

Evaluation of a telehealth parent training program in teaching self-care skills to children with autism

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The present study used synchronous video conferencing to remotely deliver a behavioral skills training-based (BST) parent training program to 3 parents of children with autism in the family home. Parents were taught to implement graduated guidance to teach their children several important self-care skills. Parents did not correctly implement graduated guidance after receiving detailed written instructions only. After parents received the BST parent training package, however, all parents implemented graduated guidance with near-perfect levels of fidelity, and all children completed the targeted self-care skills with substantially higher levels of accuracy and independence. Furthermore, parents reported high levels of satisfaction with graduated guidance, the telehealth BST training package, and their children's ability to complete self-care skills.

Key words: telehealth, parent training, behavioral skills training, self-care skills, autism

Research has demonstrated that early and intensive interventions that use the principles of applied behavior analysis (ABA) can be effective in teaching skills to children with autism spectrum disorder (ASD) (Matson & Smith, 2008). Unfortunately, parents of children with ASD often experience difficulty obtaining ABA services for their children (Kogan et al., 2008) due to barriers such as cost, lengthy waitlists, or geographic isolation (Koegel et al., 2002; Stahmer & Gist, 2001). One way to address these issues is to train parents of children with ASD to be effective behavior-analytic teachers for their children.

A number of authors have discussed the benefits of training parents to implement ABA programs with their children. For example, several authors have indicated that parent involvement in ASD interventions may help promote generalization and

maintenance of child skills and is often more cost-effective than a purely therapist-based treatment intervention (e.g., Ingersoll & Gergans, 2007; Lerman et al., 2020). Parent training and involvement has also been shown to reduce parental stress related to caring for a child with ASD (Koegel et al., 1996), increase parent optimism and reported leisure time (Koegel et al., 1982), and increase parents' reported sense of competence related to their parental abilities (Connell et al., 1997). Furthermore, the National Research Council (NRC) suggested that a fundamental component of effective ASD intervention programs is parent involvement (NRC, 2001).

One method that has been shown to be effective in teaching new skills to parents is behavioral skills training (BST). BST is a teaching procedure that involves the use of instructions, modeling, rehearsal (or role-play), and feedback (Miltenberger, 2004). BST has been used to teach parents of children with ASD to implement a variety of interventions including shaping and prompting procedures (e.g., Koegel et al., 1978), functional analyses (e.g., Stokes & Luiselli, 2008), function-based treatments to address problem behavior (e.g., Robertson et al., 2013; Tarbox et al., 2002; Vollmer et al., 1994), the Early Start Denver Model (ESDM) (e.g., Vismara et al., 2009), toilet training

This study is based on a dissertation submitted by the first author, under the supervision of the second and third author, in the Department of Applied Behavioral Science at the University of Kansas. We would like to thank Jessica Winne, Britney Latham, and Florence DiGennaro Reed for their assistance with various aspects of this project.

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doi: 10.1002/jaba.743

protocols (e.g., Kroeger & Sorensen, 2010), joint attention programs (e.g., Rocha et al., 2007), discrete trial instruction (e.g., Lafasakis & Sturmey, 2007), multiple phases of the picture exchange communication system (PECS) (e.g., Ben-Chaabane et al., 2009), and a variety of naturalistic behavioral interventions such as natural language paradigm, milieu teaching, pivotal response teaching, reciprocal imitation training, embedded teaching, and incidental teaching (e.g., Charlop-Christy & Carpenter, 2000; Ingersoll & Gergans, 2007; Koegel et al., 2002). It is often the case, however, that parents are unable to receive adequate training due to obstacles such as geographic location, cost, and a shortage of qualified professionals (e.g., Board Certified Behavior Analysts[®], BCBAAs). One way to address these issues is to use telehealth to remotely train parents.

Telehealth (also called ‘telemedicine’ or ‘telepractice’) is the use of communication technology to provide critical health services remotely to people who may not have direct access to the professionals who can provide these services. Telehealth can involve the use of telephones, email, asynchronous videos or pictures, or synchronous video conferencing (e.g., Doxy[®], Zoom[®], FaceTime[®]). A common telehealth model consists of a practitioner using synchronous video conferencing to deliver live, real-time services to a client in their home. Research has shown that therapists can effectively teach parents via telehealth to implement a variety of behavior-analytic programs with their children (e.g., for reviews, see Ferguson et al., 2019; Tomlinson et al., 2018). For example, clinicians in numerous studies have used BST via synchronous video conferencing to teach parents to implement functional assessment and treatment procedures to address problem behavior (e.g., Lindgren et al., 2016; Machalicek et al., 2016; Monlux et al., 2019; Suess et al., 2014; Suess et al., 2016; Tsami et al., 2019; Wacker et al., 2013a; 2013b) and programs aimed at increasing social and communication behaviors (e.g., Baharav &

Reiser, 2010; McDuffie et al., 2013; Vismara et al., 2012; 2013; Wainer & Ingersoll, 2015).

Although research regarding the necessary and sufficient components of BST is mixed, a number of studies have found that written instructions alone are not effective in teaching individuals to correctly and consistently implement new skills (e.g., Ducharme & Feldman, 1992; Gardner, 1972; Ward-Horner & Sturmey, 2012). Interestingly, however, recent studies examining the effectiveness of self-instruction packages in isolation have revealed some promising results. For example, a study by Graff and Karsten (2012) found that “enhanced” written instructions (EWI) effectively trained teachers to implement stimulus preference assessments with children with ASD. The EWI consisted of jargon-free, step-by-step instructions, a detailed data sheet, and diagrams that detailed how to conduct the preference assessments. A follow-up study by Shapiro et al. (2016) similarly found that EWI were sufficient to teach five of seven undergraduates with no prior coursework in ABA and four of five in-home behavior technicians to conduct stimulus preference assessments. Nonetheless, more research is needed to further investigate the range of skills that can be taught using a similar type of detailed written instructions. If effective, detailed written instructions could be used within telehealth parent training programs alone or in concert with other BST components (e.g., model, role-play, feedback) to teach parents more effectively and efficiently. Currently, no studies have examined the effectiveness of detailed written instructions in teaching parents.

