A Comparison Between Online and In-vivo Parent Training on Parental Acquisition of Skills to Promote Appropriate Behaviors in Children Diagnosed with Autism Spectrum Disorder

by

Abigail L. Blackman

A thesis submitted to the College of Psychology and Liberal Arts at Florida Institute of Technology in partial fulfillment of the requirements for the degree of

Master of Science in Applied Behavior Analysis and Organizational Behavior Management

Melbourne, Florida July, 2017
We the undersigned committee hereby approve the attached thesis, “A Comparison Between Online and In-vivo Parent Training on Parental Acquisition of Skills to Promote Appropriate Behaviors in Children Diagnosed with Autism Spectrum Disorder” by Abigail L. Blackman.

Christopher Podlesnik, Ph.D., BCBA-D
Associate Professor
School of Behavior Analysis

Corina Jimenez- Gomez, Ph.D., BCBA-D
Research Assistant Professor
The Scott Center for Autism Treatment

Ivy Chong, Ph.D., BCBA-D
Director of Autism Services and Training
The Scott Center for Autism Treatment

Travis Conradt, Ph.D.
Assistant Professor
School of Psychology

Lisa Steelman, Ph.D.
Senior Associate Dean
College of Psychology and Liberal Arts
Abstract

Title: A Comparison Between Online and In-vivo Parent Training on Parental Acquisition of Skills to Promote Appropriate Behaviors in Children Diagnosed with Autism Spectrum Disorder

Author: Abigail L. Blackman

Advisor: Christopher Podlesnik, Ph.D., BCBA-D

Individuals diagnosed with Autism Spectrum Disorder (ASD) often receive Early Intensive Behavioral Intervention (EIBI) to acquire skills to live as independently as possible. However, skills learned through EIBI often do not generalize well without the help of the child’s parents (or other caregivers). Therefore, parent training is integral for individuals with ASD to generalize and maintain acquired skills. Research supports Applied Behavior Analysis as being effective in teaching parents to work with their children. Currently, the most common way to provide parent training is through in-vivo training, which can be costly and time consuming. Therefore, the purpose of the current study was to evaluate the efficacy of online, self-paced parent training to in-vivo parent training sessions. The dependent measures assessing this outcome included standardized (e.g., Parental Stress Index—Short Form, Parental Sense of Competence) and direct methods (e.g., knowledge assessment, parent-child interaction). Before training, groups did not differ significantly on the four dependent measures. After training, statistically significant differences were found between pre- and post-test for the two direct measures, and the parental stress measure. There were no statistically significant
differences between online and in-vivo training, revealing comparable
effectiveness. These results suggest that online training can serve as a cost-effective
alternative for the delivery of parent training and potentially other behavior-analytic
services. In application, online services could support in-vivo services or be offered
as a stand-alone option when in-vivo services are unavailable or too costly.
Table of Contents

Introduction .................................................................................................................................. 1
Effectiveness of Early Intensive Behavioral Intervention ......................................................... 2
Informational Content Provided during Parent Training ......................................................... 3
Parent Training Delivery Method- In-vivo ................................................................................ 4
Parent Training Delivery Method- Online ............................................................................... 8
Purpose of Current Study .......................................................................................................... 12

Methods ................................................................................................................................... 13
Participants ............................................................................................................................... 13
Experimental Design and Group Assignment ......................................................................... 13
Dependent Measures ................................................................................................................ 14
  Parent-child interaction .......................................................................................................... 14
  Parental competence .............................................................................................................. 15
  Knowledge assessment .......................................................................................................... 15
  Parental stress ....................................................................................................................... 16
Materials .................................................................................................................................. 16
Procedure ................................................................................................................................. 17
  Pre-training .......................................................................................................................... 17
  Training ................................................................................................................................ 18
    In-vivo parent-training group .............................................................................................. 18
    Online parent-training group .............................................................................................. 18
    Control group ...................................................................................................................... 19
  Post-training ........................................................................................................................ 19
  Social Validity Questionnaire ............................................................................................... 19
  Inter-observer Agreement .................................................................................................... 19

Results ...................................................................................................................................... 21

Discussion .................................................................................................................................. 23

References ................................................................................................................................. 28
List of Figures

Figure 1 — Parent-child interaction results...................................................................... 35
Figure 2 — Knowledge assessment results. ................................................................. 36
Figure 3 — Parental Stress Index- Short Form results .................................................... 37
Figure 4 — Parental Sense of Competence results.......................................................... 38
List of Tables

Table 1 — Individual subject data for each dependent variable ............................... 34
List of Appendices

Appendix A — Outline to score parent-child interaction............................... 39
Appendix B — Parental Sense of Competence (PSOC). ................................. 40
Appendix C — Parental Stress Index- Short Form (PSI-SF). ................. 41
Appendix D — Welcome Package ................................................................. 43
Appendix E — Social Validity Questionnaire ........................................... 47
Appendix F — Glossary of acronyms used ............................................... 48
Acknowledgement

I would like to start by thanking my advisors, Dr. Corina Jimenez-Gomez and Dr. Christopher Podlesnik. Corina, thank you for the countless hours you’ve spent reading my drafts, meeting with me to discuss project information, and how comfortable you’ve made me feel coming to you for assistance. Chris, thank you for the additional feedback you’ve made throughout this project. I truly believe that I received the best guidance and training working with both of you. I cannot thank either of you enough for the opportunities and experiences you’ve allowed me to gain during my time here.

I would like to thank my committee members, Dr. Ivy Chong and Dr. Travis Conradt, for your informative feedback and support. Additional thanks to Sam Shvarts, for helping me record and present some of the parent training modules, and to Tavy Matthews for collecting inter-observer agreement. Your help, support, and ideas were greatly appreciated.

Lastly, I want to thank my family for your love and support throughout my time at Florida Institute of Technology. No one ever thought I would move 22 hours away from home for anything. And I can say without a doubt that being away from you guys has made these two years very difficult. But, I cannot thank any of you enough for listening to me laugh, cry, and vent on the phone, for the countless visits, and efforts to stay in daily contact. I highly doubt that I could’ve made it through this program without your love and support. Many thanks for believing in me and encouraging me to continue to work my very hardest.
Dedication

I dedicate this thesis to all who’ve supported me. Specifically, my boyfriend, Raj, my parents, Pat and Kathy, and my sisters, Sarah and Maddie.

Thank you for your love and encouragement throughout this journey.

