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Assessing the Efficacy of Training Parents via Telehealth to Administer Natural Environment Training

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Assessing the Efficacy of Training Parents via Telehealth to Administer Natural Environment Training

By

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"Assessing the Efficacy of Training Parents via Telehealth to Administer Natural Environment Training"

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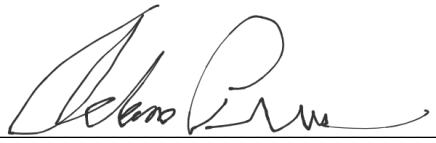

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Dedications

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Abstract

Telehealth has recently emerged as a not only a potentially effective means of preparing parents and educators as interventionists for children with autism spectrum disorder (ASD), but for many in the wake of the COVID-19 pandemic, has been the only way of safely delivering behaviorally analytic services to clients during this time. Due to these recent changes in Behavior analysis service providing, the transition to Telehealth was considered essential for many clinicians to continue providing services to their clients. With little research supporting the use of telehealth for providing Behavior Analysis services to clients, expansion on literature in this area proved necessary at this time. Results of this study indicate that telehealth services can be used to effectively teach parents to administer Natural Environment Procedures with to their children within their home.

Keywords: Behavior skills training, verbal behavior, video feedback, procedural fidelity

CHAPTER ONE

INTRODUCTION

In 2020, the SARS-CoV-2 coronavirus (COVID-19) global pandemic caused drastic changes to society. Entire cities, states, and countries were placed under government orders to stay at home, which allowed for only essential services to continue (Rodriguez, 2020). The Centers for Disease Control and Prevention (CDC) and the World Health Organization (WHO) provided guidance on community mitigation strategies, which included limiting close social contact (i.e., social distancing)—a behavior identified to be critical for slowing the spread of COVID-19 (CDC, 2020., WHO, 2020). In the United States, a national state of emergency was declared on March 13, 2020 (COVID-19 Emergency Declaration, 2020). With that state of emergency, many business and service settings came to a halt (Rodriguez, 2020). This was particularly devastating to how healthcare services could be provided, including that of Applied Behavior Analysis (ABA), which led to major disruption of services.

During this time, ABA services were generally allowed to continue as a medically necessary service (Rodriguez, 2020). However, as social-distancing restrictions tightened, clinician's ability to continue providing in-person services to their clients became nearly impossible. This was further compounded by the Behavior Analysis Certification Board's (BACB) code of ethics which states that behavior analysts must have a reasonable and timely process undertaken for the continuation of services during an emergency (Code 2.15b; BACB, 2014). Unlike with other populations, it was especially critical to consider that a disruption in ABA services could place some clients at an increased risk for serious behavioral regression. These decreases in behavioral progress could potentially lead to increases in maladaptive

behaviors, injuries, and even hospitalizations (Galindo et al., 2020). As such, interruptions of services could also have had potentially long-lasting effects on the treatment of an individual. These effects are in part due to the fact that practitioners are ethically obligated to uphold the continuity of services while doing no harm (Colombo et al., 2020). Because of this ethical obligation, doing no harm means not only considering the harm that in person services could have caused, but also harm that could have been caused by the discontinuation of services as well. This also meant clinicians had to consider that these many changes not only had an effect on our clients, but those that care for them as well.

Caregiver stress was also an unfavorable aspect that could have been a potential result of inconsistent treatment. Behavior analysts in fact demonstrated that caregiver's behavior was reinforced by escape from, or avoidance of, problem behavior, (Miller et al., 2010) and or distressing situations (e.g., infant crying; Bruzek et al., 2009; Thompson et al., 2011). With added stress and unknowns due to the pandemic, it was much more difficult for caregivers not to reinforce problem behavior in an effort to escape, or avoid, aversive environmental conditions. With events as a result of Covid-19 raising the potential for both client and caregivers to experience detrimental outcomes, services had become even more important to those receiving them.

Telehealth within ABA Services

With so many aspects of regular life being affected by the pandemic, ABA was deemed a medically necessary treatment for individuals diagnosed with autism and related disorders (Association of Professional Behavior Analysts, 2020). Despite it being declared an essential service, delivery of services in person were still considered to potentially be nonessential for

some clients and the transition to telehealth delivery of ABA services was a more ethical choice (Rodriguez, 2020). Due to that, practicing behavior analysts were transitioning to delivering services via telehealth for the very first time.

Telehealth was defined as "The Health Resources Services Administration defines telehealth as the use of electronic information and telecommunications technologies to support long-distance clinical health care, patient and professional health-related education, public health and health administration. Technologies include videoconferencing, the internet, store-and-forward imaging, streaming media, and terrestrial and wireless communications." (What is Telehealth?, 2020). Telehealth facilitates patient self-management and caregiver support for patients and includes synchronous interactions and asynchronous store and forward transfers (Services, 2020). Further, telehealth is not a distinct service, but a way that providers could deliver health care to their patients in a way that could approximate in-person care. Although the standard of care was generally considered the same whether the patient is seen in-person or through telehealth (Services, 2020), many challenges were expected to be potentially experienced since trained professionals were not physically present in the room with the client. Because of this, caregivers often played a critical role in the coordination and delivery of services on behalf of the receiving party (Allen & Hudd, 1987). As healthcare companies continued to approve practitioners to provide services via telehealth, caregiver's assistance in the coordination and delivery of services had become even more important. While providers and families navigated the transition to telehealth, many providers realized some parents may require training in order to continue providing at least some services via telehealth. Even before the pandemic, behavior analysts were already responsible for training these caregivers (i.e., teachers, parents, clinicians, staff) in behavior analytic practices for the individuals they serve (e.g.,

children/adults with developmental/intellectual disabilities; Behavior Analyst Certification Board® [BACB], 2015). However, due to the lack of in-person services during the pandemic, caregiver training required a much larger emphasis for successful client care.

Despite the challenges providers were facing while attempting to provide services, the addition of knowledge and experience using Telehealth, it was acknowledged that it could bring about newfound benefits to the field of behavior analysis that could extend beyond the pandemic. Behavior analysts were beginning to recognize that telehealth, as an element of treatment, could be something that could hold major benefits to the field due to accessibility of those services. Telehealth technologies allowed specialists to maximize resources by providing training to a greater number of people with inexpensive equipment (Wacker et al., 2013) as well as accommodate interventionists' lifestyles and routines with flexible training times, schedules, and locations (Wainer & Ingersoll, 2013).

Generally speaking, treatment of most childhood behavior problems requires parental implementation of behavior change procedures (Graziano & Diament, 1992). With the introduction of Telehealth into the field of ABA, parents were potentially required to be a bit more involved in administering treatment sessions depending on the needs of the client. This also meant that some caregivers may require training in order to implement procedures correctly. These changes in treatment styles were considered one of the potential difficult elements of Telehealth, due to the fact they could have placed new demands on parents. Those demands on parents, could have potentially created more significant demands on behavior analysts as well. Mainly due to the fact that the ability to teach parents to implement services was be an important element in whether or not clients could continue to receive services during that time. For some clients, services may have required instructions to be delivered in person. This meant that

clinicians needed to know be how to adequately train parents to administer those procedures via telehealth before services could continue.

With increases in the need for caregivers to be trained on behavior analytic concepts and procedures they were going to be implementing, came the inherent need to provide parents with effective feedback throughout that process. This need turned out to be a potential benefit of telehealth, because feedback has proven to be an effective tool for improving the performance of those implementing procedures. A study conducted by Noell and colleagues (2002) demonstrated the application of performance feedback, which resulted in high levels of treatment integrity for all teachers. As discussed in that study, feedback can be provided in two forms, written or verbal. With both forms of feedback providing different benefits, choosing which form to provide required consideration of who it was being provided to, and which style may work best them. In a study conducted by Mortenson and Witt (1998), it was found that verbal and written instructions were not enough to improve teachers' treatment fidelity. Instead, the introduction of weekly performance feedback effectively improved the teachers' fidelity of implementation along with the students' academic (Mortenson & Witt, 1998).

Another potential benefit of telehealth was that it could have allowed for more cost-effective treatments. This was demonstrated in a study conducted by Wacker et al. (2013) where the cost of a functional assessment (FA) conducted via telehealth was over five times less expensive than the delivery of a FA in person. With many remote areas lacking places to receive services, the utilization of telehealth was thought to be potential a way for families in those areas to receive services without having to spend additional money or travel long distances to providers. Another benefit was that telehealth could potentially provide additional supports, due to the clinician being able to observe direct interaction skills from the families' home as well as

allowing for flexible learning options are available online at any time of day (Vismara et al., 2016).