Furthermore, despite the growing number of studies demonstrating the effectiveness of telehealth parent training models, no studies have targeted the skills needed to teach children multistep, self-care skills. This is an important area because many children with ASD exhibit pronounced deficits in self-care skills (Flynn & Healy, 2012). Deficits in these skills can hinder a child’s integration into daycare or school settings and result in a greater reliance on parents to complete these necessary skills

(Jasmin et al. 2009). Additionally, no telehealth parent training studies have targeted graduated guidance, which is commonly used to teach children with ASD to complete self-care skills (Demchak, 1989; 1990).

The purpose of the current study was to evaluate a telehealth program to teach parents of children with ASD to implement graduated guidance to teach their children to independently complete three important self-care skills (i.e., washing hands, washing face, and applying lotion). One goal was to determine if detailed written instructions would be sufficient to teach parents to implement the graduated guidance procedure. If detailed written instructions were not sufficient, the second goal was to determine if a parent training package delivered via telehealth would be effective for teaching parents to implement graduated guidance with acceptable levels of fidelity and concurrently produce positive changes in child behavior.

Method

Participants, Setting, and Materials

Three children with ASD, two boys and one girl, and their parents participated. Children ranged from 4 to 5 years of age and were participating in a center-based ABA program that serves children with ASD located at a Midwestern university. To participate in this study, families had to meet the following criteria: (1) children had an ASD diagnosis from an independent agency; (2) children were between the ages of 3 and 5 years; (3) at least one parent was available to participate in two to three 20-30 min sessions per week for the duration of the study; (4) another adult (e.g., other parent, older sibling, neighbor, babysitter) was available to participate in several role-play sessions throughout the study; and (5) the family home was equipped with a wireless router and a high-speed Internet connection (i.e., at least 1 gigabyte/s upload and download) for the

duration of the study. One parent from each parent-child dyad (referred to as the teaching parent) was selected to teach self-care skills; the other parent is referred to as the nonteaching parent.

Jesse was a 5-year-old boy diagnosed with ASD who had received an average of 35 hr a week of ABA therapy for 16 months prior to participating. The Assessment of Basic Learning and Language Skills (ABLLS; Partington, 2006) indicated that Jesse was demonstrating 58% of all assessed skills. More specifically, Jesse was demonstrating 71% of grooming skills, 90% of gross motor skills, and 89% of fine motor skills. Jesse's mother was the teaching parent in this study. At the beginning of the study, Jesse's mother was 36 years old, had completed some college coursework, and did not have any prior experience implementing discrete-trial instruction or graduated guidance procedures. Jesse's mother was married and had a full-time job outside of the family home.

Bobby was a 4-year-old boy diagnosed with ASD who had received an average of 35 hr a week of ABA therapy for 13 months prior to participating in the current study. An ABLLS assessment indicated that Bobby was demonstrating 35% of all assessed skills. More specifically Bobby was demonstrating 86% of grooming skills, 83% of gross motor skills, and 75% of fine motor skills. Bobby's mother was the teaching parent. At the beginning of the study, Bobby's mother was 34 years old, had completed her bachelor's degree, and did not have any prior experience implementing discrete trial instruction or graduated guidance procedures. Bobby's mother was married and had a full-time job outside of the family home.

Laura was a 5-year-old girl diagnosed with ASD who had received an average of 35 hours a week of ABA therapy for the past 11 months. An ABLLS assessment indicated that Laura was demonstrating 4% of all assessed skills. More specifically, Laura was demonstrating 0% of grooming skills, 13% of gross motor skills, and

21% of fine motor skills. Laura was the only participant who engaged in problem behaviors. Laura's problem behaviors included aggression and property destruction. Functional analyses of Laura's aggression and property destruction were completed prior to the current study and indicated that both were maintained by escape from demands. Laura's mother was the teaching parent in this study. Laura's mother was 30 years old, had completed her master's degree, and did not have any prior experience implementing discrete trial instruction or graduated guidance procedures. Laura's mother was also married and had a full-time job outside of the family home.

The experimenter served as the parent trainer for the duration of the study. She was a master's-level BCBA who had 8 years of experience working with children with autism and their families and 4 years of experience conducting parent training. She had not received any formal training in telehealth or using telehealth to deliver behavior analytic services.

All teaching sessions and observations took place in the participants' homes. The experimenter conducted all sessions using FaceTime[®] video conferencing technology on password-protected iPad[®] minis that allowed the experimenter and parents to see, hear, and communicate with each other in real time. FaceTime[®] was selected as it was familiar, easily accessible by the parent participants, and authorized by the University of Kansas Institutional Review Board. Because FaceTime[®] is not HIPAA compliant, the risks associated with using FaceTime[®] were discussed with the parents who signed a consent form agreeing to its use before starting in the study.

Each parent also received an iPad[®] mini and Otterbox[®] case that functioned as a stand for the iPad[®]. To ensure that only the teaching parent (rather than both the teaching parent and the child) heard the experimenter's instructions and feedback during sessions, teaching parents were provided with Jabra[®]

wireless ear buds to wear during all telehealth sessions.

To determine which self-care skills would be taught to each parent-child dyad, an assessment questionnaire was distributed to all parent participants that asked them to individually rate their satisfaction with their child's ability to demonstrate a number of skills and how important they believed it was for their child to learn each skill. All parents reported low satisfaction with their children's ability to independently wash their hands, wash their face, and apply lotion. Additionally, all parents reported high importance with respect to their children independently completing these self-care skills. None of these self-care skills were, or had been, directly taught as part of the children's ABA program.

Response Measurement

Parent Behavior

The primary dependent variable for all parent participants was correct implementation of the graduated guidance procedures. This variable was scored using a parent behavior checklist (see Table 1). For each graduated guidance teaching session, the percentage of parent behavior steps correctly completed by the parent was calculated by dividing the total number of parent behavior steps correctly completed by the total number of applicable steps and multiplying that number by 100.