A Comparison Between Online and In-vivo Parent Training on Parental Acquisition of Skills to Promote Appropriate Behaviors in Children Diagnosed with Autism Spectrum Disorder

Abigail L. Blackman

Florida Institute of Technology
Introduction

Autism Spectrum Disorder (ASD) is characterized by deficits in social communication and social interaction, and excesses in stereotypic and maladaptive behaviors (American Psychiatric Association, 2013). Individuals diagnosed with ASD often exhibit behavioral deficits (e.g., delayed speech, no eye contact) and/or excesses (e.g., aggression, self-injurious behaviors). The current estimates suggest ASD affects one in 68 children in the United States of America (Centers for Disease Control and Prevention, 2016). A commonly used, and empirically validated, treatment for children with ASD is based on learning principles of Applied Behavior Analysis (ABA), which focuses on creating socially significant change in children’s lives (Baer, Wolf, & Risley, 1968). ABA has been particularly successful in creating meaningful outcomes for individuals with ASD, by focusing on intensive treatment at a young age (Lovaas, 1987). In fact, Lovaas found that when implementing Early Intensive Behavioral Intervention (EIBI), which aims to provide individualized services to children less than four years of age for 30 to 40 hours per week, 47% of individuals with ASD transitioned to and remained in a mainstream classroom environment. These individuals had average or above average IQ scores at the time of transition, with an average of a 30-point increase in IQ with the implementation of EIBI. The focus of EIBI is to mitigate behavioral deficits (e.g., poor communication), and decrease behavioral excesses (e.g., tantrums) that often interfere with learning in young children with ASD.
Effectiveness of Early Intensive Behavioral Intervention

Researchers have compared the effectiveness of EIBI to other intervention methods for children with ASD. For instance, Howard, Sparkman, Cohen, Green, and Stanislaw (2005) compared three treatment groups: autism educational programming, generic educational programming, and EIBI interventions. The autism educational programming group consisted of children who attended public school and received intervention (e.g., discrete trial training, and Picture Exchange Communication Systems) in a 1:1 or 1:2 teacher to student ratio, from paraprofessional aides. In the generic educational programming group, children were enrolled in a local community educational classroom where paraprofessionals provided developmentally appropriate educational activities in a 1:6 staff-to-student ratio. The individuals in this group received 15 hours of therapy per week. Finally, children in the EIBI group received 1:1 therapy from instructional staff implementing 25 to 40 hours a week of discrete trial training, a structured trial-by-trial teaching method with an end goal of increasing a child’s responding to the teacher (Maurice, Green, & Luce, 1996), and natural environments teaching, a child-led teaching method that uses naturally occurring situations as learning opportunities (Fava et al., 2011). The EIBI group demonstrated the greatest rate of skill acquisition and likelihood of “catching up” to their neurotypical peers. The results from the Howard et al. (2005) study, along with others (e.g., Lovaas, 1987;
Eikeseth, 2009), provide strong support for EIBI as the intervention of choice for children with ASD.

It is important to note that, although EIBI is effective in changing the behavior of individuals with ASD, the intervention itself is not enough to create sustained behavior change (Fava et al., 2011). Importantly, parents\(^1\) play a key role in working with their children so that child skills have a greater likelihood of generalizing and maintaining. Parents help facilitate generalization of skills due to the increased exposure to opportunities to teach targets in the home (e.g., generalizing across people and environments). Despite the importance of parent training, there is no standard for the informational content or teaching approach for training parents. Thus, parent training remains an active and important area of research.

**Informational Content Provided During Parent Training**

Researchers have evaluated what information is most useful to provide during parent training, to promote implementation and maintenance of treatment. For instance, Strauss et al. (2012) compared ABA-based parent training provided in the center and in-home, to an in-home eclectic treatment (i.e., developmental and cognitive behavioral intervention). The dependent variables examined were child progress (i.e., behavioral problems and child performance), and parental stress.

\(^1\) For the purpose of this study, the word parent will be used; however, the information contained herein also applies to other caregivers (e.g., grandparents).
levels. At follow up, the children whose parents received ABA-based training, engaged in less problem behavior and the parents reported lower levels of stress.

In a related study, Bearss et al. (2015) examined effective strategies for training parents to reduce their child’s disruptive behavior. Researchers investigated the efficacy of a parent-training group receiving a comprehensive overview of topics in ABA (e.g., how to determine the cause of problem behavior, how to manage it, and how to teach new skills) compared with a parent-education group provided with content related to advocacy, current treatment options, and how to plan for a child’s education. The dependent variables assessed were the changes in pre- and post-test standardized measures, Aberrant Behavior Checklist (ABC-I) and Home Situations Questionnaire (HSQ-ASD). At the conclusion of the study, training in ABA topics better equipped parents with the specific techniques needed to reduce their child’s disruptive behavior demonstrated by improvements in the post-test ABC-I and HSQ-ASD measures. Overall, the findings reviewed thus far (Strauss et al., 2012; Bearss et al., 2015) converge on providing parents with ABA-based training content to ensure greater success in decreasing disruptive behaviors and parental-stress levels.

**Parent Training Delivery Method- In-vivo**

Another area of research related to the type of information to provide to parents is the teaching approach used to deliver information. There are several teaching approaches that have been previously validated but the most effective
mode has yet to be determined. The most commonly used approach within ABA to train parents is through behavioral skills training, which is comprised of four components: instruction, modeling, rehearsal, and feedback (Sarokoff & Sturmey, 2004). Hsieh, Wilder, and Abellon (2011) assessed the effectiveness of using behavioral skills training to improve parent performance on implementation of incidental teaching procedures (i.e., a procedure where events are arranged within the environment to motivate children to practice a skill). For instance, they taught a skill through incidental teaching by making the child’s shoe laces visible but inaccessible, promoting the opportunity for the child to ask for the laces. Behavioral skills training was found to be an effective approach to train parents to teach their children to request for items. Specifically, parents demonstrated successful acquisition, maintenance, and generalization of teaching skills.

Another approach is to train parents to implement EIBI sessions themselves in the home. Parent-implemented EIBI is where parents are taught to conduct discrete trial training and natural environments training through both center- and home-based training sessions. Fava et al. (2011) assessed parent training in this EIBI format. The parent-implemented EIBI group was compared with training using an eclectic intervention, which consisted of cognitive behavioral therapy similar to that delivered in Strauss et al. (2012). The main dependent variables were improvement in the Vineland Adaptive Behavior Scale for the children and parental stress levels. The results showed that the parent-implemented EIBI group
outperformed the eclectic intervention group by obtaining higher scores on standardized measures of diagnostic, developmental, and language-outcome measures, as well as greater decreases in challenging behaviors and parental stress.

In a similar study, Anan, Warner, McGillivary, Chong, and Hines (2008) trained parents to provide behavioral treatment to their children. All parents attended a 12-hour training on basic behavioral principles. Following the initial training each parent received Group Intensive Family Training, which was a 12-week program where parents were provided with hands on training of various intervention procedures to effectively work with their children in the home. Child progress was assessed using the Mullen Scales of Early Learning and the Vineland Adaptive Behavior Scales. Results revealed that children’s standardized scores significantly increased from pre- to post-test. Therefore, these studies (i.e., Fava et al., 2011; Anan et al., 2008) suggest that training parents to implement the treatment themselves is an effective strategy to use.

