TEACHING A MOTHER TO USE BEHAVIOURAL SKILLS TRAINING WITH HER CHILD WITH AUTISM SPECTRUM DISORDER

by

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Abstract

Behavioural skills training (BST) involves delivering instructions, modeling, and rehearsal with feedback. Behavioural skills training is used to train caregivers, staff working with individuals with developmental disabilities, and to teach skills to individuals with developmental disabilities. This study is the second study to date to explore training a family member how to implement BST (Stewart, Carr, and LeBlanc, 2007) and is the first study to date to teach a parent how to generate a task analysis. The purpose of this study was to train a parent to implement BST with her child with autism spectrum disorder. A concurrent multiple probe across tasks design was used to teach a parent to generate a task analysis and implement BST. The training package was effective for teaching the parent to generate a task analysis and implement BST to teach three tasks to her child with autism spectrum disorder (e.g., tying a bow). The parent in this study demonstrated generalization across tasks in both the task analysis and BST stages. The results of the study are discussed in terms of implications for clinical practice and directions for future research.

Preface

The Behavioural Research Ethics Board (BREB) from the University of British Columbia approved this project and associated method on September 25, 2015. The certificate number is H14-02227.

I was the lead investigator for the experiment that this thesis contains. I was responsible for the data collection, analysis of data and the majority of manuscript composition.

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To my family, I love you and I could not have gotten through this without you. Shayne, my hardworking husband, you never fail to make me laugh and you have always supported me in my endeavours. I can't tell you enough how much I appreciate you.

1 Introduction

We work in a field where clinicians are very adept at providing children with ASD a pencil case full of tools that they need to start school. At the age of six, however, the funding in British Columbia decreases significantly along with the number of teaching opportunities that these children encounter. What are caregivers left with? What do their pencil cases look like? Often the cases are empty or scattered with tools that they may not know how to use successfully. Parents need effective and efficient strategies for helping their children to learn adaptive skills.

Behavioural skills training (BST) is an effective strategy for teaching skills to individuals with Autism Spectrum Disorder (ASD; Gunby, Carr, & LeBlanc, 2010; Nuernberger, Ringdahl, Vargo, Crumpecker, & Gunnarsson, 2012), instructors of individuals with ASD (e.g., Sarokoff & Sturmey, 2004; Ward-Horner & Sturmey, 2012), and caregivers of individuals with ASD (Lafasakis & Sturmey, 2007; Miles & Wilder, 2009; Seiverling, Williams, Sturmey, & Hart, 2012; Stewart, Carr, & LeBlanc, 2007). Instructors can use BST to teach a variety of skills using BST such as socials skills, play and leisure skills, safety skills, caregiver skills, vocational skills, and self-care skills. Instructors can implement BST in classrooms, homes, and within intervention programs for people with ASD.

Writing a task analysis is an important first step to teaching a new skill using BST. The task analysis is the detailed description of the skill the instructor is teaching and gives the instructor a framework for the modeling component of BST. Having the steps and required materials written down ensures that all the necessary steps and materials to complete the skill are included during training. Generating a task analysis helps the instructor break complex skills down into teachable units. Learning how to create a comprehensive task analysis is critical so that the instructor is able to clearly define a wide array of skills taught using BST. The instructor

can generate a task analysis by performing the behaviour and writing down each step. For example, in generating a task analysis for boiling water, the instructor would get the kettle, fill it up with water, put it back on its base, and turn it on. Each of those steps and materials would be written down. The level of detail in describing the steps will depend on the learner. Other ways to generate a task analysis are to observe someone who is competent in the skill or to consult an expert who can describe the skill in sufficient detail (Miltenberger, 2000).

1.1 Components of BST

The components of BST are: instructions, modeling, and rehearsal with feedback. Component analyses of BST have been conducted to determine which steps of BST are necessary for behaviour change and which steps may be insufficient for behaviour change.

Instructions in BST should be specific, brief, and presented when the learner is paying attention (Miltenberger, 2000; Roberts et al., 1978; Stephenson & Hanley, 2010). The instructions should include an introduction to the skill and a brief rationale that is relevant to the learner as to why it is important to learn this skill. For example, the rationale for teaching an older child how to boil water may be, "When you learn how to boil water, you'll be able to make hot chocolate!"

Instructions alone are insufficient for generating behavior change (Feldman et al., 1989; Hudson, 1982; Ward-Horner & Sturmey, 2012). However, few studies have evaluated the extent to which instructions are necessary in conjunction with modeling, rehearsal, and feedback. In addition, instructions provide a context for the training and help to establish motivation for the learner. In the component analysis conducted by Ward-Horner and Sturmey, instructions were presented during baseline. Thus, the other components of BST were conducted within the context of providing instructions. Therefore, it is unknown the extent to which modeling,

rehearsal, and feedback can be conducted in the absence of providing instructions. The literature on video modeling does not include information on whether or not they provided instructions before showing the participants the video models (e.g., Buggey & Ogle, 2012; Collier-Meek et al., 2012; Delano, 2007).

Following instructions, the instructor uses modeling to demonstrate to the learner what the behaviour should look like. The instructor should model the behaviour clearly in the learner's field of vision at an appropriate pace for the learner. The instructor may present a spoken description of each step before demonstrating it (e.g., the instructor says, "First, you fill the kettle with water", and demonstrates filling the kettle with water, "then you put the kettle back on its base", and demonstrates putting the kettle back on its base, and so on). The instructor ends the modeling component by telling the learner that it is now his/her turn to practice.

The final step of BST, rehearsal with feedback, provides opportunities for the learner to practice skills in a role-play situation before performing the skill at home, school, or in the community (Miltenberger, 2000). Instructors should provide feedback that consists of specific statements regarding what the learner did correctly, what the learner did incorrectly, and how to improve their performance (Miltenberger, 2000). Instructors should balance the type of feedback provided to ensure that the procedure is (and continues to be) a reinforcing and constructive experience (Miltenberger, 2000). Ward-Horner and Sturmey conducted a component analysis of BST during functional analysis training with teachers. The results of the study indicated that feedback was a critical component of behavior change in their study.

1.2 Generalization

Teaching multiple exemplars is an effective strategy for promoting generalization during instructional programs (e.g., Sprague & Horner, 1984; Stokes & Baer, 1977). The learner should

be provided with multiple opportunities to practice the skill using multiple exemplars and receive positive and corrective feedback, as necessary. In addition, this introduces the learner to a variety of examples that they may encounter. During an earthquake drill, for example, the learner would need to know how to respond in various settings. If an earthquake happens at school, a child may need to take cover under a desk, whereas if an earthquake happens while the child is at home, s/he may need to take cover under the kitchen table. Both scenarios should be practiced with feedback provided after each rehearsal to ensure that the child is able to respond appropriately in each setting. Teaching skills in multiple contexts using different scenarios is one way to program for generalization within the context of BST (e.g., Johnson et al., 2005; Miles & Wilder, 2009; Rosales et al., 2009). While it is possible that responses could generalize to different contexts, generalization strategies should be incorporated into BST systematically rather than using a "train and hope" strategy (Stokes & Baer).

1.3 A Caregiver's Role in Supporting Their Child With ASD

Caregivers are the most enduring behaviour-change agents in a child's life and as such, they can provide numerous teaching opportunities to supplement instruction provided by specialists (Burrell & Borrego, 2012). Generalization – a critical component of learning – is more likely when caregivers are able to use treatment strategies such as incidental teaching and differential reinforcement with their children (Burrell & Borrego). Caregivers have opportunities to practice skills in a variety of meaningful situations and settings.

