

An Evaluation of a Self-Instructional Package for Teaching Tutors to Conduct Discrete
Trials-Teaching with Children with Autism

by

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Abstract

The present study examined the effectiveness of a self-instructional package for teaching discrete-trials teaching (DTT) to Applied Behaviour Analysis tutors at the St. Amant Applied Behaviour Analysis Program for Children with Autism. A modified multiple-baseline design across participants was used, and replicated six times. An AB design was used for one participant. The training package include a self-instructional manual, video demonstrations, and self-practice. Participants required an average of 3 hours and 56 minutes to master the manual. Eleven of the 13 participants achieved the mastery criterion during the post-training assessment. Mean DTT accuracy increased from 46.2% to 85.5% (a statistically significant increase). One tutor participated in a generalization phase with a child with autism, and their DTT accuracy averaged 80.1%. The results suggest that the self-instructional package appears to be an effective tool for teaching newly-hired tutors to conduct DTT.

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Table of Contents

Abstract	ii
Acknowledgements	iii
Table of Contents	iv
Introduction	1
<i>Self-Instructional Manuals for Teaching DTT</i>	4
Self-Instructional Manual: Version 1	5
Self-Instructional Manual: Version 2.....	7
Self-Instructional Manual: Version 3.....	9
Self-Instructional Manual: Version 4.....	10
<i>Statement of the Problem</i>	11
Method	12
<i>Participants and Setting</i>	12
<i>Materials</i>	14
<i>Procedure</i>	15
Phase 1: Baseline	15
Phase 2: Training	16
Phase 3: Post-Training Assessment	19
Phase 4: Generalization	19
<i>Inter-Observer Agreement (IOA)</i>	20
<i>Procedural Integrity (PI)</i>	20
Results	21
<i>The Self-Instructional Package</i>	21

<i>Generalization</i>	28
<i>Self-Practice Activities</i>	30
<i>Social Validity</i>	31
Discussion	32
References	37
Appendix A	42
Appendix B	48
Appendix C	50
Appendix D	51
Appendix E	52
Appendix F.....	53

List of Figures

<i>Figure 1.</i> Percent of DTT items performed correct on the 20-item DTTEF (matching ▲, pointing ■, imitation ●) for Participants 1-7; Baseline (BL), Post-Manual (PM), Generalization (GEN).	22
<i>Figure 2.</i> Percent of DTT items performed correct on the 20-item DTTEF (matching ▲, pointing ■, imitation ●) for Participants 8-13; Baseline (BL), Post-Manual (PM)	23
<i>Figure 3.</i> Average DTT accuracy across Tutors 1-13 represented by task (matching, imitation, and pointing) across phases (Baseline and Post-training)	29

An Evaluation of a Self-Instructional Package for Teaching Tutors to Conduct Discrete
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Introduction

Autistic disorder, commonly referred to as autism, is a neurodevelopmental disability with diagnosis common prior to age three (Zachor, Ben-Itzhak, Rabinovich, & Lahat, 2007). The defining features of autism include impaired social interaction, impaired communication, and stereotyped or repetitive behaviours (American Psychiatric Association, 2000). The prevalence of autism is approximately 1 in 110 (Centers for Disease Control and Prevention, 2009), affecting boys at a greater rate than girls with a ratio of 4.3:1 (Newschaffer et al., 2007). As autism affects a significant number of individuals, it is important to examine and optimize treatment methods.

Although there are numerous treatments available for autism, the principles and procedures of applied behaviour analysis (ABA) used in Early Intensive Behavioural Intervention (EIBI) programs have been demonstrated to provide the most beneficial and long-lasting gains. ABA is the systematic application of learning principles and procedures to assess and improve the behaviours of individuals (Fazzio & Martin, 2010), and EIBI has been cited as the treatment of choice for children with autism (New York State Department of Health, 1999; Matson & Smith, 2008). Specifically, EIBI has resulted in significant numbers of such children obtaining scores of average intelligence, normal functioning and language skills, and diminished behavioural problems (e.g., Eikeseth, 2009; Smith, Eikeseth, Klevstrand, & Lovaas, 1997; Lovaas, 1987; McEachin, Smith, & Lovaas, 1993; Eikeseth, Smith, & Eldevik, 2002). EIBI is highly structured, typically involving 30-40 hours a week of one-on-one sessions with a trained instructor.