To date, telehealth has been used successfully to reduce challenging behavior (Wacker et al., 2013), increase communication responses (Vismara et al., 2009), and facilitate improvements in joint attention (Neely et al., 2016), and even to teach parents to implement Functional Communication training (FCT). In a study conducted by (Benson et al., 2017), results indicated that parent-implemented FA + FCT via telehealth was effective in reducing self-injurious behavior as well as increasing mands (communication requests) for both children. Both of the participants successfully implemented the FA + FCT protocol with 95% overall fidelity via telehealth-supported coaching. Although these studies may not have guaranteed that telehealth always works effectively, they provided a foundation of support that telehealth could be utilized successfully in the field of behavior analysis to provide behavioral interventions.

Incorporating Telehealth into Language Acquisition Procedures

Although behavior analysts were working to attempt to continue services as best they could, treatment via telehealth was inevitably going be much different from the style of treatment clients were receiving previously in the clinic. Much of the population receiving ABA services included children diagnosed with autism spectrum disorder (ASD). Individuals with ASD characteristically exhibit difficulties with social communication, delayed spoken language development, and stereotyped/repetitive language (American Psychiatric Association, 2000). Typical clinical style treatment for these individuals usually involved two general approaches, discrete trial training (DTT) and naturalistic environment training (NET) (Schreibman et al., 2015). Both training methods have been used in the field for developing social communication

and language skills in children with ASD (e.g., Smith, 2001), and have proven to be effective in improving such deficits with this population (Parsons et al., 2017).

Discrete Trial Training. DTT is a method of teaching in simplified and structured steps (Schreibman et al., 2015). Instead of teaching an entire skill in one go, the skill is broken down and "built-up" using discrete trials that teach each step one at a time. (Smith, 2001). Each discrete trial consists of three main components: (a) an antecedent prompt delivered by an instructor, (b) an opportunity for student response, and (c) a consequence delivered by the instructor contingent on specific student responses (Sump et al., 2018). DTT has proven effective in rapidly building skills (Smith, 2001), however, with the benefits of DTT came some limitations as well. One of the primary limitations found, was that DTT requires specialized training of individuals that would be implementing the procedure (Smith, 2001). Much of this was because DTT required a high level of procedural integrity to promote optimal outcomes. Therefore, intensive training has often been required (Davis, Smith, & Donahoe, 2002). For example, Koegel, Russo, and Rincover (1977) showed that educational staff could acquire discrete-trial teaching skills; however, instruction took up to 25 hours. These trainings took time to adequately train to those implementing them, even when provided them to someone with prior knowledge on how to work with children. Another limitation of DTT is that there are typically more than one program to be implemented, which added even more time onto training. Despite these limitations, behavior analysts have developed strategies to help teach these skills. Usually, several procedures were combined in those teaching strategies such as instructions, verbal feedback, video feedback, role-play, and self-management (Sump et al., 2018). These teaching strategies were part of a common training process known as behavior skills training (BST) (Sump et al., 2018).

BST is an empirically supported teaching strategy that has shown to be effective for training service providers to implement DTT (Sarokoff & Sturmey, 2004). In simple formulation, BST consists of instruction, modeling, rehearsal, and feedback (Rodriguez, 2020). With transitions to telehealth, the use of BST to train parents and staff in these procedures became even greater. In a study conducted by (Sump et al., 2018) undergraduate students were taught via telehealth with BST to implement DTT procedures. Students were trained on two skills via telehealth and two skills were trained in-person using BST procedures with a mock student. The results of the study showed that all participants provided high acceptability ratings for both training procedures. Results also showed telehealth training was as efficacious and efficient as in-person training for all skills across all of the participants. Results also showed five of six participants had high levels of maintenance of the newly acquired skills; these five also exhibited the skills during a novel instructional task (Sump et al., 2018). Although a well-developed telehealth training likely may never replace the need for in-person services, studies such as that show there could be potential for telehealth to at least assist in providing some services to clients, as well as successfully teaching others via telehealth to implement ABA procedures like the study discussed above.

Clients maintaining skills or decreasing in progress was also one main concern with interruptions of services. Thankfully, telehealth allowed for some of the skills previously worked on in DTT to continue being worked on through structured sessions, where the clinician attempted to implement DTT procedures with assistance from caregivers. Although this was one ideal way to program for generalization, the methodology has tended to be contrived, rather than focused on cultivating natural learning moments in an effort to generalize skills, this has typically been addressed within the NET portion of language acquisition sessions. Despite the

success of DTT in promoting new skills, the lack of generalization of treatment gains to natural environments has been noted in the use of the DTT procedures (Smith, 2001). With structured sessions being some of the only services clinicians knew how to provide via telehealth, it was more important than ever, to teach caregivers to implement NET procedures so clients could continue to acquire, generalize, and maintain the skills learned during sessions, especially while not receiving in-person services due to the COVID-19 pandemic.

Natural Environment Training. One of the key teaching methods in ABA treatments, is incidental teaching (Behavior Analyst Certification Board 2012). Incidental, or also commonly known as natural environment teaching is based on the natural language paradigm model (Koegel et al., 2003) and incorporates incidental teaching or embedded teaching procedures into the learner's natural environment (Sundberg & Partington, 2013). This teaching method is an empirically supported intervention used to improve the social communication and language skills of children diagnosed with ASD (Ingersoll, 2010). Task demands are embedded into child-directed activities based on Skinner's analysis of verbal behavior (Sundberg & Partington, 1998). These demands are conducted in naturally occurring contexts, such as playtime, to promote the generalization of skills learned during DTT. This means NET can occur anywhere, in a therapy room, home, or even at the grocery store. Data indicated that NET procedures are associated with rapid behavior gains (McGee et al., 1999) and generalized treatment effects (McDonnell, 1998).

NET is a very important aspect of treatment, as this is typically how clients are taught to generalize the skills they have learned to other people, items, and contexts (Peterson, 2004). While most ABA telehealth treatment during the pandemic primarily focused on teaching and instructing caregivers on a few specific skills, maintaining the same rate of learning at home in the natural environment, as would be gained in the clinic during NET, was unlikely. This created

a cause for concern as to how behavior analysts would continue to provide the best care possible to their clients and assist in attempting to keep treatment via telehealth as relevant and effective as it could be to typical in clinic behavior treatment. Although there was some literature supporting the effective use of telehealth to prepare interventionists (Sump et al., 2018), there was very little literature that had evaluated the use of telehealth to prepare ASD interventionists specifically in incidental teaching (Neely et al., 2016). With the lack of generalization of skills learned in DTT already being a criticism of ABA, NET being what helped promote generalization of skills, and a lack in literature providing guidance for to teach caregivers to implement these skills, there was a great need to extend literature in the current area (Neely et al., 2016).

A study conducted by Neely and colleagues (2016) evaluated the effects of a pyramidal training, on coaches and interventionists implementation of incidental teaching that was delivered via an asynchronous telehealth training. The study also assessed the effects of the training program on child requesting behavior. Upon the completion of the study, all three of the interventionists were able to reach the pre-set performance criteria of 90 % fidelity for four consecutive sessions following the telepractice training program. Interventionists also increased the number of communication opportunities offered following training. Maintenance probes for two of the interventionists indicated that they were able to maintain high fidelity of implementation. Interventionist training also produced distal child outcomes as each child participant increased and maintained their target mands above baseline levels (Neely et al., 2016). While these successful results were promising, the individuals being trained to implement the procedures had some existing knowledge of ABA. This created the questions as to whether

all caregivers without formal ABA training could be trained to successfully implement these procedures.

With there being little other guidance or literature on how to teach these procedures, the many potential risks of stopping all services at the time, and telehealth being of great significance while behavior analysts navigated the COVID-19 pandemic, it was imperative to extend the telehealth literature into areas exploring ways to teach caregivers how to use NET procedures. Therefore, the goal of this study was be to expand upon the literature in the use of telehealth practices by assessing whether parents could be taught via telehealth to successfully administer NET at home with their children. Additionally, as client outcomes were particularly relevant, this study also simultaneously assessed the effects of this training on children's skills within NET.

