Suess et al., 2014; Wacker et al., 2013b), discrete-trial instruction (Hay-Hansson & Eldevik, 2013) and preference assessments (Higgins et al., 2017; Machalicek et al., 2009b). However, a majority of the previously mentioned research has provided some form of face-to-face assistance in conjunction with telehealth services (Barretto et al., 2006; Wacker et al., 2013a; Wacker et al., 2013b)

Higgins et al., (2017) is one of the first studies to deliver BST via telehealth with no face-to-face assistance when training staff how to conduct MSWO preference assessments. Three participants with no prior training in implementing stimulus preference assessments were given written instructions based on the procedure section of DeLeon and Iwata (1996). During baseline, all participants implemented preference assessments with 50% or below accuracy. Following baseline, participants were exposed to a 24-minute multimedia presentation, descriptive feedback from previously recorded baseline sessions, and scripted roleplay with immediate feedback. Following exposure to the telehealth training package, two out of three participants implemented MSWO preference assessments with high treatment integrity. These skills were found to maintain and generalize to children diagnosed with ASD. One participant required a tailored training, when her skills did not generalize. Following a tailored training, this participant met mastery criteria. In all, training and training sessions took between 4-6 hours for each participant.

As evidenced by the cited research, telehealth is gaining traction as a means to deliver behavior analytic services and train staff. Primarily, services and training delivered via telehealth have utilized BST methodology. Although effective, using BST to train staff via telehealth can produce some complications. Telehealth prevents the direct on-site modeling, rehearsing, or assistance of engaging in the skill (Suess et al., 2014). Therefore, the trainer must be creative in how they will effectively engage in BST components when communicating via a computer screen. Real-time feedback on the other hand can readily be delivered through teleconferencing communication. As soon as the behavior is observed through the computer screen, immediate feedback can be provided.

To date, the amount of research is limited in evaluating the effects of real-time feedback delivered via telehealth. Machalicek et al., (2010) examined the effects of real-time feedback delivered via telehealth to train teachers how to implement functional analyses. The intervention proved to be time efficient with a mean of 75 minutes (range: 60-95 minutes), however experimental control was not demonstrated. Treatment was implemented when trainees' skills were improving, making it impossible to discern if trainee skill acquisition was due to real-time feedback alone. Scheeler and colleagues (2012) looked to evaluate the effects of real-time feedback delivered using a webcam and Bluetooth™ on preservice teacher performance of three-term contingencies. During baseline, all participants were exposed to delayed feedback based on their performance. Following exposure to real-time feedback all participants met mastery criteria within three to four sessions. However, within this evaluation, the participants were exposed to some form of feedback throughout baseline and treatment conditions. No data were provided on the participants acquisition of skills when no form of feedback was provided. Therefore, continued evaluation of the effectiveness of real-time feedback is needed.

There are some potential practical advantages to the use of real-time feedback delivered via telehealth. First, as previously discussed the delivery of real-time feedback does not require extensive time and resources to develop training materials. Second, because the training is delivered via telehealth, there is flexibility in the location where training is provided. Finally, the use of a single component to remotely train staff may reduce the amount of training time. The reduced training time would allow practitioners to train a greater number of staff in a variety of skills. If found to be successful, remote real-time feedback has the potential to impact how we train staff.

Purpose

There is a need to evaluate efficient staff training procedures to increase the number of providers able to conduct preference assessments. One way to increase the number of providers is by expanding access to training. Telehealth has the ability to connect trainers and trainees anywhere across the world. Higgins et al., (2017) demonstrated the effectiveness of training staff how to conduct MSWO preference assessments via telehealth. Although effective, using all components of BST required up to 6-hours of trainer time per participant. Real-time feedback has the advantage of not requiring any training materials outside of verbal feedback and has been found to be time efficient in training staff (Machalicek et al., 2010). The purpose of this experiment is to 1) evaluate the effectiveness of real-time feedback delivered via telehealth to train staff how to conduct MSWO preference assessments, 2) assess the maintenance and generalization of these skills, and 3) to measure the social validity of this staff training procedure.

CHAPTER 1: METHOD

Participants

Trainees. Four female participants were evaluated in this study (hereafter referred to as trainees). Trainees recruited in this study were newly hired EIBI staff that reported no previous experience implementing or learning about stimulus preference assessments. Abby (23 years old), Kiley (22 years old), Lucy (23 years old), and Maggie (19 years old) were all working on obtaining a bachelor's degree at the time of this study. In order to participate in this study, trainees were required to have an email address to access the link to start the telehealth sessions. Written consent was obtained prior to the start of the study.

Child. One child (4 years old, female) diagnosed with ASD, receiving 13 hours of EIBI services per week participated. The child included within this study was independently diagnosed by a clinical psychologist prior to participating within this evaluation. The child participant was able to independently scan multi-item arrays, make selections when given the instruction to pick an item, and use one-to-two-word mand utterances. A child diagnosed with ASD was selected to participate in this study, because preference assessments are a routine assessment conducted during clinical service delivery (BACB®, Applied Behavior Analysis: Treatment of Autism Spectrum Disorder: Practice Guidelines for Healthcare Funders and Managers, 2014). Probes were conducted to determine if trainee skills acquired during training with confederates generalized. Informed consent was obtained from caregivers prior to participating in this staff training evaluation.

Confederates: Confederates were recruited to simulate child behavior during MSWO preference assessments. Three registered behavior technicians (RBTs) served as confederates within this evaluation. Confederates were used during training to minimize prolonged consumer exposure to assessments implemented with low treatment integrity. In addition, the use of a confederate allowed trainees to be exposed to a wide variety of responses that can occur during a preference assessment (e.g., simultaneous selection, consecutive selection, no choice, engagement in challenging behavior). Previous research has found trainees implementation of skills demonstrated with confederates to generalize to consumers (Roscoe & Fisher, 2008).

Confederates were provided scripts at the start of each session. Scripts detailed the confederates' responses on each trial (See Appendix A for an example). All scripts were kept out of view from the trainee, but visible to the confederate during the training. Confederates only provided scripted responses and did not provide any feedback to the trainee throughout the entirety of this evaluation. Six confederate scripts were rotated in a quasirandom order across all sessions. Procedural integrity data were collected on the confederates' implementation of the scripted responses across training phases and participants across an average of 41% (range 40 % to 44%) of sessions. Average procedural integrity data were 95% (range, 86% to 100%) for confederate 1, 98% (range, 89% to 100%) for confederate 2, and 98% (range, 94% to 100%) for confederate 3.

Setting and Materials

Training sessions were conducted remotely across two settings. Trainees received their training in a private office in an EIBI clinic. The trainer delivered the training remotely from a private office in a different state. Both settings were equipped with a broadband wireless Internet connection. Following consent, the trainee and trainer never had face-to-face contact.

Videoconferencing was used to provide the live audio and visual connection between the trainee and trainer using VidyoDesktop™. Videoconferencing was achieved by using a Dell Latitude E7470™ laptop computer with a c920 Logitech® HD Pro Webcam (1080p) and a Surface Pro™ tablet with a built-in camera (1080p) at the trainee site. We worked with the university institution information-technologies (IT) department to help ensure our equipment and software allowed for a secure, HIPAA compliant, encrypted connection between the two settings to ensure confidentiality. All sessions were videotaped using Snagit 2018™ to be scored at a later time.

Materials included a laptop computer, HD webcam, SurfacePro™ tablet, videoconferencing software, desks, chairs, preference assessment stimuli (tangibles and edibles), confederate scripts, timers, calculator, writing utensils, and data sheets.

Response Measurement and Interobserver Agreement

Dependent variables. Trainees were taught to implement a brief MSWO preference assessment (Carr et al., 2000). The primary dependent measure was the percentage of brief MSWO skills implemented correctly (see *Table 1* for operational definitions of the 11 component skills). Data were collected on the identification of stimuli to include in the preference assessment (Skill 1), preference assessment implementation (Skills 2-9), and scoring and interpreting preference assessment data (Skills 10-11). Data were summarized as the percentage of component skills implemented correctly, by dividing the number of skills implemented correctly by the total number of opportunities to implement each component skill and converting to a percentage. Some component skills involved multiple responses (e.g., reinforcement interval, presentation of trials). For these component skills, the trainee was required to implement all the steps correctly for that component skill to be scored as correct. If the trainee incorrectly implemented any aspect of the component skill, the entire component skill was scored as incorrect. Trainee skills that were not sampled within a trial were marked as not applicable and were excluded from the total number of trainee skill opportunities (e.g., a trainee would only have the opportunity to ignore challenging behavior if the behavior occurred). The trainee met mastery criteria when they implemented two consecutive sessions with 90% or greater accuracy.