Laura's mother was also taught to implement constant prompt delay probe trials within the graduated guidance teaching sessions to better assess Laura's progress in learning each self-care skill. Thus, the correct implementation of the constant prompt delay probe trial steps was scored for Laura's mother using a parent behavior checklist that is available as supplementary material on the publisher's website. For each constant prompt delay prompt probe trial, the percentage of parent behavior steps correctly completed by Laura's mother was calculated by

Table 1*Parent Behavior Checklist for Graduated Guidance Teaching Procedure*

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1. Did the teaching parent present at least two different pieces of the child's preferred edibles that the child chose during prior a preference assessment?
 2. Did the teaching parent ask the child to pick what edible he or she wanted to work for?
 3. Did the teaching parent put five pieces of the edible the child chose into a small container?
 4. Did the teaching parent bring the child into the bathroom?
 5. Did the teaching parent close the bathroom door?
 6. Did the teaching parent give the child the correct instruction (e.g., "Please wash your hands")?
 7. Did the teaching parent start teaching by implementing the appropriate level of prompt for *all* steps of the skill (e.g., last level of prompt used in the previous teaching session or trial)?
 8. Did the teaching parent provide vocal praise *each time* the child correctly completed a skill step (i.e., step completed without problem behavior, with or without help from parent)?
 9. Did the teaching parent decrease the level of prompt one level when the child correctly completed *each step* of the skill (i.e., each skill step completed without problem behavior, with or without help from parent) three consecutive times?
 10. Did the teaching parent provide vocal praise, physical touches, and one serving of the child-selected edible each time the child correctly completed (i.e., each step completed without problem behavior, with or without help from parent) *all* steps of a skill?
 11. Did the teaching parent return to the previous prompt level for the remaining skill steps if the child made an error (e.g., omitted a step, did not fully complete a step) or displayed problem behavior?
 12. Did the teaching parent remain calm and continue to prompt the child through the skill if the child attempted to pull away, protest, or resist the physical prompts?
 13. Did the teaching parent ask the child to complete the skill five times?
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Note: Each item was scored as either "Y"-Yes, "N"-No, or "NA"-Not Applicable

dividing the total number of parent behavior steps correctly completed by the total number of applicable steps and multiplying that number by 100.

After each parent-child dyad had completed training for the three self-care skills, all teaching parents conducted posttraining probe trials to assess their child's performance of the self-care skills when parents simply told their children to complete each skill. Parent implementation of posttraining probe trials also was scored using a parent behavior checklist (available as

supplementary material on the publisher's website). The percentage of parent behavior steps correctly completed was calculated by dividing the total number of parent behavior steps correctly completed by the total number of applicable steps and multiplying that number by 100. All teaching parents correctly completed 100% of posttraining probe steps after receiving the oral instructions from the primary experimenter.

Child Behavior

The dependent variables for all child participants were the independent completion of self-care skill steps and the occurrence of problem behavior. Independent skill completion was defined as the child (a) correctly performing all steps of the skill in the absence of prompts, and (b) not engaging in any problem behaviors during the skill. Of the three child participants, only Laura displayed problem behavior during sessions. The behaviors included aggression, defined as anytime Laura's open or closed hands or head made contact with any part of her parent's body with enough force to produce a sound or a mark, or anytime Laura's open mouth or teeth made contact with any part of her parent's body and left a visible mark; and property destruction, defined as grabbing and releasing an object so that it traveled more than 1 foot or made an audible sound when it made contact with another object. For each graduated guidance teaching session, constant prompt delay probe trial (for Laura), and posttraining probes, the percentage of self-care skill steps independently completed by the child was calculated by dividing the number of self-care skill steps independently completed by the total number of self-care skill steps and multiplying by 100. Additionally, for each graduated guidance teaching session (and constant prompt delay trial for Laura), the percentage of self-care skill steps that contained problem behavior was calculated by dividing the number of self-care skill steps during which the child displayed

problem behavior by the total number of self-care skill steps and multiplying by 100.

Interobserver Agreement and Treatment Integrity

A second observer independently scored data on parent and child behavior for 30% of sessions for each experimental condition for each parent-child dyad. To assess interobserver agreement (IOA) on the implementation of teaching procedures for all three parents, a point-by-point comparison was conducted for each behavioral step on the graduated guidance parent behavior checklist and the constant prompt delay parent behavior checklist for Laura's mother. To evaluate IOA for child independent completion of self-care skill steps and the occurrence of problem behavior during self-care skill steps (for Laura), a point-by-point comparison was conducted for each self-care skill step. IOA was calculated by dividing the number of agreements by the number of agreements plus disagreements and converting this number into a percentage. Mean IOA for graduated guidance and constant prompt delay parent behavior across all parents was 98% (range, 86%-100%). Mean IOA for child independent completion of skill steps across all children was 99% (range, 86%-100%). Mean IOA for child problem behavior was 99% (range, 95%-100%) for Laura.

To assess treatment integrity, a second observer scored the experimenter's implementation of the BST graduated guidance parent training package and constant prompt delay parent training package for 30% of all sessions using experimenter checklists (available as supplementary material on the publisher's website). For both procedures, treatment integrity was calculated by dividing the number of steps implemented correctly by the number of correct plus incorrect steps and multiplying by 100. Procedural integrity for both the graduated guidance parent training package and

constant prompt delay parent training package was 100%.

Experimental Design and Procedures

A nonconcurrent multiple baseline design across parent-child dyads and across self-care skills within parent-child dyads was used to evaluate the effectiveness of the telehealth parent training program.

Graduated Guidance Teaching Procedure

The experimenter taught the teaching parent to implement the 13 steps reflected in the checklist in Table 1. The teaching parent taught her child one self-care skill at a time and each graduated guidance teaching session consisted of the teaching parent conducting five graduated guidance teaching trials. Following each teaching trial, the parent permitted the child to consume the edible (if earned) and to take a 2-min to 3-min break to allow the teaching parent to reset the self-care trial and the experimenter to provide feedback to the teaching parent. The parent conducted teaching sessions once per day, and each session lasted 20 min to 30 min.

The levels for gradually removing the physical prompts from the most controlling to the least controlling were as follows: (1) initially, the teaching parent used hand-over-hand, full physical prompts to gently guide the child through each step of the skill; (2) the teaching parent used partial physical prompts by using only her thumb and index finger to gently guide the child through each step of the skill; (3) the teaching parent used shadow prompts by "shadowing" the child's hands within approximately one inch for each step of the skill; finally, (4) the teaching parent presented only the initial instruction to compete the skill. Training for the skill ended when the teaching parent completely removed her physical prompts and the child independently completed at least 90% of the self-care skill steps for three

consecutive sessions. The graduated guidance procedure was based on that described by Demchak (1989).