Children and their caregivers reciprocally affect each other's behaviour because of amount of time spent together and the close relationship between them (Hastings, 2002). When caregivers are closely involved with their child's intervention, researchers have found increases in caregivers' positive affect, reductions in caregiver stress, the development of a more positive

communication style between the caregiver and child (Koegel, Bimbela, & Schreibman, 1996), improved self-efficacy and confidence (Feldman & Werner, 2002), increases in positive caregiver-child interactions (Brookman-Frazee, 2004), and reductions in maternal depression (McConachie & Diggle, 2005). Caregiver-child relationships and parental stress can be negatively affected due to a child's level of dependency and cognitive impairment (Bouma & Schweitzer, 1990), caregiver responsibilities, interference with daily activities, and concern for the stability of their child's future (Koegel, Schreibman, Loos, Dirlich-Wilhelm, Dunlap, Robbins, & Plienis, 1992). Limited funding is available for families to pay for intervention services by qualified autism specialists and therapists. Another rationale for caregiver training is to teach caregivers to supplement the services provided by professionals. For families living in rural areas with limited access to autism specialists, caregiver training is necessary to ensure that treatment occurs on a more regular basis with their children. Thus, teaching caregivers how to implement behaviour-change procedures with their children may positively benefit the entire family unit.

1.4 Caregiver Training in ASD

A large body of research has demonstrated the effectiveness of caregiver training. For example, caregivers have been taught Pivotal Response Treatment (Coolican, Smith, & Bryson, 2010), behaviour management strategies (Rickert, Sottolano, Parrish, Riley, Hunt, & Pelco, 1988), and toilet training (Kroeger & Sorensen, 2010), among several others (e.g., Kazdin, 1997; Laski, Charlop, & Schreibman, 1988; Webster-Stratton, 1997, 1982; Wilkinson, Parrish, & Wilson, 1994). There is strong support for using BST to teach caregivers strategies to support their children with developmental disabilities (Lafasakis & Sturmey, 2007; Miles & Wilder, 2009; Seiverling et al., 2012; Stewart et al., 2007) One study demonstrated the effectiveness of

teaching family members to apply BST, a more general skill that can be used to teach their children a variety of skills. Stewart et al. implemented BST to teach family members a BST program. Matt, a 10-year old boy with ASD and attention-deficit/hyperactivity disorder needed instruction on how to improve his conversation skills. His mother and sister were taught how to teach Matt the conversation skills that he needed using BST. Family members learned how to implement BST with Matt and, as a result, Matt learned the conversation skills. Teaching the family members how to generate a task analysis may increase the likelihood that families with use BST in the future to teach other skills.

Laski and colleagues (1988) taught caregivers how to implement the natural language paradigm (NLP) to increase their child's communication skills. The goal of the Laski et al. (1988) study was to teach caregivers how to increase their children's verbalizations using toys and the natural play environment. Children diagnosed with ASD and their caregivers participated in the study. The children were either nonverbal or had limited spontaneous or varied speech. Caregivers received 5 to 9 training sessions on how to use the NLP. Training sessions included a description of the NLP, caregivers observing the experimenters implementing the procedures, and the caregivers being observed implementing the procedures with experimenter feedback. A multiple baseline across participants design was used to evaluate the parent training procedure. The results showed that the caregivers learned to implement the NLP and their children's imitation and vocalizations increased as a result of the training. Furthermore, the authors observed an increase in caregiver verbalizations with the siblings of the participants with ASD, demonstrating some generalization.

Behavioural skills training is typically used to teach skills that involve multiple steps and without the ability to define a skill in detail, the participants skills may be limited in terms of the extend to which BST can be applied in the future for other skill sets.

The current study extended both the caregiver-training literature as well as the BST literature by demonstrating that BST can be used to teach a mother how to implement BST with her son to teach him three different skills. In addition, the mother was taught how to write a task analysis to increase the functionality of her BST training for future implementation with her son. The current study explored the issue of parent training and asked two questions.

1. Is there a functional relation between implementing a BST program with a parent of a child with ASD and that parent acquiring the skill of writing task analyses for complex skills?
2. Is there a functional relation between implementing a BST program with a parent of a child with ASD and that parent being able to implement a BST program with their child?

2 Method

2.1 Participant and Setting

Ivy was 43 years old at the time of the study. She earned a Bachelor of Arts degree in English Linguistics and Sociology. Inclusion in the study required that Ivy spoke and understood English, had a child with ASD, and have an interest in teaching her child new skills. Ivy reported a history of having difficulty teaching her son new skills.

Arlo, Ivy's son, was 7-years-old at the time of the study and had been previously diagnosed with ASD. At the time of the study, Arlo was fully included in a Grade 3 classroom with typically developing children in the Lower Mainland of British Columbia. Arlo participated in 6 hours of behavioural intervention per week that was supervised by a Board Certified Behavior Analyst. Inclusion required that Arlo have a diagnosis of ASD, had a generalized imitation repertoire, was able to respond to spoken instructions and feedback, and had rule-governed behaviour. The inclusion criteria were established to increase the likelihood that BST would be an effective intervention for teaching new skills.

During pre-training and post-training probes, Ivy conducted BST sessions with Arlo in the presence of the experimenter. During training, the experimenter conducted sessions with Ivy in the absence of Arlo. The experimenter conducted the majority of the sessions at the kitchen table in the participant's home. During the sessions for tying a tie, Ivy conducted sessions with Arlo in front of a mirror in the foyer of the home.

2.2 Materials

The experimenter provided Ivy with a paper copy of the BST grading criteria (see Appendix B) and a book chapter about BST from *Behavior modification: Principles and procedures* (Miltenberger, 2000). The experimenter amended the grading criteria to exclude

behaviour analytic terminology (e.g., “avoids extra vocal verbal behaviour” was changed to “keeps words to a minimum”).

During the pre-training sessions for task analysis, minimal materials were used because Ivy often did not perform the behaviour and never wrote down the steps. When asked to generate a task analysis for folding an origami boat, Ivy took out a piece of paper to fold to remind herself of the steps and this was the only skill for which she did this. For the other two skills, Ivy vocally recounted the steps without using any materials and she did not write anything down for any of her task analyses during this phase. During the pre-training sessions for BST, Ivy used a ribbon and a felt pen (on which she tied a bow to demonstrate) to teach Arlo how to tie a bow, one of Arlo’s ties to teach him how to tie it, and scrap paper to teach him how to fold an origami boat.

During the training sessions with Ivy on how to perform BST, materials such as scrap paper and scissors (for making a paper snowflake), a deck of cards, and a board game were used so that the experimenter could demonstrate how to model the skill and how to conduct a rehearsal-with-feedback session.

During the post-training sessions when Ivy was teaching Arlo the three tasks, different materials were required for each task.

For the sessions during which Ivy was teaching Arlo how to tie a bow, the experimenter provided three different types of wire ribbon and two boxes of tissues around which the ribbon was tied. For the sessions during which Ivy was teaching Arlo how to tie a tie, Ivy provided Arlo with a choice between two of his own ties (one with an Elmo ® theme and one with a Snoopy ® theme). For the sessions during which Ivy was teaching Arlo how to fold an origami boat, the experimenter provided him with a choice of three different kinds of paper (one with Mickey

Mouse ®, one with characters from Mickey Mouse ®, and one with stars on it) and Ivy provided a piece of scrap paper which she used to perform the modeling component of BST.

2.3 Pre-experimental Assessments

Several pre-experimental assessments were conducted to ensure that Arlo met the inclusion criteria for the study.

2.3.1 Brief assessment of imitation skills. The purpose of assessing Arlo's imitation skills was to increase the likelihood that the models presented during BST would be effective. The experimenter conducted a 10-trial session to assess Arlo's imitation repertoire. The experimenter presented a two-step model and provided 10 s for Arlo to imitate the model. The models consisted of two-step gross motor movements with and without objects (e.g., first make a block tower and then tap head) and two-phrase vocal responses (e.g., "Baaa", "I love cheese"). The experimenter provided brief praise for correct responses. The experimenter did not provide prompts to imitate the models during the assessment. The inclusion criterion was 80% independent correct responses during the assessment of imitation skills. Arlo engaged in 100% independent correct responses during the assessment.

2.3.2 Brief assessment of following spoken instructions. The purpose of assessing Arlo's instruction-following repertoire was to increase the likelihood that feedback would be an effective component of BST. The experimenter conducted a 10-trial session to assess Arlo's response to two-step spoken instructions. After the experimenter delivered an instruction, Arlo was given up to 10 s to respond. The experimenter provided brief praise for correct responses. No prompts were provided if Arlo did not respond within 10 s or if he engaged in an incorrect response. His correct and incorrect responses during each trial were recorded in vivo on a data sheet. For inclusion in the study, Arlo was required to engage in 80% independent correct

responses during the assessment. Arlo engaged in 90% independent correct responses, which met the pre-determined criteria.