Relatedly, Ward-Horner and Sturmey (2008) evaluated whether the combination of general-case training and behavioral skills training leads to greater generalization of skills taught to parents compared to each treatment delivered individually. General-case training is a method of programming for generalization of responses (i.e., by having the individual attend to the action presented, rather than only the verbal stimulus). In other words, if a child only attends to the word touch when ‘touch head’ is presented, then an error will likely occur when ‘touch
ears’ is presented. To assess the effects of this treatment package the three parents were first given written instructions on how to conduct discrete trial training sessions (i.e., as a baseline measure), and then taught how to teach their children using the treatment package. Parents were taught to teach with three different exemplars, specific to each individual child. Next, generalization probes were conducted on novel targets. The main dependent variable was correct implementation of discrete trials by the parents. After the training sessions, parents implemented programming at a higher percentage than in baseline, providing evidence that this treatment package is effective in increasing parent implementation of discrete trials and promotion of generalization of skills taught during training. These findings suggest that behavior specialists can effectively teach parents using this treatment package.

Another approach to training parents to implement ABA strategies more naturally is through the use of the Natural Language Paradigm. The Natural Language Paradigm provides parents with a loosely structured way to interact with children by working with them on the ground with toys (e.g., Gillet & LeBlanc, 2007; Laski, Charlop, & Schreibman, 1988). For instance, Laski et al. (1988) trained parents by providing background information on the Natural Language Paradigm procedures, before observing parent-child interactions across two observation periods and then conducting in-vivo training to enhance these skills. The results showed that the Natural Language Paradigm is an effective way to train
parents to increase vocalizations and appropriate social play in their children because it embeds training into everyday activities. These finding suggests that parents who are trained properly to implement the Natural Language Paradigm procedures can serve as a valuable component to their child’s treatment.

Past research has examined the content most effective in producing lasting behavior change in parents. Strong evidence supports the usefulness of ABA-based content and the different methods used to teach parents how to work with their children (e.g., behavioral skills training, natural environments training, discrete trial training, general-case training, Natural Language Paradigm). The interventions discussed up to this point are resource intensive, requiring face-to-face training provided by a behavior specialist or Board Certified Behavior Analyst, which is often expensive for families. In addition to cost, families often must wait for enrollment at a local treatment facility and for approval of services from insurance companies, with no access to professional behavioral services in the meantime. Because of the limited access to treatment for many families, recent research has examined different modes of delivery to make behavior analytic services readily available in more cost and time effective ways.

Parent Training Delivery Method- Online

One mode of delivery that has been investigated is telehealth, which refers to providing health-related information over the internet in the form of video calls, readings, and modules from trained professionals. Wacker et al. (2013) used
telehealth in the form of video calls to provide parents of children with ASD with information on how to decrease problem behaviors using functional communication training. Functional communication training is a differential reinforcement procedure used to teach a communicative response in an attempt to decrease problem behavior caused by not being able to communicate a specific need. In this study, parents were instructed on how to (1) conduct functional analyses (Iwata, Dorsey, Slifer, Bauman, & Richman, 1982/1994) to determine the cause(s) of their child’s challenging behaviors, and (2) appropriately treat the problem behavior with functional communication training. Training via telehealth was effective in teaching the parents to conduct a functional analysis and implement functional communication training, resulting in decreases in problem behavior in their children. Telehealth training was comparable to in-vivo training in terms of effectiveness in teaching parents to implement functional analyses and functional communication training. Importantly, telehealth was a more cost-effective method to provide information and training to parents compared to in-home behavior therapy (also see Suess, Wacker, Schwartz, Lustig, & Detrick, 2016).

Lindgren et al. (2016) further examined whether telehealth was a cost-effective method to provide parents with information on the basic principles of ABA. As previously discussed, parents provided with information regarding the principles of ABA can have a positive impact on their child’s learning trajectory (Strauss et al., 2012; Bearss et al., 2015). The researchers compared three groups: [9]
in-home therapy, clinic-based telehealth, and home-based telehealth. A behavior consultant trained all the parents using the same training procedures to conduct a functional analysis and implement functional communication training, regardless of the group to which they were assigned. Parents from all three groups decreased their child’s problem behaviors by 90% by implementing the strategies learned through training. There were no significant differences between the three groups, suggesting all delivery methods were equally effective. An important finding, however, was that telehealth decreased the cost of parent training by 66%, compared to the two types of in-vivo parent training sessions provided. The authors suggest that any family with access to the internet could receive instruction on how to implement services at a low cost.

It is important to note, however, that telehealth services using video calls (e.g., Wacker et al., 2013; Seuss et al., 2016; Lindgren et al., 2016) are still relatively resource intensive, as they require specialists to be available during the time of instruction (i.e., synchronous). Therefore, Pollard, Higbee, Akers, and Brodhead (2014) examined another method of providing information, via an interactive computer training, to determine if this mode of delivery is effective in training individuals on how to implement discrete trial training. The interactive computer training consisted of a combination of self-instruction manual materials, and video modeling, with embedded questions in the training, related to the material discussed. There was not a trained professional present during training
(i.e., asynchronous), as the modules were previously recorded. The main dependent variable was change in module test scores, from pre- to post-test, in terms of duration and accuracy. The interactive computer training was effective with an average of 68% increase from pre- to post-test scores. These findings indicate that services can be provided effectively via interactive computer training while reducing the cost associated with the presence of a trained professional. Similarly, Jang et al. (2012) examined the effectiveness of online modules in an eLearning program designed to train parents the principles and procedures of ABA. The online parent training modules were effective in teaching parents about ABA compared to a control group receiving delayed access to training. Specifically, parent training produced increases in measures of knowledge on ABA principles and procedures between pre- and post-test assessments.

In a related study, Wainer and Ingersoll (2013) evaluated the efficacy of a self-directed, internet-based, distance-learning program to teach imitation training to parents. Imitation training teaches the child to repeat the same action that a model engaged in to increase spontaneous imitation, a skill missing for some children with ASD. The two dependent variables assessed were correct implementation and knowledge of imitation training. The distance-learning method of delivering information to parents improved the generalization of imitation skills and reduced parental stress. Taken together, findings from the studies described suggest online parent training modules are a cost-effective alternative to
disseminate evidence-based services to a variety of people at a lower cost.

However, a limitation of the studies described above (Pollard et al., 2014; Jang et al., 2012) was that they did not simultaneously compare internet-based training with the more traditional in-vivo training formats. In fact, Wainer and Ingersoll (2013) suggested future research should compare internet-based training to more traditional training formats to assess the relative effectiveness of different training methods.

**Purpose of Current Study**

The purpose of the present study was to examine whether web-based, self-paced training modules are an effective alternative to in-vivo parent training. Specifically, the aim was to compare the relative effectiveness of online training to in-vivo training by assessing changes in parental stress, parental competence, a knowledge assessment, and improvement in parent-child interactions. For this purpose, pre- and post-test measures were administered on each of the four dependent variables among the three groups.