Constant Prompt Delay Probe Trials

To better assess Laura's progress in learning self-care skills, Laura's mother was taught to conduct constant prompt delay probe trials. During delayed feedback graduated guidance teaching sessions for the first self-care skill, washing face, Laura's mother was implementing graduated guidance with near 100% fidelity, yet she was not able to successfully fade out her physical prompts due to either the occurrence of problem behavior or because Laura consistently needed at least partial physical prompts to complete certain skill steps (e.g., pumping soap onto wash cloth, rinsing her face, turning off the water). As a result, Laura did not have the opportunity to independently complete the skill. Thus, Laura's mother was instructed to conduct a constant prompt delay probe trial prior to every third graduated guidance teaching session to assess skill mastery. Laura's mother was instructed to use this additional assessment procedure for the remaining two self-care skills (i.e., applying lotion, wash hands) during all teaching phases (e.g., detailed written instructions, immediate feedback with child, delayed feedback with child).

Laura's mother was taught to implement the following steps each time she conducted a constant prompt delay probe trial: 1) give Laura the correct instruction (e.g., "Please wash your face"); 2) deliver a full physical prompt to help Laura complete each skill step that Laura did not complete within 5 s of the initial instruction or within 5 s of completing of the previous skill step; 3) deliver a full physical prompt to help Laura complete each skill step during which Laura displayed problem behavior (e.g., throwing wash cloth, hitting parent, biting parent); 4) provide vocal praise each time Laura correctly completed a skill step without problem behavior, with or

without help from parent; 5) provide vocal praise, physical touches, and one serving of the child-selected edible if Laura correctly completed all steps without problem behavior, with or without prompts from the parent).

Parent Training Procedures

The parent training program consisted of a baseline phase, a detailed written instructions phase, and, if necessary, a BST parent training package phase.

Baseline. The experimenter told the teaching parent to use graduated guidance to teach her child to complete a self-care skill and did not answer any questions or provide feedback.

Detailed Written Instructions. The experimenter gave the teaching parent detailed written instructions that explained how to implement the graduated guidance teaching procedure to teach a skill. The detailed written instructions also included a task analysis detailing the specific skill steps for the self-care skill (e.g., get wash cloth, turn on water, get wash cloth wet). The detailed written instructions were the same for each self-care skill except for the specific task analysis detailing the steps for the self-care skill. The experimenter then told the teaching parent to use graduated guidance to teach her child to complete the self-care skill and did not provide any feedback on her performance. If the teaching parent attempted to ask a question regarding the graduated guidance teaching procedures before or during graduated guidance teaching trials, the experimenter stated to "Just do your best." For each self-care skill, if the teaching parent implemented graduated guidance with her child across five consecutive sessions with at least 90% fidelity after receiving the written instructions *and* the child independently demonstrated at least 90% of the skill steps for three consecutive sessions, training on the skill was considered complete and the parent conducted no further training on the skill. If not, the experimenter delivered the BST parent training package.

BST Parent Training Package. Training consisted of a graduated guidance teaching overview, modeling, role play, and immediate and delayed feedback. First, the experimenter orally described the graduated guidance teaching procedure and the skill that the parent would teach. The experimenter listed the skill steps from the task analysis for the self-care skill and provided rationales for why it is important to teach the skill (e.g., "If we teach Laura to wash her face by herself, she will be able to do so when her face gets dirty and she will also be able to maintain good hygiene"). Then, the experimenter read aloud the steps of the graduated guidance procedure. Finally, the experimenter assessed the teaching parent's knowledge and understanding of the procedure by giving the teaching parent an oral quiz that involved answering aloud a series of questions. The teaching parent had to answer all questions correctly to move on to the modeling phase.

Next, the experimenter correctly modeled, with a research assistant playing the child, the parent behavior steps in using the graduated guidance prompting procedure to teach the skill. Before each teaching trial, the experimenter instructed the research assistant on how to perform during the trial (e.g., complete all self-care steps correctly, complete a step incorrectly, omit a step, engage in problem behavior during skill). First, the experimenter correctly modeled all 13 parent behavior steps. Next, the experimenter correctly modeled nine parent behavior steps and incorrectly modeled four parent behavior steps with the research assistant still playing the role of the child. A random number generator (<http://www.random.org>) was used to determine which four graduated guidance steps were incorrectly modeled. Following each model, the experimenter asked the teaching parent to state the steps that were correctly and incorrectly implemented by the experimenter. The teaching parent had to correctly identify all steps that were correctly and incorrectly implemented by the experimenter to move to role play.

During role play, the teaching parent's spouse (i.e., nonteaching parent) played the role of the child, and the experimenter "coached" the teaching parent through her implementation of the entire graduated guidance teaching procedure by providing immediate and on-going positive and corrective feedback after each parent behavior step. The feedback consisted of the experimenter praising the parent for steps that were completed correctly (e.g., "Perfect hand-over-hand prompting!") and giving corrective feedback for errors (e.g., "Remember to deliver praise, physical touches, and an edible if Jesse correctly completes all the steps"). Prior to each trial, the experimenter instructed the nonteaching parent on how to perform the self-care skill during the trial and ensured that the teaching parent practiced given a variety of child responses. After the teaching parent role-played the entire graduated guidance teaching procedure *and* performed five consecutive graduated guidance teaching trials with no corrective feedback from the experimenter, the teaching parent began to implement the graduated guidance procedure with her child.

During the immediate feedback phase, the teaching parent conducted graduated guidance teaching sessions with the child while the experimenter provided ongoing positive and corrective feedback (coaching). This feedback was given immediately following each parent behavior skill step during teaching sessions using the same procedure as that in role play. The experimenter switched to delayed feedback by providing feedback at the end of each teaching session once the teaching parent conducted three consecutive sessions with no corrective feedback. Sessions continued until the teaching parent completed three consecutive sessions with no corrective feedback from the experimenter *and* the child independently demonstrated at least 90% of the skill steps. The experimenter then conducted baseline sessions for all yet-to-be-taught skills, followed by

parent teaching for the next self-care skill. These steps were repeated for each self-care skill.

