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Training Parent Implementation of a Visual Activity Schedule Treatment Package

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by

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Abstract

Much of the extant research on visual activity schedules (VAS) involves professional behavior change agents, such as experimenters, therapists, and teachers, with little information about parent implementation in the home environment. The behavioral skills training (BST) literature also lacks studies on training implementation of activity schedules. A BST procedure consisting of instructions, modeling, rehearsal, and feedback was used to teach parents of three children with autism to implement a VAS intervention at home. Experimental control was demonstrated using a multiple baseline design across parent-child dyads. Results showed that the BST procedure was effective in training parents to conduct a 50-component task analysis with high fidelity. Child on-task and on-schedule behaviors also improved significantly as a result of the intervention. Social validity was assessed via a 10-item questionnaire after completion of follow-up. Strengths and limitations are discussed, as well as implications for future research.

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Chapter I

INTRODUCTION AND REVIEW OF LITERATURE

Children and adults with autism sometimes require adult assistance to complete various tasks at home and in the community. However, regular assistance from adults often leads to prompt dependency (Bryan & Gast, 2000; Hume & Odom, 2007; MacDuff, Krantz, & McClannahan, 1993). A person who becomes prompt dependent may not exhibit learned skills in the absence of supports (MacDuff et al., 1993). Hume and Odom (2007) suggested that this may be due to the individual's difficulty in remaining engaged, rather than his or her ability to do the task itself. Another concern is that some individuals with autism regularly rely on others to prompt the start of each task in a sequence or chain of activities (MacDuff et al., 1993). This type of ongoing support can be stressful and exhausting for parents and other caregivers. Another problem is that persons with autism commonly exhibit disruptive behavior (e.g., tantrums, aggression, self-injurious behavior, stereotypy) when they are left unsupervised (Krantz, MacDuff, & McClannahan, 1993). Teaching these individuals to stay on-task and on-schedule without adult supervision is of social importance because it provides more opportunities for them to be included successfully in home, work, and community environments (Pierce & Schreibman, 1994).

Visual Activity Schedules

One area of research that has garnered interest is the use of visual (e.g., photographic or picture) prompts to promote independent performance in individuals with autism. MacDuff et al. (1993) used a photographic activity schedule and graduated guidance treatment package to improve on-task and on-schedule behavior of four children (ages 9-14) diagnosed with autism

living in a group home. All of the children had limited language and communicative abilities. In addition, they exhibited both disruptive and stereotypic behaviors, the latter of which occurred most frequently when there was a lack of structured programming. The individuals required constant supervision and were dependent on adult verbal prompts to engage in, and complete, household, leisure, and self-help activities. Observers measured on-task and on-schedule behaviors using 60-s momentary time-sampling, and they measured prompts using 60-s partial-interval recording. A multiple baseline across participants design was used to assess experimental control of the intervention. During baseline, photographic activity schedules and task materials were present in the room where the children were told by the primary observer to find something to do. No prompts were provided, nor were consequences delivered, and the teacher was absent. During the teaching phase, the relevant materials (photographic activity schedules and tasks) were, again, made available and the children were given the same instruction by the primary observer to find something to do. This time, the teacher manually guided each child to his photographic activity schedule book and utilized physical prompts, if necessary, from behind the child to complete each step. The teacher did not provide any verbal or gestural prompts, but did use graduated guidance. During the maintenance condition, no prompts were provided. In the re-sequencing phase, four of the six activities used in the teaching phase were presented in a different order. No prompts were provided, and the teacher was not present in the room. During generalization, the teacher was absent, and two of the six activities included in the teaching phase were substituted with two novel leisure activities.

Results showed that during baseline, on-task behavior was either low or variable, and on-schedule behavior was nonexistent across participants. In contrast, once the participants were

taught to use their photographic activity schedules, they maintained high and stable performances for on-task and on-schedule behaviors throughout all subsequent phases. The percentage of intervals scored for prompts were zero or near-zero during baseline for all of the children. The level of prompts increased at the start of the intervention and gradually decreased to zero by the end of the intervention. Results were maintained in all subsequent phases.

Several researchers have systematically replicated the study by MacDuff et al. (1993) using different forms of visual prompts. For instance, instead of photographs, Bryan and Gast (2000) used line-drawings to represent the activities to be completed in each student's schedule. Spriggs, Gast, and Ayres (2007), and more recently, Pierce, Spriggs, Gast and Luscre (2013) utilized Boardmaker® pictures to create activity schedule books. These studies all concluded that activity schedules using visual prompts were effective in increasing engagement and enhancing independent functioning for the participants involved.

In another study, Pierce and Schreibman (1994) incorporated self-management in their intervention to teach three children (ages 6-9) with autism to use picture cues to perform daily living skills (e.g., making lunch, doing laundry, etc.). A separate book and task analysis were developed for each activity. The books contained colored photos, each of which depicted either a step of the task analysis or an item to be used as part of the activity. To help prompt the child to turn the page, a small, green, felt dot was placed on the bottom right hand corner of each page. On the last page was a Smiley face sticker that represented task completion and an opportunity to receive a reward. During baseline, the therapist instructed the participant to complete the target activity and pointed to the task materials (first trial only). If the child did not engage in the target behavior within 5 min, the session was terminated. Treatment consisted of three phases. In the

first phase, the therapist taught the participant to discriminate all pictures associated with a particular task. In the next phase, the therapist taught the participant to select his own reinforcer, turn pages in the picture book independently, complete motor actions, and self-reinforce. And, in the final phase, the therapist faded her presence. Data were also recorded for post-treatment, generalization, stimulus control probes, as well as follow-up observations. Baseline results showed low levels of on-task behavior and high levels of inappropriate behavior for each child. In comparison, post-treatment measures revealed increased levels of on-task behavior and decreased levels of inappropriate behavior across participants. The majority of the children performed the tasks in another setting and during two-month follow-up probes with the book available. In addition, the children were able to follow the picture prompts when the photos were placed in novel sequences.

The effects of static picture prompts versus video prompts on task performance have also been investigated. For example, Mechling and Gustafson (2008) implemented two treatments, one using photographs or line drawings and the other using video modeling, to teach six male high school students (ages 15-21) with a diagnosis of autism spectrum disorders (ASD) to complete cooking-related tasks. Overall, the results showed that the percentage of tasks performed correctly was higher using video prompts as opposed to static picture prompts. Cihak (2011) assessed the effects of two different activity schedule interventions (i.e., picture-based vs. video-based) on the transition behavior of four adolescent students (ages 11-13) with autism. The results were mixed, with two of the four students demonstrating a greater percentage of independent transitions using a video modeling schedule, one student engaging in a higher percentage of independent transitions with a static-picture schedule, and one student showing no

differential performance between the two types of activity schedules. However, it was clear that each participant's ability to transition independently improved with the introduction of a VAS.

Mechling and Gustafson (2008) used a DVD player and Cihak (2011) used a touch-screen computer with a media player to present video clips to the participants. Other researchers have, likewise, integrated technology with activity schedules. For example, Rehfeldt, Kinney, Root, and Stromer (2004) outlined how to create computer activity schedules using PowerPoint® software. Mechling, Gast, and Seid (2009) utilized a personal digital assistant (PDA) to help three male high school students (ages 16-17) with ASD perform the steps outlined for specific cooking recipes. And recently, Carlile, Reeve, Reeve, and Debar (2013) taught four boys (ages 8-12) with autism to engage in leisure activities by following a schedule presented on an iPod touch.

A number of reviews on activity schedules have been conducted in the past few years (Banda & Grimmett, 2008; Knight, Sartini, & Spriggs, 2014; Koyama & Wang, 2011; Lequia, Machalicek, & Rispoli, 2012). Banda and Grimmett's (2008) comprehensive review of the literature, which included 13 studies from 1993 to 2004, found that activity schedules were effective in improving correct responding of persons with autism in the following areas: social skills, functional daily living skills, on-task behaviors, and transition behaviors. Findings from their review also suggested that activity schedules generalized across settings, people, and novel tasks and were maintained over time. In addition, activity schedules may be used as treatment for reducing inappropriate behaviors during transitions. Lequia et al. (2012) confirmed that activity schedule interventions were effective in decreasing problem behavior of children with ASD.

The most recent comprehensive review of the VAS literature was conducted by Knight et al. (2014). The aim of their review was to assess the acceptability of activity schedule studies published from 1993 to 2013 by using criteria established for evidence-base practice (EBP) (Horner et al.; as cited in Knight et al., 2014) and to determine whether or not VAS qualifies as an EBP. The investigators found that 16 of the 31 studies reviewed met all features for acceptability. Collectively, the acceptable studies also met all evidence-based criteria. Thus, VAS can be considered an EBP for persons with ASD.