2.3.3 Brief assessment of rule-governed behaviour. The purpose of assessing the child's repertoire of rule-governed behaviour was to increase the likelihood that the participant would be motivated to learn the new skills based on the caregiver-provided instructions and rationale for learning the new skill (e.g., "Learning what to do if there's an earthquake will help keep you safe")**.** The experimenter conducted a 10-trial session to assess Arlo's ability to engage in rule-governed behaviour. The experimenter asked Arlo to engage in a sequence that he had not previously learned. For example, "If this block is purple, say your name but if this block is orange, say 'giraffe'". It was important that Arlo had not learned this sequence before to ensure that he was responding based on the rule rather than a previous reinforcement history. Arlo was given up to 10 s to respond after the presentation of the antecedent stimulus (e.g., the spoken rule) during each trial. The experimenter provided brief praise for correct responses and, where applicable, the specified reinforcer (e.g., if a rule stated that a candy would be delivered for engaging in a particular behaviour then the candy was delivered upon correct completion of the behaviour). No prompts were provided if the he did not respond or if he engaged in an incorrect response. Arlo's responses were recorded in vivo on a data sheet. To be included in the study, Arlo was required to engage in 80% independent correct responses during the assessment. Arlo engaged in 90% independent correct responses during the assessment, which met the pre-determined criteria.

Pre-training probes were conducted with Arlo to confirm that he was unable to adequately complete the chosen tasks according to task analyses constructed by Ivy and the

experimenter. The experimenter asked him to tie a bow, tie a tie, and fold an origami boat. Arlo performed each task two times across two visits.

2.4 Dependent Variable and Measurement

The primary dependent variable was the percentage of steps correctly implemented by Ivy when generating a task analysis and using BST. During pre- and post-training sessions, the percentage of steps implemented correctly was calculated by dividing the number of steps completed correctly by the total number of steps in the entire treatment package and multiplying by 100. During training, the percentage of steps implemented correctly was calculated for each training phase (e.g., modeling) by dividing the number of steps completed correctly by the total number of steps in that phase and multiplying by 100. Appendix A shows the grading criteria for writing a task analysis and Appendix B shows the grading criteria for the BST program. Sessions were recorded for the purposes of data collection, treatment integrity, and calculating interobserver agreement (IOA). Ivy's performance throughout the study was scored in vivo and was verified for coding accuracy via video after each session.

2.5 Interobserver Agreement

A trained observer collected interobserver agreement (IOA) data for the percentage of correctly implemented steps for writing a task analysis and conducting BST. An agreement was defined as both observers recording a 'Y' (for 'yes') or an 'N' (for 'no') on an item in the checklist. A disagreement was defined as any differences in the responses recorded by the data collectors on a given item in the checklist. Point-by-point agreement was calculated by dividing the number of agreements by the total number of trials and multiplying the proportion by 100.

For the task analysis training, interobserver agreement was collected for 22%, 33%, and 100% of sessions for the pre-training probes, training, and post-training probes, respectively

(there was only one post-training probe conducted). The mean agreement was 75% (range, 75%), 75% (range, 75%), and 100% for the pre-training probes, training, and post-training probes, respectively.

For the BST training, interobserver agreement was collected for 33%, 30%, and 33% of sessions and the mean agreement was 82% (range, 74% to 88%), 92% (range, 83% to 100%), and 86% (range, 75% to 96%) for the pre-training probes, training, and post-training probes, respectively.

2.6 Experimental Design

A concurrent multiple probe baseline across tasks design was used to evaluate the effectiveness of BST for teaching Ivy how to perform task analyses of skills that are developmentally appropriate for her child (Watson & Workman, 1981). The same design was used to evaluate the effectiveness of BST for teaching Ivy to implement BST with Arlo to teach three tasks: tying a bow, tying a tie, and folding an origami boat. Pre-training probes were conducted instead of continuous pre-training data to strengthen internal validity and to avoid unnecessary exposure the tasks in the absence of training. In addition, the experimenter was able to conduct pre-training probes at crucial stages of the study such as phase changes (Christ, 2007).

2.7 Procedure

The experimenter taught Ivy how to generate a task analysis for complex skills in preparation for teaching her son. The experimenter provided a rationale for learning how to generate a task analysis and modeled how to write out a task analysis. An example of instructions for writing a task analysis is, “I’m going to teach you how to write a task analysis. This is an important first step that you do before you teach a skill to Arlo because it will be a written account of all the necessary steps in performing the skill. It will also include the materials

that you need to perform the skill. This is how it is done (models how to write a task analysis)." Following instructions and modeling, the experimenter conducted a number of rehearsals with feedback until Ivy had reached the mastery criterion using example skills. After Ivy completed training for writing a task analysis, the experimenter taught Ivy how to implement BST. The instructor used BST to teach Ivy how to deliver instructions. The instructor provided a rationale for why instructions are important, modeled the skill, and conducted rehearsal sessions with feedback until Ivy reached the mastery criterion. The experimenter taught Ivy how to model skills and how to conduct rehearsals with feedback using the same format.

There were three phases in this study for each of the two stages. For the task analysis stage, pre-training, training, and post-training probes were conducted. For the BST stage, pre-training, training, and post-training probes were conducted.

2.7.1 Phase One: Task Analysis

The experimenter conducted training in three phases to teach Ivy to generate task analyses: pre-training probes, training, and post-training probes.

Pre-training for task analysis. To assess Ivy's level of accuracy in generating a task analysis, the experimenter asked her write down the steps in tying a bow, tying a tie, and folding an origami boat. Pre-training probes were conducted for each of the three skills. During pre-training, the experimenter did not deliver instructions, prompts, or feedback to Ivy.

Training for task analysis. To teach Ivy how to generate a task analysis, we first cogenerated a list of skills to teach Arlo that were functional and age-appropriate. From that list, three skills were selected that were useful, interesting, and were unlikely to be encountered in Arlo's home or educational settings. These skills were; how to tie a bow, how to tie a tie, and how to fold an origami boat. The mastery criterion for the task analysis stage was 100% of steps implemented correctly across two skills consecutively.

To teach Ivy how to generate a task analysis, the experimenter implemented each phase of BST (i.e., instructions, modeling, and rehearsal with feedback). The instructions consisted of introducing the skill and providing a brief rationale for why this is an important or interesting skill to learn. Instructions are concise, clearly spoken and relevant to the learner. An example of good quality instructions is: "I am going to teach you how to tie a bow. When you learn how to tie a bow you will be able to tie your own shoes and help wrap presents at Christmas."

Modeling is the next phase of BST following instructions. For this teaching phase, the experimenter had all the required materials ready and these materials were used to demonstrate the steps of the skill. The demonstration was conducted at an appropriate pace for the learner to follow, conducted in the learner's line of vision, and conducted separately from the rehearsal so that the learner could focus on the demonstration. Spoken information was also delivered while modeling the skill. For example, "First, I'm going to get a piece of paper to write on and a pen, and then a piece of paper to fold. Next, I'm going to go through the steps of making a paper snowflake and write down the steps as I go."

After modeling, the experimenter used rehearsal with feedback for generating a task analysis. During the rehearsal, the experimenter provided Ivy with an opportunity to practice generating a task analysis and intervened only if she made an error that would prevent her from continuing to practice. The experimenter used multiple exemplar training during rehearsal and feedback. Immediately after each rehearsal, the experimenter provided Ivy with feedback on her performance. The experimenter's feedback included an acknowledgement of the steps that Ivy performed correctly and corrective feedback for any steps that Ivy missed or performed incorrectly. The experimenter delivered corrective feedback in a neutral tone of voice and described specifically what the Ivy did incorrectly and how Ivy should complete the step next

time. Only one corrective feedback was delivered during each round of rehearsal with feedback. Each time feedback was delivered, the experimenter began and ended with praise for what was done well. Praise was always specific, detailed, and genuine. The experimenter continued with Rehearsal with feedback until corrective feedback was no longer necessary.