Constant Prompt Delay Parent Training.

The experimenter taught Laura's mother to implement constant prompt delay probe trials using the procedures described above. However, the experimenter switched from immediate to delayed feedback when Laura independently completed at least 75% of skill steps and the teaching parent completed sessions with no corrective feedback from the experimenter for three consecutive trials. The mastery criterion was modified for Laura because the experimenter and Laura's mother believed that the 90% mastery criterion level might be unrealistic. If Laura did not meet the modified mastery criterion for a skill after three constant time delay probe trials (initially occurring prior to every third graduated guidance teaching session), the experimenter instructed Laura's mother to conduct a constant prompt delay probe trial prior to *each* graduated guidance teaching session until Laura met the modified mastery criterion. The parent continued to implement the probe trials until Laura and her mother met the mastery criteria under delayed feedback.

Posttraining Self-Care Skill Probes

The experimenter instructed the teaching parent to 1) give the child the instruction to complete a self-care skill (e.g., "Please wash your face"); 2) *not* provide vocal praise for each correctly completed step; 3) *not* provide any type of physical prompts or assistance while the child completes the skill (even if the child incorrectly completes or omits a self-care skill step); 3) end the probe trial if the child engages in problem behavior *or* pauses for more than 5 s before they completed the skill; and 4) only provide vocal praise, physical touches, and an edible if the child completes the skill with no more than one incorrect or omitted skill step.

Social Validity

The experimenter distributed a social validity survey to each teaching parent. The survey contained 13 questions (see Table 2) that asked the parents to rate the acceptability of and their satisfaction with the telehealth BST parent training procedures, the graduated guidance teaching procedure, and the outcomes of the parent training program for their children using a five-point Likert-type scale with "0" being the worst rating and "4" being the best rating. The experimenter distributed an electronic version of the social validity survey to the teaching parents via email following each parent's completion of the parent training program. Teaching parents scanned and sent their completed surveys back to the experimenter via email.

Results

Experimental control of the BST parent training package was demonstrated via a multiple baseline design across parent-child dyads for the first self-care skill (i.e., washing face). For ease of inspection, Figures 1-3 display results for each parent-child dyad across the three self-care skills (washing face, applying lotion, washing hands). During baseline, Jesse's mother correctly implemented less than 40% of graduated guidance teaching steps, and Jesse independently completed less than 30% of skill steps (Figure 1). After Jesse's mother received detailed written instructions on how to use graduated guidance to teach Jesse to wash his face, she correctly implemented 29% to 67% of graduated guidance teaching steps, and Jesse independently completed less than 10% of washing face skill steps. Her correct responding increased to more than 90% of steps after she received the BST parent training package. Jesse rapidly began to independently complete 100% of washing face skill steps. For the other two self-care skills (applying lotion and washing hands), Jesse's mother correctly implemented more than 95% of steps and Jesse's

Table 2*Social Validity Survey Results*

Question	Mean (Range)
1. How much did you like using the graduated guidance teaching procedures to teach your child?	3.67 (3-4)
2. How effective do you think the graduated guidance teaching procedures were in helping you teach your child?	4
3. How likely are you to continue using the graduated guidance teaching procedures to teach your child other skills?	4
4. How likely are you to recommend the graduated guidance teaching procedures to other parents?	4
5. How much did you like the remote parent training program (i.e., using iPads® and FaceTime® rather than engaging in in-home, face-to-face interactions)?	3.67 (3-4)
6. Overall, how helpful do you think the remote parent training procedures were in teaching you to teach your child effectively?	3.67 (3-4)
7. How helpful do you think the detailed written instructions were in teaching you to teach your child effectively?	4
8. How helpful do you think the graduated guidance overview/model/role play session was in teaching you to teach your child effectively?	3.67 (3-4)
9. How helpful do you think the remote coaching sessions were in teaching you to teach your child effectively?	3.67 (3-4)
10. How likely are you to recommend a remote parent training program to other parents?	4
11. How satisfied are you with your child's ability to wash their face?	3.67 (3-4)
12. How satisfied are you with your child's ability to apply lotion?	4
13. How satisfied are you with your child's ability to wash their hands?	4

Note: The scale was from 0 (lowest rating) to 4 (highest rating).