Table 1. MSWO component operational definitions

Target Responses		Operational Definitions
1	Item selection	a) Identifies 6 items to include within the preference assessment based on indicated consumer preference
2	Pre-session exposure	a) Allows learner to sample item prior to conducting first assessment. Provides the child with access to the item for 20s (+/-2) b) Demonstrates the use of each item if the learner has never engaged with item c) Identifies each item by name prior to presenting instruction (first trial only).
3	Presentation of items	a) Arranges items approximately .3m from learner and equidistant from each item (approximately .15m apart) b) Arranges item in line or semi-circle
4	Presentation of instruction	a) Provides learner with instruction to select an item at the beginning of each trial (e.g., “Pick one”)
5	Delivery and removal of item	a) Allows learner 10s to approach item (e.g., point, touch, vocally state) following instruction b) Delivers selected item to learner or allows learner to select single item selected c) Removes unselected item(s) from learner’s view and reach (e.g., removes items from table or places a divider over items)
6	Reinforcement interval	a) Provides learner with selected item for designated 20 seconds (+/-2s) reinforcement interval b) Terminates reinforcement interval if learner stops engaging with item (e.g., says “all done” or hands item back) c) Removes selected item at the end of reinforcement interval (within 2s)
7	Records data	a) Correctly scores learner’s selected item on each trial during reinforcement interval, by writing selected item name in corresponding trial b) Writes NR if no selection is made after trial is represented (see skill 9)
8	Presentation of trials	a) Rotates item arrangement from previous trial b) Does not include previously selected item in array c) Presents all trials until no items are left or learner stops selecting item
9	Response to idiosyncratic child responses	a) Blocks attempts to approach more than one item (simultaneous selection—reaches for two items at the same time; consecutive selection—touches 1 item than another item). -Represents previous trial and repeats instruction b) If no selection is made within 10s, repeats instruction - Removes remaining choices if no selections are made within 20s of original instruction (i.e., 10s after repeated instruction) c) Ignores challenging behavior (e.g., inappropriate play, stereotypy) and continues assessment(e.g., continuing assessment without delivering vocal statements about challenging behavior or altering facial expression
10	Calculates rank order	a) Calculates order in which items are selected in order to determine preference hierarchy. For each stimulus, the numerator is calculated by adding up the number of times the item was approached by the learner. The denominator is calculated by the number of trials the stimulus was presented to the consumer. The numerator is divided by the denominator and multiplied by 100. b). Based off of the calculated percentages, the stimuli are put in rank order. Where the highest percentage is provided the lowest rank (e.g., 100% = rank of 1). If items have the same percentage these ranks are tied (i.e., assigned the same rank). Follow a tie, one number is skipped (e.g., tied items have a rank of 2, the next highest number is provided a rank of 4).
11	Identifies stimuli to use for teaching	a) Selects the highest preferred item to be utilized in teaching b) If there is a tie, selects the item that was approached first more frequently in the assessment.

Data collection. Data were collected using a paper and pencil data collection system by trained therapists (see Appendix B for data sheet). The percentage of skills implemented correctly for each session was calculated by dividing the total number of component skills performed correctly by the total number of component skills implemented correctly and incorrectly and converting the resulting ratio to a percentage.

Interobserver agreement. A second observer independently scored an average of 34% (range, 33% to 35%) of sessions across phases for each participant. Interobserver agreement (IOA) was calculated using trial-by-trial IOA. An agreement was defined as the observers scoring the same response (incorrect or correct) in the same trial. IOA was calculated by dividing the number of agreements by the total number of agreements plus disagreements and converting to a percentage. Mean IOA percentages for each participant were 93% (range, 91% to 97%) for Abby, 96% (range, 90% to 100%) for Kiley, 97% (range, 94% to 100%) for Lucy, and 94% (range, 85% to 100%) for Maggie.

Treatment integrity. Treatment integrity data were obtained on the trainer's delivery of feedback after each trial an average of 63% (range, 50% to 67%) of sessions across all participants. Data were collected on the trainer's use of positive feedback, constructive feedback, or omission feedback (see Appendix C for data sheet). Positive feedback included general and behavior specific praise for trials implemented correctly. Constructive feedback included a brief description of how the skill should be implemented, when an error was observed. Omission feedback included instances in which the trainer did not provide positive or constructive feedback following a trial. Feedback delivery was scored as correct if positive feedback followed a correctly implemented trial and corrective feedback followed an incorrectly implemented trial (i.e., trials with omission or commission errors). Feedback delivery was scored as incorrect if praise was not provided following a correctly implemented trial or was provided following an incorrectly implemented trial, and if constructive feedback was provided following a correctly implemented trial and not provided following an incorrectly implemented trial. An outside observer calculated the percentage of treatment integrity by dividing the number of correct responses by the total number of correct and incorrect responses and converting to a percentage. Mean treatment integrity scores were 87% (range, 81% to 92%) for Abby, 94% for Kiley, 100% for Lucy, and 97% (range, 94% to 100%) for Maggie.

Experimental Design

A nonconcurrent, multiple-baseline-across-participants design (Watson & Workman, 1981) was used to evaluate the effects of real-time feedback delivered via telehealth on the acquisition, maintenance, and generalization of brief MSWO preference assessment skills.

General Procedures

Prior to the start of each session, the trainer emailed the trainee a link to join a videoconference meeting. Remote meetings were scheduled at the trainee's convenience. At the start of the study, the trainee was provided step-by-step instructions for how to connect to the videoconference session (see Appendix D for the step-by-step guide). Email and telephone correspondence were used to troubleshoot technical difficulties of connecting as needed. Once a connection was established, the trainer provided feedback as needed to ensure the tablet was positioned to increase the likelihood that all relevant session events would be captured. The trainee and trainer were connected via videoconferencing throughout the entirety of each session.

To begin each session, the trainees were asked to take out a large box containing all relevant training materials (e.g., data sheet, writing utensils, assessment stimuli, etc.) to the table. The trainees were then asked to take out a blank MSWO preference assessment data sheet (see Appendix E) from the folder provided. The trainer then provided the trainee a scenario (see Appendix F for an example) that discussed potential preferences for a consumer, via a shared computer screen. The scenarios were short paragraphs discussing potential stimuli the consumer might prefer or not prefer in order to mimic caregiver-nominated stimuli to serve as input for the MSWO preferences assessment (Cote et al., 2007; Fisher, Piazza, Bowman & Amari, 1996; Karsten et al., 2011; Piazza, Fisher, Hagopian, Bowman, & Toole, 1996). Six scenarios were randomly rotated across confederate tangible preference assessment sessions. Three scenarios were randomly rotated across confederate edible preference assessment sessions. One scenario each was generated for the tangible and edible preference assessment sessions conducted with the child diagnosed with ASD based on caregiver report. Potential stimuli that may be preferred or non-preferred for the child participant were discussed with the caregiver during the child consent process.

Upon review of the scenario, the trainees were asked to select six items to use during the preference assessment. The six items were selected from a box labeled tangible items containing 14 tangibles, or a box labeled edible items containing 14 edibles, depending on which preference assessment they were to conduct during the session. Following the review of the scenario and selection of stimuli to include within the preference assessment, trainees were told, "Complete a brief MSWO preference assessment to the best of your ability." Each session consisted of the trainee conducting three iterations of a six-item, brief MSWO preference assessment for a total of 18 trials. Following the completion of 18 trials, trainees were asked to hold up their data sheet to the computer screen. This step allowed the trainer to video record the data sheets which could later be screen captured, allowing for a permanent product of the data sheet at the trainer's site. Next, the trainee was asked to calculate the average percentage each stimulus was selected during the preference assessment. Trainees were then asked which item they would use for teaching a new skill based on the results of the brief MSWO preference assessment (Deliperi et al., 2015). If the trainee was not able to calculate percentages during a session, hypothetical data were provided to the trainee. Trainees were then asked which stimulus they would use for teaching a new skill based off the hypothetical data provided.

Procedures

Baseline. Upon logging into videoconference session, the trainee was asked to take out the brief MSWO data sheet and the necessary assessment materials found in the provided box (e.g., assessment stimuli, preference assessment scenario, writing utensil, timer, etc.). Trainees were allowed to review the data sheet and preference assessment scenario for up to 15 minutes. Following 15 minutes of reviewing the materials, or when the trainee said they were ready, the confederate entered the room, and the trainer instructed the trainee to, "Conduct a brief tangible MSWO preference assessment to the best of your ability." No feedback was provided and no questions were answered.

Real-time Feedback. Following stability during baseline conditions, trainees were again instructed to "Conduct a brief tangible MSWO preference assessment to the best of your ability." The trainee was provided real-time feedback contingent on the delivery or absence of MSWO skills, as well as on the addition of skills not included in the brief MSWO (i.e., commission errors). Positive feedback (praise) was provided for trials implemented correctly. General praise was provided for trials the trainee adhered to all components (e.g., "That was a perfect implementation of a MSWO trial."). Behavior specific praise was provided on trainees correct implementation of components previously implemented with errors (e.g., "Nice work on giving access to the selected item for 20 seconds."). Constructive feedback was delivered for incorrectly implemented trials (e.g., "Remember to rotate the items from the previous trial."). Trainees were not provided the opportunity to rehearse the skill following constructive feedback or prior to the next trial or session. Feedback was delivered moments after the trial was conducted. Frequent feedback was provided, due to reports of novice trainees often requiring a higher rate of performance feedback during skill acquisition (Turner et al., 2016). Training was discontinued after the trainee had reached mastery by conducting two consecutive sessions with at least 90% or higher accuracy.

Post-training probes. Once the mastery criterion was met during training, the trainees were asked to conduct a preference assessment with the confederate in the absence of real-time feedback. The trainer asked the trainee to "Conduct a brief tangible MSWO preference assessment to the best of your ability." No feedback was provided and no questions were answered. Post-training probes were conducted at least two days following exposure to real-time feedback.

Maintenance. Maintenance data were collected 2-weeks following exposure to real-time feedback. Maintenance data were collected at these intervals based on the recommendation that new staff have more frequent treatment integrity checks (BACB®, Applied Behavior Analysis: Treatment of Autism Spectrum Disorder: Practice Guidelines for Healthcare Funders and Managers, 2014) and typical supervision periods behavior technicians are exposed to. Maintenance sessions were identical to baseline procedures; real-time feedback was not provided and no questions were answered.

Generalization probes.

Tangible MSWO preference assessment with child diagnosed with ASD. Generalization probes were conducted with a child diagnosed with ASD. At the start of the session, the trainee was told, "Conduct a brief tangible MSWO to the best of your ability." No real-time feedback was provided and no questions were answered during generalization probes.

Edible MSWO preference assessments. Generalization probes assessing the implementation of a brief edible MSWO preference assessment were assessed with both the confederate and child diagnosed with ASD. Trainees were asked to "Conduct a brief edible MSWO preference assessment to the best of your ability." No real-time feedback was provided and no questions were answered.