Post-training for task analysis. After Ivy reached the mastery criterion during the task analysis training, the experimenter conducted a post-training probe for generating a task analysis for tying a bow. The post-training probe was similar to the pre-training probe with one exception. The experimenter delivered post-session feedback on Ivy's performance. The mastery criterion was one session with 100% of steps correctly.

2.7.2 Phase Two: BST

The experimenter conducted training in three phases to teach Ivy how to implement BST: pre-training probes, training, and post-training probes. The procedures in Phase Two were similar to those described in Phase One except the experimenter taught Ivy how to implement BST.

Pre-training for BST. To assess the level of accuracy with which Ivy could perform BST before training, the experimenter asked her to teach her son how to tie a bow, tie a tie, and fold an origami boat. During pre-training, the experimenter did not deliver instructions, prompts, or feedback to Ivy.

Training for BST. Following the pre-training probes, the experimenter conducted training using one-to-one sessions. The mastery criterion for the BST stage was 90% of steps implemented correctly across two consecutive sessions. The format that was used to train Ivy was delivering instructions, modeling the skill, and conducting rehearsals with feedback (i.e., BST).

Training for developing and delivering instructions. The BST format described above was also used to train Ivy how to develop and deliver instructions. The experimenter delivered instructions on why it is important to develop and deliver instructions. The next step was to model the process of developing and delivering instructions clearly and concisely. Ivy practiced developing and delivering instructions. The experimenter used multiple exemplar training. Immediately after each rehearsal, the experimenter delivered feedback. The rehearsal and feedback process continued until Ivy reached mastery.

Training for delivering models. The BST format described above was used to train Ivy how to model a skill. The experimenter delivered instructions on why it is important to model a skill for the learner. The next step was to model the process of demonstrating a skill. Ivy rehearsed modeling and the experimenter provided feedback.

Training for conducting rehearsal with feedback sessions. The experimenter used the BST format described above to train Ivy how to conduct rehearsals and deliver feedback. The experimenter delivered instructions on why it is important to conduct rehearsals and deliver feedback. The next step was to model the process of conducting rehearsals and delivering feedback. During most of the sessions, Ivy acted as the learner and in other sessions, when available, a research assistant acted as the learner. Ivy practiced conducting rehearsal and feedback sessions and the experimenter took on the role of her child. The experimenter acted out some of the typical behaviours that Arlo has displayed in the past during instructional activities with his mother to create a training environment that mimicked their typical interactions. The experimenter used multiple exemplar training during rehearsal and feedback sessions. After each rehearsal, the experimenter provided corrective and positive feedback, as needed.

Post-training probes for BST. After Ivy met the mastery criterion during training for BST, the experimenter conducted post-training probes. The probes were similar to the procedures described in the pre-training probes for BST with two exceptions. First, Ivy used the task analyses she generated from the previous task analysis training. Second, the experimenter provided feedback to Ivy about her performance immediately following each post-training probe.

The experimenter made some adjustments to the procedure due to some verbal protesting and noncompliance from Arlo. Specifically, Arlo would make comments such as, "I can't do this", "I don't want to do this", "I already know how to do this" and he would sometimes look away from Ivy during the modeling component. During initial post-training probes, Ivy to used a token board to visually display the number of trials Arlo had to complete during BST. Initially, he was required to complete five trials, however this was later reduced to three. Anecdotally, the shorter session length seemed to help to increase Arlo's participation behaviour. However, some of the non-compliant behaviours persisted. With Ivy's permission, we introduced edible reinforcers to increase compliance. Before the beginning of the session, Arlo was offered a choice of candy (e.g., sour gummies, chocolate). After each trial, Ivy gave Arlo one small piece of candy and a break that lasted approximately 30 s to consume the candy. Following the addition of edibles, Arlo's participation behaviours increased and his affect was much more positive (i.e., smiling more and laughing). In turn, Ivy was more animated with him during the breaks might have added to the reinforcing value of the break and the candy.

2.8 Treatment Integrity

A trained observer assessed the experimenter's implementation of BST. The trained observer used a checklist to assess treatment integrity that was similar to the checklist used to evaluate Ivy's implementation of BST (see Appendix C for the treatment integrity checklist).

The data collector watched videotaped sessions and scored each step as either correctly or incorrectly implemented. The percentage of correctly implemented steps was calculated by dividing the number of steps performed correctly by the total number of steps performed and multiplied by 100.

Treatment integrity data were collected by a trained observer for 25% of the task analysis and BST sessions across the pre-training, training, and post-training phases. The mean treatment integrity score for the training phase was 98.5% (range, 91%-100%). For the post-training phase of the study, where the experimenter provided post-session feedback, the mean treatment integrity score was100%.

3 Results

Parents of children with ASD are in need of skills they can use to help their children learn a variety of tasks that will help them become more independent and increase their quality of life. In the current study, Ivy successfully learned how to write a task analysis for complex skills and how to implement BST with her son to begin teaching him how to tie a bow, how to tie a tie, and how to fold an origami boat. Ivy's pre- and post-training scores are shown in Figure 1.1.

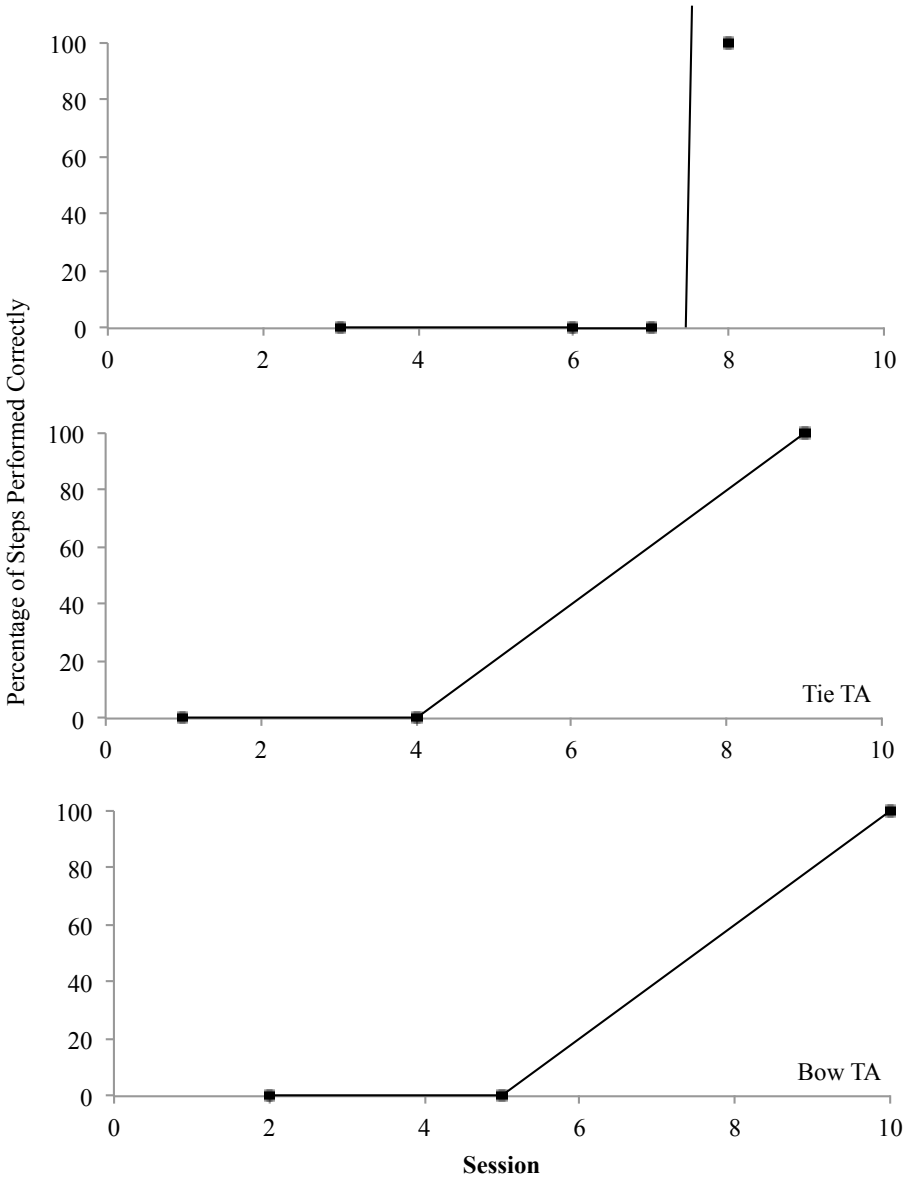

Figure 1.1. Data showing Ivy's pre- and post-training performance for writing a task analysis.