In another literature review on activity schedules, Koyama and Wang (2011) found that only one study involved a parent as the primary behavior change agent. Clarke, Dunlap, and Vaughn (1999) developed an intervention to increase engagement and decrease disruptive behavior in a 10-year-old boy with Asperger's syndrome during his morning routine at home. Baseline and withdrawal conditions involved usual interactions between the boy and members of his family. The intervention consisted of a visual schedule with the steps of the routine, dressing modifications to enhance independence, and an opportunity to choose a reinforcer after completion of the routine. The participant's mother implemented the treatment strategies. The results showed that the percentage of intervals of engagement was low (M = 25%) and the percentage of intervals of disruptive behavior was high (M = 68%) during baseline and withdrawal conditions. In contrast, the percentage of intervals of engagement was high (M = 80%) and the percentage of intervals of disruptive behavior was low (M = 13%) during intervention conditions. In addition, the amount of time it took the participant to complete the routine averaged approximately 27 min during baseline and withdrawal phases, whereas it took him approximately 11 min, on average, to complete the routine during intervention phases.

One of the strengths of this study is that assessment and intervention were conducted in collaboration with the family. Family involvement in the treatment development process may help to increase fidelity to the prescribed procedures (Albin, Lucyshyn, Horner, & Flannery; as cited in Clarke et al., 1999). A second strength is that social validity was assessed using a 10-item questionnaire, which the participant's mother filled out at the end of each session. Social validity measures are important because they allow investigators to evaluate whether or not the goals, procedures, and outcomes are useful and effective for the individual and/or significant others in his or her environment (Cooper, Heron, & Heward, 2007). Despite its importance, Koyama and Wang (2011) found that only 30.4% (7/23) of the studies they reviewed reported measures of social validity.

A major limitation of the study conducted by Clarke et al. (1999) was that the investigators did not describe the specific strategies used to train the participant's mother to implement the treatment procedures. A detailed account of the training procedures used within a study facilitates future replications (Baer, Wolf, & Risley, 1968).

Krantz et al. (1993) trained parents how to implement graduated guidance to teach their children to use photographic activity schedules for completing various tasks (i.e., household, leisure, self-help, and social interaction) by modeling the procedures, supervising practice, and providing feedback. However, the study included a pre-teaching phase in which the instructors initially taught the children how to use their photographic activity schedules in a training environment. It cannot be determined whether parent implementation of the procedures alone, without the pre-teaching phase, would have led to the same results. In addition, the authors point out that home programmers visited participants' homes 17 to 22 times and spent between 53 to

90 hours training each parent. The number of home visits and hours of training may be of concern to some consumers, and a more cost-efficient method for training parents to implement graduated guidance procedures to teach their children to use photographic activity schedules is a potential area in need of research.

Behavioral Skills Training

A method known as behavioral skills training (BST) utilizes instructions, modeling, rehearsal, and feedback to teach a specific skill (Sarokoff & Sturmey, 2004). Researchers have examined variations of this four-part training method across different skills (e.g., preference assessments, discrete-trial teaching (DTT)) and people (e.g., teachers, parents). Some of the more recent studies have focused on training caregivers to implement treatment strategies to improve child behavior.

Stewart, Carr, and LeBlanc (2007) used BST to train the mother and the sister of a 10-year-old boy with Asperger's disorder (AD) and attention-deficit/hyperactivity disorder (ADHD) to teach social skills using BST. Two family members took part in the study because the mother was legally blind and required an assistant to implement the procedures. An assessment was conducted on the participant's target behaviors (i.e., make appropriate eye contact, ask if the conversation partner is bored, ask if the conversation partner wants to change the topic, avoid perseverative topics) before family training and, again, after completion of treatment. Training for the participant's mother and sister began with a computer presentation of the steps for conducting BST. Following the instructional presentation, the experimenter and her assistants modeled the BST procedure multiple times. Then, the family members practiced implementing the BST procedure with an assistant while the experimenter delivered feedback. Data were

recorded on whether or not the mother-sister dyad correctly delivered each component of the procedure. After reaching criterion, which was 80% or higher on a minimum of two consecutive trials, the mother and sister applied the BST treatment directly with the participant. Results showed that the participant's family members obtained more than 80% correct on most of the trials. The participant also performed well, achieving a mean of 88% correct during modeling trials and a mean of 92.5% correct during rehearsal trials. The assessment of the participant's target behaviors indicated that his conversation skills improved after BST treatment was provided. At 3 months after treatment, the participant's mother filled out a 6-item rating scale and received a phone consultation. She rated the majority of the items on the scale as highly acceptable. However, she mentioned that her son may have experienced mild discomfort during BST treatment.

This study demonstrated that family members could be trained via BST to implement BST to teach social skills with relatively high procedural fidelity. The participant's social skills also improved as a result of the intervention. One limitation was that the intervention occurred in a clinical setting, which may hinder generalization of the participant's skills to natural contexts. However, since the participant's mother and sister were trained to serve as his behavior change agents, their presence across environments may help to enhance generalization.

In another study, Lafasakis and Sturmey (2007) taught three parents (ages 35-50) to carry out DTT procedures with their children. The children were 4-years-old and each had a developmental disability (i.e., autism, mental retardation, and Down syndrome). A multiple baseline across parents design was used to assess the effects of the BST intervention on the percentage of correct implementation of 10 components of DTT during gross motor imitation

(training) and vocal imitation (generalization). During baseline, the experimenter presented a list of the 10 components of DTT and their definitions to each parent. Next, the parents were asked to conduct ten trials of DTT. Following baseline, each parent participated in training. During training, the experimenter explained each of the 10 components of DTT, provided graphic and verbal feedback on baseline performance, answered any questions, modeled three discrete trials with the child, delivered positive and corrective feedback on parent performance of three discrete trials with her child, and provided additional demonstrations and opportunities for rehearsal. Sessions lasted 10 min and were followed by ten discrete trials conducted by the parent. Training ended when the parent achieved at least 90% correct responses across two consecutive sessions. Post-training sessions were similar to baseline. The results indicated that the percentage of correct responses for both parents and children improved substantially after training was implemented. Improved responding was observed in gross motor imitation sessions, as well as vocal imitation sessions, even though DTT training was only provided during gross motor imitation sessions.

In this experiment, BST was successful in teaching parents of children with developmental disabilities how to implement DTT. In addition, the parents' correct teaching responses generalized to an untrained program. Training parents, or other caregivers, to carry out effective teaching procedures will likely help to reduce costs for families in the long term, especially when the techniques can be used to teach a variety of skills.

Similarly, Miles and Wilder (2009) investigated the use of BST to teach caregivers how to implement guided compliance with their children. Participants included a kindergarten teacher, a nanny, and a mother. The teacher worked with a boy (6 years) diagnosed with autism,

the nanny worked with a girl (6 years) with a learning disability, and the mother worked with her son (4 years) with typical development. The experimenter recorded whether or not the caregivers correctly implemented the 10-component task analysis of the guided compliance procedure on each trial. The demand for each child was individualized and selected based on a history of non-compliance. During baseline, the participant presented the demand to the child. Sessions lasted no longer than 10 min. During training, the experimenter provided written instructions of the 10-component task analysis, presented a graph and vocal feedback of the participant's baseline performance, directed the participant to rehearse the procedure with the child, delivered vocal feedback, and modeled the procedure with the child. The participant continued to rehearse the procedures and observe demonstrations by the experimenter until she reached the training mastery criterion, which was 100% correct implementation across three back-to-back sessions. During post-training, the experimenter delivered brief feedback to the participant on her performance in the previous session, and then asked her to conduct guided compliance with the child. An additional probe was implemented with each participant to assess generalization in a novel setting. The investigators found that the mean percentage of correct responses for the three participants ranged from 29% to 38% during baseline and from 95% to 99% during post-training. The percentage of correct responses during generalization probes ranged from 86% to 98%. The authors also reported that compliance increased for two of the three children.

The BST provided in this study appeared to be quite efficient as training lasted an average of 59 min and post-training lasted an average of 11 min across participants. However, compliance only improved slightly for two of the children, and the child that did not make any

improvements had autism. Future research may want to address whether more training time is needed for caregivers of individuals with autism to deliver guided compliance effectively.