Social Validity. Following the maintenance condition, all participants were sent a social validity questionnaire via email. Participants responded to each of the five statements on a 6-point Likert scale, with 1 indicating strongly disagree and 6 indicating strongly agree (Appendix G). Ratings closer to a score of six indicated social acceptability. Below each question, space was provided to allow trainees the option to elaborate on their responses.

CHAPTER 2: RESULTS

Figure 1 displays the percentage of brief MSWO skills implemented correctly during baseline, training, post-training, maintenance, and generalization probes across four trainees. During the baseline condition, all trainees implemented brief tangible MSWO preference assessments conducted with the confederate with low to moderate procedural integrity. The average percentage of correctly implemented MSWO skills was 43% (range, 38-46%), 53% (range, 50-54%), 42% (range, 32-54%), and 19% (range, 18-20%) for Abby, Kiley, Lucy, and Maggie, respectively. In addition, all trainees implemented generalization probes with low to moderate procedural integrity across baseline conditions. The brief tangible MSWO preference assessments conducted with the child diagnosed with ASD was implemented with 59%, 61%, 37%, and 15% procedural integrity for Abby, Kiley, Lucy, ad Maggie, respectively. The brief edible MSWO preference assessment conducted with the child diagnosed with ASD was implemented with 51%, 52%, 22%, and 50% procedural integrity for Abby, Kiley, Lucy, and Maggie, respectively. The brief edible MSWO preference assessment conducted with the confederate was implemented with 56%, 57%, 46%, and 19% procedural integrity for Abby, Kiley, Lucy, and Maggie, respectively.

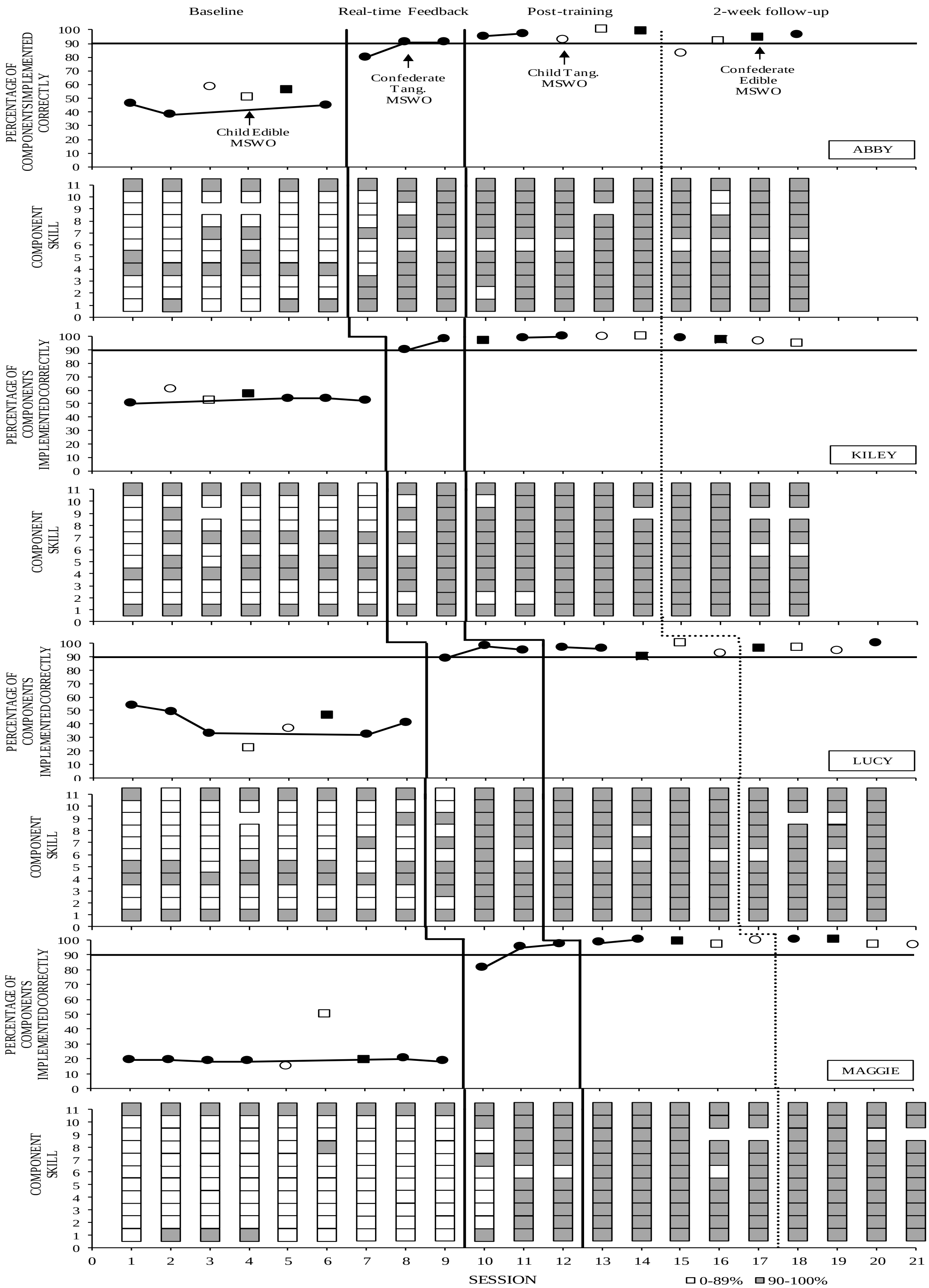

Figure 1. Percentage of MSWO component skills implemented correctly. The bottom panel for each participant depicts a boxplot showing MSWO component skills that met mastery criteria at or above 90% accuracy (gray box), less than 90% accuracy (white boxes), or had no opportunity to perform the skill (absent box).

Following exposure to real-time feedback, an increase in trainees' implementation of the brief MSWO skills was seen within a few sessions. Abby met mastery criteria within three treatment sessions, (M=87%, range 80-91%) Kiley met mastery criteria within two sessions, (M=94%, range 90-98%) Lucy met mastery criteria within three sessions (M=94%, range 89-98%) and Maggie met mastery criteria within three sessions (M=91%, range 81-97%). The total duration of real-time feedback delivery was 11 minutes 58 seconds, 8 minutes 17 seconds, 13 minutes 20 seconds, and 13 minutes 9 seconds for Abby, Kiley, Lucy, and Maggie, respectively. The total duration of training time, including preference assessment implementation and real-time feedback delivery was 39 minutes 55 seconds for Abby (Figure 2), 31 minutes 4 seconds for Kiley (Figure 3), 46 minutes 2 seconds for Lucy (Figure 4), and 45 minutes 2 seconds for Maggie (Figure 5).

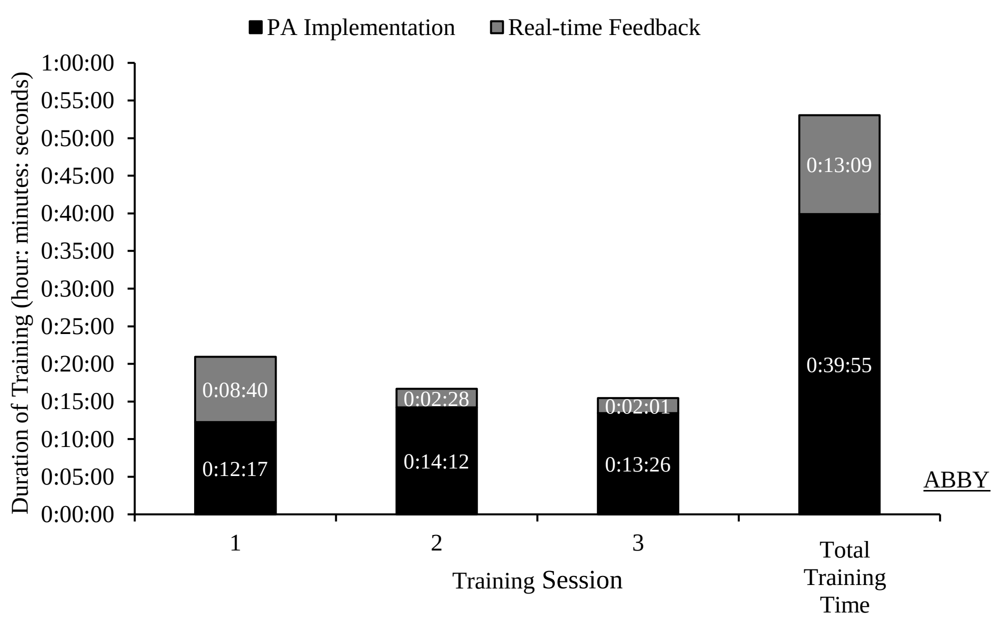

Figure 2. Duration of training time for Abby.