It was hypothesized that participants in the two training groups, online and in-vivo, would increase their scores from pre- to post-test on the parent-child interaction, knowledge assessment, and parental competence measures. Further, participants would decrease their scores from pre- to post-test on the parental stress measure. Lastly, there would be no difference from pre- to post-test for the control
group, across any of the four dependent variables. However, there would be no significant difference in the effectiveness between the online and in-vivo training.

**Method**

**Participants**

20 parent-child dyads were enrolled in the study. Three dyads discontinued training prior to conclusion, due to time constraints. The remaining 17 parent-child dyads completed the study. All dyads were recruited through a University-based autism center. The inclusion criteria was 1) the parent had to be living with the child at the time and have no prior formal training on ASD or ABA, and 2) the child had a diagnosis of ASD and be eight years of age or younger. The mean age of participants was 36.5 years old (range: 25-57). Most participants were females (e.g., mothers and a grandmother- 84.2%); other participants included fathers. Participants ranged in ethnicities, which included Caucasian (63.2%), African American (15.8%), Hispanic (15.8%), and Asian (5.3%).

**Experimental Design and Group Assignment**

A between-groups design was used in this study. Each parent-child dyad was matched to one of three treatment groups, based on their pre-test scores on the four dependent variables assessed in this study. Dependent measures included parental stress, parental sense of competence, knowledge of module material presented, and parent-child interaction. Matching ensured that all groups started the training with similar scores. Six parent-child dyads participated in in-vivo parent
training sessions, which were presented in a group format at the University-based clinic. Six parent-child dyads participated in the online, self-paced parent-training program, to which they had access through a secure online platform, Canvas. The final five parent-child dyads served as the control group. The control group did not receive any intervention during the six-week training period, but gained access to the online training modules after completing all post-test measures.

**Dependent Measures**

**Parent-child interaction.** Each parent-child dyad completed two five-minute parent-child interaction sessions. During this time, researchers collected data on both positive and negative interactions between the parent and their child, based on the Parent-Child Interaction Therapy literature (Barnett, Niec, & Acevedo-Polakovich, 2013; also see Eyberg, Nelson, & Boggs, 2005). Positive interactions included the use of neutral talk (e.g., “the car goes beep”), reflection (e.g., repeating what the child said, “oo-oo” “oo-oo”), behavior description (e.g., labeling what the child was doing, “you’re putting the ball in the hoop”), unlabeled praise (e.g., “good job”), and labeled praise (e.g., “nice job putting the puzzle together”). Negative interactions included the parent asking questions (“where does it go?”), delivering commands (e.g., “look here”), and talking negatively to their child (e.g., “don’t throw the block”) (see Appendix A). The parent-child interaction score was calculated as the proportion of positive interactions (Hembree-Kigin & McNeil, 1995). One of the observation sessions occurred as the pre-test measure.
and the second was conducted as the post-test following the completion of the parent training modules for both the online and in-vivo parent training groups. Parents in the control group completed both pre- and post-test measures for all four dependent variables before participating in parent training, but the time between completion of pre- and post-test matched that of parents in other two groups.

**Parental competence.** Parental competence was measured using the Parenting Sense of Competence Scale (PSOC) developed by Gibaud-Wallston and Wandermann (1978; see Ohan, Leung, & Johnston, 2000) (see Appendix B). This assessment was used to assess the degree to which parents perceive their ability to fulfill the parenting role and their satisfaction in doing so. Parents answered 16 questions/statements (e.g., “If anyone can find the answer to what is troubling my child, I am the one”) on a Likert scale. In the Likert scale, a rating of (1) represented “strongly disagree” and a rating of (6) represented “strongly agree.” Thus, a higher the score indicated a higher sense of competence.

**Knowledge assessment.** Knowledge was assessed before and after the delivery of the modules for each parent. During both pre- and post-test, the knowledge measure was comprised of 20 multiple-choice questions that were drawn from a bank of active parent responding questions. Throughout the modules, active parent responding questions followed the presentation of content material to keep the parents engaged and to evaluate their understanding of the material.
**Parental stress.** Parental stress was measured using the Parenting Stress Index-Short Form (PSI-SF; Abidin, 1995; see Appendix C). The PSI-SF is comprised of three categories to determine the stress the parent is enduring (i.e., parental distress, parent-child dysfunctional interaction, and difficult child). This assessment was used to evaluate stress levels in different aspects of a parent’s life, while capturing the areas where higher levels of stress were reported. Parents completed a 36 statement/questionnaire on a Likert scale. In the Likert scale SA (1) stood for strongly agree, A (2) for agree, NS (3) for not sure, D (4) for disagree, and SD (5) for strongly disagree. A lower PSI-SF score indicated lower levels of parental stress.

**Materials**

Upon enrollment in the study, each parent-child dyad received a welcome package, which included a welcome letter into the study, general information about ASD (e.g., signs and symptoms), ABA (e.g., methods used), and additional resources (e.g., behavioral resources within the County). For parent-child dyads assigned to the control group, this was the only information they received prior to completing pre- and post-test assessments.

Six parent-training modules were developed specifically for this study. Training modules were 30 to 40 minutes in length and covered the following topics: (1) introduction to ASD (e.g., diagnosis, prevalence, and etiology); (2) introduction to ABA (e.g., definition of behavior, environmental control of
behavior); (3) general behavior management skills (e.g., providing choices, 
providing clear instructions and consequences); (4) strategies for management of 
problem behavior (e.g., extinction, functional communication training, and 
differential reinforcement of alternative behaviors); (5) strategies for increasing 
communication skills (e.g., mand training); and (6) how to teach a new skill 
through the use of natural environments training and Natural Language Paradigm. 
The topics were selected using training templates provided to parents at the 
University-based clinic where the study was conducted, and information contained 
in previous parent training studies (e.g., Bearss et al., 2015).

**Procedure**

**Pre-training.** Once recruited, each parent-child dyad came to the 
University-based clinic to complete the pre-test measures. Each parent completed 
the PSOC, PSI-SF, 20-question knowledge assessment, and five-minute parent-
child interaction. Upon completion of all four assessments, each of the 17 parent-
child dyads were assigned to one of the three treatment groups. There were three 
cohorts of parents to complete the study, as they were recruited at different times. 
The first cohort of parents was randomly assigned to one of the three groups. 
However, the subsequent cohorts of parents were matched to ensure the three 
groups were comparable in pre-test measures.
Training.

**In-vivo parent-training group.** The in-vivo parent-training group attended weekly training sessions at the University-based clinic, for a total of six weeks. Throughout the modules, parents answered active parent responding questions. Additionally, parents had the ability to ask questions and make comments throughout the module, without steering off task or into specific child examples. Although most sessions were conducted in a group format (i.e., more than one parent present during training), there were a couple occasions where only one parent was present during training due to illness or unforeseen circumstances preventing other participants from attending. For parents unable to attend the regularly scheduled meeting, make up sessions were conducted.