Seiverling, Williams, Sturmey, and Hart (2012) used BST to teach parents of children with ASD to implement a food selectivity treatment package, which included repeated taste exposure, escape extinction, and fading. Three mothers (ages 33-41) and their sons (ages 4-8) participated in the study. Experimental control was evaluated using a multiple baseline design across mother-child dyads. During baseline taste sessions, the experimenter presented a written task analysis of taste sessions to each mother and requested that she conduct about 20 sessions per day. During baseline probe meals, the experimenter provided a probe meal task analysis to each mother and asked her to implement a probe meal following every 10 taste sessions. During taste session training, the experimenter read-aloud the taste session task analysis and modeled two sessions with the child. Subsequently, the mother completed a rehearsal taste session while the experimenter delivered feedback on correct and incorrect performance. The process of modeling, rehearsal, and feedback was repeated. Next, the mother conducted three taste sessions without receiving feedback. The criterion for mastering taste session training was a minimum of 90%, on average, correct completion of steps. Probe meal training was conducted in a similar manner, except probe meals during modeling and rehearsal were only 3 min in duration. Following delivery of feedback, the mother conducted three taste sessions and a 10-min probe meal. Post-training sessions were identical to baseline. The results showed that the mean percentage of correct steps performed by the parents ranged from 29% to 44% during baseline taste sessions. In contrast, their performance ranged from 70% to 86% during baseline probe meals. However, all parents demonstrated improvements in post-training taste sessions (range =

95% to 99%) and post-training probe meals (range = 92% to 97%), as well as follow-up taste sessions (range = 86% to 94%) and follow-up probe meals (range = 89% to 94%). In addition, the children refused bites and engaged in disruptive behavior during all baseline taste sessions. The proportion of bites accepted within 30 s increased, and the proportion of bites with disruption decreased during post-training taste sessions. Two of the three participants were able to maintain consistently high levels of acceptance and low levels of disruption during follow-up sessions. The number of bites accepted during post-training probe meals also increased from baseline levels for all three children. Further improvements were observed in two of the three children during follow-up sessions.

Overall, BST was effective in teaching parents to carry out a feeding intervention with their children in their natural environment. All mothers found the BST procedure and the feeding intervention to be highly acceptable and effective. They were also happy with their children's feeding behavior after treatment was complete.

In addition to training parent implementation of treatment procedures, researchers have also trained caregivers how to execute behavior assessments and to design intervention programs. Recently, Shayne and Miltenberger (2013) evaluated the use of BST to teach parents how to conduct a functional assessment and to develop an appropriate treatment for problem behavior. Eight foster/adoptive parents participated in the study. A multiple baseline across participants design was used to demonstrate experimental control. Several videos, each consisting of a child engaging in problem behavior in the presence of a parent, were prepared for presentation during the different phases of the experiment. Structured recording sheets were also provided to help participants identify antecedents, behaviors, consequences, and the function of

the behavior, as well as to select appropriate treatments. During baseline, the participants watched a minimum of three videos and completed an ABC recording sheet, a summary/hypothesis statement, and a treatment choices recording sheet for each video. Following baseline, the participants attended a 2 hr and 45 min training class. First, the trainer used PowerPoint to discuss the various functions maintaining problem behavior, the purpose and components of a functional assessment, how to use an ABC recording sheet, how to complete summary statements, and how to select interventions for problem behavior. Then, the trainer presented a video and demonstrated what to do. Next, the participants watched another video and practiced the same procedures while the trainer delivered praise and corrective feedback. This rehearsal process was repeated with two additional videos. Finally, the trainer reviewed all of the information and answered any questions. Post-training performance was assessed on an individual basis immediately following the completion of training. Each participant watched four videos. The trainer delivered corrective feedback if the participant scored below 80% on any dependent variable for two videos. Follow-up assessments for each participant were conducted one or two weeks after training using methods identical to baseline. The results showed that the percentage correct for summary statements and treatment choices were variable and low, whereas the percentage correct for ABC recording was higher. In general, scores for the dependent variables increased during training and post-training phases and were maintained at follow-up.

BST was successful in teaching foster parents to conduct structured functional assessments, to formulate summary statements about the possible function(s) of the behaviors, and to select appropriate treatments for those behaviors. However, the investigators found that

the scores during follow-up were not as high as those observed during post-training and suggested that an additional review class may help to maintain the skills learned.

In summary, BST is an effective means of teaching caregivers to conduct structured behavioral assessments, design effective programs, and carry out treatment procedures with high fidelity. Research also shows that parents can perform these skills with novel behaviors and tasks. Though, parent booster training, or review classes, may be necessary to maintain the skills over time.

The preceding review of the activity schedule literature overwhelmingly supports the use of VAS in promoting independent performance of persons with autism. Yet, despite the fact that VAS should be classified as an EBP, few studies exist that involve parents, or other caregivers, as the primary behavior change agent. Activity schedule interventions in published studies were typically conducted by experimenters, teachers, or other staff/instructors.

In addition, research on BST has expanded in the past several years, validating its utility in training individuals to perform a variety of skills. Investigators have successfully used BST to train parents to carry out a number of assessment and treatment procedures. However, there are no known existing studies that have evaluated the effectiveness of BST in training parents to implement procedures for following a schedule.

The purpose of this study was to assess the effectiveness of a BST procedure consisting of instructions, modeling, rehearsal, and feedback on teaching parents of children with autism to implement a VAS intervention at home. In addition, this investigation consisted of two goals: to broaden the application of BST via training implementation of activity schedules and to extend

VAS research by teaching parents of children with autism to serve as the primary behavior change agent in their natural environment.

Chapter II

METHOD

Participants and Setting

Three parent-child dyads participated in the study. The families were recruited from an agency that provides behavior analytic services to individuals with autism and other developmental disabilities. At the time of the study, the children were receiving one-to-one behavior intervention in the home or at the agency. The parents selected to participate in the study had no previous experience teaching their children to follow an activity schedule. In addition, parents who had completed, or were enrolled in, undergraduate or graduate courses in applied behavior analysis (ABA) were excluded from the study. The children selected to participate in the study had a primary diagnosis of autism, were able to match identical pictures/photographs, were able to complete a number of activities independently when the tasks were presented separately, and had little or no experience in using visual prompts to engage in a chain of behaviors. Each child also demonstrated off-task behavior (defined below) for at least 30% of the time, on average, across three 10-min observation sessions and had difficulty transitioning between activities when unsupervised.

Rebecca was 35-years-old and had two children. Hannah was 36-years-old and had three children. Grace was 29-years-old and had two children. Eric was a 4-year-old boy who spoke in two-to-four word utterances. He engaged in stereotypic behavior (e.g., spinning objects and flapping), property destruction (e.g., throwing objects) and aggression (e.g., pushing and hitting his younger sister). Lance was a 3-year-old boy who spoke in one-to-two word utterances. He engaged in stereotypic behavior (e.g., spinning objects and flapping) and whining/crying. Ian

was a 6-year-old boy who did not use words to express himself. He engaged in a variety of stereotypic behavior (e.g., twisting his body at the waist, hitting objects against his teeth, flicking objects with his fingers, and making vocal noises).

All assessments took place in the participants' homes. Sessions were conducted in the family room for Rebecca/Eric and Hannah/Lance. Sessions were conducted in the dining room for Grace/Ian. The rooms were arranged to include a table, a chair, and a storage tower containing task materials.

Materials

Activity Schedule Task Analysis

The activity schedule teaching procedure consisted of 50 steps or components (Appendix A).

Observer Training Videos

A series of videos were made for the purpose of training the second observer to record parent and child target behaviors during baseline and post-training sessions. In the videos, the experimenter acted as the parent and a confederate played the role of the child.

Parent Training Videos.

These were the same videos used for training the second observer. However, parents were only shown shortened clips of the videos representing post-training sessions.

Tasks

The tasks for the activity schedules were closed-ended activities such as puzzles, stringing beads, patterning worksheets, and cutting.

Photographic Activity Schedule

Each child's activity schedule was displayed in a three-ring photo album (6.5" × 6.75") that fits 4" × 6" photos. Inside the album were six double-sided pages. The same colored cardstock paper was inserted into the front sleeve of each page (4" × 6"). A small piece of Velcro® was positioned on the front center of each sleeve. Two colored photographs of each task (2" × 2.5") were printed, cut, and laminated. One set was used for the storage drawers (i.e., photos placed on the front, left of each drawer), and the other set was used for the photographic activity schedule book (i.e., photos placed by the child on the front, right of each drawer). A small piece of Velcro® was placed on the back center of each photo. A foam dot sticker (3/8 inch in diameter) was placed on the bottom right corner of each page in the photo album. A laminated white cardstock paper (3" × 4.5") with the words "All done" printed in black was mounted on the center of the sixth and last page of the album using Velcro®. A laminated Smiley face image (2" × 2") was mounted on the "All done" card beneath the words "All done" with Velcro®. A second, identical Smiley face image was placed on the front, left of the shoebox (i.e., "reward box").