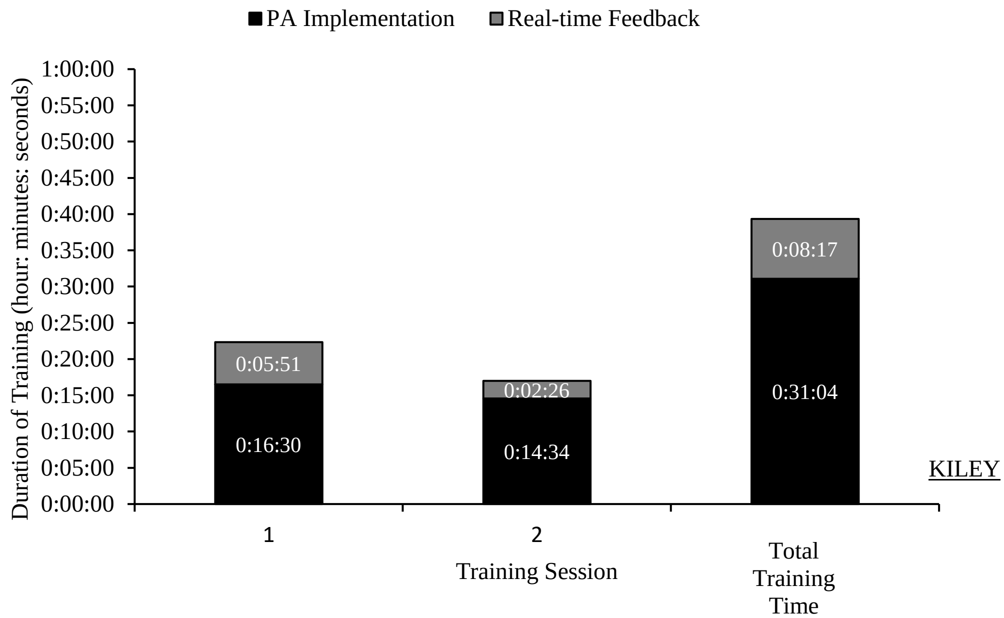

Figure 3. Duration of training time for Kiley.

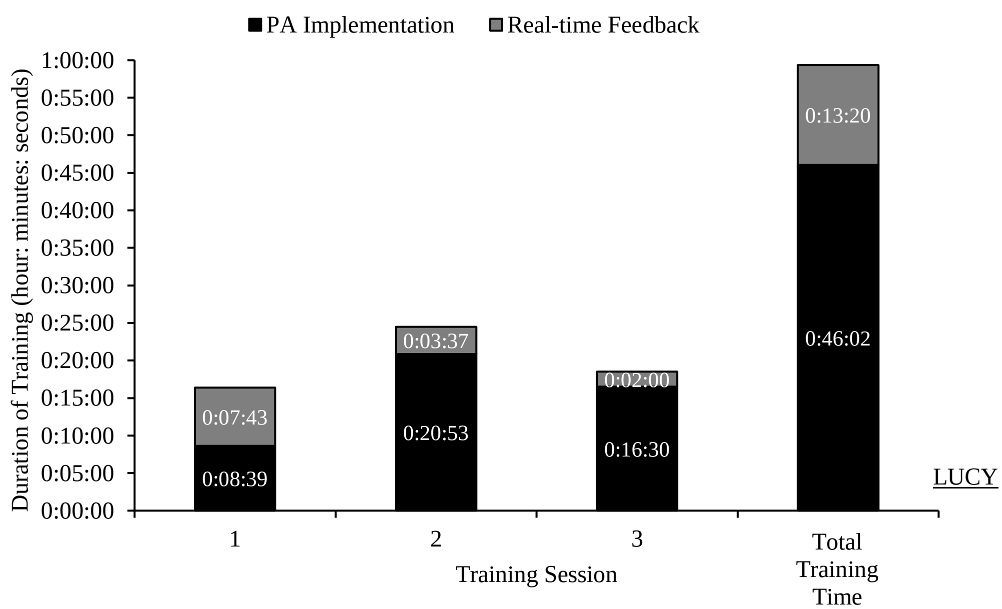

Figure 4. Duration of training time for Lucy.

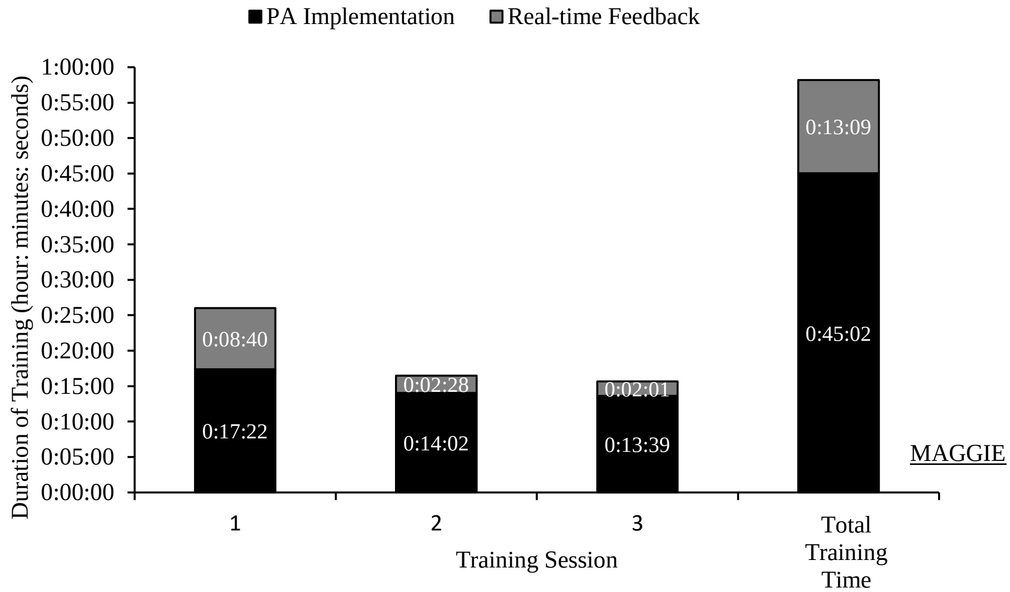

Figure 5. Duration of training time for Maggie.

Following the delivery of real-time feedback, post-training probes were conducted with the confederate and child diagnosed with ASD a minimum of two days following exposure to real-time feedback. All trainees conducted post-training probes with high treatment integrity. On average trainees implemented brief tangible MSWO preference assessments with the confederate with 96%, 99.5%, 97%, and 99% procedural integrity for Abby, Kiley, Lucy, and Maggie, respectively. Additionally, all trainees were observed to generalize these skills to a child diagnosed with ASD and were able to conduct brief edible MSWO preference with both confederates and a child diagnosed with ASD. The brief edible MSWO preference assessments were implemented with the confederate with 99%, 97%, 91%, and 99% procedural integrity for Abby, Kiley, Lucy, and Maggie, respectively. The brief tangible MSWO preference assessments were implemented with the child diagnosed with ASD with 93%, 100%, 100%, and 100% procedural integrity for Abby, Kiley, Lucy, ad Maggie, respectively. The brief edible MSWO preference assessments conducted with the child diagnosed with ASD were implemented with

100%, 100%, 93%, and 97% procedural integrity for Abby, Kiley, Lucy, and Maggie, respectively.

All of the participants' implementation of the brief tangible MSWO preference assessment maintained at the two-week follow-up. Three of the four participants implemented all generalization probes above 90% at the two-week follow-up. Abby fell below 90% following the 2-week generalization probe with the implementation of the brief tangible MSWO preference assessment conducted with a child diagnosed with ASD. However, Abby was able to implement the brief edible MSWO preference assessments with the child and confederate above 90% accuracy.

The results of the social validity questionnaire are summarized in Table 2. In general, the trainees rated this staff training procedures as favorable by providing ratings between 4 and 6 on a scale from 1 to 6, with 1 indicating not satisfied and 6 indicating highly satisfied. All trainees rated this procedure as effective and indicated that they found the delivery of real-time feedback acceptable. Kiley provided neutral, but still positive ratings (rating of 4) regarding the telehealth setup. It should be noted that the Internet connection at her site was lost a few times during her training sessions. Lucy provided some additional feedback on her social validity questionnaire stating, "I feel the telehealth training procedure worked better than training in person would have." Overall, the procedural integrity data and the results from the social validity questionnaire demonstrate that remote real-time feedback is an effective and acceptable way to train staff how to conduct brief MSWO preference assessments.

Likert Scale: 1 I strongly disagree to 6 I strongly agree					
Questions	Abby	Kiley	Lucy	Maggie	*Average*
1. The training procedure was effective at teaching me how to conduct MSWO preference assessments.	6	6	6	6	6.0
2. I found the telehealth service delivery acceptable.	6	5	6	6	5.8
3. I found the real-time feedback delivery acceptable.	6	6	6	6	6.0
4. I was satisfied with the technology setup.	6	4	6	6	5.5
5. I would recommend the training procedure (using telehealth to deliver feedback) to others interested in learning how to conduct behavior analytic skills.	6	5	6	6	5.8

Table 2. Social Validity Results

CHAPTER 3: DISCUSSION

This study looked to evaluate the effectiveness of a single-component delivered via telehealth. Overall, the results of the current study support the use of telehealth technology to deliver real-time feedback to train staff. Four trainees were taught to conduct brief MSWO tangible preference assessments within a nonconcurrent, multiple-baseline-across-participants arrangement. During baseline, all trainees implemented preference assessment components with low-to moderate treatment integrity. Following exposure to real-time feedback an immediate increase in treatment integrity was observed. All trainees met mastery criteria within 2-3 sessions. These skills were found to generalize both to a child diagnosed with ASD and brief edible MSWO preference assessments. At the two-week follow-up, all trainees implemented the brief tangible preference assessment with high treatment integrity. Following the completion of the study, all trainees provided favorable social validity ratings for the use of remote real-time feedback.

The current evaluation supports previous research in delivering staff trainings via telehealth without in-person or on-site assistance between the trainer and the trainees (Fisher et al., 2014; Higgins et al., 2017). Although a confederate was present with the trainee during this evaluation, they never provided feedback to the trainees. Additionally, the current research further extends the research conducted by Higgins et al., (2017) in that the participant and trainer were not located within the same training facility and were located over a hundred miles away in different states. The findings from the current study are important because they provide further evidence of the ability to train staff from a distance without requiring any face-to-face contact. Telehealth technology without any needed onsite assistance has the ability to reach anyone that has an Internet connection. This line of research may be especially important at training providers how to conduct assessments in areas where trainers or travel to a training site is inaccessible. In addition, the telehealth technology utilized in this study was relatively inexpensive (i.e., laptop and tablets equipped with webcams, broadband Internet connection, and

VidyoDesktop™ teleconferencing software) and may be accessible for others to utilize. However, it should be noted that VidyoDesktop™ was a university provided teleconferencing platform to enable a HIPAA compliant teleconferencing connection between the trainer and trainee within this evaluation.