**Online parent-training group.** The online parent-training group was provided access to all six modules through a secure login to Canvas. Parents could complete the modules at their own pace, with a maximum time to complete all modules being six weeks to match the timeline of participants in the in-vivo group. Throughout the modules, parents answered active parent responding questions, could ask questions, and could communicate concerns via a discussion board on the Canvas site. Several email reminders were sent to parents in this group, as progression through the online training did not match that of the in-vivo group. Additionally, one family was given an extra week to complete the training because they were unable to complete all modules in the allotted time.
**Control group.** The control group went through the initial pre-test measures, as described for the two parent training groups. However, only the initial welcome package was provided, as the other two groups were receiving the full parent training series. Following the post-test assessment, the control group was offered access to the online parent-training modules. Eight weeks after conclusion of the study, none of the participants from the control group had accessed the online training modules. A follow-up email was sent as a reminder.

**Post-training.** Upon completion of the six parent-training modules, each parent-child dyad was asked to complete post-test measures at the University-based clinic. Again, parents completed the PSOC, PSI-SF, 20-question knowledge assessment, and a five-minute parent-child interaction session.

**Social Validity Questionnaire**

In-vivo and online training participants were asked to complete a social validity questionnaire at the conclusion of the study (Appendix E). The questionnaire was administered to assess an overall rating of the parent training course and to give the participants the ability to provide the researcher with any additional feedback on what the course did well and what could be improved.

**Inter-Observer Agreement**

Three independent observers collected data for the two five-minute parent-child interaction sessions. Data collection occurred remotely via video recordings, following a training session to ensure the observers were reliable. Frequency data
was collected for each of the positive and negative interactions tracked for the five-minute duration of the interaction (See Appendix A). Inter-observer agreement was calculated using total count per positive and negative interaction, and total count. Because observers were required to score multiple behaviors in a complex environment, two forms of inter-observer agreement were calculated, as suggested by Cooper, Heron, and Heward (2007). Due to the complexity of the behaviors and non-exclusive response categories, it was possible for different observers to identify a positive behavior as different subtypes. For example, one behavior could be both praise and reflection and be scored differently by the two observers. Because the main dependent variable for parent-child interaction was percentage positive interactions, consensus on total count per positive and negative interaction was the most relevant of the Inter-observer agreement measures.

Inter-observer agreement was collected for 38.2% of parent-child interaction sessions. Total count per positive and negative interaction was calculated by dividing the smaller sum of all five positive behaviors by the larger sum and multiplying by 100, and repeating for all three negative behaviors. After calculating a percentage for the positive and negative interaction, the percentages were summed and divided by two. Total count per positive and negative interaction Inter-observer agreement averaged 83.9%, with a range from 61.6% to 93.3%. Total count was calculated by dividing the smaller sum of all eight behaviors by the
larger sum and multiplying by 100. Total count Inter-observer agreement averaged 90.1%, with a range from 66.7% to 100%.

**Results**

Repeated-measures Analysis of Variance (ANOVA) with a Bonferroni multiple comparison test was used to evaluate the differences among the four dependent measures between pre- and post-tests for each of the three treatment groups (Gravetter & Wallnau, 2013; also see Rosenthal & Rosnow, 1991). For each dependent variable, group assignment was the between-subjects variable and pre- and post-test scores was the within-subject variable.

Figure 1 shows the mean proportion of positive parent-child interactions, for pre- and post-test, across the three groups. Table 1 shows individual-subject data and the mean of each dependent variable for each group. Results revealed a statistically significant difference between pre- and post-test for the parent-child interaction measure, \( F(1,14)=14.45, p=0.0019 \), and an interaction effect, \( F(2,14)=4.83, p=0.0249 \). However, there was no significant effect of group, \( F(2,14)=0.4666, p=0.6364 \). A Bonferroni post-test revealed a significant difference between pre- and post-test for online, \( p=0.0030 \), and in-vivo, \( p=0.0278 \), groups, but not for the control group, \( p>0.9999 \).

Figure 2 shows the mean proportion of correct answers on the knowledge assessment for pre- and post-test across the three groups. There was a statistically significant difference between pre- and post-test for the knowledge measure,
There was no significant effect of the group, \( F(2,14)=1.057, p=0.3736 \). The Bonferroni post-test revealed a significant difference between pre- and post-test for the online, \( p=0.0009 \) and in-vivo, \( p<0.0001 \), groups, but not for the control group, \( p=0.5080 \).

Figure 3 shows the mean proportion of parental stress for pre- and post-test across the three groups. There was a statistically significant difference between pre- and post-test for the parental stress measure \( F(1,14)=5.633, p=0.0325 \), and an interaction effect \( F(2,14)=5.377, p=0.0185 \). There was no significant effect of group \( F(2,14)=1.216, p=0.3259 \). The Bonferroni post-test revealed a significant effect for the in-vivo group, \( p=0.0272 \), but not for the online, \( p=0.0578 \), or control group, \( p=0.6425 \).

Figure 4 shows the mean parental competence score, for pre- and post-test, across the three groups. There was no statistically significant difference between pre- and post-test for parental competence, \( F(1,14)=0.8461, p=0.3732 \), interaction effect, \( F(2,14)=2.819, p=0.0936 \), or a difference between the groups, \( F(2,14)=0.8219, p=0.4597 \).

The results of the social validity questionnaire revealed 35.3% of participants agreed and 64.7% strongly agreed with questions pertaining to the usefulness of the strategies provided and the time commitment for the course. These results suggest the training course was well accepted by the participants.
Participants had the ability to answer open-ended questions. One participant reported that learning about the antecedents and consequences of behavior was key to their success in effectively identifying the cause of their child’s behavior and determining which strategy to use to change behavior. Furthermore, the information discussed throughout training helped parents understand that their children could respond to behavioral techniques used to change behavior in a positive manner. Participants also made suggestions on how to improve the course. One idea included receiving a flow chart to use at home. Another suggestion included embedding more videos into the modules, as the videos that were available were helpful in absorbing the information discussed during training.

**Discussion**

The current study sought to examine whether web-based, self-paced parent training could be an effective alternative to in-vivo parent training. Specifically, the aim was to compare the effectiveness between online and in-vivo training by evaluating changes in assessment measures from the time before participants received parent training to immediately after completing parent training. We expected no difference between the two intervention groups, as it would lend support for the use of web-based training as an equally effective but more cost-effective alternative.

Participants in the online and in-vivo groups significantly increased their scores in the parent-child interaction and knowledge assessment measures, whereas
there was no such difference for participants in the control group. Additionally, participants in the in-vivo group significantly decreased their scores on the parental stress measure, with no such difference for participants in the online or control group. Consistent with our expectations, this finding suggests online and in-vivo delivery methods were equally effective in terms of improving parental interactions with their child and increasing parent’s knowledge of ABA strategies.