CHAPTER TWO

Method

Participants

Participation in this study was offered to all clients already receiving some form of Early Intensive – Language Learning (EI-LL) at a Midwestern region university-based clinic. The EI-LL program is an in-center program that provides up to 10 hours of one-on-one therapy per week, and utilizes a combination of discrete trial training and naturalistic training procedures. This program is designed to help pre-school aged children develop language learning skills and basic school readiness behaviors as well as assisting in establishing foundational language skills as well as promoting basic social skills. The program also provides basic behavioral supports for reducing stereotypy, perseverative or repetitive behaviors, non-cooperation, and low intensity self-injurious behaviors or aggressive behaviors. EI-LL services are conducted by behavior technicians enrolled in the university behavior analysis program and overseen by Board Certified Behavior Analysts. Participant criteria requires children to be within the age range of two to six years of age, and demonstrate a delay or deficit in language and basic social skills.

Both Wilson (child #1) and Eddy (child #2) were cared for by Elanore (participant #1) and Stuart (participant #2) whom were married and the parents of both children. Both parents participated in this study separately with one of their children. Elanore (participant #1) participated in this study with Wilson, (child #1). Elanore was 37-year-old female with an associate in cosmetology whom worked as part time cosmetologist. Elanore has participated in Eddy's services for four years and Wilson's services for one year. Wilson (child #2) was a 3-year-old male with no diagnosis that had been receiving comprehensive support services at the

university center since January 2020 (1+ years). The focus of ABA services was in school readiness behaviors such as development of cooperation and reinforcer effectiveness, visual performance, motor imitation, vocal imitation, requests, labeling, intraverbals, and social interaction. Based on Wilson's treatment program, the following were determined to be targets for the purposes of this study: Listener responding and intraverbals.

Stuart, (participant #2) participated in this study with Eddy, (child #2). Stuart is 36-year-old male with a Bachelors in business and computer information systems, and whom worked full time in IT. Stuart also participated very slightly in Eddy's services for four years and Wilson's services for one year. Eddy (#1) was a 7-year-old male diagnosed with Autism Spectrum Disorder. Eddy had been receiving comprehensive support services at the university center since January 2017 (4+ years). The focus of language acquisition has been in development of cooperation and reinforcer effectiveness, visual performance, receptive language, imitation (motor and vocal), requests, labeling, intraverbals, and spontaneous vocalization. Based on Eddy's treatment program, the following were determined to be targets for the purposes of this study: Listener responding and imitation.

Janice, (participant #3) participated in this opportunity with her son Oliver, (child #3). Janice was 49 years old and had 3 years of general college education. Janice (parent #3) has participated in Oliver's services for four years. Oliver (child #3) was a 6-year-old male receiving comprehensive support services at the university center since January 2017 (4+ years). The focus of skill acquisition for Oliver had been in the skill areas of: development of cooperation and reinforcer effectiveness, receptive language, requests, labeling, intraverbals, syntax and grammar, social interactions, play and leisure, generalized responding, math, writing, spelling, gross motor and fine motor. Based on Oliver's treatment program, the following were

determined to be targets for the purposes of this study: Listener responding and intraverbals.

Materials and Equipment

In order to participate in the study, the parent/guardians needed a device with a camera, microphone, and adequate audio. This included devices such as laptops with built in cameras, computers with webcam and microphone accessories, and Smartphones. If the parent/guardian did not have access to a device meeting these specifications, a device could be "checked out" from the center. The parent/guardian also needed the minimum transmission speed necessary to allow the smooth and natural communication pace needed for clinical encounters. This meant that parent's devices needed to have the minimum bandwidth speed needed to successfully live video chat. The services used systems that transmitted data (bandwidth) at a minimum of one megabit per second (mbps). The center where the clients received EI-LL services from utilized HIPAA-compliant Zoom Video Communication to deliver telehealth.

Laptop technology allowed clinicians to connect with clients from safe distances, without the need for transport to a remote telehealth site. However, the use of laptop technology presented special challenges that would not be an issue with stationary equipment, and therefore required extra steps to ensure safety and security of the equipment. These challenges included things such as, the need to assure the quality of the connection provided adequate sound and image, as well as if the client had received the training necessary to operate the equipment properly if needed. Laptop technology especially required taking extra steps to ensure the method for teleservices was compliant with the Health Insurance Portability and Accountability Act of 1996 (HIPAA). The safety and security of participants information was an essential part of this study and all services, communication, and documentation provided telehealth services was be done so using HIPAA compliant services and procedures.

Experimental Design

A non-concurrent multiple-baseline design was used across participants to evaluate the effectiveness of this training in teaching parents via telehealth to implement NET. This design was selected because the dependent variables were not likely to be a skill that can be reversed. Participants were assigned randomly in the multiple-baseline design and the treatment was initiated for participants once there was consistent responding in both parent and child behavior.

Data Collection

Data were collected on three different categories for each session. The first measured the frequency of presented learning opportunities presented within each 10-minute session. This frequency was then used to determine the overall rate of presented learning opportunities per minute. A presented learning opportunity occurred when the parent had arranged the environment by either (1) placing a preferred item in sight but out of reach such as on a high shelf, (2) intentionally interrupted and/or made it so the child could not complete the task, or (3) when the parent asked questions about an item or placed demands on a child related to an item of interest. To ensure that the relevant motivating operations were captured, a presented learning opportunity was only counted when the client displayed interest toward the item providing the learning opportunity. Client initiations were defined as physical initiations such as reaching toward, pointing, attempting to grab, exchanging a sentence strip ‘‘I want___’’ or verbal initiations requesting with or without the targeted mand. Multiple learning opportunities could occur within each session. For each learning opportunity, data was taken not only on if the learning opportunity was presented or not, but also the level of prompting that was used to help the child produce the correct response. The second behavior data were collected on frequency of

reinforcement was provided correctly for each correctly presented learning opportunity in each 10-minute session. The final element of data collection involved recording any data on additional operants that were prompted without being previously taught. This data regarding interventionist's implementation of natural environment training were then used to calculate the percentage of the training protocol steps completed correctly. Since the natural environment can potentially offer multiple communication opportunities within one session, the resulting percentages for each opportunity were then used to calculate an overall average percentage of steps completed correctly during each session. This data allowed for the comparison of parent abilities to correctly implement natural environment training based on opportunities in baseline to their skill levels post treatment.

Setting

Participants in this study will be able to participate from their homes. During the first meeting, the parents, lead researcher, and supervising BCBA identified an area within the home that was suitable for every session to be conducted in. For most participants this involved settings such as family living rooms, due to fact this is an environment where many natural learning opportunities could occur. All participating supervisors, researchers, and research assistants will be participating in sessions or reviewing videos of sessions either from the clinic or from their homes with HIPPA compliant technology and services utilized by the center.

Pre-Assessment

Upon the receipt of the informed consent from the parents that chose to participate, a pre-assessment phase was conducted with parents. During the pre-assessment the first meeting with parents was utilized for the clinic's supervising BCBA and the head researcher to meet with

parents via Zoom and assure they could accurately access and utilize these services. They also then discussed the purpose of the study and reviewed the basic components and timeline of treatment.

Baseline Data Collection

During the first phase of research, baseline data were collected while observing parents via Zoom in their home. During this, parents were instructed via telehealth to engage with their child and teach them through play. This was the only instruction given to parents and no additional assistance or suggestions were provided during this phase. Baseline data were collected as stated above on presented learning opportunities, their prompting level, and if reinforcement was provided correctly. Each participant had at least three baseline observations before instructional procedures were implemented with the parent. Data were collected while observing participants in the same setting of their home each visit. Baseline observations were all conducted separately from one another per client and observation.

Parent Training and Intervention

At the conclusion of baseline, appropriate verbal operants for the child needed to be identified. To do so, the supervising BCBA and researcher collaborated with the parents to identify which verbal operants were most clinically and social significant to their children's current abilities and needs. Of those verbal operants described by Skinner (1957), listener responding, imitation and intraverbals were the only operants assigned to participants. Echoics are emitted in the presence of a verbal stimulus, have point-to-point correspondence with the occasioning response and are maintained by generalized reinforcement (Shillingsburg et al., 2009). For example, following presentation of the spoken word "truck," the participant emits the

word "truck," which results in praise from the therapist. A mand is a verbal operant that is occasioned by a motivating operation and maintained by social reinforcement specific to the MO (MO; Laraway, Snycerski, Michael, & Poling, 2003). For example, the response "truck" is emitted following a period of time without access to a child's favorite toy truck and results in access to the truck. By contrast, a tact is a verbal operant that occurs in the presence of a nonverbal stimulus and is maintained by generalized reinforcement (Shillingsburg et al., 2009). For example, a child may see a truck and respond "truck," which results in generalized reinforcement (e.g., the therapist saying, "that's right!"). Finally, an intraverbal is occasioned by a verbal stimulus and is maintained by generalized reinforcement, but the response does not have point-to-point correspondence with the occasioning response (Shillingsburg et al., 2009). For example, following presentation of the phrase "what has wheels?" the participant may emit the word "truck," resulting in praise from the therapist. In sum, the response "truck" may serve a variety of functions (i.e., mand, tact, or intraverbal), depending on the context (Colón et al., 2012). Following the selection of the targeted verbal operants, the parents were provided with the training modules that corresponded to the verbal operants they would be teaching.