This research extends support for the delivery of real-time feedback via telehealth (Machalicek et al., 2010; Scheeler et al., 2012). Experimental control utilizing a single-subject research design was demonstrated. Previous telehealth research has mostly relied on implementing comprehensive BST packages to train staff (Fisher et al., 2014; Higgins et al., 2017). Although using BST has been demonstrated to be effective at training a variety of skills, BST can be time consuming (Fisher et al., 2014). Delivering real-time feedback alone effectively trained staff to implement MSWO preference assessments and took less than 14 minutes for each participant. The short, but effective procedure may be especially appealing for practitioners facing staffing barriers such as high staff turnover rate, lack of trained providers, and limited training time. An efficient staff training procedure such as real-time feedback would allow trainers more time to train other staff, train staff how to implement additional assessments and skills, or allow more time to complete other supervisor responsibilities.

In addition to displaying treatment integrity data using a line graph, a boxplot format was utilized to collect and depict data within this evaluation. The boxplot provided a visual depiction of the component skills the trainees implemented at or below mastery criteria. Collecting and depicting data in this manner, aided in the delivery of feedback on specific MSWO component skills implemented. This display allowed for an ongoing visual analysis of component skills and trainee progress throughout the evaluation.

Limitations

There were some limitations within this evaluation that warrant mentioning. First, two different confederates were used for sessions with Kiley and Maggie. Due to scheduling conflicts, the same confederate could not be used throughout the entire evaluation. With Kiley, confederate 1 implemented sessions 1, 2, and 4. Confederate 2 implemented all remaining confederate sessions with Kiley. With Maggie, confederate 1 implemented sessions 1, 2, 3, and 6. All remaining sessions conducted with Maggie were implemented with confederate 2. Procedural integrity data found minimal differences in the implementation of scripts across confederates.

Second, maintenance probes were only conducted at a 2-week follow-up to mimic typical clinical supervision. Although the skills to implement brief tangible MSWO preference assessment were found to maintain for all participants; longer maintenance periods would have allowed for a better understanding of the long-term effects of this staff training procedure. Future research should consider evaluating the maintenance of remote real-time feedback at longer intervals.

Third, generalization probes were only conducted with one child diagnosed with ASD. Although the child participant exhibited a variety of idiosyncratic responses (e.g., no choice, simultaneous selection, challenging behavior) the child mostly engaged in correct responses. It would be important for future research to consider including additional child participants to evaluate if the skills learned would generalize to different behavioral repertoires. Additionally, the child participant was sometimes observed to continue playing with the item when the trainee requested the return of the item. Future research could consider targeting this idiosyncratic response during training.

Fourth, there were some technology difficulties that took place during this evaluation. Periods of weak internet connection ended calls or froze the computer screen during four sessions. This impeded the observers' ability to always witness all components of every trial which interfered with providing feedback during one training session with Kiley. These technical barriers may have impacted Kiley's social validity ratings with regards to technology setup (Question 4).

Future Research

The outcomes of the current study suggest several areas for future research. During this evaluation, real-time feedback was provided after every trial. This guideline was utilized to limit the amount of errors a trainee would exhibit between feedback delivery periods. Future research should consider the optimal rate real-time feedback should be delivered during training sessions.

Additionally, this evaluation focused on training staff how to conduct brief MSWO preference assessments. Future research should evaluate the effectiveness and feasibility of using remote real-time feedback when training staff how to conduct other behavioral assessments and clinical service procedures. Furthermore, newly hired EIBI clinic staff served as trainees within this evaluation. Although the trainees were told participating in this research would not impact their employment; their current employment status, as newly hired staff may have impacted their motivation to acquire this skill. Future research might consider the effectiveness of using remote real-time feedback when training other professionals or caregivers. Extended evaluations with these populations could further meet the service delivery need and completion of these assessments within other settings (e.g., home, school, etc.).

Using web-based technologies to provide staff trainings has the potential to extend the reach and ease of training providers around the world. Utilizing this technology has the power to increase the number of qualified providers able to conduct assessments and provide services to consumers. Remote trainings have the potential to overcome a variety of barriers such as location and limited access to training providers. Refining the way we provide staff trainings through telehealth, such as utilizing real-time feedback alone can impact the time and resources required to train skills. Efficient, effective, and accessible staff training procedures have the potential to have a widespread impact at meeting the demand for qualified service providers.

REFERENCES

Adkins, V. K. (1996). Behavioral procedures for training direct care staff in facilities serving dependent populations. *Behavioral Interventions, 11,* 95-100. doi:10.1002.1099-078X(199604)11:2<95::AIDBRT149>3.0.CO:2-7

Alavosius, M. P. & Sulzer-Azaroff, B. (1990). Acquisition and maintenance of health-care routines as a function of feedback density. *Journal of Applied Behavior Analysis, 23,* 151-162. doi:10.1901/jaba.1990.23-151

Alvero, A. M., Bucklin, B. R., & Austin, J. (2001). An objective review of the effectiveness and essential characteristics of performance feedback in organizational settings (1985-1998). *Journal of Organizational Behavior Management, 21,* 3-29. doi:10.1300/j075v21n01_02

Arnal, L., Fazzio, D., Martin, G. L., Yu, C. T., Keilback, L., & Starke, M. (2007). Instructing university students to conduct discrete-trial teaching with confederates simulating children with autism. *Developmental Disabilities Bulletin. 35,* 131-147. doi.org/10.1177/0145445508327443

Arntzen, E., Brekstad, A., & Holth, P. (2006). Special issue on contingent reinforcement. *European Journal of Behavior Analysis, 7,*99-185.

Baer, D. M., Wolf, M. M., & Risley, T. (1968). Some current dimensions of applied behavior analysis. *Journal of Applied Behavior Analysis, 1,* 91-97. doi:101901/jaba.1968. 1-91

Baer, D. M., Wolf, M.M., & Risley, T. (1987). Some still-current dimensions of applied behavior analysis. *Journal of Applied Behavior Analysis*, *20*, 313-327. doi:10.1901/jaba.1987.20-313

Baggett et al. (2010). Technologies for expanding the reach of evidence-based interventions: Preliminary results for promoting social-emotional development in early childhood. *Topics in Early Childhood Special Education*, *29*, 226-238. doi:10.1177/0271121409354782

Barretto, A., Wacker, D. P., Harding, J., Lee, J., & Berg, W. K. (2006). Using telemedicine to conduct behavioral assessments. Journal of Applied Behavior Analysis, 39, 333–340. doi:10.1901/jaba.2006.173-04

Behavior Analyst Certification Board. (2014). *Professional and ethical compliance code for behavior analysts*. Retrieved from http://bacb.com/wp-content/uploads/2016/03/160321-compliance-code-english.pdf

Behavior Analyst Certification Board. (2014). *Applied behavior analysis treatment of autism spectrum disorder: Practice guidelines for healthcare funders and managers*. (2nd ed.). Retrieved from https://bacb.com/wp-content/uploads/2016/08/ABA_Guidelines_for_ASD.pdf

Bishop, M. R., & Kenzer, A. L. (2012). Teaching behavioral therapists to conduct brief preference assessments during therapy sessions. *Research in Autism Spectrum Disorders, 6,* 450-457. doi:10.1016/j.rasd.2011.07.005

Bolton, J. & Mayer, M. D. (2008). Promoting the generalization of paraprofessional discrete trial teaching skills. *Focus on Autism and Other Developmental Disabilities, 23,* 103-111. doi:10.1177/1088357608316269

Cannella, H. I., O'Reilly, M. F., & Lancioni, G. E. (2005). Choice and preference assessment research with people with severe to profound developmental disabilities: A review of the literature. *Research in Developmental Disabilities, 26,* 1–15. doi:10.1016/j.ridd.2004.01.006

Carr, J. E., Nicolson, A. C., Higbee, T. S. (2000). Evaluation of a brief multiple-stimulus preference assessment in a naturalistic context. *Journal of Applied Behavior Analysis, 33,* 353-357. doi:10.1901/jaba.2000.33-353

Catania, C. N., Almeida, D., Liu-Constant, B., & DiGennaro Reed, D. (2009). Video modeling to train staff to implement discrete-trial instruction. *Journal of Applied Behavior Analysis, 42,* 387-392. doi:10.1901/jaba.2009.42-387

Ciccone, F. J., Graff, R. B., & Ahearn, W. H. (2007). Long-term stability of edible preferences in individuals with developmental disabilities. *Behavioral Interventions, 22,* 223-228. doi:10.1002/bin.238

Cooper, J. O., Heron, T. E., & Heward, W. L. (2007). *Applied behavior analysis* (2nd ed.). Upper Saddle River, NJ: Pearson.

Cote, C. A., Thompson, R. H., Hanley, G. H., & McKerchar , P. M. (2007). Teacher report and direct assessment of preferences for identifying for young children. *Journal of Applied Behavior Analysis, 40,* 157-166. doi:10.1901/jaba.2007.177-05

Coulter, G. A., & Grossen, B. (1997). The effectiveness of in-class instructive feedback versus after-class instructive feedback for teachers learning direct instruction teaching behaviors, *Effective School Practices, 16,* 21-35.