Ivy implemented 0% of the task analysis steps correctly for all three skills. After three training sessions with the experimenter on how to write a task analysis, Ivy reached the training mastery criterion. The experimenter conducted a post-training probe in which Ivy wrote out a detailed and complete task analysis for folding an origami boat. Ivy generated the task analysis with 100% of the steps implemented correctly. Following mastery of the first task, the experimenter conducted pre-training probes and Ivy generated both task analyses (i.e., tying a bow and tying a tie) with 100% of the steps implemented correctly.

Following mastery of task analysis, the experimenter conducted pre-training probes with Ivy for BST. Pre-training data were collected and the data are shown in Figure 1.2. There is one data point missing due to lost video from one of the pre-training sessions for tying a bow (a total of three probes were conducted for tying a bow, however, only two could be verified for coding accuracy). The experimenter conducted and coded two pre-training probes for tying a bow, four pre-training probes for tying a tie, and six pre-training probes for folding an origami boat.

The mean percentage of correct implementation of BST during pre-training was 30.5%, 30%, and 60.5% for the tying a bow, tying a tie, and origami boat tasks, respectively. During pre-training probes, Ivy demonstrated proficiency with modeling skills. Ivy mastered all of the components of BST in 19 training sessions (seven, four, and eight sessions for instructions, modeling, and rehearsal with feedback respectively). After training, the experimenter conducted post-training probes in which Ivy implemented BST with Arlo. The experimenter conducted post-training probes for tying a bow first. During post-training probes for tying a bow, Ivy's percentage of correct implementation was higher than observed during the pre-training probes.

As part of the multiple-probe design, the experimenter conducted pre-training probes for tying a tie and folding an origami boat after a treatment effect was evident during the post-

training probes for tying a bow. Ivy's correct implementation of BST during tying a tie and folding an origami boat were higher than observed during the pre-training probes conducted before BST training with the experimenter. That is, tying a tie increased from 26% to 68% and folding an origami boat increased from 30% to 73%. After the pre-training probes, Ivy continued teaching Arlo how to tie a bow until she reached mastery of BST for teaching tying a bow. Ivy reached mastery for tying a bow after five post-training probes.

After Ivy mastered BST with teaching Arlo how to tie a bow, the experimenter conducted post-training probes with Ivy and Arlo with the tying a tie. During the post-training probes, the experimenter delivered feedback to Ivy immediately after each BST session with her child. Ivy reached mastery after four post-training sessions for tying a tie.

After mastery in the tying a tie panel, the experimenter conducted pre-training probes with Ivy using BST to teach Arlo how to fold an origami boat. Ivy mastered this skill in two sessions without the use of post-session feedback from the experimenter.

The primary focus of the experimenter's corrective feedback was on delivering praise. The experimenter provided feedback about starting and ending with praise and making praise specific to the step that Arlo completed correctly. In contrast, Ivy did very well in providing corrective feedback. She consistently used a neutral tone of voice, demonstrated specifically what he did incorrectly, and showed him how he should perform the step during his next rehearsal opportunity.

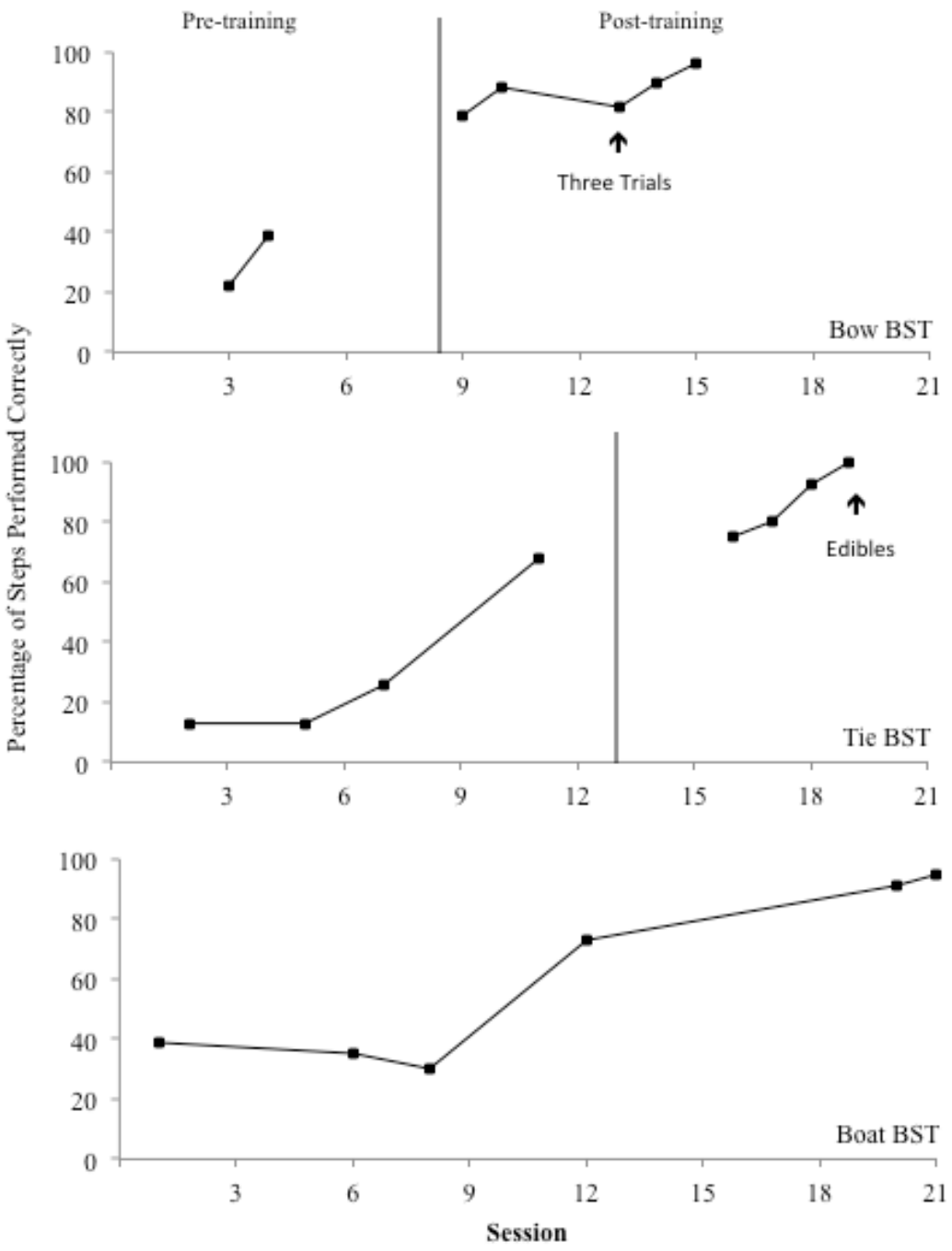

Figure 1.2. Data showing Ivy's pre- and post-training performance for the implementation of BST. The arrows in the graph indicate when the experimenter made a change to the intervention.

Arlo's performance was scored for the last post-training session of each skill to assess his improvement. Each skill that Ivy taught Arlo was broken down into teachable sections. Arlo was

to practice each section to mastery before moving onto the next one. When Ivy reached the mastery criterion with one task, she moved onto the next skill. As a result, Arlo did not have an opportunity to learn the remaining steps in each skill. It is, therefore, not surprising that Arlo did not master the skills. During the tying a bow task, Arlo completed 12.5% and 57% of steps correctly during pre-training and post-training, respectively. During the tying a tie task, he completed 0% and 30% of steps correctly during pre-training and post-training, respectively. During the folding an origami boat task, he completed 6.25% and 56% of steps correctly during pre-training and post-training, respectively. Arlo would sometimes engage in mild non-compliance including verbal protests such as, "I can't do this", "It's too hard", or putting the materials down.