Phase 1 - Video Module Training. The first phase of parent training was a pre-recorded video module for parents to watch on their devices anytime they had access to the internet. Modules were assigned to parents based on the specific operants that were identified as clinically significant for parents to train. Modules showcased the researcher providing instruction and modeling the verbal operants with a confederate using a behavioral skills training (BST) style approach. Parents watched these modules on YouTube, after receiving links to the video trainings in their email. Modules consisted of PowerPoint trainings for each operant with videos embedded to provide examples of the operants being taught. Parents were required to complete

all assigned modules on the operants they would be teaching before moving on to any further phases in treatment.

Phase 2 - Mock Practice. Following the completion of the video training modules, parents moved on to the second phase of training consisting of live telehealth training with the lead researcher. Each parent participated in a trial-based teaching session between the parent and the researcher (who was acting the part of the child). After the parent provided a response, the researcher prompted the parent as needed. After the completion of each trial block, the researcher provided feedback to the parent in order to correct the procedure and to provide praise to parents on accomplishments. The researcher then had parents practice implementing the procedure for 5 minutes with the researcher continuing to act in the role of the child. Data was taken the same on frequency of presented learning opportunities and reinforcement. This data was then used to determine the overall rate of presentations per minute. Once parents reached 90% procedural fidelity on the implementation of their sessions they were moved into the final phase of treatment. Procedural fidelity was recorded for all of participant's mock sessions. Each element of criteria within the procedural fidelity check was scored as either correct or incorrect based on set criteria for implementing these skills. Procedural fidelity check criteria can be found in appendix A.

Phase 3 - Independent Instruction. The final phase of this study involved the implementation of all procedures similarly to the mock practice, but this time parents were provided no feedback or assistance from the researcher. These sessions were ten minutes in length, as like with the baseline phase, and were video recorded. The researcher collected data in the same way on all sessions conducted. Data from this session was then be compared to data from baseline and used assess the effects the training program had on parent abilities. Some

observations within this study were conducted on the same day. All observations were conducted separate from one another and recorded and analyzed separately. Due some observations being conducted on the same day, the timeline of this treatment will be displayed by sessions on the graph axis rather than dates.

IOA

Data were collected in this study by the lead researcher and research assistant who were both students in an applied behavior analysis graduate program with experience in implementing NET and taking NET data. IOA was calculated using percent agreement by dividing the total number of agreements by the sum of the agreements and disagreements and multiplying by 100 to obtain a percentage (Kazdin2011). Due to the use of video recording technology, IOA data was taken for at least 30% of total sessions and all IOA scores were at least 90%.

Reliability/Social Validity

Following the completion of treatment each of the parent was asked to complete a social validity questionnaire. The questionnaire contained 10 questions, each question asked the interventionists to rate their responses on a 1 to 5 scale with 1 corresponding to ‘‘strongly disagree’’ and 5 corresponding to ‘‘strongly agree’’. Example questions included ‘‘This method could be effective’’ and ‘‘I would keep using this approach’’. The second questionnaire was another researcher developed questionnaire developed to evaluate the usefulness of the training procedures (i.e., videoconferencing and self-evaluation). This questionnaire asked the interventionist (# of questions) questions and asked them to respond on a scale of 1 to 5 (with 1 indicating ‘‘strongly disagree’’ and 5 indicating ‘‘strongly agree’’). All questions were positively

phrased and included ‘‘I found self-evaluation to be effective’’ and ‘‘This training approach is an efficient training method’’.

CHAPTER THREE

RESULTS

Targeted Operants

Correctly Presented Learning Opportunities

Baseline. The number of correctly presented learning opportunities presented by the caregiver are displayed in Figure 1. as the line with black circles. During the baseline, condition the interventionists were scored on their offered communication opportunities. Elanore had an average of 2.5 presentations per minute for the target operants listener responding and intraverbals with a range of (2.2 – 2.8) presented learning opportunities. Stuart had an average of 0.5 presented learning opportunities for their target operants listener responding and imitation, with a range of (0.3 - 0.6) presented learning opportunities per minute. Janice had an average of 2.5 presented learning opportunities per minute for target operants, with an average of (2.3 - 2.7) per minute.

Mock Practice. During the mock practice phase, all of the interventionists increased the number of correctly presented learning opportunities they offered within a 10-minute session. Elanore had an average of 3.6 correctly presented learning opportunities per minute for target operants, with a range of (1.5 – 6.4). Janice had an average of 4.7 correctly presented learning opportunities with a range of (4 – 5.2) for all target operants.

Post-Intervention Independent Treatment. For the final independent treatment phase, all of the interventionists either increased or maintained their average number of correctly presented learning opportunities. Elanore had an average of 3.9 correctly presented learning opportunities per minute and a range of (3.3 – 4.3). Compared to baseline scores, Elanore

increased her average presented learning opportunities per minute from 2.5, to 3.9 per minute, resulting in an average increase of 1.4 additional presented learning opportunities per minute. During Janice's baseline, she had an average of 2.5 correctly presented learning opportunities per minute and a range of (2.3 – 2.7). Post treatment, Janice increased her average presented learning opportunities per minute from 2.5, to (4.5) per minute with a range of (4.4 – 4.6), resulting in an average increase of (2.1) additional presented learning opportunities per minute.

Correctly Provided Reinforcement

Baseline. The rate of correctly provided reinforcement per minute is displayed on figure 1. As the line with the black triangle. Before training during baseline, the caregiver's implementation of incidental teaching was stable and low across all interventionists. During the baseline condition, Elanore had an average of 1.5 correctly provided reinforcement opportunities per minute for target operants with a range of (1.2 – 1.8). During baseline, Stuart had an average of .2 correctly provided reinforcement opportunities for target operants and a rage of (0-.3) opportunities per minute. Janice had a baseline average of 1.7 correctly provided reinforcement opportunities per minute for target operants, with a range of (1.2 – 2.1) opportunities per minute.

Mock Practice. Upon completion of the mock practice with the researcher, Elanore had an average of 3.4 correctly reinforced learning opportunities per minute with a range of (1.6 – 4.8) for target operants. Janice had an average of 4.5 correctly reinforced learning opportunities per minute for target operants with a range of (3.6 - 5).

Post-Intervention Independent Treatment. Finally, during the final independent post treatment phase, the amount of correctly reinforced learning opportunities also either maintained or increased. Elanore had an average of 3.2 correctly reinforced learning opportunities per

minute for target operants with a range of (2.3 – 3.8). Janice had an average of (4.4) correctly reinforced learning opportunities per minute, and a range of (4.4 – 4.6).