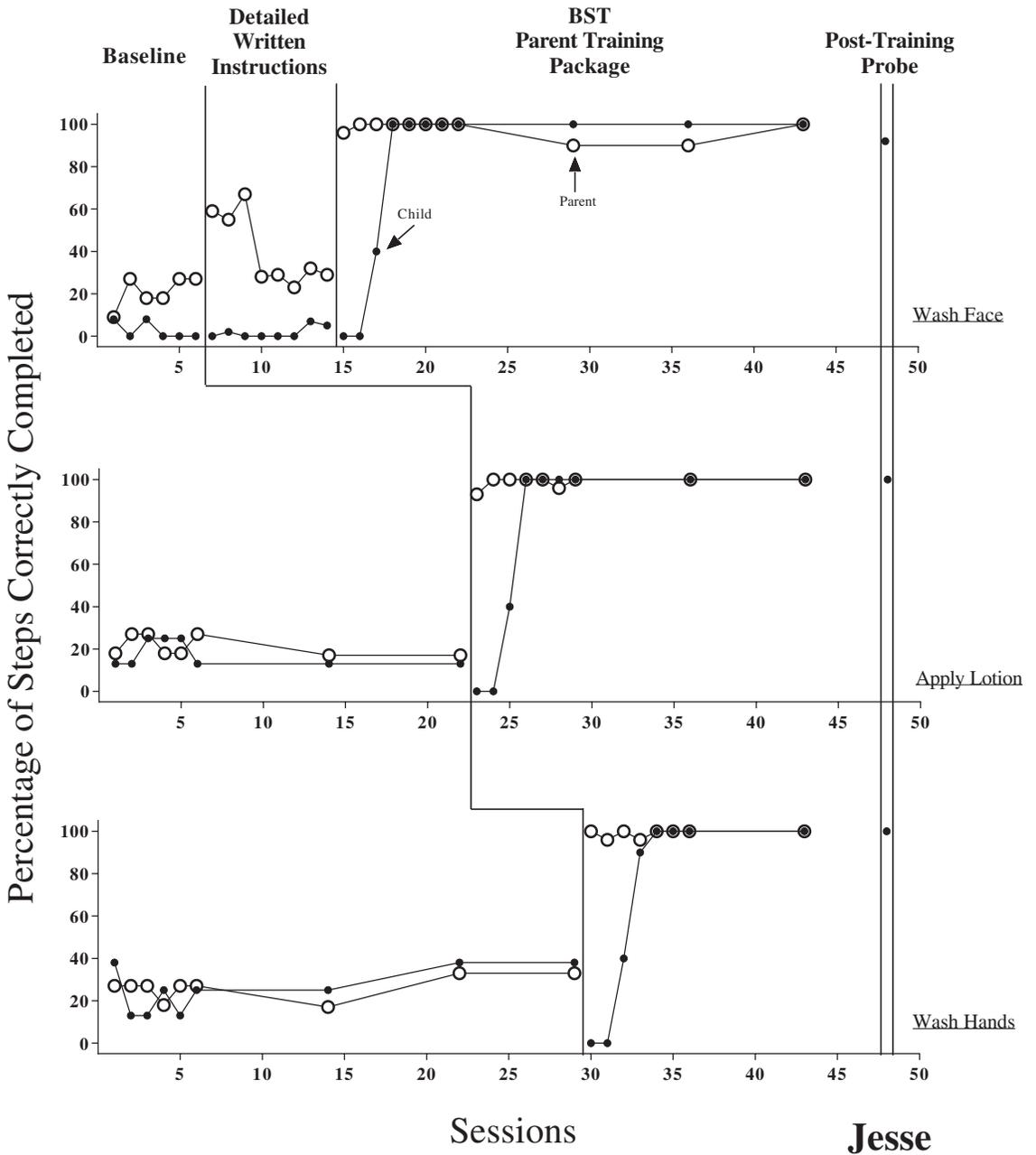
performance rapidly met the mastery criterion after the parent received detailed written instructions. During posttraining probe trials, Jesse independently completed 92% of washing face skill steps, 100% of applying lotion skill steps, and 100% of washing hands skill steps.

Figure 2 depicts data for Bobby and his mother. Bobby's mother correctly implemented less than 40% of graduated guidance teaching steps, and Bobby independently completed less than 65% of self-care skill steps during baseline

for all self-care skills. After Bobby's mother received detailed written instructions for the first skill, she correctly implemented 29% to 48% of graduated guidance teaching steps, and Bobby independently completed less than 25% of washing face skill steps. After Bobby's mother received the BST parent training package, she correctly implemented more than 90% of steps, and Bobby quickly began to implement 100% of the skills steps independently. Like Jesse's mother, Bobby's mother correctly implemented more than 95% of graduated guidance teaching steps and Bobby's performance rapidly met the mastery criterion for the other two self-care skills (applying lotion and washing hands) after the parent received detailed written instructions. During posttraining probe trials, Bobby independently completed 100% of self-care skill steps across all three skills.

Figure 3 presents data for Laura and her mother. Across baseline sessions for all self-care skills, Laura's mother correctly implemented less than 60% of graduated guidance teaching steps. Laura independently completed less than 50% of self-care skill steps and engaged in problem behavior for, on average, 15.4% of self-care skill steps. After Laura's mother received detailed written instructions for the first self-care skill, she correctly implemented, on average, 78.5% of graduated guidance teaching steps. Laura completed 0% of washing face skill steps and engaged in problem behavior for an average of 11.2% of steps. After Laura's mother received the BST parent training package, she correctly implemented more than 90% of steps. However, Laura continued to complete 0% of washing face skill steps and engaged in problem behavior during an average of 1.6% of steps. After we instructed Laura's mother to conduct constant prompt delay probe trials, Laura's mother correctly implemented 100% of the probe steps, Laura's performance gradually increased to the mastery criterion, and Laura engaged in

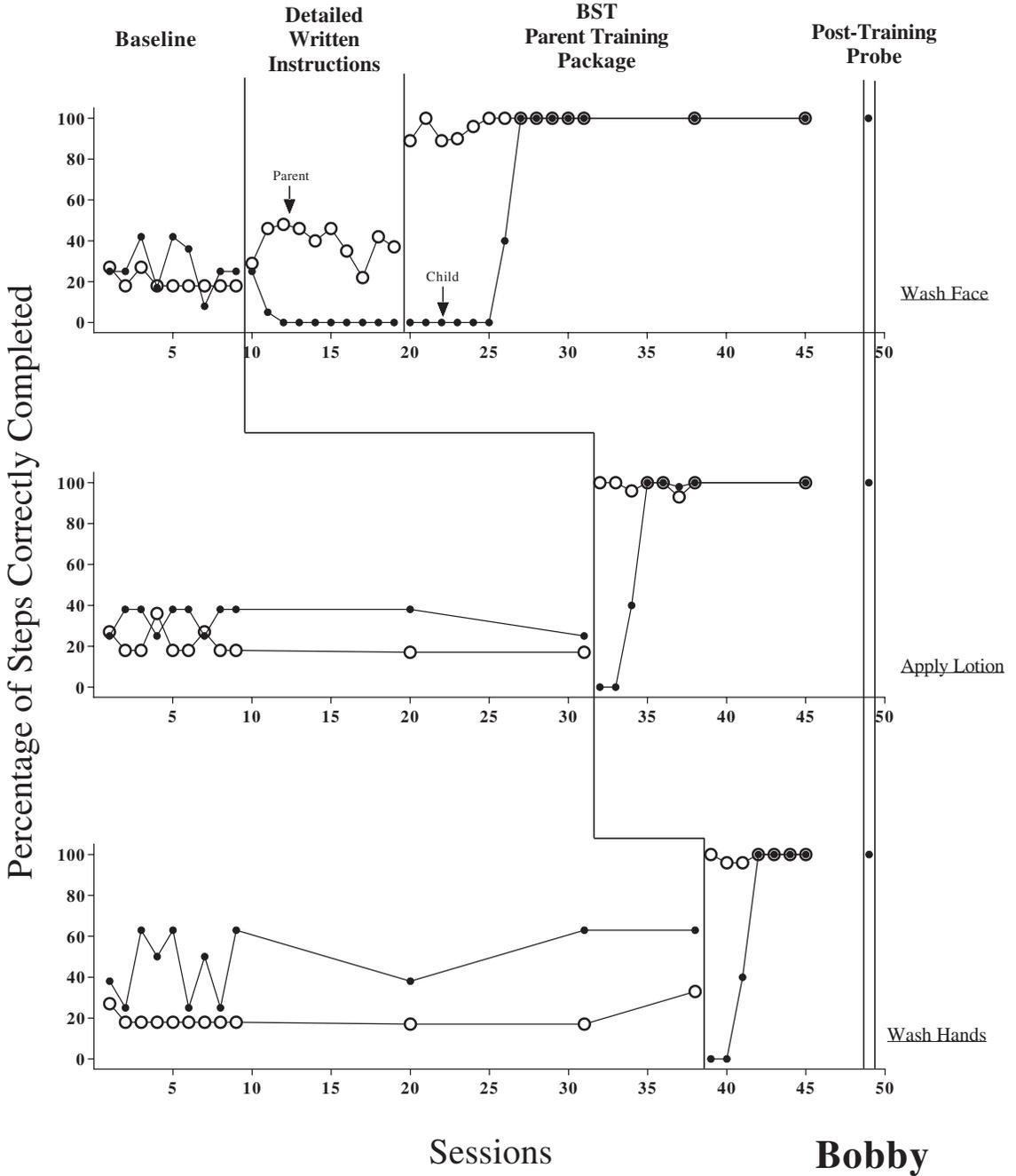
Figure 1
Parent and Child Behavior for Jesse