While experimental control was not established and we cannot make definitive conclusions about the effect of BST on parent behaviour, it is unlikely that other factors were responsible for Ivy's acquisition of BST. Ivy had no prior experience with BST and her skills conformed to the checklist that was used in the study. In the task analysis post-training phase, there was a significant level change from pre-training. The training phase for this skill was very brief (three sessions) and it is unlikely that she acquired the necessary skills by any other means to achieve 100% independent correct responding according to the checklist generated by the experimenters. The data during the BST post-training phase may suggest that the components of BST that were implemented by the experimenter (specifically feedback) had the most impact on Ivy's learning.

3.1 Social Validity

Ivy completed an adapted version of the social validity measure by Ward-Horner and Sturmey (2012). Both the current social validity measure and the Ward-Horner and Sturmey

study included a rating scale for questions pertaining to how much the participant(s) liked each component of the training. The social validity measure used for this study included writing a task analysis as one of the components. In addition, the current study included a question pertaining to the likelihood of using BST in the future. The purpose of the measure was to assess the preference ratings for the components of the training. Ivy rated the overall usefulness of the intervention as "very useful". Ivy rated the various components of the training package. Her responses ranged from "fair" to "very good". Ivy demonstrated the greatest preference for rehearsal with feedback and showed the least preference for generating a task analysis.

In addition to the formal measurement of social validity, the experimenter responded to the training context and Ivy's preference throughout the study. For example, Ivy suggested that it might be easier for her to teach Arlo to tie a tie using a mirror. She and Arlo sat in front of a large wall mirror in the foyer of their home for the tying a tie sessions instead of at the table where the rest of the teaching occurred. Ivy expressed some concern during her training that the initial strategies would be insufficient for handling the noncompliant behaviour that Arlo exhibited during the pre-training probes (e.g., off-topic questions, statements such as "I can't do this"). The experimenter taught Ivy to respond briefly to off-topic questions in a neutral tone and immediately bring his attention back to the task (i.e., redirection by tapping the table or saying "Look here"), ignore statements of noncompliance (e.g., "I don't want to do this"), or to wait quietly for him to bring his attention back to the task if he was looking away. The most salient aspect of these strategies was to speak as little as possible and avoid lengthy attempts to engage him in the task. In response to her concerns about her son's behaviour, the experimenter included a token system into Ivy's training that she implemented in her training with Arlo. Ivy reported that the strategy of waiting quietly was particularly helpful in her interactions with Arlo even

outside of the training sessions. She reported feeling more calm when she remained silent during times when Arlo was engaging in minor problem behaviour.

4 Discussion

The present study adds to the parent training literature in a several ways. First, Ivy learned how to use BST to teach her child new skills. Thus, it is possible that she will apply learnt skills to increase learning opportunities at home and in community settings. These additional learning opportunities can supplement the services from outside agencies through public funding. Second, the instructor may need to provide additional training when the caregiver begins to implement BST with his/her child. Additional training may include specific feedback about how to respond to his/her child's performance and behaviour. For example, Arlo engaged in some verbal protesting and minor noncompliance during some of the post-training probes. Ivy needed some additional training on how to avoid protesting and how to respond if Arlo engaged in protesting or noncompliance. Third, the training was efficient. Ivy learned to teach three complex skills using BST in 22 sessions (three for task analysis and 19 for BST). Furthermore, it is possible that Ivy may to continue to use BST with Arlo in a variety of contexts for years to come. Fourth, BST is clearly a generalizable skill that parents can use to teach a number of different complex skills.

Behavioural skills training is a useful and versatile strategy that can be incorporated into parent training (e.g., Gunby et al., 2010; Lafasakis & Sturmey, 2007; Sarokoff & Sturmey, 2004; Ward-Horner & Sturmey, 2012). While BST has a robust literature base for teaching caregivers a variety of skills including discrete trial teaching (Lafasakis & Sturmey), guided compliance (Miles & Wilder, 2009), and food acceptance (Seiverling et al., 2012), this is only the second study to demonstrate its effectiveness for teaching a parent how to use BST with his/her child.

The experimenters of the Stewart et al. (2007) study implemented BST to teach a boy's mother and sister how to use BST to teach conversation skills such as making eye contact,

changing the topic of the conversation, and tailoring the conversation to suit a conversation partner. The current study extends the Stewart et al. (2007) study by demonstrating the usefulness of parent-implemented BST across a greater variety of skills. The study also addresses a potential limitation of the Stewart et al. (2007) study in terms of generalizability. That is, in the current study, Ivy learned how to generate a task analysis, which may increase Ivy's ability to use BST in the future to teach her son new skills.

The effectiveness and efficiency of the Stewart et al. (2007) study was similar to the current study. In both studies, the family members successfully implemented BST with the target child and required only 18 training sessions (Stewart et al., 2007) and only 19 training sessions (the current study). The social validity scores from both studies were similar, showing an overall positive impression of the procedure. Both mothers from the two studies indicated that they would be likely to use BST with their respective children again in the future. The training procedure was similar across the two studies. The mothers in the studies conducted the modeling and rehearsal with feedback components with the experimenter and research assistants rather than with the target child. In several other BST studies, the modeling and rehearsal with feedback components were conducted with the child (e.g., Lafasakis & Sturmey, 2007; Miles & Wilder, 2009; Seiverling et al., 2012).

Ivy demonstrated competence in modeling at the beginning of the study so it is unsurprising that she required fewer training sessions for this component. Instructions required seven sessions and most of the feedback during this training pertained to developing a rationale that was relevant to Arlo. An example of a reasonable rationale for teaching a child how to tie shoelaces may be "When you learn how to tie your shoes, you can wear your cool Star Wars lace up shoes. If your laces come undone on the playground, you won't have to stop playing to find a

teacher to help you with it; you'll be able to do it yourself!" An example of a rationale for tying shoelaces that may not be relevant to a child could be, "Learning how to tie your shoes will help you with your fine motor skills".

Training for rehearsal and feedback required the greatest number of sessions, requiring a total of eight sessions. Considering the large number of items on the BST checklist for this component (12 items), the experimenters expected that it would involve the most training. Most of the corrective feedback in this area pertained to positive feedback. Ivy reported that she was not accustomed to providing praise very frequently or for behaviours that were expected of Arlo (e.g., participating in the training). By the end of the training, Ivy was consistently beginning her and ending her feedback to Arlo with praise for desired behaviours in which Arlo engaged during the preceding rehearsal.

4.1 Strengths and Limitations

Ivy's training included the use of multiple exemplars, which is the recommended practice when teaching new skills (Stokes & Baer, 1977). Some of the tasks used for training the various BST components were: boiling water, making a paper snowflake, playing a card game, and playing a board game. During Ivy's implementation with Arlo, she did not use multiple exemplars due to the skills that she was teaching. For example, the process of folding an origami boat is the same regardless of the design on the paper.

During the post-training phase, generalization across tasks occurred. A stronger experimental design would have been a multiple probe baseline design across participants. Recruitment of additional participants was not feasible due to a lack of participant inquiries after a several months of recruitment. Although generalization of newly learned skills is ideal, from a methodological perspective, a multiple-probe-across-participants design would have been a

stronger demonstration and reduced the likelihood of generalization across the baselines. Additional replications of the study are needed to assess the generality of the results.

The experimenters developed the grading criteria for the current study and tested out many versions before they decided on the criteria listed in Appendix B. The experimenters edited the grading criteria to reflect Ivy's pre-training repertoires. In clinical practice, it is impractical for clinicians to modify the grading criteria for each parent that participates in the training. Future research might focus on generating a more general but still effective grading criteria to make the dissemination of BST among caregivers more feasible. High interobserver scores were difficult to achieve due to the complexity of the grading criteria, For example, the item "Includes sufficient detail" in the task analysis component was sometimes difficult to score. The level of detail that is required in a task analysis depends on the learner and the context.