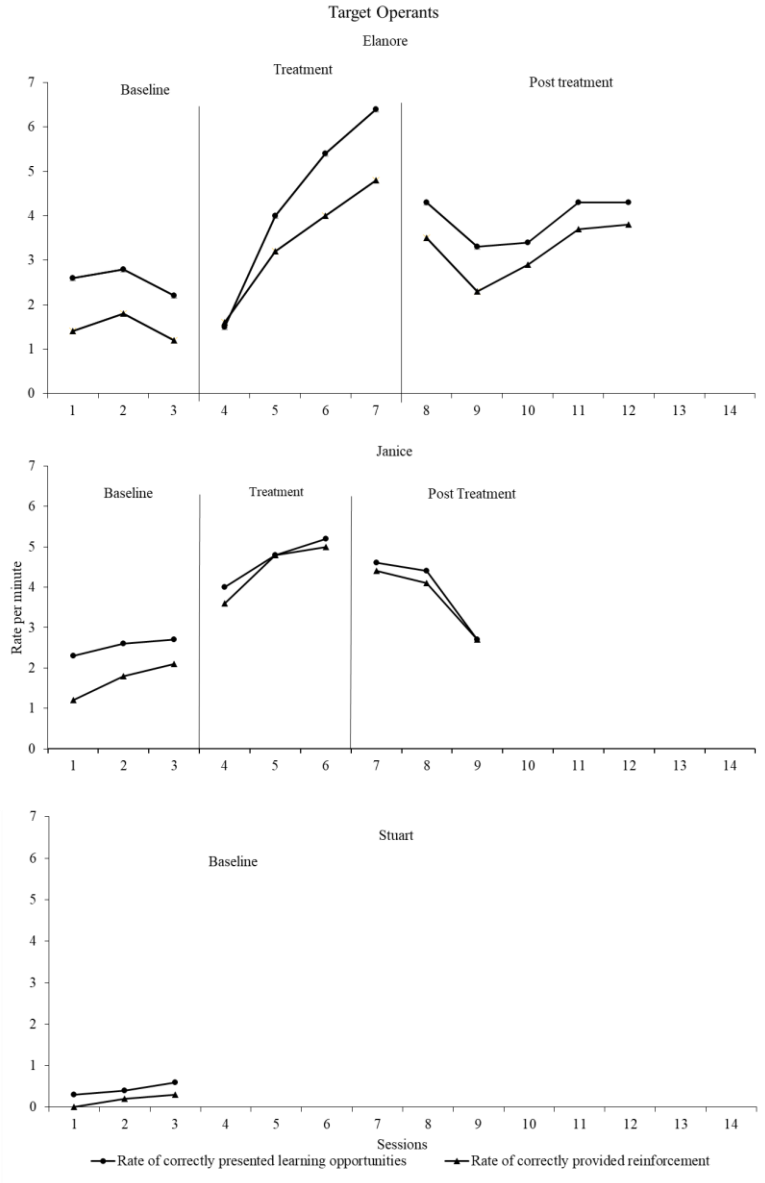

Figure 1. The figure above displays the results of the AB design for presented learning opportunities per minute and provided reinforcement per minute for all operants targeted in provided training modules. Showing increases for both participants from baseline to post treatment rates.

Generalization and Untaught Operants

Correctly Presented learning Opportunities

Baseline. During baseline, Elanore had an average of 1.1 presented learning opportunities per minutes with a range of (1 – 1.3) presented learning opportunities per minutes for all operants not being taught in their training. Stuart had an average of .1 presented learning opportunities per minute, with a range of (.0 - .2) for all of the operants that were not going to be taught in their training. Janice, all had an average of 1.7 presented learning opportunities per minute with a range of (1 - 2.5) per minute for all untaught operants.

Mock Practice. Following mock practice, Elanore had an average of 1.5 correctly presented learning opportunities per minute with a range of (.8 – 2.4) presentations per minute for all non-targeted operants. Janice had an average of 1.1 correctly presented learning opportunities per minute with a range of (.8 – 1.6).

Independent post treatment. Finally, during the final independent post treatment phase, the amount of correctly reinforced learning opportunities also either maintained or increased. Elanore had an average of 1.3 correctly presented learning opportunities per minute for un taught operants with a range of (.7 – 1.8). Janice had an average of 1.5 correctly reinforced learning opportunities per minute, and a range of (1- 1.9).

Correctly Provided Reinforcement

Baseline. The rate of correctly provided reinforcement per minute is displayed on figure 1. as the line with the black triangle. Before training during baseline, the caregiver's implementation of incidental teaching was stable and low across all interventionists. During the baseline condition, Elanore had an average of 1.5 correctly provided reinforcement opportunities

per minute for untaught operants with a range of (1.2 – 1.8). During baseline, Stuart had an average of .2 correctly provided reinforcement opportunities for untaught operants and a rage of (0-.3) opportunities per minute. Janice had a baseline average of 1.1 correctly provided reinforcement opportunities per minute for untaught operants with a range of (.4 – 1.7) opportunities per minute.

Mock practice. Upon completion of the mock practice with the researcher, Elanore had an average of 3.4 correctly reinforced learning opportunities per minute with a range of (1.6 – 4.8) for untaught operants. Janice had an average of (1.1) correctly reinforced learning opportunities per minute with a range of (.8 – 1.6) for untaught operants.

Post intervention independent treatment. Finally, during the final independent post treatment phase, the amount of correctly reinforced learning opportunities also either maintained or increased. Elanore had an average of 1.1 correctly reinforced learning opportunities per minute for un taught operants with a range of (.9 – 1.7). Janice had an average of 1.5 correctly reinforced learning opportunities per minute, and a range of (1 – 1.9) for untaught operants.

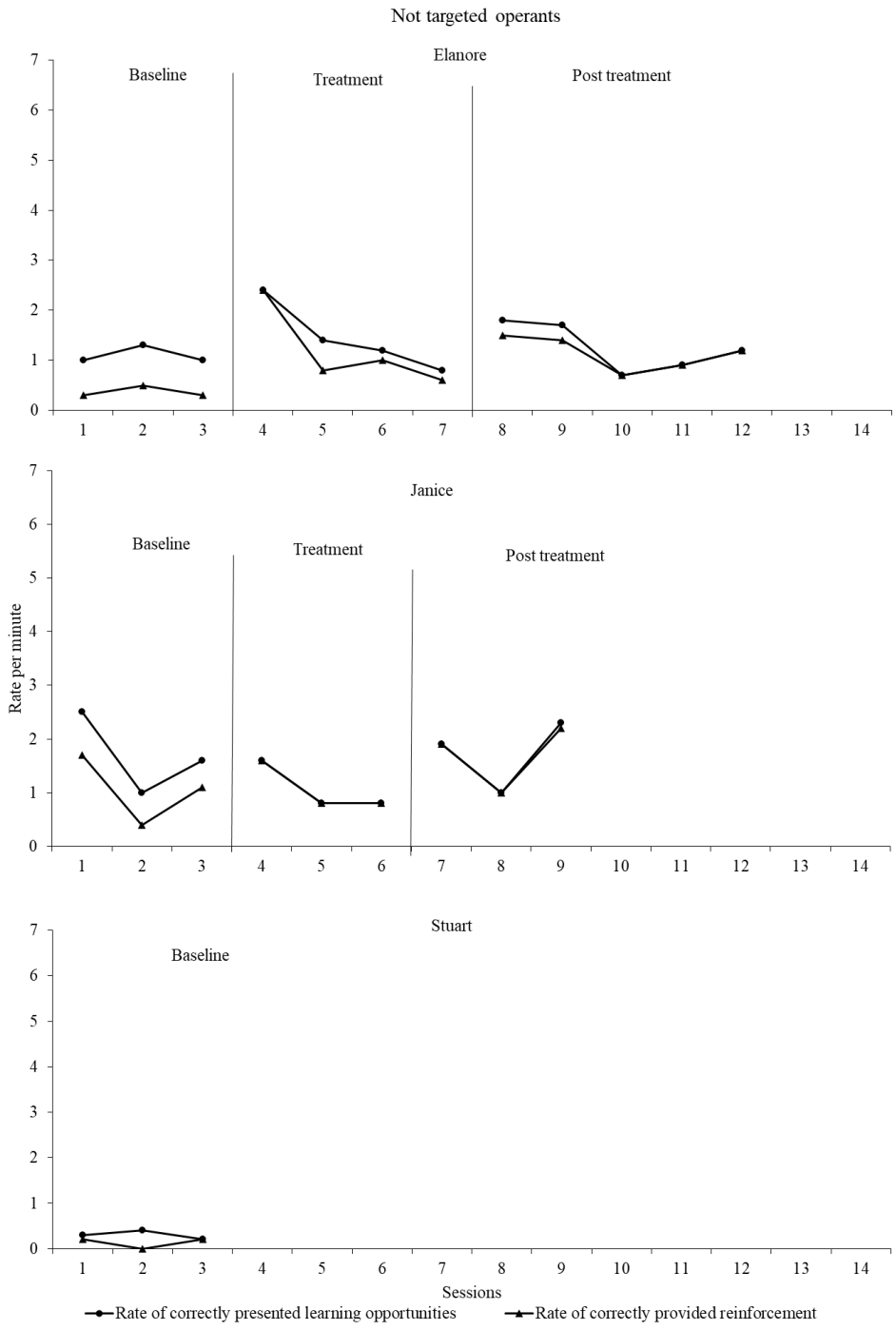

Figure 2. The figure above displays the results of the AB design for presented learning opportunities per minute and provided reinforcement per minute for all operants not targeted in provided training modules. This graph shows no apparent effects from trainings provided.