For the parental competence measure, however, there were no significant changes for any group. It was expected that parental competence would increase as a result of receiving parent training (Johnston & Mash, 2010). It is possible this measure was not sufficiently sensitive to capture changes in the limited sample of participants. Parental competence, measured by PSOC, depends on parental self-report. Self-report measures may be impacted by current environmental conditions unrelated to parenting (Cousino & Hazen, 2013). For instance, the PSOC includes statements such as “Sometimes I feel like I’m not getting anything done.” Thus, there are other factors within the parent’s environment that may be impacting their competence levels.

These findings confirm previous research that shows parent training produces significant differences in parental knowledge of material presented (Wainer & Ingersoll, 2013; Pollard et al., 2014; Jang et al., 2012), the ability to enhance their interactions with their children (Laski et al., 1998; Gillet & LeBlanc, 2007), and decreases in parental stress (Struass et al., 2012). This study contributes
to the parent-training literature by being the first to directly compare online and in-vivo parent training and, importantly, finding no significant difference in their effectiveness regarding knowledge and parent-child interaction measures.

Research has shown that parental involvement is crucial for generalization and maintenance of skills acquired through behavioral interventions (Fava et al., 2011). Parent training can provide additional support for families receiving behavioral services by equipping parents with skills to properly manage problem behaviors by rewarding appropriate behaviors, as well as encouraging and supporting more effective parent-child interactions, that can have a lasting impact in the home and the school environment (Serketich & Dumas, 1996). Unfortunately, some families do not have access to behavioral treatment, due to dearth of trained professionals in their geographical area or lack of insurance or other funding to cover the costly service, leading to lengthy waitlists (Koerting et al., 2013). Other barriers to accessing parent training include time and geographical constraints precluding parents from attending in-vivo sessions. Therefore, online parent training provides a way to circumvent some of these barriers (i.e., fill a gap), and provide parents with an efficient and cost-effective way to access empirically validated information to effectively foster learning opportunities for their children in their home environment. This type of delivery is not to replace EIBI, instead it could be an adjunct service or a way to provide access to those on waitlists or have other barriers to receiving in-vivo services. Further, providing the training in the
form of online modules is more efficient than other telehealth methods (e.g., video calls), because a trained professional does not need to be present during the time of training, which can more costly.

In the present study, other potential barriers to access parent training were identified. Due to unforeseen circumstances, some of the in-vivo training had to be rescheduled, which led to some of the sessions not being conducted in a group setting and two modules presented within the same training session. Parents reported time constraints or illness as preventing them from attending the regularly scheduled sessions. In these circumstances, online training provides a method to circumvent these barriers, as online participants could complete the training on their own time. In addition, the time to complete the online modules ranged from 30 to 40 minutes per module, whereas the in-vivo sessions lasted twice as long, on average. Anecdotally, one online participant noted that she enjoyed having the ability to sit down and complete the online modules with her husband after their kids went to bed. Another participant stated that she enjoyed watching the videos when she had free time in between chores, errands, or while her son was at school.

Although online parent training was found to be comparable to in-vivo parent training in the present study, further research should be conducted with a larger sample to further validate these findings and determine whether differences in parental competence can be elucidated. In addition, some modifications could potentially aid in decreasing attrition. For instance, implementing contingencies to
support parents in adhering to the timeline to complete the modules, such as providing parents access to additional training in a one-on-one format. Similarly, decreasing the time commitment required to complete the training modules could also aid in increasing completion rates. Finally, it is possible that the requirement for parents to attend an in-vivo session for pre- and post-tests may have been an obstacle for some families. Thus, future research could evaluate the feasibility of conducting the parent-child interaction and other measures remotely via telehealth.

The present study lends additional evidence for the efficacy of a self-paced web-based parent-training course (Jang et al., 2012), as the results of the online and in-vivo parent training groups suggest these are equally effective in producing positive change in parent-child interaction and knowledge. In addition, this study is the first direct comparison of these two delivery methods of ABA content to parents of children with ASD. Thus, given the possibility of circumventing barriers such as cost and accessibility of services, online training may be a more efficient alternative to providing parent training due to its low cost and flexibility, giving parents the option of when and where to complete training.
References


Table 1.

*Individual-subject data for each of the four dependent measures, across groups.*

<table>
<thead>
<tr>
<th>Group</th>
<th>Participant</th>
<th>Interaction</th>
<th>Knowledge</th>
<th>Stress</th>
<th>Competence</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Pre</td>
<td>Post</td>
<td>Pre</td>
<td>Post</td>
</tr>
<tr>
<td>In-vivo</td>
<td>1</td>
<td>40</td>
<td>49</td>
<td>50</td>
<td>75</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>58</td>
<td>77</td>
<td>70</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>49</td>
<td>85</td>
<td>75</td>
<td>95</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>47</td>
<td>80</td>
<td>60</td>
<td>85</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>41</td>
<td>52</td>
<td>70</td>
<td>90</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>48</td>
<td>41</td>
<td>85</td>
<td>95</td>
</tr>
<tr>
<td>Mean</td>
<td></td>
<td>47</td>
<td>64</td>
<td>68</td>
<td>90</td>
</tr>
<tr>
<td>Online</td>
<td>1</td>
<td>52</td>
<td>85</td>
<td>75</td>
<td>85</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>72</td>
<td>72</td>
<td>65</td>
<td>70</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>62</td>
<td>86</td>
<td>65</td>
<td>90</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>29</td>
<td>68</td>
<td>50</td>
<td>70</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>59</td>
<td>79</td>
<td>80</td>
<td>95</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>22</td>
<td>46</td>
<td>65</td>
<td>80</td>
</tr>
<tr>
<td>Mean</td>
<td></td>
<td>49</td>
<td>73</td>
<td>68</td>
<td>82</td>
</tr>
<tr>
<td>Control</td>
<td>1</td>
<td>47</td>
<td>54</td>
<td>65</td>
<td>60</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>44</td>
<td>45</td>
<td>80</td>
<td>80</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>51</td>
<td>55</td>
<td>70</td>
<td>75</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>65</td>
<td>64</td>
<td>80</td>
<td>85</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>69</td>
<td>48</td>
<td>40</td>
<td>60</td>
</tr>
<tr>
<td>Mean</td>
<td></td>
<td>55</td>
<td>53</td>
<td>67</td>
<td>72</td>
</tr>
</tbody>
</table>
Figure 1. Mean proportion of positive interactions, for pre- (black) and post-test (white), on the parent-child interaction measure for each group. Error bars depict standard deviation (SD). The asterisk (*) depicts a statistically significant difference between pre- and post-test scores for that group ($p<0.05$).
Figure 2. Mean proportion of correct, for pre- (black) and post-test (white), on the knowledge assessment for each group. Error bars depict standard deviation (SD). The asterisk (*) depicts a statistically significant difference between pre- and post-test scores for that group ($p<0.05$).
Figure 3. Mean proportion of parental stress, for pre- (black) and post-test (white), on the Parental Stress Index- Short Form for each group. Error bars depict standard deviation (SD).
Figure 4. Mean scores, for pre- (black) and post-test (white), on the Parental Sense of Competence for each group. Error bars depict standard deviation (SD).
Appendix A

Outline used to score positive and negative interactions during the two five-minute parent-child interaction sessions, and collect Inter-observer agreement.