The training process for both writing a task analysis and BST was very efficient. Ivy learned to write a detailed task analysis for a complex skill in just three training sessions and the materials required were very minimal (e.g., pen, paper, playing cards). Ivy met the mastery criteria in the BST training in 19 sessions and the materials required for training were minimal (e.g., scrap paper, scissors). Therefore, BST may be useful and efficient instructional strategy to teach parents within the context of clinical practice.

4.2 Practical and Clinical Application

There are several practical and clinical implications based on the results of the current study. The funding that is provided to families in the Lower Mainland of BC significantly declines at the age of 6 years old and parents might not continue with their child's behavioural programs outside of school for financial reasons. Behavioral skills training may be useful for parents and other caregivers (e.g., grandparents, siblings, group home staff) for increasing the

number of learning opportunities that the child encounters. For example, parents can use BST to teach the child skills around the house (e.g., laundry, cooking, self-care) and out in the community (e.g., ordering food in a restaurant, conversation skills, street safety). Families can make use of multiple exemplars in community and educational settings to promote the acquisition and generalization of new skills. After BST is learned, the instructor may chose to implement the entire BST package or to use certain components in isolation. The feedback component has the greatest impact on learning (Ward-Horner & Sturmey, 2012). Feedback alone can be used in a variety of situations and settings to increase correct performance for a wide array of skills. Learning how to deliver effective feedback is a critical feature of caregiver training.

Ivy's responses on the social validity measure indicated that her most preferred component of BST was rehearsal with feedback. A component analysis similar to the one conducted by Horner and Sturmey (2012) would be beneficial to conduct with a parent in the home and community settings. It is possible that writing a task and implementing every step of BST may be too cumbersome considering the number of skills a parent may want to teach their child on a daily basis. Future research might explore ways to modify BST to make the procedure more reasonable to implement in homes by family members. For example, was the task analysis training necessary for the mother to learn how to use BST to teach her child outside of the context of the study?

Refining BST to make the procedure more straightforward for clinicians and consumers of the training is a worthwhile endeavour. Teaching only certain components might help to conserve limited and valuable resources and perhaps make it more likely that this parent training would take place. In an effort to increase the efficiency and likelihood of teaching parents how to

use BST, future research could evaluate group parent training and pyramidal training (Kuhn et al., 2003; Shore et al., 1995). Clinicians might be able to teach groups of parents to make the training more cost and time efficient. Another benefit of group training is that members can conduct rehearsal and feedback sessions with each other to practice. Another potential benefit is that family members who participate in group training may subsequently serve as supports and sources of advice in the future. Alternatively, clinicians might use pyramidal training by teaching one family member to implement BST and that trained family member can then train other members of the family (e.g., dad and sister).

A few considerations must be addressed prior to clinicians training caregivers and other family members how to implement BST. Clinicians require formal training on how to implement BST effectively and how BST may need to be adapted to suit different learners. In addition, clinicians will need to be cognizant of the instructional history that the caregiver has with the child whom they will be teaching. If the caregiver does not have a history of strong instructional control when attempting to teach the child, instructional control should be addressed before teaching the caregiver how to implement BST. Furthermore, if the child has a history of problem behaviour during instructional settings (e.g., aggression, self-injurious behaviour), BST may be unsuitable for the child until that behaviour has been successfully treated. If mild problem behaviour occurs during instructional settings (e.g., off-topic comments, looking away, negative comments about the task), this can often be addressed within the context of the BST training.

4.3 Summary

The current study suggests that parents can be taught an effective and efficient strategy for teaching their children new skills. Practitioners working with children with ASD are proficient at teaching children new skills and those same teaching abilities should be applied to

parent training. High quality parent training is necessary for providing families with the necessary tools to complement and continue their child's education.

References

Bouma, R., & Schweitzer, R. (1990). The impact of chronic childhood illness on family stress: A comparison between autism and cystic fibrosis. *Journal of Clinical Psychology, 46,* 722-730.

Brookman-Frazee, L. (2004). Using parent/clinician relationships in parent education programs for children with autism. *Journal of Positive Behavior Interventions, 6,* 195-213.

Buggey, T., & Ogle, L. (2012). Video self-modeling. *Psychology in the Schools, 49,* 52-70.

Burrell, T. L. & Borrego, J. (2012). Parents' involvement in ASD treatment: What is their role? *Cognitive and Behavioral Practice, 19,* 423-432. .

Christ, T. J. (2007). Experimental control and threats to internal validity of concurrent and nonconcurrent multiple baseline designs. *Psychology in the Schools, 44,* 451-459.

Collier-Meek, M. A., Fallon, L. M., Johnson, A. H., Sanetti, L. M. H., & Delcampo, M. A. (2012). Constructing self-modeling videos: Procedures and technology. *Psychology in the Schools, 49,* 3-14.

Coolican, J., Smith, I. M., & Bryson, S. E. (2010). Brief parent training in pivotal response treatment for preschoolers with autism. *Journal of Child Psychology and Psychiatry, 51,* 1321-1330.

Delano, M. E. (2007). Video modeling interventions for individuals with autism. *Remedial and Special Education, 28,* 33-42..

Feldman, M. A., Case, L., Rincover, A., Towns, F., & Betel, J. (1989). Parent education project III: increasing affection and responsivity in developmentally handicapped mothers: Component analysis, generalization, and effects on child language. *Journal of Applied Behavior Analysis, 22,* 211-222.

Feldman, M. A., & Werner, S. E. (2002) Collateral effects of behavioral parent training on families of children with developmental disabilities and behavioral disorders. *Behavioral Interventions, 17,* 75-83.

Gunby, K. V., Carr, J. E., & LeBlanc, L. A. (2010). Teaching abduction-prevention skills to children with autism. *Journal of Applied Behavior Analysis, 43,* 107-112.

Hastings, R. (2002). Parental stress and behavior problems of children with developmental disability. *Journal of Intellectual & Developmental Disability, 27,* 149-160.

Hudson, A. M. (1982). Training parents of developmentally handicapped children: A component analysis. *Behavior Therapy, 13,* 325-333.

Johnson, B. M., Miltenberger, R. G., Egemo-Helm, K., Jostad, C.M., Flessner, C., & Gatheridge B. (2005). Evaluation of behavioral skills training for teaching abduction-prevention skills to young children. *Journal of Applied Behavior Analysis, 38*, 67-78.

Kazdin, A. (1997). Parent management training: evidence, outcomes, and issues. *American Academy of Child and Adolescent Psychiatry, 36,* 1349-1356.

Koegel, R. L., Bimbela, A., & Schreibman, L. (1996). Collateral effects of parent training on family interactions. *Journal of Autism and Developmental Disorders, 26,* 347-359.

Koegel, R. L., Schreibman, L., Loos, L. M., Dirlich-Wilhelm, H., Dunlap, G., Robbins, R. R., & Plienis, A. J. (1992). Consistent stress profiles in mothers of children with autism. *Journal of Autism and Developmental Disorders, 22,* 205-216.

Kroeger, K., & Sorensen, R. (2010). A parent training model for toilet training children with autism. *Journal of Intellectual Disability Research, 54,* 556-567.

Kuhn, S. A. C., Lerman, D. C., & Vorndran, C. M. (2003). Pyramidal training for families of children with problem behavior. *Journal of Applied Behavior Analysis, 36,* 77-88.

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

Laski, K. E., Charlop, M. H., & Schreibman, L. (1988). Training parents to use the natural language paradigm to increase their autistic children's speech. *Journal of Applied Behavior Analysis, 4,* 391-400.

McConachie, H., & Diggle, T. (2005). Parent implemented early intervention for young children with autism spectrum disorder: A systematic review. *Journal of Evaluation in Clinical Practice, 13,* 120-129.

Miles, N. I., & Wilder, D. A. (2009). The effects of behavioral skills training on caregiver implementation of guided compliance. *Journal of Applied Behavior Analysis, 42,* 405-410.