Note. BST = Behavioral Skills Training. The percentage of correct implementation of graduated guidance by Jesse’s mother is shown as an open circle. The percentage of self-care skill steps completed independently by Jesse is shown as a closed circle.

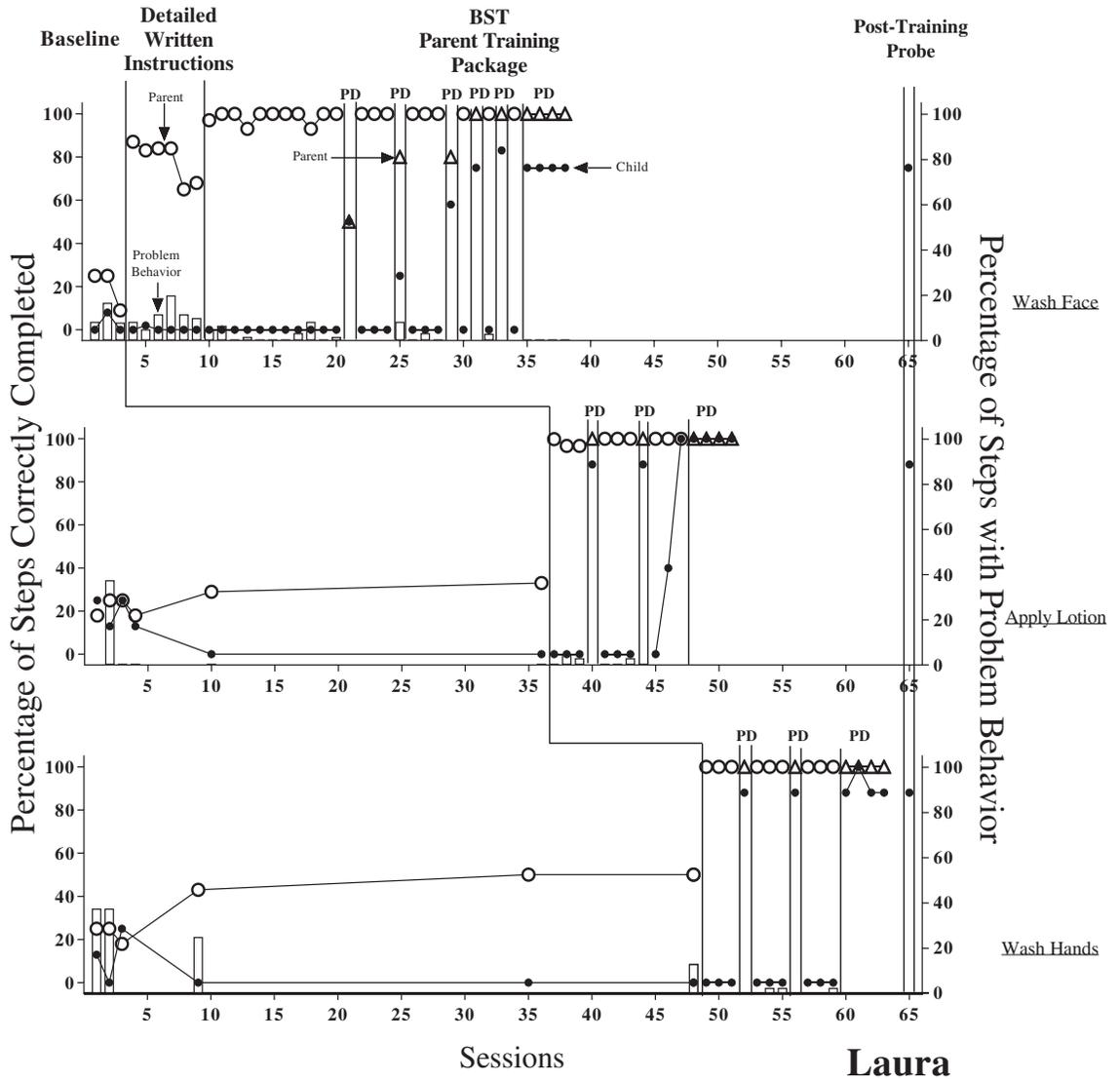
problem behavior during an average of 1.4% of steps. Like the other two teaching parents, Laura’s mother correctly implemented more than 95% of graduated guidance teaching steps after she received detailed written instructions for the other two self-care skills

Figure 2
Parent and Child Behavior for Bobby



Note. BST = Behavioral Skills Training. The percentage of correct implementation of graduated guidance by Bobby's mother is shown as an open circle. The percentage of self-care skill steps completed independently by Bobby is shown as a closed circle.