CHAPTER FOUR

DISCUSSION

The purpose of this study was to evaluate the effects of a telehealth training program designed to teach parents of children receiving in clinic ABA services. This training program was focused on specific ABA procedures used within the clinic to teach their children, and how to implement these procedures successfully themselves. This study also assessed the effects the trainings they were given on specific operants, had on their ability to present their child with more learning opportunities and reinforcement for operants they were not instructed on. The results of this study indicate that the telehealth behavioral skills training modules and mock practice sessions with the researcher were effective, and resulted in overall increases in both correctly presented learning opportunities and correctly provided reinforcement for both participants to complete this study.

As depicted above in *Figure 1.* both participants had moderate levels of presented learning opportunities and low levels of provided reinforcement during their baseline phase. Elanore's baselines scores as depicted above in the baseline phase of Figure 1. are all at a moderate level, with no trend and slight variability for both presented learning opportunities and provided reinforcement. Janice's baseline scores also depicted in Figure 1. show presented learning opportunities at a moderate level, with a slightly increasing trend and very little variability and provided reinforcement at a low level, with an increasing trend and very little variability

During mock practice sessions with the research, both participants increased presented learning opportunities and provided reinforcement as depicted in Figure 1. Elanore's presented

learning opportunities and provided reinforcement start at a low level and follow an increasing trend with low variability. Presented learning opportunities ended at a high level per minute and provided reinforcement also followed that increasing trend with low variability, but ended lower that presented learning opportunities, but still at a moderately high level.

During the post treatment phase, both participants did decrease slightly from their final mock practice scores when implementing with their children. These decreases could be in part due to the fact that the researcher was producing responses faster and more accurately than children were when parents implemented these skills with them. Things such as additional playing, conversation, and prompting children to produce the correct answer took up more time for parents when implemented with children than with the researcher, and could account for slight decreases in scores. As depicted in Figure 1. During the post treatment phase, both Elanore and Janice continued to present learning opportunities and provide reinforcement at a higher rate per minute than during their baseline phase. Elanore's presented learning opportunities in post treatment maintained a moderate level, with a slightly decreasing trend in the first two data points followed by a slight increasing trend in the last three data points, with a moderate level of variability. Provided reinforcement followed the same slight decrease in trend in the first two data points followed by a slight increase in trend in the last three data points. Provided reinforcement also having moderate variability, but being at still a moderate level, but lower than presented learning opportunities. Janice's presented learning opportunities in post treatment also dipped slightly, but maintained at moderate level with a decreasing trend and low variability for both presented learning opportunities and provided reinforcement for the first two data points. Following the first two data points, the graph depicts a significant decreasing trend from the second to the third data point, still at a moderate level, but with high variability compared to the

first two data points in Janice's post treatment phase. It was observed that Janice's son Oliver was engaging in problem behaviors during the observation, which played a part in the amount of time it took to prompt Oliver to produce a correct response compared to other observations. Despite decreases, Janice still reinforced every learning opportunity she was able to presented and receive a correct response on, and still presented learning opportunities and reinforcement at a moderate level.

As depicted in Figure 2. there were no significant changes from baseline to post treatment that appear to have had an effect on operants not targeted in the trainings provided to parents. This means that trainings provided to parents did not promote the generalization of the skills taught, to other untaught operants. This lack of change between phases, supports the idea that training needs to be provided on each specific operant to increase presented learning opportunities and presented reinforcement for that operant.

Despite slight decreases from mock practice to post treatment observations, both participants showed improvements on increasing their average rate of presented learning opportunities per minute and provided reinforcement per minute, by an average of at least one additional presented learning opportunity and provided reinforcement per minute. These results indicate, that a telehealth training program can teach parents of children receiving ABA services, to implement specific NET procedures in their homes with their children successfully.

Limitations and Suggestions for Future Research

There are several limitations in this study that serve as directions for future research. The first potential limitation involves potential carryover affects between parent participants. More specifically, Stuart and Elanore were married and lived in the same household. This scenario potentially allows for carryover affects between parents due to possible collaboration between

one another. Both parents will be implementing the procedures with a separate child of theirs, both within the same home. Both parents were given one operant the same as the other (listener responding) and one operant different than the other (Imitation for Stuart to work on with Eddy, and Intraverbals for Elanore to work on with Wilson). These potential carryover affects could allow for increases in scores to be observed on some elements of the treatment package, which would be especially true for the operant listener responding due to it being assigned to both parents. Along with potential carryover due to being married and living within the same household, there is also potential carryover affects that can be seen due to session arrangement. Observations and sessions involving Elanore and Stuart were often conducted within one Zoom meeting right after another for the sake convenience for both the parents and the children. Participants were still recorded, instructed, and had all feedback and instruction provided separately and to only based on their specific performance. Despite addressing participants individually, parents being present in the same environment, using the same device, and potentially hearing information and feedback from each other's sessions could have played a part in their scores and performance. These effects were not seen however, as Stuart withdrew from participation in this study after his third baseline observation. Future research however might look at more specifically comparing families with two parents participating that collaborate to families with two parents participating that do not collaborate.

The second potential limitation in this study involves Elanore, and her involvement in her children's programming and treatment at the clinic. Elanore had been actively involved and was the main caretaker present in both children's services for more than four years. Additionally, she played an active role in her children's services This involvement may be a factor in Elanore's higher initial scores during baseline and her ability to learn the targeted operants more rapidly

compared to the participants who were not as heavily involved in their child's services. Future research might look at assigning the same operant to parents that have been involved in services for some time, compared to parents just starting services for their child.

A third limitation of this research involves the challenges associated with the use of telehealth and live video streaming platforms. For example, poor internet connections, freezing of frames during live video sessions, pixilation of the picture, difficulties discriminating sounds when there is a lot of background noise, and the inability to receive in-person feedback (such as physical prompting) from the behavior analyst can impact the success of the session.

The fourth limitation to this study involves the arranging and conducting of sessions. All sessions were conducted separately with at least an hour in-between, and were recorded and treated as separate sessions. Within the study, there were some additional unforeseen difficulties and strains on time and ability to participate for Stuart. Just after agreeing to participate in this research opportunity, Stuart became sick and unable to meet or begin participating in the opportunity for a period of three days, following that, this participant was working a full-time day job and could only meet in the evenings or on weekends with the researcher. The participant then missed the next two schedule sessions with the researcher, which added an additional two days before the researcher could meet and begin baseline observations with the participant. Once the researcher and Stuart completed 3 baseline observations, Stuart had to leave town for a period of 5 days for work and was unable to meet during this time as well. Upon returning, Stuart experienced personal difficulties that resulted in him withdrawing from participating further in this study. As a result, additional baseline observations were unable to be conducted, resulting in a limitation, as all participants had only three baseline observations. Due to this limitation, the design of this study was unable to continue as a non-concurrent multiple baseline design and is

now depicted as an AB design on the graph. This amount of observations adds to the limitations of this study due to the fact that limited baseline observations

The fifth limitation found in this research involves the behavioral skills training (BST) provided to parents. The parents were provided with only two of the existing seven operants that can be taught in NET and DTT. For example, participants were assigned some operants the same and some operants different than one another based on what was most clinically significant for them to work on with their children. However, in most clinical settings, clients would be working on only a few targets at a time. Therefore, this study lends itself to support an applied clinical environment. It would be of interest to determine if the differences in trainings (based on the verbal operants being targeted) could have an influence on parent performance and success. Future research may want to evaluate the effects of providing parents with trainings on all of the operants and the success parents have learning and implementing the different operants.

The final limitation within this study involved mock practice session with the researcher. Due to two of the three parents involved in this study having more than one child at home to care for, and often being the only caretaker for both children, getting periods of time to work with parents separate of their children proved to be difficult for most participants. For this reason, the researcher continued to do a trial-based learning with parent providing feedback, and then proceeded to have parents practicing implementing these skills with the researcher for 5 minutes instead of the 10 minutes they will be doing with their children. This was done to due to the fact that trial-based learning and discussing any feedback proved to take 10- 15-minutes on average for most parents before practicing. Shortening the amount of time practicing these skills was both more feasible and comfortable for participants.

Conclusion

Despite limitations, this study does show positive effects from the treatment implemented. Although only two of the original three participants finished this study, data from the two participants to complete this study shows improvements from baseline levels, on their ability to implement NET skills in their home with their children. While some studies have demonstrated the efficacy of training parents to implement ABA procedures (Benson et al., 2017), the current study demonstrates a Telehealth training program can be used effectively to provide parents with training on NET skills they can implement in their homes with their children successfully.