Storage Tower

The storage tower prepared for Eric and Lance each consisted of two three-drawer towers placed side-by-side. Only five of the six drawers were used during the study. Ian was taller and used a single five-drawer unit. Each drawer contained a different task, and its corresponding photograph was mounted on the front, left of the drawer with Velcro®. A second piece of Velcro® was positioned on the front, right of each drawer.

Shoebox

A Smiley face image was mounted on the front, left of the shoebox (6” × 9”) with Velcro®. A second piece of Velcro® was positioned on the front, right of the shoebox.

Reinforcers

Preferred tangible items and/or activities, identified via a formal preference assessment, were used to reinforce activity schedule completion.

Additional Materials

Other items included a laptop computer, data recording sheets for parent behaviors (Appendix B) and child behaviors (Appendix C), pens, two MotivAiders®, a video recording device (i.e., cell phone and digital camera), a tripod, and social validity questionnaires (Appendix D).

Dependent Measures and Data Collection

Parent Behavior

The dependent variable was the percentage of components in the activity schedule task analysis completed correctly. The percentage of correct responses was calculated by dividing the total number of correct responses by the total number of correct and incorrect responses and multiplying by 100%. A *correct response* was scored when the parent performed a step as described in the task analysis. Steps 44 and 45 were scored as correct only when the parent responded correctly to all occurrences of the situation. Steps 47 and 48 were scored as correct only when the parent performed all repetitions correctly. An *incorrect response* was scored when the parent performed a step in any way other than described in the task analysis or if the parent

failed to respond correctly in all repetitions or occurrences of a particular step. Steps 41 and 47-50 were scored only if applicable.

Child Behavior

The dependent variables were the percentage of intervals of on-task behavior and the percentage of intervals of on-schedule behavior. Definitions were the same as those used by MacDuff et al. (1993). *On-task* was defined as (a) visually attending to any appropriate task materials, (b) looking at a photographic activity schedule, (c) manipulating task materials appropriately (i.e., in the ways they were designed to be used), or (d) transitioning from one activity to another. *Off-task* was defined as (a) using task materials in a manner other than that for which they were designed, (b) manipulating but not visually attending to the task materials, (c) engaging in inappropriate behavior (e.g., stereotypy, property destruction, tantrum), or (d) not engaging in activities or using task materials. *On-schedule* was defined as being engaged in the task depicted on the current photograph in the picture activity schedule book. *Off-schedule* was defined as being engaged in a task not depicted on the current photograph in the picture activity schedule book. On-task/off-task and on-schedule/off-schedule behaviors were recorded using a 10-s momentary time sampling procedure. Specifically, when the MotivAider® vibrated, observers looked at the child and recorded whether he was on-task or off-task at that particular moment. If he was on-task, a (+) was written in the corresponding box on the data sheet. If he was off-task, a (-) was written in the corresponding box on the data sheet. Similarly, each time the MotivAider vibrated, observers recorded whether the child was on-schedule or off-schedule at that particular moment. If he was on-schedule, a (+) was written in the corresponding box on the data sheet. If he was off-schedule, a (-) was written in the corresponding box on the data

sheet. The percentage of intervals on-task was calculated by dividing the number of intervals on-task by the total number of intervals and multiplying by 100%. Similarly, the percentage of intervals on-schedule was calculated by dividing the number of intervals on-schedule by the total number of intervals and multiplying by 100%.

Baseline sessions lasted 10 min. The duration of post-training and follow-up sessions varied depending on how long it took the child to complete all tasks in his activity schedule. However, child behavior was recorded only for the first 10 min of each session. A cell phone video camera was used to record baseline sessions so as to minimize reactivity when the child moved around the home. Post-training and follow-up sessions were videotaped using a digital camera on a tripod.

Experimental Design

A multiple baseline design across parent-child dyads was used to evaluate the effects of the training intervention on parent and child responses.

Preference Assessment

A modified version of the brief multiple-stimulus without replacement (MSWO) preference assessment by Carr, Nicolson, and Higbee (2000) was conducted with each child to determine his/her most preferred tangible items and/or activities. The experimenter prepared photographs of five tangible items/activities selected by the parent. She placed the five photographs in a horizontal row on the table in front of the child and instructed him to make a selection. The child was given 10 s to respond. After he made a selection, the experimenter removed that photograph and re-arranged the remaining photographs by moving the picture furthest to the right of the participant to the left end of the row and adjusted the pictures so that

they were evenly spaced apart. As implemented in the study by Daly et al. (2009), the child did not have access to the items/activities following each selection. The experimenter repeated the procedures (i.e., instructed the child to select a photograph and rotated the pictures) until all photographs had been selected or until there was no response. If the child did not respond within 10 s, the experimenter would mark "no choice" on the data sheet for that trial, as well as the remaining trials in that session. The session would be terminated, and the experimenter would replace all photographs and start a new session. All three children made a selection on every trial. Three presentation sessions were implemented with each child to determine the average percentage and rank order of the items/activities.

The items/activities ranked first, second, and third for each child were used as reinforcer choices during post-training and follow-up. Eric's most preferred items/activities were bubble bath, spinning top, and ice cream play set. Lance's most preferred items/activities were Hot Wheels, Playdoh, and scooping rice. Ian's most preferred items were sparkly wand, musical keychain, and squishy caterpillar.

Procedures

Baseline

The experimenter told the parent to instruct her child to go play. All materials required for the VAS program were present in the room, as well as other toys not associated with the activity schedule.

Parent Training

Following baseline, the experimenter trained the parent using instructions, modeling, rehearsal, and feedback. First, the experimenter presented a written copy of the activity schedule

task analysis to the parent and described each component. The experimenter also provided an opportunity for the parent to ask questions or to state any concerns. Then, the experimenter presented a video demonstration of the teaching procedure on her laptop computer, while pointing out the various components of the task analysis. As mentioned earlier, the video clips included parent errors and child problem behaviors. Next, the parent rehearsed the procedures with a staff member acting as the child. During rehearsal, the confederate occasionally engaged in problem behavior to help prepare the parent to respond correctly when similar behaviors occurred during post-training. The experimenter delivered feedback in the form of praise for correct responses and correction for incorrect responses during the rehearsal process. If the parent made an error, the experimenter immediately described and/or modeled the correct behavior. Subsequently, the parent repeated the step as explained. Following three rehearsal with feedback sessions, the parent performed a full, uninterrupted session with the staff member. The criterion for completion of training was at least 90% correctly completed components across three consecutive sessions. Praise and corrective feedback were given to the parent at the end of each session.

Post-Training

Parents were instructed to carry out the steps as outlined in the activity schedule task analysis with their child. Feedback was given to the parent at the end of each session. The criterion for completion of post-training was at least 90% correctly completed components across three consecutive sessions.

Follow-Up

Each parent was told to continue to implement the activity schedule at least once a day for three weeks. Weekly follow-up assessments were conducted for three weeks after post-training. Sessions were identical to post-training.

Interobserver Agreement

The experimenter served as the primary observer and trained a second observer (i.e., a staff member at the agency) to independently collect data. First, the experimenter gave the second observer a written description, as well as a verbal explanation, of the operational definitions and recording procedures. The experimenter also went over the activity schedule task analysis, the data recording sheets, and how to operate the MotivAider®. Opportunity was provided for the staff member to ask questions or to state any concerns. Then, the primary and secondary observers watched videotaped recordings of the experimenter and a confederate acting as the parent and child, respectively. The scenes in the video clips were representative of baseline and intervention sessions. Video clips included parent errors and child problem behaviors. The second observer practiced taking data with the primary observer until at least 90% reliability was achieved for all dependent variables across three consecutive sessions.

Interobserver agreement data for parent responses was collected for at least 33% of sessions during each phase of the study. Agreement was defined as two observers recording the same response (i.e., correct or incorrect) for a given component. Disagreement was defined as two observers recording a different response for a given component. Interobserver agreement was calculated by dividing the total number of agreements by the total number of agreements plus disagreements and multiplying by 100%.

Reliability data for child behavior was also collected for at least 33% of sessions during each phase of the study. Agreement was calculated by dividing the number of intervals of agreements by the number of intervals of agreements plus the number of intervals of disagreements and multiplying by 100% for each target behavior.