Parent-Child Interaction Score Sheet

<table>
<thead>
<tr>
<th>Child Name: ____________________</th>
<th>Date: ______________</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assessment (circle): PRE POST</td>
<td>Coder Initials: ______</td>
</tr>
<tr>
<td>Caregiver (circle): MOTHER FATHER GRANDMA GRANDPA</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>POSITIVE</th>
<th>TALLY</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Neutral Talk</strong> (e.g., the guitar is making noise)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Behavior Description</strong> (e.g., you’re putting the ball in the hoop)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Reflection</strong> (e.g., repeating what the child does…. “oo-oo” “oo-oo”)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Labeled Praise</strong> (e.g., great job putting the ball in the hoop)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Unlabeled Praise</strong> (e.g., good job)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>NEGATIVE</th>
<th>TALLY</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Question</strong> (e.g., what are you doing? Why are you doing that?)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Negative Talk</strong> (e.g., common, don’t do that!)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Commands</strong> (e.g., Look, watch me, put the ball in the hoop)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Let them know what they did well and ask whether this was a typical interaction or not (circle): TYPICAL NON-TYPICAL why?**
Appendix B

Parenting Sense of Competence (PSOC) scale- 16 question/statements.

Part I. Listed below are a number of statements. Please respond to each item, indicating your agreement or disagreement with each statement in the following manner.

Parenting Sense of Competence Scale
If you strongly agree, check the letters SA
If you agree, check the letter A
If you mildly agree, check the letters MA
If you mildly disagree, check the letters MD
If you disagree, check the letter D
If you strongly disagree, check the letters SD

1. The problems of taking care of a child are easy to solve once you know how your actions affect your child, an understanding I have acquired.  
SA A MA MD D SD

2. Even though being a parent could be rewarding, I am frustrated now while my child is at his/her present age.  
SA A MA MD D SD

3. I go to bed the same way I woke up in the morning—feeling I have not accomplished a whole lot.  
SA A MA MD D SD

4. I do not know what it is, but sometimes when I'm supposed to be in control, I feel more like the one being manipulated.  
SA A MA MD D SD

5. My mother/father was better prepared to be a good mother/father than I am.  
SA A MA MD D SD

6. I would make a fine model for a new mother/father to follow in order to learn what she/he would need to know in order to be a good parent.  
SA A MA MD D SD

7. Being a parent is manageable, and any problems are easily solved.  
SA A MA MD D SD

8. A difficult problem in being a parent is not knowing whether you're doing a good job or a bad one.  
SA A MA MD D SD

9. Sometimes I feel like I'm not getting anything done.  
SA A MA MD D SD

10. I meet my own personal expectations for expertise in caring for my child.  
SA A MA MD D SD

11. If anyone can find the answer to what is troubling my child, I am the one.  
SA A MA MD D SD

12. My talents and interests are in other areas, not in being a parent.  
SA A MA MD D SD

13. Considering how long I've been a mother/father, I feel thoroughly familiar with this role.  
SA A MA MD D SD

14. If being a mother/father of a child were only more interesting, I would be motivated to do a better job as a parent.  
SA A MA MD D SD

15. I honestly believe I have all the skills necessary to be a good mother/father to my child.  
SA A MA MD D SD

16. Being a parent makes me tense and anxious.  
SA A MA MD D SD

Appendix C

Parental Stress Index- Short Form (PSI-SF)- 36 question/statements.

<table>
<thead>
<tr>
<th>Question</th>
<th>SA</th>
<th>A</th>
<th>NS</th>
<th>D</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I often have the feeling that I cannot handle things very well.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. I find myself giving up more of my life to meet my children's needs than I ever expected.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. I feel trapped by my responsibilities as a parent.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Since having this child, I have been unable to do new and different things.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Since having a child, I feel that I am almost never able to do things that I like to do.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. I am unhappy with the last purchase of clothing I made for myself.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. There are quite a few things that bother me about my life.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Having a child has caused more problems than I expected in my relationship with my spouse/parenting partner.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. I feel alone and without friends.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. When I go to a party, I usually expect not to enjoy myself.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. I am not as interested in people as I used to be.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. I don't enjoy things as I used to.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. My child rarely does things for me that make me feel good.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. When I do things for my child, I get the feeling that my efforts are not appreciated very much.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. My child smiles at me much less than I expected.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16. Sometimes I feel my child doesn't like me and doesn't want to be close to me.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17. My child is very emotional and gets upset easily.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18. My child doesn't seem to learn as quickly as most children.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19. My child doesn't seem to smile as much as most children.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20. My child is not able to do as much as I expected.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21. It takes a long time and it is very hard for my child to get used to new things.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22. I feel that I am: (Choose a response from the choices below.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. a very good parent.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. a better-than-average parent.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. an average parent.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. a person who has some trouble being a parent.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. not very good at being a parent.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23. I expected to have closer and warmer feelings for my child than I do, and this bothers me.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24. Sometimes my child does things that bother me just to be mean.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SA = Strongly Agree</td>
<td>A = Agree</td>
<td>NS = Not Sure</td>
<td>D = Disagree</td>
<td>SD = Strongly Disagree</td>
</tr>
<tr>
<td>---</td>
<td>-------------------</td>
<td>----------</td>
<td>---------------</td>
<td>--------------</td>
<td>------------------------</td>
</tr>
<tr>
<td>25.</td>
<td>My child seems to cry or fuss more often than most children.</td>
<td>SA A NS D SD</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>26.</td>
<td>My child generally wakes up in a bad mood.</td>
<td>SA A NS D SD</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>27.</td>
<td>I feel that my child is very moody and easily upset.</td>
<td>SA A NS D SD</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>28.</td>
<td>Compared to the average child, my child has a great deal of difficulty in getting used to changes in schedules or changes around the house.</td>
<td>SA A NS D SD</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>29.</td>
<td>My child reacts very strongly when something happens that my child doesn’t like.</td>
<td>SA A NS D SD</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30.</td>
<td>When playing, my child doesn’t often giggle or laugh.</td>
<td>SA A NS D SD</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>31.</td>
<td>My child’s sleeping or eating schedule was much harder to establish than I expected.</td>
<td>SA A NS D SD</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32.</td>
<td>I have found that getting my child to do something or stop doing something is: (Choose a response from the choices below.)</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1. much harder than I expected.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. somewhat harder than I expected.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. about as hard as I expected.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. somewhat easier than I expected.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>5. much easier than I expected.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>33.</td>
<td>Think carefully and count the number of things which your child does that bothers you. For example, dawdles, refuses to listen, overactive, cries, interrupts, fights, whines, etc. (Choose a response from the choices below.)</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1. 1-3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. 4-5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. 6-7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. 8-9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>5. 10+</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>34.</td>
<td>There are some things my child does that really bother me a lot.</td>
<td>SA A NS D SD</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>35.</td>
<td>My child’s behavior is more of a problem than I expected.</td>
<td>SA A NS D SD</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>36.</td>
<td>My child makes more demands on me than most children.</td>
<td>SA A NS D SD</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix D

Welcome package provided to parents upon enrollment into the study.