References

Allen, D., & Hudd, S. (1987). Are we professionalizing parents? Weighing the benefits and pitfalls. Mental Retardation, 25, 133-139.

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Washington, DC: American Psychiatric Association.

Barkaia, A., Stokes, T. F., & Mikiashvili, T. (2017). Intercontinental telehealth coaching of therapists to improve verbalizations by children with autism. *Journal of Applied Behavior Analysis*, *50*(3), 582–589. https://doi.org/10.1002/jaba.391

Behavior Analyst Certification Board. (2020, March 29). *Ethics guidance for ABA providers during COVID-19 pandemic.* Retrieved from https://www.bacb.com/ethics-guidance-for-aba-providers-during-covid-19-pandemic-2/

Behavior Analyst Certification Board. (2014). *Professional and ethical compliance code for behavior analysts*. Retrieved from http://www.bacb.com/wp-content/uploads/BACB-Compliance-Code-english_190318.pdf

Behavior Analyst Certification Board. (2020). Ethics guidance for ABA providers during Covid-19 pandemic. Retrieved from https://www.bacb.com/ethics-guidance-for-aba-providers-during-covid-19- pandemic-2/

Benson, S. S., Dimian, A. F., Elmquist, M., Simacek, J., Mccomas, J. J., & Symons, F. J. (2017). Coaching parents to assess and treat self-injurious behaviour via telehealth. *Journal of Intellectual Disability Research*, *62*(12), 1114–1123. https://doi.org/10.1111/jir.12456

Brookman-Frazee, L., Stahmer, A., Baker-Ericzén, M. J., & Tsai, K. (2006). Parenting Interventions for Children with Autism Spectrum and Disruptive Behavior Disorders:

Opportunities for Cross-Fertilization. *Clinical Child and Family Psychology Review*, *9*(3-4), 181–200. https://doi.org/10.1007/s10567-006-0010-4

Bruzek, J. L., Thompson, R. H., & Peters, L. C. (2009). Resurgence of infant caregiving responses. Journal of the Experimental Analysis of Behavior, 92,327-343. doi: 10.1901/jeab.2009-92-327

Centers for Disease Control and Prevention. (2017). Community mitigation guidelines to prevent pandemic influenza. *Morbidity and Mortality Weekly Report*, 66(1). Retrieved from https://stacks.cdc. gov/view/cdc/45220

Centers for Disease Control and Prevention. (2017). Community mitigation guidelines to prevent pandemic influenza. Morbidity and Mortality Weekly Report, 66(1). Retrieved from https://stacks.cdc. gov/view/cdc/45220

Colombo, R. A., Wallace, M., & Taylor, R. (2020). An Essential Service Decision Model for ABA Providers During Crisis. Behavior Analysis in Practice, 13(2), 306–311. https://doi.org/10.1007/s40617-020-00432-z

Colón, C. L., Ahearn, W. H., Clark, K. M., & Masalsky, J. (2012). The Effects Of Verbal Operant Training And Response Interruption And Redirection On Appropriate And Inappropriate Vocalizations. *Journal of Applied Behavior Analysis*, *45*(1), 107–120. https://doi.org/10.1901/jaba.2012.45-107

COVID-19 Emergency Declaration. (2020). https://www.fema.gov/news-release/20200726/covid-19-emergency-declaration.

Davis, B. J., Smith, T., & Donahoe, P. (2002). Evaluating supervisors in the UCLA treatment model for children with autism: Validation of an assessment procedure. *Behavior Therapy*, 33, 601–614. doi: 10.1016/s0005-7894(02)80019-3

Digennaro, F. D., Martens, B. K., & Kleinmann, A. E. (2007). A Comparison Of Performance Feedback Procedures On Teachers' Treatment Implementation Integrity And Students' Inappropriate Behavior In Special Education Classrooms. *Journal of Applied Behavior Analysis*, *40*(3), 447–461. https://doi.org/10.1901/jaba.2007.40-447

Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision (DSM-IV-TR). (2000). https://doi.org/10.1176/appi.books.9780890423349

Galindo, N., Galindo, N., Msw, & Manager, C. M. (2020, August 28). *Telehealth and ABA: Best Practices for Optimal Client Experience*. Relias. https://www.relias.com/blog/telehealth-and-aba-best-practices.

Graziano, A. M., & Diament, D. M. (1992). Parent Behavioral Training. *Behavior Modification*, *16*(1), 3–38. https://doi.org/10.1177/01454455920161001

Health Information Technology (HIT) in Healthcare Settings: Telemedicine and Telehealth (2017, September 28th) Retrieved from https://www.healthit.gov/topic/health-it-initiatives/telemedicine-and-telehealth

Ingersoll, B. (2010). The Differential Effect of Three Naturalistic Language Interventions on Language Use in Children With Autism. *Journal of Positive Behavior Interventions*, *13*(2), 109–118. https://doi.org/10.1177/1098300710384507

Koegel, L. K., Carter, C. M., & Koegel, R. L. (2003). Teaching Children with Autism Self-Initiations as a Pivotal Response. *Topics in Language Disorders*, *23*(2), 134–145. https://doi.org/10.1097/00011363-200304000-00006

Mcgee, G. G., Morrier, M. J., & Daly, T. (1999). An Incidental Teaching Approach to Early Intervention for Toddlers with Autism. *Journal of the Association for Persons with Severe Handicaps*, *24*(3), 133–146. https://doi.org/10.2511/rpsd.24.3.133

McDonnell, J. (1998). Instruction for students with severe disabilities in general education settings. *Education and Training in Mental Retardation and Developmental Disabilities,* 33, 199-215.

Miller, J. R., Lerman, D. C., & Fritz, J. N. (2010). An experimental analysis of negative reinforcement contingencies for adult-delivered reprimands. Journal of Applied Behavior Analysis, 43, 769-773. doi: 10.1901/ jaba.2010.43-769

Mortenson, B. P., & Witt, J. C. (1998). The Use of Weekly Performance Feedback to Increase Teacher Implementation of a Prereferral Academic Intervention. *School Psychology Review*, *27*(4), 613–627. https://doi.org/10.1080/02796015.1998.12085942

National Autism Center. (2009). *Evidence-based practice and autism in the schools: A guide to providing appropriate interventions to students with autism spectrum disorders*. Randolph, MA: Author.

Neely, L., Rispoli, M., Gerow, S., & Hong, E. R. (2016). Preparing Interventionists via Telepractice in Incidental Teaching for Children with Autism. *Journal of Behavioral Education*, *25*(4), 393–416. https://doi.org/10.1007/s10864-016-9250-7

Noell, G. H., Gresham, F. M., & Gansle, K. A. (2002). Does treatment integrity matter? A preliminary investigation of instructional implementation and mathematics performance. *Journal of Behavioral Education,* 11, 51– 67. doi: 10.1023/A:1014385321849

Parsons, L., Cordier, R., Munro, N., Joosten, A., & Speyer, R. (2017). A systematic review of pragmatic language interventions for children with autism spectrum disorder. *Plos One*, *12*(4). https://doi.org/10.1371/journal.pone.0172242

Peterson, P. (2004). Naturalistic language teaching procedures for children at risk for language delays. *The Behavior Analyst Today*, *5*(4), 404–424. https://doi.org/10.1037/h0100047

Qualls, N., Levitt, A., Kanade, N., Wright-Jegede, N., Dopson, S., Biggerstaff, M., … Jernigan, D. (2017). Community Mitigation Guidelines to Prevent Pandemic Influenza — United States, 2017. MMWR. Recommendations and Reports, 66(1), 1–34. https://doi.org/10.15585/mmwr.rr6601a1

Roane, H. S., Ringdahl, J. L., & Falcomata, T. S. (2015). *Clinical and organizational applications of applied behavior analysis*. Elsevier/AP, Academic Press is an imprint of Elsevier.

Rodriguez, K. (2020). Maintaining Treatment Integrity in the Face of Crisis: A Treatment Selection Model for Transitioning Direct ABA Services to Telehealth. https://doi.org/10.31234/osf.io/phtgv

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, 535-538. https://doi.org/10.1901/jaba. 2004.37-535

Shillingsburg, M. A., Kelley, M. E., Roane, H. S., Kisamore, A., & Brown, M. R. (2009). Evaluation and training of yes-no responding across verbal operants. Journal of Applied Behavior Analysis, 42(2), 209–223. https://doi.org/10.1901/jaba.2009.42-209

Schreibman, L., Dawson, G., Stahmer, A. C., Landa, R., Rogers, S. J., Mcgee, G. G., … Halladay, A. (2015). Naturalistic Developmental Behavioral Interventions: Empirically Validated Treatments for Autism Spectrum Disorder. *Journal of Autism and Developmental Disorders*, *45*(8), 2411–2428. https://doi.org/10.1007/s10803-015-2407-8

Services, D. of H. C. (2020). *Medi-Cal & Telehealth*. Telehealth. https://www.dhcs.ca.gov/provgovpart/Pages/Telehealth.aspx.