During baseline, mean agreement on the percentage of components of the task analysis completed correctly was 100% for all three parent participants. During post-training, mean agreement was 97%, 94%, and 93% for Rebecca, Hannah, and Grace, respectively. During follow-up, mean agreement was 95%, 96%, and 96% for Rebecca, Hannah, and Grace, respectively.

During baseline, mean agreement on the percentage of intervals of on-task behavior was 100%, 95%, and 100% for Eric, Lance, and Ian, respectively. During post-training, mean agreement was 85%, 93%, and 63% for Eric, Lance, and Ian, respectively. During follow-up, mean agreement was 80%, 80%, and 71% for Eric, Lance, and Ian, respectively.

During baseline and post-training, mean agreement on the percentage of intervals of on-schedule behavior was 100% for all three child participants. During follow-up, mean agreement was 98% for Eric, Lance, and Ian.

Social Validity

A 10-item survey (Appendix D) was presented to each parent after the last follow-up session. The survey was scored using a 5-point Likert scale. Questionnaires were placed in envelopes (pre-stamped and addressed to the agency) and handed to the parents. In order to help keep responses anonymous, parents were instructed to not write their names or their child's name on the survey forms/envelopes and to mail the completed forms.

Chapter III

RESULTS

Figure 1 shows the percentage of components of the activity schedule task analysis completed correctly by each parent during baseline, post-training, and follow-up phases. Table 1 (Appendix E) shows the mean and range scores for parent performance. During baseline, the percentage of correctly completed components was 0% for all sessions across the three parents as they did not perform any of the steps outlined in the activity schedule task analysis. After baseline, all three parents completed training in the minimum amount of sessions (i.e., each parent required only three full, uninterrupted sessions to reach criterion). During post-training sessions, Rebecca reached criterion in three sessions (*M* = 93.3%), Hannah in four sessions (*M* = 96.0%), and Grace in five sessions (*M* = 92.8%). The percentage of correctly completed components during follow-up were comparable to post-training for Rebecca (*M* = 94.0%), Hannah (*M* = 95.7%), and Grace (*M* = 91.7%).

Figure 2 (Appendix E) shows the percentage of intervals of on-task behavior exhibited by each child in each phase. Table 2 (Appendix E) shows the mean and range scores for child on-task performance. During baseline, Eric engaged in moderate levels of on-task behavior (*M* = 39.0%), Lance engaged in low-to-moderate levels of on-task behavior (*M* = 23.2%), and Ian engaged in zero or near-zero levels of on-task behavior (*M* = 0.2%). During post-training, the percentage of intervals on-task increased for both Eric (*M* = 89.7%) and Ian (*M* = 70.4%). Lance also exhibited high levels of on-task behavior in three of four sessions (*M* = 73.0%). However, in his second post-training session, Lance's on-task percentage was lower than his average performance during baseline. In Eric's first follow-up session, his on-task performance remained

high. However, in his second and third follow-up sessions, Eric's on-task percentage decreased (*M* = 79.0%). In contrast, Lance's on-task performance decreased in his first follow-up session and increased in his second and third follow-up sessions (*M* = 73.0%). Ian's on-task performance during follow-up remained relatively stable (*M* = 74.3%).

Figure 3 (Appendix E) shows the percentage of intervals of on-schedule behavior exhibited by each child in each phase. During baseline, Eric, Lance, and Ian engaged in zero levels of on-schedule behavior. During post-training, all three children were on-schedule for 100% of the intervals in each session. The three child participants also maintained high and stable levels of on-schedule behavior during follow up.

Table 3 (Appendix E) shows the mean and range scores for individual statements on the social validity questionnaire. All parents either agreed or strongly agreed with Statements 1-6, 8, and 10. Two of the three parents were neutral with regard to Statement 7, whereas one parent marked "disagree" for that statement. Also, two parents strongly agreed with Statement 9, whereas one parent marked "neutral" for that statement.

Chapter IV

DISCUSSION

The BST procedure consisting of instructions, modeling, rehearsal, and feedback was effective in teaching parents of children with autism to implement a VAS intervention at home. Parents with no formal education in ABA and no prior experience teaching their children to follow an activity schedule learned how to implement a 50-component task analysis with relatively high fidelity upon completion of a two-hour training session. As mentioned previously, parents in the Krantz et al. (1993) study received 53 to 90 hours of training. The current study was more efficient, requiring considerably less training time. In addition, this study did not include a pre-teaching phase in which children were initially taught by an experienced instructor, indicating that parents could initiate training and produce successful outcomes. Moreover, the effects of training maintained over time. Parents continued to implement the VAS teaching procedures at high performance levels during follow-up sessions (Appendix E, Figure 1).

As for the child participants, sharp increases in the percentage of intervals of on-task and on-schedule behaviors coincided with the initiation of the VAS intervention (Appendix E, Figures 2 and 3). These data confirm that the parents' teaching techniques were effective in improving their children's behaviors. Relatively stable performances were observed throughout the post-training phase for two of the three children. Lance caught a cold and was not entirely healthy on the day his mother conducted the second post-training session, which may help to explain why his on-task performance was so low for that particular session. During follow-up, there were slight decreases in the percentage of intervals of on-task behavior for Eric and Lance.

However, performance levels for all three children were clearly higher at follow-up compared to baseline.

According to the results of the social validity questionnaire, all parents enjoyed being involved in the treatment program. Each parent strongly agreed that the tasks were appropriate for her child's skill level and planned to continue the VAS intervention at home with her child. The parents also believed that their knowledge and skills with regard to implementing an activity schedule program improved after receiving training. Each parent thought the amount of time it took to teach her child how to use the activity schedule was reasonable and felt that her child was more independent while using the activity schedule. There was also consensus that the children were less disruptive while using their activity schedules. Additionally, two of the three parents had more confidence in their ability to teach their children appropriate behaviors. However, none of the parents agreed with the statement, "I have more time to myself when my child is using the photographic activity schedule." By the end of the study, Rebecca and Hannah were beginning to fade their proximity by stepping a few feet behind their children. Grace was still in close proximity to her child but using less intrusive prompts. Thus, it is understandable that the parents did not feel they had more time to themselves because the children still required prompts and parent presence was not completely faded. Ultimately, the end goal is to improve independence for the child and to increase leisure time for the parent. Therefore, future investigations may want to lengthen the duration of post-training until parents have completed the fading process. It might also be worthwhile to spend more time practicing prompt fading during parent training.

Other potential limitations require consideration. First, the BST procedure consisted of several components, and it is difficult to determine if all components are necessary to produce

effective results. The ideal solution to this problem is to conduct a component analysis. It might also be helpful to collect data on what consumers believe is important for their training. For example, Graudins, Rehfeldt, DeMattei, Baker, and Scaglia (2012) used their social validity questionnaire to ask participants which components of BST they thought were most beneficial and most unnecessary. Second, participants continued to receive feedback at the end of post-training and follow-up sessions. This makes it difficult to differentiate the effects of training alone from the effects of training plus ongoing feedback. Third, there was no evaluation of the experimenter's procedural integrity during training. Data should be taken to measure the extent to which the experimenter conforms to the training protocol. Fourth, parents were instructed to continue to implement the VAS intervention at least once per day during the three-week follow-up phase. However, parents reported various reasons (e.g., health issues, relatives visiting from out of town, and preparations for winter holiday events) that made this challenging. Future research should investigate ways to improve adherence to the prescribed procedures.

Fifth, in order to thin the intermittent reinforcement (i.e., giving the child a hug), the experimenter spent additional time observing child behavior during the follow-up phase. Specifically, the experimenter either observed additional sessions in person or watched video recordings taken by the parents in order to record data on child behaviors. This was done to determine if the child reached criteria for thinning the schedule of reinforcement. The experimenter did not provide feedback with regard to parent behavior at the end of these sessions. Rebecca stopped delivering hugs within the first week of the follow-up phase. Hannah stopped delivering hugs within the second week of the follow-up phase. Grace continued to deliver hugs each time Ian touched the foam dot in his photographic activity schedule book.

Future studies should look into more efficient methods for thinning the reinforcement schedule. Sixth, interobserver agreement scores on the percentage of intervals of on-task behavior during post-training and follow-up for Ian were below 80%. This suggests that Ian's on-task behavior results should be interpreted with caution. In addition, better operational definitions and improved data recording procedures are needed to enhance reliability. Finally, the activity schedules created for each child entailed costs and took some time to prepare. Parents interested in implementing VAS interventions need to be familiar with their child's skill level, select appropriate tasks, and gather necessary supplies. They also have to consider purchasing or making materials (e.g., storage tower, photo album, task photos, etc.) for structuring the environment. This may be difficult to do for parents with limited resources.