Thank you for your interest!
Families living with a child diagnosed with Autism Spectrum Disorder (ASD) can face many challenges.

Despite the wealth of information available, it can be difficult for parents and caregivers to identify useful resources and reliable information. We aim to provide you evidence-based resources and strategies to learn more about ASD and navigate parenting challenges through a series of instructional modules. We invite you to read the information contained in this package as introduction to our parenting series.

Please fill out the brief questionnaire attached and send it back at your earliest convenience. The information you provide will help us best meet your needs.
Autism Spectrum Disorder (ASD)

ASD is characterized by behavioral deficits in areas of communication and social interaction, as well as excessive problem behavior, such as tantrums, and repetitive behaviors and restricted interests, such as lining toys up in a row.

**Signs:**
- Problems with social, emotional, and communication skills
- May show rigidity with schedules and repetition of certain behaviors
- Different individuals exhibit different ways of learning, paying attention, and reacting to events in their environment
- This is a disorder that develops during early childhood and persists through one's life

**Symptoms:**
Development of symptoms varies per individual, but typically appear between 18 and 24 months of age and include:
- Not responding to name by 12 months
- Not pointing to objects by 14 months
- Does not engage in pretend play
- AVOIDS EYE CONTACT AND PREFERS TO BE ALONE
- Has trouble understanding other people's feelings
Applied Behavior Analysis (ABA)

According to the American Academy of Pediatrics and the National Research Council, behavior and communication approaches that most help children with ASD are those that provide structure, direction, and organization for the child in addition to family participation.

A widely accepted treatment for individuals with ASD and extensively used within school and clinic settings is Applied Behavior Analysis (ABA). The treatment encourages positive behaviors and discourages negative ones to improve the individual’s skills.

The individual child’s progress is continuously monitored and analyzed, and teaching plans are individualized.

ABA Methods are used to:

• Teach new skills
• Increase new positive behaviors
• Maintain positive behaviors
• Reduce behaviors that interfere with learning
Additional Resources Available
This list contains several Brevard County area resources. The Scott Center for Autism Treatment does not endorse or claim to have personal knowledge of the abilities of those listed.

<table>
<thead>
<tr>
<th>Name</th>
<th>Phone</th>
<th>Ages served</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basix Behavioral Health Services</td>
<td>321-877-4500</td>
<td>0-12</td>
<td>Home, School</td>
</tr>
<tr>
<td>Brevard Educational Center</td>
<td>321-639-9800</td>
<td>0-18+</td>
<td>Clinic, School</td>
</tr>
<tr>
<td>Caladium Learning Center</td>
<td>321-362-5760</td>
<td>0-17</td>
<td>Clinic, School</td>
</tr>
<tr>
<td>Center for Autism and Related Disabilities (CARD)</td>
<td>1-800-9-AUTISM</td>
<td>0-18+</td>
<td>Consultation</td>
</tr>
<tr>
<td>Coastal Behavior Analysis</td>
<td>772-713-0108</td>
<td>0-18+</td>
<td>Clinic, Home</td>
</tr>
<tr>
<td>Early Steps</td>
<td>321-634-3688</td>
<td>0-5</td>
<td>Home</td>
</tr>
<tr>
<td>Everyday ABA, LLC</td>
<td>321-536-3532</td>
<td>0-18+</td>
<td>Home</td>
</tr>
<tr>
<td>Great Leaps Academy</td>
<td>321-610-3849</td>
<td>0-12</td>
<td>School</td>
</tr>
<tr>
<td>Kaleidoscope Interventions</td>
<td>321-821-4068</td>
<td>0-17</td>
<td>Home</td>
</tr>
<tr>
<td>MTS Health Services, LLC</td>
<td>407-389-9966</td>
<td>0-18+</td>
<td>Home</td>
</tr>
<tr>
<td>Positive Behavior Supports Corporation</td>
<td>855-832-6727</td>
<td>0-18+</td>
<td>Home, School</td>
</tr>
<tr>
<td>Puzzle Box Academy</td>
<td>321-821-4069</td>
<td>0-12</td>
<td>School</td>
</tr>
</tbody>
</table>

For more information, please contact:
Abigail Blackman  ablackman2015@my.fit.edu
Samuel Shvarts  sshvarts2016@my.fit.edu
Corina Jimenez-Gomez, Ph.D., BCBA-D  cjmenez@fit.edu  (321) 674-8106
Appendix E

Social Validity measure- 12 questions.

1. The strategies I learned about in this program helped me to interact better with my child.
   
<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

2. The content of this program was easy to understand.
   
<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

3. Reinforcement of appropriate behavior was easy to use at home with my child.
   
<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

4. I feel using reinforcement of appropriate behavior had a positive impact on my child’s behavior.
   
<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

5. I will continue to use reinforcement of appropriate behavior with my child.
   
<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

6. I feel the length of the sessions (about 1 hour) was enough to learn about and practice the strategies.
   
<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

7. Six sessions were enough to learn about, practice, and receive feedback of the use of the strategies.
   
<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

8. The time commitment to this training was manageable.
   
<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

9. Should anything be added to this training? If yes, what?

10. Should anything be removed from this training? If yes, what?

11. What do you feel would most help you continue to use the strategies presented in the training?

12. Please list any further comments or explanations you have here.
Appendix F

Glossary of acronyms used throughout the document.

A

Applied Behavior Analysis (ABA)
Focuses on socially significant behavior change in individuals diagnoses
with autism

Autism Spectrum Disorder (ASD)
The acronym used for the diagnosis of autism, which is a developmental
disorder characterized by deficits in social communication and interaction,
and excesses in stereotypic and maladaptive behaviors

E

Early Intensive Behavioral Intervention (EIBI)
Providing individualized behavioral services to children less than four years
of age for 30-40 hours per week

P

Parental Sense of Competence Scale (PSOC)
Assessment used to assess the degree to which parents perceive their ability
fulfill the parenting role and their satisfaction in doing so

Parental Stress Index—Short Form (PSI-SF)
Assessment used to evaluate stress levels in different aspects of the parent’s
life