Smith, T. (2001). Discrete Trial Training in the Treatment of Autism. *Focus on Autism and Other Developmental Disabilities*, *16*(2), 86–92. https://doi.org/10.1177/108835760101600204

Sump, L. A., Richman, D. M., Schaefer, A. M., Grubb, L. M., & Brewer, A. T. (2018). Telehealth and in-person training outcomes for novice discrete trial training therapists. *Journal of Applied Behavior Analysis*, *51*(3), 466–481. https://doi.org/10.1002/jaba.461

Sundberg, M. L., & Partington, J. W. (2013). *Teaching language to children with autism or other developmental disabilities*. Behavior Analysts, Inc.

Thompson, R. H., Bruzek, J. L., & Cotnoir-Bichelman, N. M. (2011). The role of negative reinforcement in infant caregiving: An experimental simulation. Journal of Applied Behavior Analysis, 44, 295-304. doi: 10.190 l/jaba.2011.44-295

The Role of Caregiver Involvement in ABA Therapy. Behavioral Health Center of Excellence Accreditation. (2020, January 29). https://bhcoe.org/2016/07/the-role-of-caregiver-involvement-in-aba-therapy/.

Vismara, L. A., Mccormick, C. E. B., Wagner, A. L., Monlux, K., Nadhan, A., & Young, G. S. (2016). Telehealth Parent Training in the Early Start Denver Model: Results From a Randomized Controlled Study. *Focus on Autism and Other Developmental Disabilities*, *33*(2), 67–79. https://doi.org/10.1177/1088357616651064

Vismara, L. A., Young, G. S., Stahmer, A. C., Griffith, E. M., & Rogers, S. J. (2009). Dissemination of evidence-based practice: Can we train therapists from a distance? *Journal of Autism and Developmental Disorders*, 39, 1636-1651. https://doi. org/10.1007/s10803-009-0796-2

Wacker, D. P., Lee, J. F., Padilla Dalmau, Y. C., Kopelman, T. G., Lindgren, S. D., Kuhle, J., & Waldron, D. B. (2013a). Conducting functional analyses of problem behavior via telehealth. *Journal of Applied Behavior Analysis*, 46, 31–46. doi:10.1002/jaba.29.

Wacker, D. P., Lee, J. F., Padilla Dalmau, Y. C., Kopelman, T. G., Lindgren, S. D., Kuhle, J., Waldron, D. B. (2013b). Conducting functional communication training via telehealth to reduce the problem behavior of young children with autism. *Journal of Developmental and Physical Disabilities*, 25, 35–48. doi:10.1007/s10882-012-9314-0.

Wainer, A. L., & Ingersoll, B. R. (2013). Disseminating ASD interventions: A pilot study of a distance learning program for parents and professionals. *Journal of Autism and Developmental Disorders*, 43, 11–24. doi:10.1007/s10803-012-1538-4.

Ward-Horner, J., & Sturmey, P. (2012). Component analysis of behavior skills training in functional analysis. *Behavioral Interventions*, **27**, 75– 92. https://doi-org.nmu.idm.oclc.org/10.1002/bin.1339

What is telehealth? How is telehealth different from telemedicine? HealthIT.gov. (2019, October 17). https://www.healthit.gov/faq/what-telehealth-how-telehealth-different-telemedicine.

World Health Organization. (2020). Critical preparedness, readiness and response actions for COVID-19. Retrieved from https://www.who.int/emergencies/diseases/novel-coronavirus-2019/technicalguidance/critical-preparedness-readiness-and-response-actions-forcovid-19

Appendices

Appendix A: NET Procedural Fidelity Checklist

Date: _____ Participant: _____ Observer: _____ Site: _____

Objectives	Opportunities incorrect	Opportunities correct	% of occurrence	Comments
Identifies appropriate learning opportunities				
Identifies motivating operations relevant to activity				
Gains client attention prior to delivery of SD				
Delivers SD clearly				
Follows prompt hierarchies and error correction procedures				
Appropriate use of differential reinforcement				
Rate of presented learning opportunities				

Overall Score: _____ Target Score: _____

Observer Signature: _____

Appendix B: NET Data Sheet

Date:_____ Client:_____ Therapist: _____

NET Data Collection: Place a tally in the corresponding box to the response emitted. Divide the number or responses by the interval time length to record the rate.

Start Time:_____ End Time:_____ Total Time:_____

Total Prompted: _____ Total Spontaneous: _____ Total Independent: _____

Rate of Prompted:_____ Rate of Spontaneous:_____ Rate of Independent:_____

Mand **Tact**

Prompted: Total: **Full: Partial:**	**Prompted: Total:** **Full: Partial:**
Spontaneous: Total:	**Spontaneous: Total:**
Independent: Total:	**Independent: Total:**

Listener Responding **Intraverbal**

Prompted: Total: **Full: Partial:**	**Prompted: Total:** **Full: Partial:**
Spontaneous: Total:	**Spontaneous: Total:**
Independent: Total:	**Independent: Total:**

Imitation **Echoic**

Prompted: **Total:** **Full:** **Partial:**	**Prompted:** **Total:** **Full:** **Partial:**
Spontaneous: **Total:**	**Spontaneous:** **Total:**
Independent: **Total:**	**Independent:** **Total:**

Appendix C: Mock Feedback Form

Date: Time: Participant:

Therapist:

Feedback:

Appendix D: Social Validity Questionnaire

Rating scale:

Strongly Disagree, Disagree, Neutral, Agree, Strongly Agree

1. I find this approach to be an acceptable way of training therapists
2. I found the video conferencing to be effective
3. I found feedback provided to me to be effective.
4. I like the procedure(s) used in this approach.
5. I believe this approach is likely to be effective for me in my home.
6. I believe this training approach is an efficient (time, cost, etc.) training method.
7. I believe this approach is likely to result in permanent improvement.
8. Overall, I have a positive reaction to this approach.
9. I would do more trainings like this.
10. I am satisfied with the way the researcher conducted sessions and interacted with me.
11. Please express any addition comments, thoughts, feedback

Appendix E: IRB Approval Letter

NORTHERN MICHIGAN UNIVERSITY

Graduate Studies and Research
Marquette, MI 49855-5301
906-227-2300
www.nmu.edu/graduatestudies/

Memorandum

TO: Ashley Shayter
Department of Psychological Sciences

Olivia LaForest
Mellissa Lucas
Department of Psychological Sciences

DATE: April 14, 2021

FROM: Lisa Schade Eckert
Dean of Graduate Studies and Research

SUBJECT: **IRB Proposal** HS21-1179
IRB Approval Date 3/9/2021
Proposed Project Dates: **2/22/2021 – 2/22/2022**
"Training Caregivers via Telehealth"

Your proposal "Training Caregivers via Telehealth" has been approved by the NMU Institutional Review Board. Include your proposal number (HS21-1179) on all research materials and on any correspondence regarding this project.

A. If a subject suffers an injury during research, or if there is an incident of non-compliance with IRB policies and procedures, you must take immediate action to assist the subject and notify the IRB chair (dereande@nmu.edu) and NMU's IRB administrator (leckert@nmu.edu) within 48 hours. Additionally, you must complete an Unanticipated Problem or Adverse Event Form for Research Involving Human Subjects.

B. Please remember that informed consent is a process beginning with a description of the project and insurance of participant understanding. Informed consent must continue throughout the project via a dialogue between the researcher and research participant.

C. If you find that modifications of investigators, methods, or procedures are necessary, you must submit a Project Modification Form for Research Involving Human Subjects before collecting data. Any changes or revisions to your approved research plan must be approved by the IRB prior to implementation.

Until further guidance, per CDC guidelines, the PI is responsible for obtaining signatures on the COVID-19 Researcher Agreement and Release and COVID-19 Research Participant Agreement and Release forms for any in person research.

All forms can be found at the NMU Grants and Research website:
http://www.nmu.edu/grantsandresearch/node/102