A suggestion for further research is to examine parent implementation of activity schedules presented in other mediums. This study utilized photographic activity schedules that required handling of task pictures placed inside a photo album. However, activity schedules may also be presented in a variety of formats using different computer technologies.

In addition, the current study only focused on closed-ended tasks, such as puzzles and worksheets. Incorporation of open-ended activities (e.g., train set, tea party, building blocks, etc.) requires additional investigation.

Another suggestion for future research is to determine if other caregivers are able to implement the intervention with the same level of precision without direct training from an experienced instructor. In the current study, the experimenter trained only the children's mothers. The children's fathers were present during some sessions, but they did not participate in the

training session. Researchers may want to investigate whether or not a trained parent can successfully train a second caregiver.

Finally, researchers may be interested in long-term maintenance of skills for parents. The follow-up phase in this study only lasted three weeks. Future studies should follow parent-child dyads for longer periods of time to determine if booster training sessions are necessary to help maintain performance levels.

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Appendices

Appendix A

Activity Schedule Task Analysis

Set Up

1	Place the materials for a single activity in each of the five drawers of the storage tower.
2	Attach the pictures corresponding to the activities on the front, left of each drawer.
3	Put the matching pictures in the photographic activity schedule book in the order presented on the storage tower (i.e., from top to bottom).
4	Put the "All done" card with attached Smiley face on the last page of the photographic activity schedule book, close the book, and leave it on the table.
5	Present to your child two preferred items and physically guide him/her to place the selected item inside the shoebox located on the storage tower.

First Task

6	Deliver the instruction, "Go find something to do."
7	Guide your child to the table and physically prompt him/her to open the photographic activity schedule book to the first page.
8	Physically prompt your child to remove the photograph and attach it to the front, right of the drawer with the matching picture.
9	Physically prompt your child to take the activity out of the drawer and place it on the table.
10	Let your child complete the activity; if he/she stops, then physically prompt to continue.
11	Once your child has completed the activity, prompt him/her to return the activity to the drawer.
12	Guide your child back to the table and physically prompt him/her to touch the foam dot on the bottom, right corner of the first page in the photographic activity schedule book.

Second Task

13	Physically prompt your child to turn the page.
14	Physically prompt your child to remove the photograph on the second page and attach it to the front, right of the drawer with the matching picture.
15	Physically prompt your child to take the activity out of the drawer and place it on the table.
16	Let your child complete the activity; if he/she stops, then physically prompt to continue.
17	Once your child has completed the activity, prompt him/her to return the activity to the drawer.
18	Guide your child back to the table and physically prompt him/her to touch the foam dot on the bottom, right corner of the second page in the photographic activity schedule book.

Third Task

19	Physically prompt your child to turn the page.
20	Physically prompt your child to remove the photograph on the third page and attach it to the front, right of the drawer with the matching picture.
21	Physically prompt your child to take the activity out of the drawer and place it on the table.
22	Let your child complete the activity; if he/she stops, then physically prompt to continue.
23	Once your child has completed the activity, prompt him/her to return the activity to the drawer.
24	Guide your child back to the table and physically prompt him/her to touch the foam dot on the bottom, right corner of the third page in the photographic activity schedule book.

Fourth Task

25	Physically prompt your child to turn the page.
26	Physically prompt your child to remove the photograph on the fourth page and attach it to the front, right of the drawer with the matching picture.
27	Physically prompt your child to take the activity out of the drawer and place it on the table.
28	Let your child complete the activity; if he/she stops, then physically prompt to continue.
29	Once your child has completed the activity, prompt him/her to return the activity to the drawer.
30	Guide your child back to the table and physically prompt him/her to touch the foam dot on the bottom, right corner of the fourth page in the photographic activity schedule book.

Fifth Task

31	Physically prompt your child to turn the page.
32	Physically prompt your child to remove the photograph on the fifth page and attach it to the front, right of the drawer with the matching picture.
33	Physically prompt your child to take the activity out of the drawer and place it on the table.
34	Let your child complete the activity; if he/she stops, then physically prompt to continue.
35	Once your child has completed the activity, prompt him/her to return the activity to the drawer.
36	Guide your child back to the table and physically prompt him/her to touch the foam dot on the bottom, right corner of the fifth page in the photographic activity schedule book.

All Done, Check, and Reward

37	Physically prompt your child to turn the page.
38	Physically prompt your child to give you the "All done" card.
39	Say, "All done! Let me check."
40	After checking that all activities have been completed appropriately, deliver praise (e.g., "Good work!"), and let your child take the Smiley face image off the "All done" card.
41	If your child did not properly complete an activity (e.g., did not colour the picture on the worksheet), then prompt him/her to complete it correctly before giving the Smiley face image.
42	Physically prompt your child to attach the Smiley face to the front, right of the shoebox.
43	Physically prompt your child to retrieve the preferred item from the shoebox.

Prompting and Reinforcement

44	When your child begins to initiate actions while you are using one level of prompting (i.e., hand, wrist, forearm, elbow, upper arm, shoulder, shadow, presence), fade to a less intrusive prompt.
45	If your child makes an error, return to the previous prompting level.
46	Use physical prompts only.
47	Initially, give a hug from behind your child each time he/she touches the foam dot after completing an activity.
48	After your child stays on-task and on-schedule for 80% of intervals in two back-to-back sessions, give your child a hug only when he/she touches the foam dot at the end of the second and fourth activities.
49	After your child stays on-task and on-schedule for 80% of intervals in two back-to-back sessions, give your child a hug only when he/she touches the foam dot at the end of the third activity.
50	After your child stays on-task and on-schedule for 80% of intervals in two back-to-back sessions, stop giving hugs.

Appendix B

Data Recording Sheet: Parent Behaviors

Note: Mark component as incorrect if the parent takes more than 2 seconds to prompt.

Set Up		Correct	Incorrect
1	Place the materials for a single activity in each of the five drawers of the storage tower.		
2	Attach the pictures corresponding to the activities on the front, left of each drawer.		
3	Put the matching pictures in the photographic activity schedule book in the order presented on the storage tower (i.e., from top to bottom).		
4	Put the "All done" card with attached Smiley face on the last page of the photographic activity schedule book, close the book, and leave it on the table.		
5	Present to your child two preferred items and physically guide him/her to place the selected item inside the shoebox located on the storage tower.		
First Task			
6	Deliver the instruction, "Go find something to do."		
7	Guide your child to the table and physically prompt him/her to open the photographic activity schedule book to the first page.		
8	Physically prompt your child to remove the photograph and attach it to the front, right of the drawer with the matching picture.		
9	Physically prompt your child to take the activity out of the drawer and place it on the table.		
10	Let your child complete the activity; if he/she stops, then physically prompt to continue.		
11	Once your child has completed the activity, prompt him/her to return the activity to the drawer.		
12	Guide your child back to the table and physically prompt him/her to touch the foam dot on the bottom, right corner of the first page in the photographic activity schedule book.		
Second Task			
13	Physically prompt your child to turn the page.		
14	Physically prompt your child to remove the photograph on the second page and attach it to the front, right of the drawer with the matching picture.		
15	Physically prompt your child to take the activity out of the drawer and place it on the table.		
16	Let your child complete the activity; if he/she stops, then physically prompt to continue.		
17	Once your child has completed the activity, prompt him/her to return the activity to the drawer.		
18	Guide your child back to the table and physically prompt him/her to touch the foam dot on the bottom, right corner of the second page in the photographic activity schedule book.		
Third Task			
19	Physically prompt your child to turn the page.		
20	Physically prompt your child to remove the photograph on the third page and attach it to the front, right of the drawer with the matching picture.		
21	Physically prompt your child to take the activity out of the drawer and place it on the table.		
22	Let your child complete the activity; if he/she stops, then physically prompt to continue.		
23	Once your child has completed the activity, prompt him/her to return the activity to the drawer.		
24	Guide your child back to the table and physically prompt him/her to touch the foam dot on the bottom, right corner of the third page in the photographic activity schedule book.		

Fourth Task		Correct	Incorrect
25	Physically prompt your child to turn the page.		
26	Physically prompt your child to remove the photograph on the fourth page and attach it to the front, right of the drawer with the matching picture.		
27	Physically prompt your child to take the activity out of the drawer and place it on the table.		
28	Let your child complete the activity; if he/she stops, then physically prompt to continue.		
29	Once your child has completed the activity, prompt him/her to return the activity to the drawer.		
30	Guide your child back to the table and physically prompt him/her to touch the foam dot on the bottom, right corner of the fourth page in the photographic activity schedule book.		