Daly III, E. J., Wells, N. J., Swanger-Gagne, M.S., Carr, J. E., & Kunz, G. M. (2009). Evaluation of the multiple stimulus without replacement preference assessment method using activities as stimuli. *Journal of Applied Behavior Analysis, 42,* 563-574. doi:10.1901/jaba.2009/42-563

DeLeon, I. G., Fisher, W. W., Rodriguez-Catter, V., Maglieri, K., Herman, K., & Marhefka, J. M. (2001). Examination of relative reinforcement effects of stimuli identified through pretreatment and daily brief preference assessments. *Journal of Applied Behavior Analysis, 34,* 463-473. Doi:10.1901/jaba.2001.34-463

DeLeon, I. G., & Iwata, B. A. (1996). Evaluation of a multiple-stimulus presentation format for assessing reinforcer preferences. *Journal of Applied Behavior Analysis, 29,* 519-533. doi:10.1901/jaba.1996.29-519. doi:10.1901/jaba.2001.34-463

Deliperi, P. Vladescu, J., Reeve, K. F., Reeve, S. A., & DeBar, R. M. (2015). Training staff to implement a paired-stimulus preference assessment using video modeling with voiceover instruction. *Behavioral Intervention, 30,* 314-332. doi:10.1002/bin.1421

Delli Bovi, G. M., Vladescu, J. C., DeBar, R. M., Carroll, R. A., Sarokoff, R. A. (2017). Using video-modeling with voice-over instruction to train public school staff to implement a preference assessment. *Behavior Analysis in Practice, 10*, 72-76. doi:10.1007/s40617-016-0135-y

Dewhurst, D. L., & Cautela, J. R. (1980). A proposed reinforcement survey schedule for special needs children. *Journal of Behavior Therapy and Experimental Psychiatry, 11*, 109-112. doi:10.1016/0005-7916(80)90006-3

DiGennaro Reed, F. D., & Henley, A. J. (2015). A survey of staff training and performance management practices: The good, the bad, and the ugly. *Behavior Analysis in Practice, 8,* 16-26. doi:10.1007/s40617-015-0044-5

Dyer, K. (1987). The competition of autistic stereotyped behavior with usual and specially assessed reinforcers. *Research in Developmental Disabilities, 8,* 607–626. doi:10.1016/0891-4222(87)90056-4

Fazzio, D., Martin, G. L., Arnal, L., & Yu, D. C. T. (2009). Instructing university students to conduct discrete-trials teaching with children with autism. *Research is Autism Spectrum Disorders, 3,* 57-66. doi:10.1016/j.rasd.2008.04.002

Feliciano, L., Steers, M. E., Elite-Marcandonatou, A., McLane, M., & Ahearn, P. A. (2009). Application of preference assessment procedures in depression and agitation management in elders with dementia. *Clinical Gerontologists, 32,* 239-259. doi:10.1080/07317110902895226

File, T. (2013). Computer and internet use in the United State. Current Population Survey Reports, P20-568. U.S. Census Bureau, Washington, D.C.

Fisher et al. (2014). Preliminary findings of a randomized clinical trial of a virtual training program for applied behavior analysis technicians. *Research in Autism Spectrum Disorders, 8*, 1044-1054. doi:10.1016/j.rasd.2014.05.002

Fisher, W.W., Piazza, C. C., Bowman, L. G., & Amari, A. (1996). Integrating caregiver report with a systematic choice assessment to enhance reinforcer identification. *American Journal of Mental Retardation, 101,* 15-25.

Fisher, W.W., Piazza, C. C., Bowman, L. G., Hagopian, L. P., Owens, J. C., & Slevin, I. (1992). A comparison of two approaches for identifying reinforcers for persons with severe and profound disabilities. *Journal of Applied Behavior Analysis, 25,* 491-498. doi:10.1901/jaba.1992.25-491

Fleming, R K., & Sulzer-Azaroff, B. (1989). Enhancing quality of teaching by direct care staff through performance feedback on the job. *Behavioral Residential Treatment, 4,* 377-395. doi:10.1002/bin.2360040407

Frieder, J. E., Peterson, S. M., Woodward, J., Crane, J., & Garner, M. (2009). Teleconsultation in school settings: linking classroom teachers and behavior analysists through web-based technology. *Behavior Analysis in Practice, 2,* 32–39. doi:10.1007/BF033911746

Graff, R. B., & Karsten, A. M. (2012a). Evaluation of a self-instruction package for conducting stimulus preference assessments. *Journal of Applied Behavior Analysis, 45*, 69-82. doi:10.1901/jaba.2012.45-69

Green, C. W., Reid, D. H., Vanipe, V. S., & Gardner, S. M. (1991). A comprehensive evaluation of reinforcer identification processes for persons with profound multiple handicaps. *Journal of Applied Behavior Analysis, 24,* 537-552. doi:10.1901/jaba.1991.24-537

Green, C. W., Rollyson, J. H., Passante, S. C., & Reid, D. H. (2002). Maintaining proficient supervisor performance with direct support personnel: An analysis of two management approaches. *Journal of Applied Behavior Analysis, 35,* 205-208. doi:10.1901/jaba.2002.35-205

Hagopian, L. P., Long, E. S., Rush, K. S. (2004). Preference assessment procedures for individuals with developmental disabilities. *Behavior Modification, 28*, 668-677. doi:10.1177/0145445503259836

Hall, R. V., Lund, D., & Jackson, D. (1968). Effects of teacher attention on study behavior. *Journal of Applied Behavior Analysis*, *1*, 1-12. doi:10.1901/jaba.1968.1-1

Hanley, G. P., Iwata, B. A., & Roscoe, E. RM. (2006). Some determinants of changes in preference over time. *Journal of Applied Behavior Analysis, 39,* 189-202. doi:10.1901/jaba.2012.45-69

Hay-Hansson, A. W., & Eldevik, S. (2013). Training discrete trials teaching skills using videoconferencing. *Research in Autism Spectrum Disorders*, *7,* 1300-1309. doi:10.1016/j.rasd.2013.07.022

Higbee, T.S., Carr, J.E., & Harrison, C. D. (2000). Further evaluation of the multiple-stimulus preference assessment. *Research in Developmental Disabilities, 21,* 61-73. doi.org/10.1016/S0891-4222(99)00030-X

Higgins, W. J., Luczynsnki, K. C., Carroll, R. A., Fisher, W. W., & Mudford, O. C. (2017). Evaluation of a telehealth training package to remotely train staff to conduct a preference assessment. *Journal of Applied Behavior Analysis, 50*, 1-14. doi:10.1002/jaba.370

Iwata, B. A., Wallace, M. D., Kahng, S. W., Lindberg, J. S., Roscoe, E. M., Conners, J., et al. (2000). Skill acquisition in the implementation of functional analysis methodology. *Journal of Applied Behavior Analysis*, *33*, 181–194. doi:10.1901/jaba.2000.33-181

Jacobson, J. W., & Mulick, J. A. (2000). System and cost research issues in treatments for people with autistic disorders. *Journal of Autism and Developmental Disorders*, *30,* 585–593. doi:10.1023/A:1005691411255

Johnston, M. K., Kelly C. S., Harris, F. R., & Wolf, M. M. (1966). An application of reinforcement principles to the development of motor skills of a young child. *Child Development*, *37,* 370-389.

Jahr, E. (1998). Current issues in staff training. *Research in Developmental Disabilities*, *19,* 73-87.

Kang, S., O'Reilly, M., Lancioni, G., Falcomata, T. S., Sigafoos, J., & Xu, Z. (2013). Comparison of the predictive validity and consistency among preference assessment procedures: A review of the literature. *Research in Developmental Disabilities, 34,* 1125-1133. doi:10.1016/j.ridd.2012.12.021

Karsten, A. M., & Carr, J. E. (2009). The effects of differential reinforcement of unprompted responding on the skill acquisition of children with autism. *Journal of Applied Behavior Analysis, 42,* 327-334. doi:10.1901/jaba.2009.42-327.

Karsten, A. M., Carr, J. E., & Lepper, T. L. (2011). Description of a practitioner model for identifying preferred stimuli with individuals with autism spectrum disorder. *Behavior Modification, 35,* 347-369. doi:10.1177/0145445511405184

Koegel, R. L., Russo, D. C., & Rincover, A. (1977). Assessing and training teachers in the generalized use of behavior modification. *Journal of Applied Behavior Analysis, 11*, 95-109. doi:10.1901/jaba.1977.10-197

Lafasakis, M. & Sturmey, P. (2007). Training parent implementation of discrete-trial teaching: Effects on generalization of parent teaching and child correct responding. *Journal of Applied Behavior Analysis, 40*, 685-689. doi:10.1901/jaba.2007.685-689

Lavie, T. & Sturmey, P. (2002). Training staff to conduct a paired-stimulus preference assessment. *Journal of Applied Behavior Analysis, 35*, 209-211. doi:10.1901/jaba.2002.35-209

Leblanc, M.P., Ricciardi, J. N., Luiselli, J. K. (2005). Improving discrete trial instruction by paraprofessional staff through an abbreviated performance feedback intervention. *Education and Treatment of Children, 28,* 76-82.

Lee, M. S. H., Yu, C. T., Martin, T. L., & Martin, G. L. (2010). On the relation between reinforcer efficacy and preference. *Journal of Applied Behavior Analysis, 43,* 95–100. doi:10.1901/jaba.2010.43-95

Leitenberg, H., Agras, W. S., Thompson, L. E., & Wright, D. E. (1968). Feedback in behavior modification: An experimental analysis in two phobic cases. *Journal of Applied Behavior Analysis, 1,* 131-137. doi:10.1901/jaba.1968.1-131

Lipschultz, J. L., Vladescu, J. C., Reeve, K. F., Reeve, S. A., & Dipsey, C. R. (2015). Using video modeling with voiceover instruction to train staff to conduct stimulus preference assessments. *Journal of Developmental and Physical Disabilities, 27*, 505-532. doi:10.1007/s10882-015-9434-4

Machalicek et al. (2009a). Using videoconferencing to conduct functional analysis of challenging behavior and develop classroom behavioral support plans for students with autism. *Educational and Training in Developmental Disabilities, 44*, 207-217.