Miltenberger, R. G. (2000). Behavioral skills training procedures. In *Behavior modification: Principles and procedures* (pp. 251-268). Belmont, CA: Wadsworth Publishing Company.

Nuernberger, J. E., Ringdahl, J. E., Vargo, K. K., Crumpecker, A. C., & Gunnarsson, K. F. (2012). Using a behavioral skills training package to teach conversation skills to young adults with autism spectrum disorders. *Research in Autism Spectrum Disorders, 7,* 411-417.

Rickert, V. I., Sottolano, D. C., Parrish, J. M., Riley, A. W., Hunt, F. M., & Pelco, L. E. (1988). Training parents to become better behavior managers: The need for a competency-based approach. *Behavior Modification, 12,* 475-496.

Roberts, M. W., McMahon, R. J., Forehand, R., & Humphreys, L. (1978). The effect of parental instruction-giving on child compliance. *Behavior Therapy, 9,* 793-798.

Rosales, R., Stone, K., & Rehfeldt, R. A. (2009). The effects of behavioral skills training on implementation of the picture exchange communication system. *Journal of Applied Behavior Analysis, 42*, 541-549.

Sarokoff, R. A., & Sturmey, P. (2004). The effects of behavioral skills training on staff implementation of discrete-trial teaching. *Journal of Applied Behavior Analysis, 34*, 535-538.

Seiverling, L., Williams, K., Sturmey, P., & Hart, S. (2012). Effects of behavioral skills training on caregiver treatment of children's food selectivity. *Journal of Applied Behavior Analysis, 45,* 197-203.

Shore, B. A., Iwata, B. A., Vollmer, T. R., Lerman, D. C., & Zarcone, J. R. (1995). Pyramidal staff training in the extension of treatment for severe behavior disorders. *Journal of Applied Behavior Analysis, 28,* 323-332.

Sprague, J. R., & Horner, R. H. (1984). The effects of single instance, multiple instance, and general case training on generalized vending machine use by moderately and severely handicapped students. *Journal of Applied Behavior Analysis, 17*, 273-278.

Stephenson, K. M., & Hanley, G. P. (2010). Preschoolers' compliance with simple instructions: A descriptive and experimental evaluation. *Journal of Applied Behavior Analysis, 43,* 229-247.

Stewart, K. K., Carr, J. E., & LeBlanc, L. A. (2007). Evaluation of family-implemented behavioral skills training for teaching social skills to a child with Asperger's disorder. *Clinical Case Studies, 6,* 252-262.

Stokes, T. F., & Baer, D. M. (1977). An implicit technology of generalization. *Journal of Applied Behavior Analysis, 10,* 349-367.

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

Watson, P. J., & Workman, E. A. (1981). The non-concurrent multiple baseline across-individuals design: An extension of the traditional multiple baseline design. *Journal of Behavior Therapy and Experimental Psychiatry, 12,* 257-259.

Webster-Stratton, C. (1982). The long-term effects of a videotape modeling parent-training program: Comparison of immediate and 1-year follow-up results. *Behavior Therapy, 13,* 702-714.

Webster-Stratton, C. (1997). Treating children with early-onset conduct problems: A comparison of child and parent training interventions. *Journal of Consulting and Clinical Psychology, 65,* 93-109.

Wilkinson, W., Parrish, J. M., & Wilson, F. E. (1994). Training parents to observe and record: A data-based outcome evaluation of a pilot curriculum. *Research in Developmental Disabilities, 15,* 343-354.

Appendices

Appendix A: Task Analysis Grading Criteria

Task Analysis	1	2	3	4	5	6	7
Performs the behaviour and writes down all of the steps							
Steps are clearly and concisely written							
Steps include sufficient detail							
Skill is broken down into logical and appropriate chunks							
TOTAL (out of 4):							
PERCENTAGE:							

Appendix A. The task analysis grading criteria used to evaluate Ivy's performance when generating a task analysis.

Appendix B: BST Grading Criteria

Skill:								
Date:	**Session:**	**Exp.:**				**Reli.:**		
Instructions		**1**	**2**	**3**	**4**	**5**	**6**	**7**
Gains and maintains learner's attention								
Delivers instructions clearly and audibly								
Uses positive affect and tone of voice								
Provides brief rationale (2-3 points) for the skill (before modeling) that is relevant to the child								
Avoids extra vocal verbal information								
Uses redirect technique, if needed								
Date:	**Session:**	**Exp.:**				**Reli.:**		
Modeling		**1**	**2**	**3**	**4**	**5**	**6**	**7**
Has all required materials ready and organized								
Demonstration is accurate, appropriately paced, and clearly visible to the learner								
Uses redirect technique, if needed								
Adheres to the task analysis								
Separates instructions/demonstration from rehearsal/feedback								
Date:	**Session:**	**Exp.:**				**Reli.:**		
Rehearsal & Feedback		**1**	**2**	**3**	**4**	**5**	**6**	**7**
Provides opportunity to rehearse								
Allows the learner to practice the complete skill chunk								
Provides assistance only as needed to complete the skill chunk and does not add any spoken information								
Feedback is provided immediately after the rehearsal								
Provides praise that is genuine and specific at least once per chunk using a positive tone of voice								
Uses redirect technique, if needed								
Provides corrective feedback (CF) as needed								
1 CF for every 1-2 praises								
Describes what was done incorrectly								
Describes what should be done next time								
Uses a neutral voice to deliver CF								
Allows up to 3 rehearsals as needed								
TOTAL:								
PERCENTAGE:								

Appendix B. A checklist of the steps during instructions, modeling and rehearsal with feedback. .

Appendix C: Treatment Integrity Grading Criteria

Skill:								
Date:	**Session:**	**Exp.:**				**Reli.:**		
Instructions		**1**	**2**	**3**	**4**	**5**	**6**	**7**
Gains and maintains learner's attention								
Delivers instructions clearly and audibly								
Uses positive affect and tone of voice								
Provides brief rationale (2-3 points) for the skill (before modeling) that is relevant to the child								
Avoids extra vocal verbal information								
Date:	**Session:**	**Exp.:**				**Reli.:**		
Modeling		**1**	**2**	**3**	**4**	**5**	**6**	**7**
Has all required materials ready and organized								
Demonstration is accurate, appropriately paced, and clearly visible to the learner								
Adheres to the task analysis								
Date:	**Session:**	**Exp.:**				**Reli.:**		
Rehearsal & Feedback		**1**	**2**	**3**	**4**	**5**	**6**	**7**
Provides opportunity to rehearse								
Allows the learner to practice the complete skill chunk								
Provides assistance only as needed to complete the skill chunk and does not add any spoken information								
Feedback is provided immediately after the rehearsal								
Provides praise that is genuine and specific at least once per chunk using a positive tone of voice								
Provides corrective feedback (CF) as needed								
1 CF for every 1-2 praises								
Describes what was done incorrectly								
Describes what should be done next time								
Uses a neutral voice to deliver CF								
Allows additional rehearsals as needed								
TOTAL:								
PERCENTAGE:								

Appendix C. A checklist of the BST steps used for treatment integrity measurement.

Appendix D: Social Validity Measure

1. Rate how much you liked:
   a) Writing a Task Analysis? Poor fair good very good excellent
   b) Instructions training? Poor fair good very good excellent
   c) Modeling training? Poor fair good very good excellent
   d) Rehearsal and feedback training? Poor fair good very good excellent

2. Rate the effectiveness of:
   a) Writing a Task Analysis? Poor fair good very good excellent
   b) Instructions training? Poor fair good very good excellent
   c) Modeling training? Poor fair good very good excellent
   d) Rehearsal and feedback training? Poor fair good very good excellent

3. Which component of the training package did you find most effective?
   a) Instructions
   b) Modeling
   c) Rehearsal with feedback

4. Which component of the training package did you like the *most*?
   a) Instructions
   b) Modeling
   c) Rehearsal with feedback

5. How useful will this training be to you and your family in the future?
   a) Not at all useful
   b) Somewhat useful
   c) Very useful

Appendix D. The social validity measure was adapted from Ward-Horner & Sturmey (2012). The rating scale was used to evaluate Ivy's preference for the components of training.