Fifth Task			
31	Physically prompt your child to turn the page.		
32	Physically prompt your child to remove the photograph on the fifth page and attach it to the front, right of the drawer with the matching picture.		
33	Physically prompt your child to take the activity out of the drawer and place it on the table.		
34	Let your child complete the activity; if he/she stops, then physically prompt to continue.		
35	Once your child has completed the activity, prompt him/her to return the activity to the drawer.		
36	Guide your child back to the table and physically prompt him/her to touch the foam dot on the bottom, right corner of the fifth page in the photographic activity schedule book.		

All Done, Check, and Reward			
37	Physically prompt your child to turn the page.		
38	Physically prompt your child to give you the "All done" card.		
39	Say, "All done! Let me check."		
40	After checking that all activities have been completed appropriately, deliver praise (e.g., "Good work!"), and let your child take the Smiley face image off the "All done" card.		
41	If your child did not properly complete an activity (e.g., did not colour the picture on the worksheet), then prompt him/her to complete it correctly before giving the Smiley face image.		
42	Physically prompt your child to attach the Smiley face to the front, right of the shoebox.		
43	Physically prompt your child to retrieve the preferred item from the shoebox.		

Prompting and Reinforcement			
44	When your child begins to initiate actions while you are using one level of prompting (i.e., hand, wrist, forearm, elbow, upper arm, shoulder, shadow, presence), fade to a less intrusive prompt.		
45	If your child makes an error, return to the previous prompting level.		
46	Use physical prompts only.		
47	Initially, give a hug from behind your child each time he/she touches the foam dot after completing an activity.		
48	After your child stays on-task and on-schedule for 80% of intervals in two back-to-back sessions, give your child a hug only when he/she touches the foam dot at the end of the second and fourth		
49	After your child stays on-task and on-schedule for 80% of intervals in two back-to-back sessions, give your child a hug only when he/she touches the foam dot at the end of the third activity.		
50	After your child stays on-task and on-schedule for 80% of intervals in two back-to-back sessions, stop giving hugs.		

Total:		
Total number of applicable components:		

Appendix C

Data Recording Sheet: Child Behaviors

Note: Record data for only the first 10 min of each session.

on/off-task						
on/off-schedule						

on/off-task						
on/off-schedule						

on/off-task						
on/off-schedule						

on/off-task						
on/off-schedule						

on/off-task						
on/off-schedule						

on/off-task						
on/off-schedule						

on/off-task						
on/off-schedule						

on/off-task						
on/off-schedule						

on/off-task						
on/off-schedule						

on/off-task						
on/off-schedule						

on-task/schedule = (+)
off-task/schedule = (-)

Total Intervals	
On-task =	/60
Off-task =	/60
On-schedule =	/60
Off-schedule =	/60

Session start time: _______________

Session end time: _______________

Total duration of session: _______________

Appendix D

Social Validity Questionnaire

Indicate your level of agreement with the following set of statements.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. My knowledge and skills with regard to teaching my child to follow an activity schedule improved after training was provided.					
2. The activity schedule was easy to set up.					
3. The activity schedule tasks are appropriate for my child's skill level.					
4. It took a reasonable amount of time to teach my child how to use the photographic activity schedule.					
5. My child is more independent when he/she is using the photographic activity schedule.					
6. My child is less disruptive when he/she is using the photographic activity schedule.					
7. I have more time to myself when my child is using the photographic activity schedule.					
8. I enjoyed being involved in my child's treatment program.					
9. I have more confidence in my ability to teach my child appropriate behaviors.					
10. I will continue to have my child use the photographic activity schedule at home.					

Appendix E

Figures and Tables

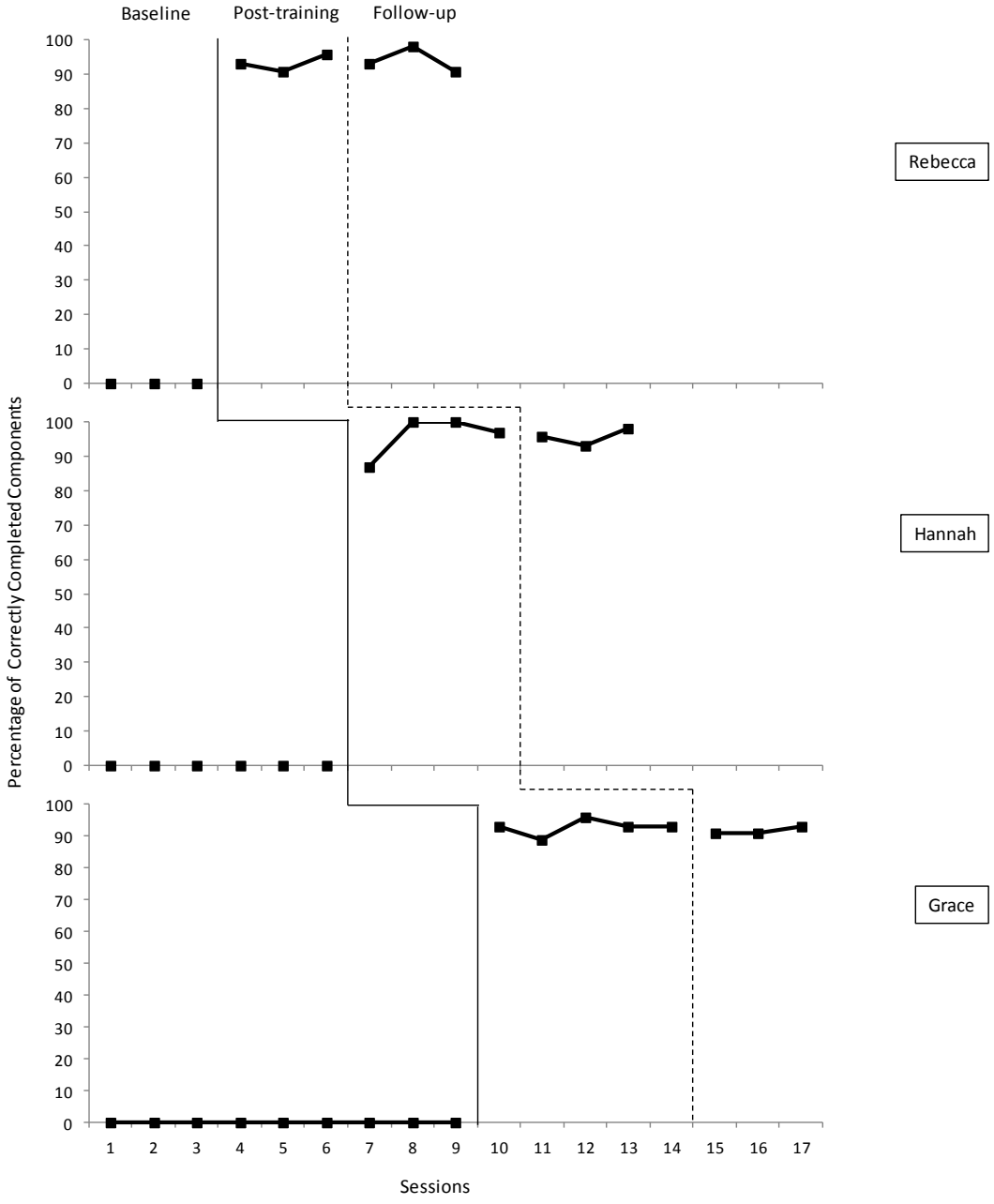

Figure 1. The percentage of components of the activity schedule task analysis completed correctly by each parent.

Table 1

Mean and Range Scores of the Percentage of Components Completed Correctly by each Parent across Phases.