Machalicek, W., O'Reilly, M. F., Chan, J., Rispoli, M., Lang, R., Davis, T., Shogren, K., Sigafoos, J., Lancioni, G., & Langthorne, P. (2009b). Using videoconferencing to support teachers to conduct preference assessments with students with autism and developmental disabilities. *Research in Autism Spectrum Disorders,3*, 32–41.

Machalicek et al. (2010). Training teachers to assess the challenging behavior of student with autism using video tele-conferencing. *Education and Training in Autism and Developmental Disabilities, 45,* 203-215.

Matson, J. L., Bielecki, J. A., Mayville, E. A., Smalls, Y., Bamburg, J. W., & Baglio, C. S. (1999). The development of a reinforcer choice assessment scale for persons with severe and profound mental retardation. *Research in Developmental Disabilities, 20,* 379-384. doi:10.1016/S0891-4222(99)00018-9

Miltenberger, R. (2016). *Behavior Modification: Principles and procedures* (6th ed.). Boston, MA: Cengage Learning.

Moore, J. W., & Fisher, W. W. (2007). The effects of videotape modeling on staff acquisition of functional analysis methodology. *Journal of Applied Behavior Analysis, 40,* 197-202. doi:10.1901/jaba.2007.24-06

Nigro-Bruzzi, D., & Sturmey, P. (2010). The effects of behavioral skills training on mand traning by staff and unprompted vocal mands by children. *Journal of Applied Behavior Analysis, 43,* 757-761. doi:10.1901/jaba.2010.43-757

Northup, J., Jones, K., Broussard, C., & George, T. (1995). A preliminary comparison of reinforcer assessment methods for children with attention deficit hyperactivity disorder. *Journal of Applied Behavior Analysis, 28,* 99–100. doi:10.1901/jaba.1995.28-99

O'Reilly, M. F., Renzaglia, A., & Lee, S. (1994). An analysis of acquisitio, generalization, and maintenance of systematic instruction competencies by preservice teachers using behavioral supervision techniques. *Education and Training in Mental Retardation and Developmental Disabilities, 29,* 22-33.

Pace, G. M., Ivancic, M. T., Edwards, G. L., Iwata, B. A., & Page, T. J. (1985). Assessment of stimulus preference and reinforcer value with profoundly retarded individuals. *Journal of Applied Behavior Analysis, 18,* 249-255. doi:10.1901/jaba.1985.18-249

Paramore, N. W., Higbee, T. S. (2005). An evaluation of a brief multiple-stimulus preference assessment with adolescents with emotional-behavioral disorders in an educational setting. *Journal of Applied Behavior Analysis, 38,* 399-403. doi:10.1901/jaba.2005.76-04

Parsons, M. B., & Reid, D. H. (1990). Assessing food preference among persons with profound mental retardation: Providing opportunities to make choices. *Journal of Applied Behavior Analysis, 23,* 183-195. doi:10.1901/jaba.1990.23-183

Parsons, M. B. & Reid, D. H. (1995). Training residential supervisors to provide feedback for maintaining staff teaching skills with people who have severe disabilities. *Journal of Applied Behavior Analysis, 28,* 317-322. doi:10.1901/jaba.1995.28-317

Parsons, M. B., Rollyson, J. H., & Reid, D. H. (2012). Evidence-based staff training: A guide for practitioners, *Behavior Analysis in Practice, 5,* 2-11. doi:10.1007/BF03391819

Pence, S. T., St. Peter, C. C., & Tetreault, A. S. (2012). Increasing accurate preference assessment implementation through pyramidal training. *Journal of Applied Behavior Analysis, 45,* 345-359. doi:10.1901/jaba.2012.45-345

Piazza, C. C., Fisher, w. W., Hagopian, L. P., Bowman, L.G., & Toole, L. (1996). Using choice assessment to predict reinforcer effectiveness. *Journal of Applied Behavior Analysis, 29,* 1-9. doi:10.1901/jaba.1996.29-1

Prue, D. M. & Fairbank, J. A. (1981). Performance feedback in organizational behavior management: A review. *Journal of Organizational Behavior Management, 3,* 1-16. doi:10.1300/J075v03n01_01

Realon, R. E., Lweallen, J. D., & Wheeler, A. J. (1983). Verbal feedback vs. verbal feedback plus praise: The effects on direct care staffs training behavior. *Mental Retardation, 21,* 492.209-212.

Reid, D. H. O'Kane, N. P. & Macurik, K. M. (2011) Staff Training and management. In: Fischer, W. W., Piazza, C. C., & Roane, H. S., editors. *Handbook of Applied Behavior Analysis* (281-294). New York, NY: The Guilford Press.

Reid, D. H., Parsons, M. B., & Greens, C. W. (2011). *Evidence-based ways to promote work quality and enjoyment among support staff*. Washington, D. C.: American Association on Intellectual and Developmental Disabilities.

Reid, D. H., Parsons, M. B., & Jensen, J. M. (2015). Maintaining staff performance following an training intervention: Suggestions from a 30-year case example. *Behavior Analysis in Practice, 10,*12-21. doi:10.1007/s40617-015-0101-0

Reid, D. H., Rotholz, D. A., Parsons, M. B., Morris, L., Braswell, B. A., Green, C. W., & Schell, R. M. (2003). Training human service supervisors in aspects of positive behavior support: Evaluation of a state-wide, performance-based program. *Journal of Positive Behavior Interventions, 5,* 35-46. doi:10.1177/10980070300500106 01

Resetar, J. L., & Noell, G. H. (2008). Evaluating preference assessments for use in the general education population. *Journal of Applied Behavior Analysis, 41*, 447-451. doi:10.1901/jaba.2008.41-447

Ringdahl, J. E., Vollmer, T. R., Marcus, B. A., & Sloane, H. S. (1997). An analogue evaluation of environmental enrichment: The role of stimulus preference. *Journal of Applied Behavior Analysis, 30*, 203-216. doi:10.1901.jaba.1997.30-203

Roane, H. S., Vollmer, T. R., Ringdahl, J. E., & Marcus, B. A. (1998). Evaluation of a brief stimulus preference assessment. *Journal of Applied Behavior Analysis, 31*, 605-620. doi:10.1901/jaba.1998.31-605

Roscoe, E. M., & Fisher, W. W. (2008). Evaluation of an efficient method for training staff to implement stimulus preference assessments. *Journal of Applied Behavior Analysis, 41*, 249-254. doi:10.1901/jaba.2008.41-249

Roscoe, E. M., Fisher, W.W., Glover, A. C., & Volkert, V. M. (2006). Evaluating the relative effects of feedback and contingent money for staff training of stimulus preference assessments. *Journal of Applied Behavior Analysis, 39*, 63-77. doi:10.1901/jaba.2006.7-05

Ryan, C. S. & Hemmes, N. S. (2005). Post-training discrete-trial teaching performance by instructors of young children with autism in early intensive behavioral intervention. *The Behavior Analyst Today, 6*, 1-11. doi:10.1037/h0100052

Sarokoff, R. A., & Sturmey, P. (2004). The effects of behavioral skills training on staff implementation of discrete-trial teaching. *Journal of Applied Behavior Analysis, 37,* 353-358. doi:10.1901/jaba.2004.37-535

Sarokoff, R. A., & Sturmey, P. (2008). The effects of instructions, rehearsal, modeling, and feedback on acquisition and generalization of staff use of discrete trial teaching and student correct responses. *Research in Autism Spectrum Disorder, 2,* 125-136. doi:10.1016/j.rasd.2007.04.002

Scheeler, M. C., McAfee, J. K., Ruhl, K. L., & Lee, D. L. (2006). Effects of corrective feedback delivered via wireless technology on preservice teacher performance and student behavior. *Teacher Education and Special Education, 29,* 12-25. doi:10.1177/088840640602900103

Scheeler, M. C., McKinnon, K., & Stout, J. (2012). Effects of immediate feedback delivered via webcam and bug-in-ear technology on preservice teacher performance. *Teacher Education and Special Education, 35,* 77-90.

Scheeler, M.C., Ruhl, K. L., & McAfee, J. K. (2004). Providing performance feedback to teachers: A review. *Teacher Education and Special education, 27,* 396-407. doi:10.1177/088840640402700407

Severtson, J. M., & Carr, J. E. (2012). Training novice instructors to implement errorless discrete-trial teaching: A sequential analysis. *Behavior Analysis in Practice, 5,* 13-23. doi:10.1007/BF03391820

Shapiro, M., Kazemi, E., Pogosjana, M., Rios, D. Mendoze, M. (2016). Preference assessment training via self-instruction: A replication and extension. *Journal of Applied Behavior Analysis, 49*, 794-808. doi:10.1002/jaba.339

Sidman, M. (1960). *Tactics of scientific research.* New York; Basic Books.

Sigurdsson, S., & Austin, J. (2008). Using real-time visual feedback to improve posture at computer workstations. *Journal of Applied Behavior Analysis, 41,* 365-375. doi:10.1901/jaba.2008.41-365

Skinner, B. F. (1938). *The behavior of organisms: An experimental analysis*. New York: Macmillan.

Skinner, B. F. (1953). *Science and human behavior.* New York: Macmillan.

Skinner, B. F. (1981). Selection by consequences. *Science, 213,* 501-504.