Typical skills taught to children receiving treatment include attending to tasks, basic discrimination skills, language and communication, daily living, socialization, play, fine and gross motor skills, and pre-academics (Zachor et al., 2007).

A procedure commonly used in implementing EIBI with children with autism is discrete-trials teaching (DTT), a method for individualizing and simplifying instruction to enhance learning. Children receiving EIBI usually receive several hours of DTT daily (Fazzio & Martin, 2010). DTT breaks down ordinary interactions into discrete events that are more easily discriminated by the individual (Smith, 2001). In DTT, a teacher first provides an antecedent such as an instruction (e.g., “point to the ball”). The child then responds (e.g., by pointing to the ball or not), and may be prompted by the teacher (e.g., physical guidance) to minimize errors. If the child responds correctly, then the behaviour is reinforced (e.g., with praise). Finally, the teacher pauses for a 1-5 second inter-trial interval before presenting the child with the next antecedent (Smith, 2001). Thus, there are three essential components of a discrete-trial; an antecedent, a behaviour, and a consequence. The trials are usually presented in blocks of 10-20, each trial with a duration of 5-20 seconds, providing many learning opportunities. DTT is useful for teaching numerous behaviours, such as different forms of behaviour (e.g., speech sounds and motor skills), new discriminations (e.g., responding correctly to requests), and managing disruptive or problem behaviours (Smith, 2001).

In a review of DTT literature, Thomson, Martin, Arnal, Fazzio, and Yu (2009) examined 20 published experiments evaluating the procedures used for teaching individuals to conduct DTT. The most common training methods consisted of: (a) various forms of instruction (e.g., written, verbal, and videotaped), (b) demonstration or

modeling, (c) feedback from the experimenter, and (d) role-playing and practice.

Reported changes in DTT accuracy from baseline ranged from 9.67 % to 98%. However, different experimental designs and instructional procedures were used in the experiments, and changes in accuracy were not always reported or applicable (e.g., Arco, 1997; McBride & Schwartz, 2003; Ryan & Hemmes, 2005). The review emphasized several limitations of the research that has been completed in evaluating instructional methods for teaching DTT. Specifically, the descriptions of the training procedures were often brief and not always detailed enough, creating a difficulty in replication. The studies also lacked procedural reliability measures, did not include generalization assessments, and the duration of the training time was not always stated. Moreover, throughout the studies, participants differed in the amount of DTT instruction that they received before training, and there was variability in the number of DTT components that were measured as the dependent variable. Due to these limitations, it is difficult to draw conclusions on the effectiveness of the instructional DTT methods reviewed. Based on the review by Thomson et al., it is clear that research is limited, and that there is a need for additional methodologically valid and reliable research in the evaluation of instructional methods for teaching individuals to conduct DTT.

Considering that researchers have demonstrated the effectiveness of EIBI and the use of DTT in the treatment of children with autism, and that the demand for early interventions is high, it is important for individuals such as parents/guardians, educators, therapists, and ABA tutors, to effectively provide and conduct DTT training sessions. Furthermore, as there are a large number of instructors that are required to implement DTT sessions in ABA programs (e.g., parents, teachers, and tutors), and that the turn-

over rate of these positions tends to be high, there is a need to develop efficient and economic training procedures for these individuals.