	Baseline		Post-training		Follow-up	
	M	Range	*M*	Range	*M*	Range
Rebecca	0.0	0	93.3	91-96	94.0	91-98
Hannah	0.0	0	96.0	87-100	95.7	93-98
Grace	0.0	0	92.8	89-96	91.7	91-93

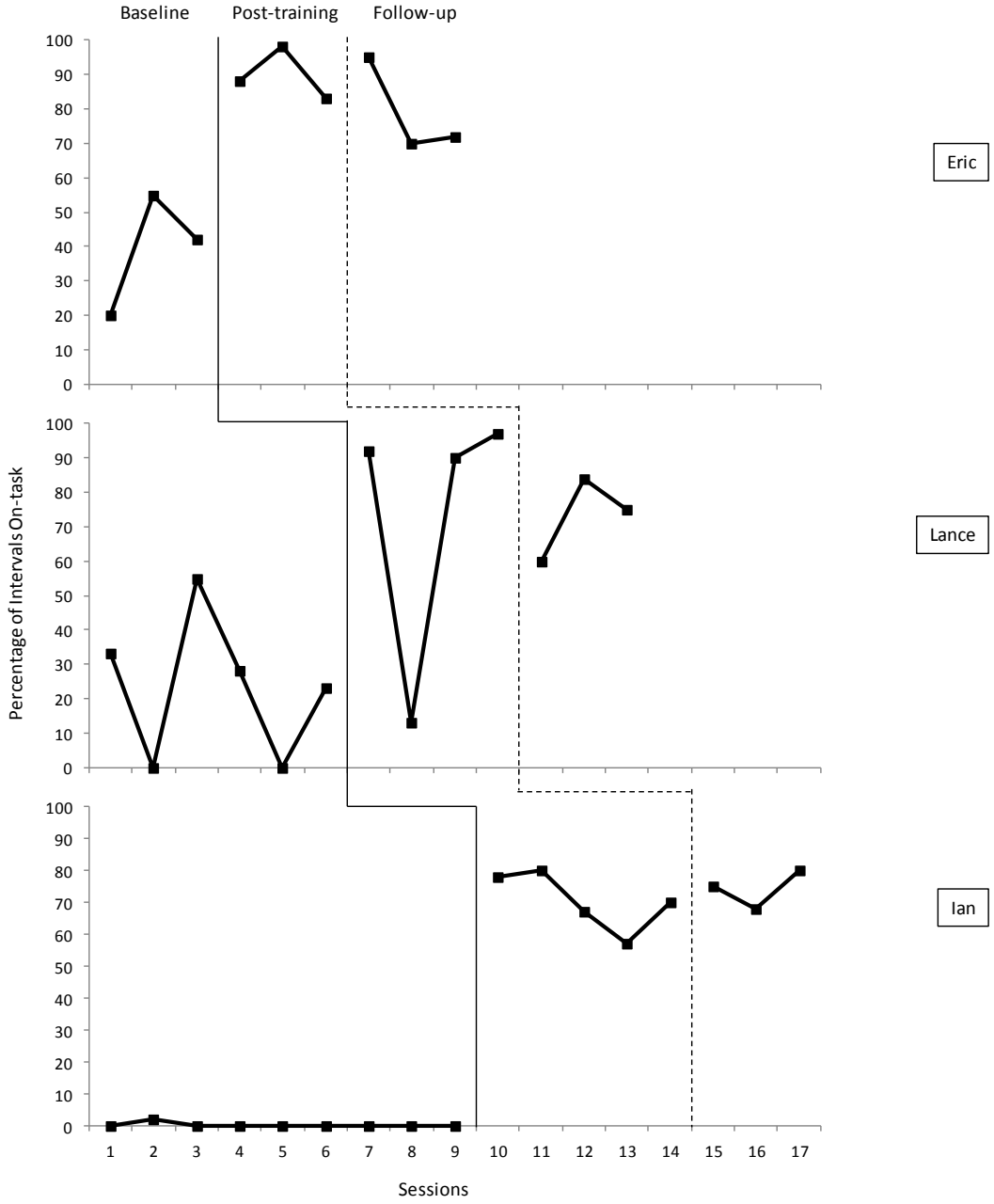

Figure 2. The percentage of intervals of on-task behavior exhibited by each child.

Table 2

Mean and Range Scores of the Percentage of Intervals of On-Task Behavior Exhibited by each Child across Phases.

	Baseline		Post-training		Follow-up	
	M	Range	*M*	Range	*M*	Range
Eric	39.0	20-55	89.7	83-98	79.0	70-95
Lance	23.2	0-55	73.0	13-97	73.0	60-84
Ian	0.2	0-2	70.4	57-80	74.3	68-80

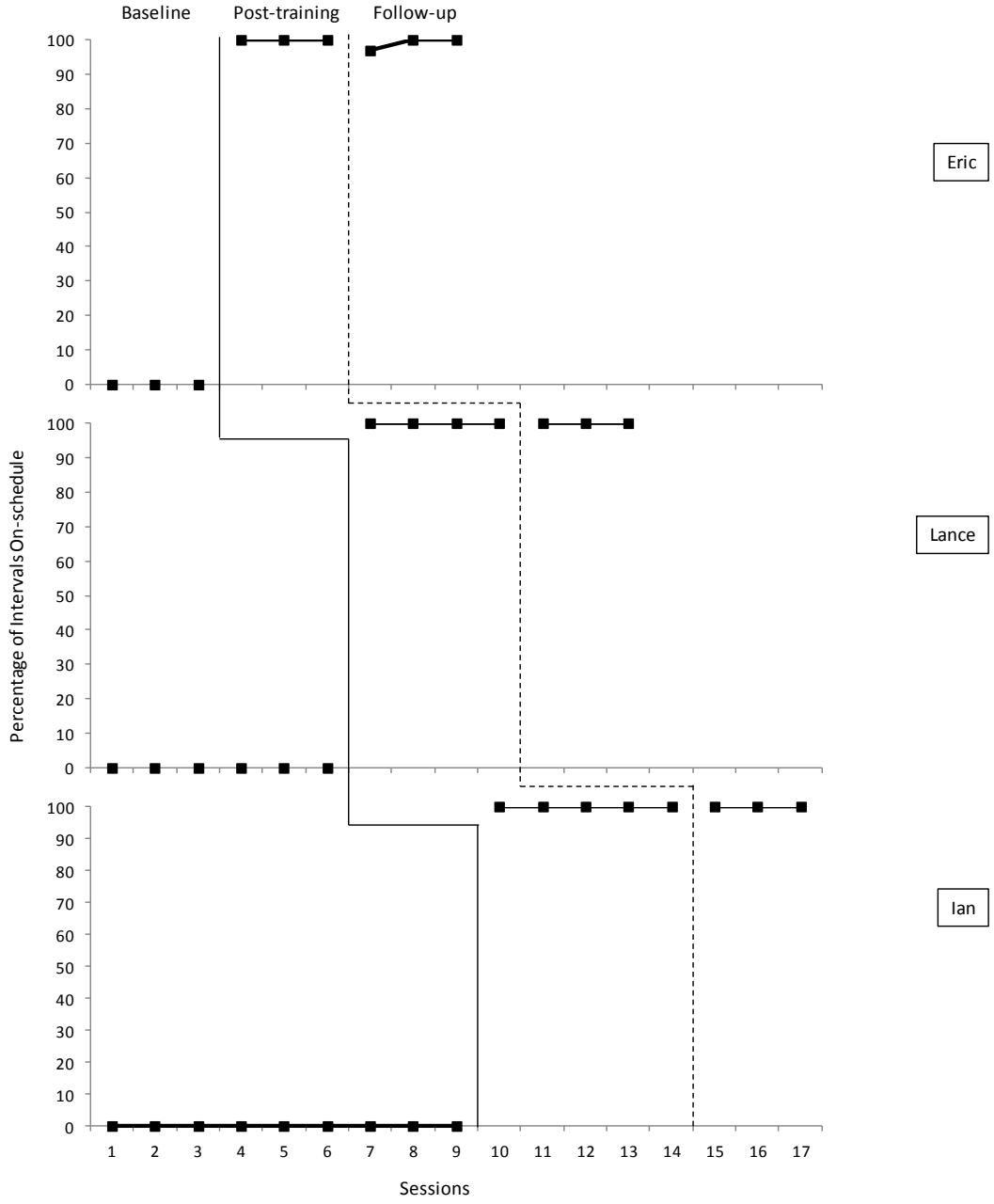

Figure 3. The percentage of intervals of on-schedule behavior exhibited by each child.

Table 3

Mean and Range Scores for Statements on the Social Validity Questionnaire.

	Statement	*M*	Range
1	My knowledge and skills with regard to teaching my child to follow an activity schedule improved after training was provided.	4.7	4-5
2	The activity schedule was easy to set up.	4.7	4-5
3	The activity schedule tasks are appropriate for my child's skill level.	5.0	5
4	It took a reasonable amount of time to teach my child how to use the photographic activity schedule.	4.3	4-5
5	My child is more independent when he/she is using the photographic activity schedule.	4.7	4-5
6	My child is less disruptive when he/she is using the photographic activity schedule.	4.7	4-5
7	I have more time to myself when my child is using the photographic activity schedule.	2.7	2-3
8	I enjoyed being involved in my child's treatment program.	5.0	5
9	I have more confidence in my ability to teach my child appropriate behaviors.	4.3	3-5
10	I will continue to have my child use the photographic activity schedule at home.	5.0	5

Note: 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 = strongly agree