Suess, A. N., et al. (2014). Evaluating the treatment fidelity of parents who conduct in-home functional communication training with coaching via telehealth. *Journal of Behavioral Education, 23,* 34-59. doi:10.1007/s10864-013-9183-3

Suess, A. N., Wacker, D. P., Schwartz, J. E., Lustig, N., & Detrick, J. (2016). Preliminary evidence on the use of telehealth in an outpatient behavior clinic. *Journal of Applied Behavior Analysis, 49,* 686-692. doi:10.1002/jaba.305

Thompson, K. M., Martin, G. L., Fazzio, D., Salem, S., Young, K., & Yu, C. T. (2012). Evaluation of a self-instruction package for teaching tutors to conduct discrete-trials teaching with children with autism. Research in Autism Spectrum Disorders, 6, 1073–1082. doi:10.1016/j.rasd.2012.005

Tullis, C. A., et al. (2011). Review of the choice and preference assessment literature for individuals with severe and profound disabilities. *Division on Autism and Developmental Disabilities, 46*, 576-595.

Turner, L. B., Fischer, A. B, & Luiselli, J. K. (2016). Towards a competency-based, ethical, and socially valid approach to the supervision of applied behavior analytic trainees. *Behavior Analysis in Practice, 4*, 287-298. doi:10.1007/s40617-016-0121-4

United States Census Bureau. (2012). Computer and Internet Access in the United States: 2012. Reported Internet Usage for Individuals 3 years and older by state: 2012-- http://census.gov/data/tables/2012/demo/computer-internet/computer-use-2012.html

Van Houten, R. (1980). *Learning through feedback.* New York: NY: Human Sciences Press.

Vollmer, T. R. & Hackenberg, T. D. (2001). Reinforcement contingencies and social reinforcement: Some reciprocal relations between basic and applied research. *Journal of Applied Behavior Analysis, 34*, 241-253. doi:10.1901/jaba.2001.34-241

Wacker, D. P, Lee, J. F., et al. (2013a). Conducting functional analyses of problem behavior via telehealth. *Journal of Applied Behavior Analysis, 46*, 31-46. doi:10.1003/jaba.29

Wacker, D. P., et al., (2013b). Conducting functional communication training via telehealth to reduce the problem behavior of young children with autism. *Journal of Developmental Physical Disabilities, 25,* 35-48. doi:10.1007/s10882-012-914-0

Wallace, M. D., Iwata, B. A., & Hanley, G. P. (2006). Establishment of mands following tact training as a function of reinforcer strength. *Journal of Applied Behavior Analysis, 39,* 17-24. doi:10.1901/jaba.2006.119-04

Ward-Horner, J. & Sturmey, P. (2012). Component analysis of behavior skills training in functional analysis. *Behavioral Interventions, 27,* 75-92. doi:10.1002/bibn.1339

Watson, P. J., & Workman, E. A. (1981). The nonconcurrent multiple baseline across-individuals design: An extensive of the traditional multiple baseline design. *Journal of Behavior Therapy and Experimental Psychiatry, 12,* 257-259. doi:10.1016/0005-7916(81)90055-0

Weldy, C. R., Rapp, J. T., & Capocasa, K. (2014). Training staff to implement brief stimulus preference assessments. *Journal of Applied Behavior Analysis, 47*, 214-218. doi:10.1002/jaba.98

Wilder, D. A., Ellsworth, C., White, H., Shock, K. (2003). A comparison of stimulus preference assessment methods in adults with schizophrenia. *Behavioral Interventions, 18,* 151-160. doi:10.1002/bin.132

Windsor, J., Piché, L. M., & Locke, P. A. (1994). Preference testing: A comparison of two presentation methods. *Research in Developmental Disabilities, 15,* 439-455. doi:10.1016/0891-4222(94)90028-0

Appendix A. Example of Confederate Script

Trial	Response
1	**Correct:** Select an item.
2	**Correct:** Select an item. Hand item back after approximately 10s
3	**Error:** Reach for two items at the same time (simultaneous selection). If represents, select only one item.
4	**Error:** Select an item and bang it against the table
5	**Correct:** Select an item.
6	**Error:** No response. Do not make a response after repeated instruction.
7	**Correct:** Select an item
8	**Error:** No response. Select 1 item after instruction is repeated.
9	**Correct:** Select an item.
10	**Error:** Reach for one item, and then another item (consecutive selection)
11	**Correct:** Hand item back after approximately 10s
12	**Error:** Throw item up in air.
13	**Error:** Reach for two items at the same time (simultaneous selection). If represents, select only one item.
14	**Correct:** Select an item.
15	**Error:** Inappropriately play with item.
16	**Correct:** Select an item.
17	**Error:** No response. Select 1 item after instruction is repeated.
18	**Correct:** Select an item.

Appendix B. Trainer Data Sheet

	Skill	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	Selects 6 items for assess	C I																	
2	Pre-session exposure	C I																	
3	Presentation of items	C I	C I	C I	C I	C I	C I	C I	C I	C I	C I	C I	C I	C I	C I	C I	C I	C I	C I
4	Presentation of instruction	C I	C I	C I	C I	C I	C I	C I	C I	C I	C I	C I	C I	C I	C I	C I	C I	C I	C I
5	Delivery and removal of items	C I	C I	C I	C I	C I	C I	C I	C I	C I	C I	C I	C I	C I	C I	C I	C I	C I	C I
6	Reinforcement interval	C I	C I	C I	C I	C I	C I	C I	C I	C I	C I	C I	C I	C I	C I	C I	C I	C I	C I
7	Records data	C I	C I	C I	C I	C I	C I	C I	C I	C I	C I	C I	C I	C I	C I	C I	C I	C I	C I
8	Presentation of trials	C I	C I	C I	C I	C I	C I	C I	C I	C I	C I	C I	C I	C I	C I	C I	C I	C I	C I
		SS CS NC CB	SS CS NC CB	SS CS NC CB	SS CS NC CB	SS CS NC CB	SS CS NC CB	SS CS NC CB	SS CS NC CB	SS CS NC CB	SS CS NC CB	SS CS NC CB	SS CS NC CB	SS CS NC CB	SS CS NC CB	SS CS NC CB	SS CS NC CB	SS CS NC CB	SS CS NC CB
9	Response to idiosyncratic child responses	C I NA	C I NA	C I NA	C I NA	C I NA	C I NA	C I NA	C I NA	C I NA	C I NA	C I NA	C I NA	C I NA	C I NA	C I NA	C I NA	C I NA	C I NA
10	Calculate rank order																		C I
11	Identified high preferred item as teaching stimuli																		C I
	#C/ #C + I x100	%																	
	Session Duration:	Skill Demonstration Duration:	Key: Simultaneous selection (SS); Consecutive selection(CS); No choice/selection (NC); Challenging Behavior (CB)																

Appendix C. Treatment integrity data sheet.

Treatment Integrity Data Sheet

Session: Participant: Scorer

	Skill	1		2		3		4		5		6		7		8		9		10		11		12		13		14		15		16		17		18	
1	Selects items	C I	P C O																																		
2	Pre-session exposure	C I	P C O																																		
3	Presen of items	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O
4	Presen of instruction	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O
5	Delivery/ removal of items	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O
6	Reinf interval	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O
7	Records data	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O
8	Present. of trials	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O	C I	P C O
9	Idiosync. child responses	C I N A	P C O	C I N A	P C O	C I N A	P C O	C I N A	P C O	C I N A	P C O	C I N A	P C O	C I N A	P C O	C I N A	P C O	C I N A	P C O	C I N A	P C O	C I N A	P C O	C I N A	P C O	C I N A	P C O	C I N A	P C O	C I N A	P C O	C I N A	P C O	C I N A	P C O	C I N A	P C O
10	Calculate rank order																																			C I	P C O
11	Identify High Pref																																			C I	P C O
	#C/ #C + I x100	%																																			

Shaded Codes, trainees implementation of component skills: c= correct, I=incorrect
Unshaded codes, tx integrity codes: p=positive, c=corrective, o=omission

Appendix D. Step-by-step guide for accessing VidyoDesktop™

1. Open Chrome Browser by double clicking on Chrome icon.
2. Type in URL provided.
3. If a notification appears at the top of the page asking your permission to run VidyoDesktop™ select *always run on this site*.
4. Type in your name.
5. Click enter conference room.
6. If an external protocol window request pops up select *remember my choices for all links of this type.* Select Launch Application.
7. A small window with your video will appear.
8. When the call is connected you will hear a call ringtone and a video will pop up on your screen.
9. Your video will start automatically.
10. If you accidentally close or end session early click the join conference room window.

If support is needed please contact the trainer

Appendix E. Brief MSWO preference assessment data sheet

Directions: Conduct a Brief MSWO preference assessment to the best of your ability

Session:________________

List of Items:

A.____________	B. ____________	C._____________	D. ____________	E._____________
F.____________	G. ____________	H._____________	I. ____________	J._____________

Preference Assessment #1		Notes
1.		
2.		
3.		
4.		
5.		
6.		

Rank Order Calculation
1.
2.
3.
4.
5.
6.

Stimuli used for teaching:

____

Appendix F. Example scenario

Austin loves to play with pirates. He will often play with dinosaurs and superheroes where he creates elaborate stories. He doesn't really like to play with play-doh or bubbles because of the texture. Instead he likes to play with toys that he can use his imagination with such as legos and puppets.

Appendix G. Social Validity Questionnaire

Directions: Please rate the following questions where 1 indicates *strongly disagree* and 6 indicates *strongly agree.*

Question	Rating
1. The training procedure was effective at teaching me how to conduct MSWO preference assessments.	1 2 3 4 5 6
Additional thoughts on question 1:	
2. I found the telehealth service delivery acceptable.	1 2 3 4 5 6
Additional thoughts on question 2:	
3. I found the real-time feedback delivery acceptable.	1 2 3 4 5 6
Additional thoughts on question 3:	
4. I was satisfied with the technology setup.	1 2 3 4 5 6
Additional thoughts on question 4:	
5. I would recommend the training procedure (using telehealth to deliver feedback) to others interested in learning how to conduct behavior analytic skills	1 2 3 4 5 6
Additional thoughts on question 5:	