Figure 3
Parent and Child Behavior for Laura



Note. BST = Behavioral Skills Training. PD = constant prompt delay probe trial. The percentage of correct implementation of graduated guidance by Laura’s mother is shown as an open circle. The percentage of self-care skill steps completed independently by Laura is shown as a closed circle. Open triangles indicate the percentage of correct implementation of constant prompt delay probe trials. The open bars display the percentage of skill steps with problem behavior (right y-axis).

(applying lotion and washing hands). Laura independently completed more than 85% of the self-care steps and engaged in problem behavior during an average of 1.1% and 0.83% of the steps for applying lotion and

washing hands, respectively. During posttraining probe trials, Laura independently completed 75%, 88%, and 88% of the steps for washing face, applying lotion, and washing hands, respectively, and she did not engage in any problem behavior.

Overall, results of the social validity surveys indicated that parent participants were satisfied with their children's ability to complete self-care skills at the conclusion of the study and found both the BST parent training package and graduated guidance to be acceptable and effective teaching procedures (see Table 2). Notably, the mean rating reported by the teaching parents across all social validity questions was 3.83 out of 4 (range, 3-4).

Discussion

Results indicate that the telehealth parent training program was effective in teaching all parents to implement graduated guidance with near-perfect levels of fidelity. Furthermore, all parents substantially increased their children's independent completion of three important self-care skills. These results support previous research indicating telehealth parent training programs can successfully teach parents to implement new interventions with their children, and parent-implemented behavioral interventions can produce meaningful changes in child behavior (e.g., McDuffie et al., 2013; Vismara et al., 2012; Wacker et al., 2013b).

Results also demonstrated that detailed written instructions alone initially were not sufficient to teach parents to implement graduated guidance with acceptable levels of fidelity. Although parent fidelity increased after parents received the written instructions, none of the parents implemented graduated guidance with at least 90% fidelity when teaching the first self-care skill until the experimenter implemented the telehealth BST parent training package. However, written instructions alone were effective for the remaining self-care skills, suggesting that the effects of BST generalized across target skills.

These results have several implications for practicing behavior analysts and the telehealth parent training literature. First, these findings extend the telehealth parent training literature by demonstrating that BST procedures delivered via

telehealth can be used to teach parents to correctly implement graduated guidance to teach their children self-care skills. Because graduated guidance is a robust teaching procedure that can be used to teach a variety of functional skills (e.g., chained gross and fine motor skills, toileting, dressing, feeding), behavior analysts should consider including graduated guidance training in their typical parent training programming. Second, the initial ineffectiveness of detailed written instructions provides evidence that practitioners may need to combine self-instructional packages with observation and feedback when teaching parents certain skills. Because this finding is inconsistent with some prior studies (e.g., Graff & Karsten, 2012; Shapiro et al., 2016), further research is needed to evaluate the conditions under which self-instruction alone would be effective.

Second, Laura's mother was taught to conduct constant prompt delay probe trials to better assess Laura's progress in acquiring self-care skills. As a result, this study extends the telehealth parent training literature by providing preliminary evidence that a parent can be remotely taught to correctly implement constant prompt delay probe trials through the delivery of oral instructions and feedback via telehealth. Additionally, results suggest that the addition of constant prompt delay probe trials embedded within a graduated guidance teaching procedure may help to better assess child progress when learning self-care skills, and, in turn, make graduated guidance teaching procedures more efficient.

Although observers did not collect data on connectivity, anecdotally, the experimenter experienced minimal (i.e., less than five) instances of technological issues such as "dropped" FaceTime[®] sessions, audio interference, audio or visual lags, or FaceTime[®] "freezing" during the study. This was most likely due to the requirement for all participants to have sufficient, high-speed internet connection in their home.

Nonetheless, the study is limited in several respects. First, the synchronous videoconferencing

software, FaceTime[®], is not HIPAA compliant. The experimenter and parents conducted all telehealth sessions using encrypted and password protected iPads[®], the experimenter discussed the risks associated with using FaceTime[®] with the parents before their participation, and all parents signed a consent form to participate in the study. Despite these measures, verified HIPAA-compliant platforms (e.g., Zoom[®] for Healthcare, Doxy[®]) should be used to ensure maximum protection of participants' protected health information. Furthermore, many children with ASD receive ABA services through insurance plans that require the use of HIPAA compliant software for telehealth services.

Second, the role-play phase of the BST package required an additional adult (e.g., nonteaching parent) to participate, which may not be feasible for all parents (e.g., single-parent households). Future applications or studies of telehealth parent training should evaluate the effectiveness of remote role-play exercises between the parent and the trainer or the necessity of including role play in the training. Third, the children of all three parents were receiving services at the center-based ABA program that the experimenter had supervised for at least 8 months prior to the study. Thus, prior experience with ABA therapy and the parents' prior relationship with the parent trainer may have impacted performance of both the child and parent. Fourth, the absence of constant prompt delay probe trials for Jesse and Bobby may have delayed their mastery of the self-care skills because they did not have an opportunity to independently complete each skill until the parent completely faded out her physical prompts (per the prompt-fading procedure). In addition, because the experimenter based the criteria to move between experimental phases on both parent and child performance, results may have overestimated the duration of training needed for parents to implement the teaching procedures with a high level of fidelity.

Finally, the BST parent training package included a variety of components, including oral instructions, an oral knowledge quiz,

modeling, role-play exercises, and both immediate and delayed feedback. A component analysis is needed to identify the necessary and sufficient components of telehealth BST parent training models. For example, the benefits of including both immediate and delayed feedback should be evaluated in further studies. It is also possible that feedback alone may be sufficient to increase parent fidelity after they receive detailed written instructions. In addition to these areas, future research might evaluate the effectiveness of similar telehealth programs for teaching parents to implement other procedures (e.g., three-step prompting) and to target skills in other important areas (e.g., toileting, feeding, interacting with siblings), along with the long-term maintenance of both parent and child outcomes.

Telehealth has been effectively used to deliver ABA services and parent training for almost 20 years. Findings from the current study further validate the use of telehealth to train parents of children with ASD and extend the literature by demonstrating that telehealth can be successfully used to teach parents to implement a graduated guidance teaching procedure.

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Received April 24, 2020

Final acceptance June 9, 2020

Action Editor, Dorothea Lerman

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