Self-Instructional Manuals for Teaching DTT

To address the need for an efficient method to teach behaviour modification skills such as DTT to individuals who work with individuals with autism, the use of a training manual has been examined by several researchers. For example, Koegel, Russo, and Rincover (1977) offered one of the first training manuals, and examined the manual with teachers conducting DTT sessions with children with autism. Their DTT manual was used along with a number of other teaching instruments such as video demonstrations, practice, and feedback. The results suggested that the training package increased DTT performance (37%). However, there was no component analysis so it is unclear which teaching component increased DTT performance (Thomson et al., 2009). Ryan and Hemmes (2005) also examined a training manual with verbal and video instruction, and practice that was used by special education employees who worked with children with autism. Their study suggested that mastery of their manual resulted in high DTT accuracy (85%). However, no baseline measures were taken, so it is unclear what level of accuracy the participants were at prior to the manual. Therefore, it is unclear of the degree to which DTT accuracy improved.

Fazio and Martin (2006) prepared *Discrete-Trials Teaching with Children with Autism: A Self-Instructional Manual*. Their manual was aimed at teaching ABA tutors to conduct DTT at the St. Amant ABA Preschool Program for Children with Autism, a government-funded facility that provides intensive ABA treatment for children with autism. The manual described an introduction to autism, behavioural principles, positive

and negative reinforcement, prompting procedures, fading procedures, error correction procedures, and data recording procedures. Since the first version of the manual in 2006, the manual has been revised three times in order to improve its effectiveness as a tool for teaching DTT. Revisions include the addition of content, study questions, and most recently, video demonstrations with practice components. Throughout the revision processes, researchers have field tested the effectiveness of the manual for teaching individuals (e.g., university students, tutors, and parents) to conduct DTT.

Self-Instructional Manual: Version 1. The first manual by Fazzio and Martin (2006) consisted of 21 pages of self-instruction and included 19 DTT components. In two experiments, Arnal et al. (2007) examined the self-instructional manual with university students. At Baseline in Experiment 1, four university students taught a confederate role-playing a child with autism to perform three tasks which are commonly taught to children with autism: (a) pointing-to-named pictures, (b) identity matching, and (c) motor imitation. Participants then studied and mastered the manual, which was demonstrated by obtaining 100% accuracy when tested on randomly selected study questions contained in the manual. Mastering the manual took an average of 2.2 hours. At the Post-training assessment, participants taught the same three tasks to a confederate role-playing a child with autism. Performance was scored using the Discrete-Trials Teaching Evaluation Form (DTTEF), which has been demonstrated to have good reliability and validity (Babel, Martin, Fazzio, Arnal & Thomson, 2008; Jeanson et al., 2010). Mean DTT performance increased from 44% in Baseline to 67% in Post-training (a 23% increase). Although obtaining promising results, only one student reached the 90% mastery criterion, and only on one of the three teaching tasks. Because Experiment

1 suggested that mastering the manual alone was not enough to produce mastery when teaching DTT, in Experiment 2, Arnal et al. included a video demonstration. Three participants studied and mastered the manual, and also scored a video demonstration of DTT, in which they received feedback on the accuracy of their scoring. Mean DTT accuracy increased from 36% in Baseline to 82% in Post-training assessment (a 46% increase), a greater increase than studying the manual alone. However, similar to the first study, only one participant achieved the 90% mastery criterion.

Fazzio, Martin, Arnal and Yu (2009) conducted a replication study using the 2006 version of the manual with five additional university students. As the previous study indicated that a method of feedback increased DTT accuracy, one to three sessions of feedback and demonstration were included with mastery of the study questions in the manual. If a participant met the 90% mastery criterion during the Post-training assessment while teaching a confederate role-playing a child with autism, then the participant moved on to a generalization phase where he/she taught the three tasks to a child with autism. If the participant did not achieve 90% mastery when teaching any one of the three tasks, then they received demonstration and feedback by the experimenter. It took an average of 2.6 hours to master the manual. Mean DTT performance increased from 34% at Baseline to 66% at Post-training assessment (a 32% increase) when studying the manual alone. Four of the five participants needed at least one session of feedback and demonstration. Following the feedback and demonstration, mean DTT performance increased to 92% at the Post-training assessment (a 58% increase), and to 91% when teaching a child with autism in a generalization phase. Although these results demonstrated substantial improvements in DTT performance, the component of

demonstration and feedback provided by the researchers defeated the purpose of the ‘self-instructional’ manual.

Self-Instructional Manual: Version 2. With feedback provided from participants of the previous studies, and using the results obtained from previous studies, Fazzio and Martin (2007) revised the manual to include 37 pages, 21 DTT components, twice as many study questions, and practice sections where the reader was prompted to engage in imaginary role-play. Thiessen, Fazzio, Arnal, Martin, and Yu (2009) examined the effectiveness of the revised 2007 version of the manual with four university students. Similar to the previous studies, at Baseline the students were to teach three tasks to a confederate role-playing a child with autism. Then they studied and mastered the manual, and at Post-training assessment they taught the same three tasks to a confederate role-playing a child with autism. If the students reached 80% mastery on a task, then they took part in a generalization phase where they taught the three tasks to a child with autism. The participants took an average of 4 hours and 34 minutes to master the manual, and their mean DTT performance increased from 52% at Baseline to 88% at Post-training (a 36% increase) with a confederate role-playing a child with autism, and to 77% when teaching a child with autism in a generalization phase (three participants proceeded to teach all three tasks and one participant taught two tasks). These results demonstrated greater improvements in DTT accuracy compared to the previous two studies of the first version of the manual, suggesting that the revised manual was more effective in teaching individuals to perform DTT.

Salem et al. (2008) also examined the effectiveness of the 2007 manual with the addition of video demonstrations of DTT. At Baseline, four university students taught

three tasks to a confederate role playing a child with autism. Then they studied and mastered the manual, watched video demonstrations for specific sections, and practiced the material. At the Post-training assessment, participants taught the same three tasks to a confederate role-playing a child with autism. It took an average of 4 hours and 47 minutes to master the manual. Two of the four participants obtained the 85% mastery criteria in the Post-training assessment, and proceeded to a generalization phase with a child with autism. Mean DTT performance increased from 45.5% during Baseline to 78% at Post-training (a 32.5% increase), and averaged 74%. The results were similar to Thiessen et al. (2009).

Thomson et al. (2010) also examined the above manual, and with the aid of video demonstrations. These researchers evaluated the manual with four pairs and eight individual tutors from the St. Amant ABA Preschool Program for Children with Autism who were to be trained to work with children with autism in the program. Similar to previous studies, at Baseline, participants taught three tasks to a confederate role-playing a child with autism. Then they studied and mastered the manual. If tutors did not meet the mastery criterion of 80% during the Post-training assessment, then they watched a video demonstration of DTT. Participants required 4.6 hours to master the self-instructional manual, and demonstrated a mean improvement of 32.2% in DTT accuracy. Overall, 13 out of the 16 participants met mastery. Specifically, only three met mastery after the manual alone, and 10 met mastery after the manual and the video demonstration. After exposure to the video, performance improved an average of 12%. Thus, these results demonstrated that the video was clearly beneficial as an accompaniment to the manual for learning DTT.

Self-Instructional Manual: Version 3. The third version of the manual by Fazio and Martin (2009) included new topics (e.g., how to record data), 62 pages, six more Chapters for a total of 12, and 42 more study questions. The third manual was more in-depth, descriptive and specific. Boris et al. (in press) examined the revised 2009 version of the manual for teaching university students to apply DTT. Like previous evaluations of the earlier versions of the manual, at Baseline three participants taught a confederate role-playing a child with autism three tasks commonly taught to children with autism. The participants then studied and mastered the manual, and taught the same tasks to a confederate role-playing a child with autism. If 80% mastery was obtained in the Post-training assessment, participants partook in a generalization phase where they taught DTT to a child with autism. If a participant did not obtain the 80% mastery criterion when teaching the confederate, then they received a feedback and demonstration session provided by the author. It took an average of 6 hours and 41 minutes to master the manual, and mean DTT performance increased from 45% at Baseline to 82% (a 37% increase) at Post-training assessment. One of the three participants required a feedback and demonstration session, which increased her DTT performance to 91%. Generalization when teaching a child with autism averaged 83%. As demonstrated by the larger increase in DTT accuracy, the 2009 version of the manual was effective in teaching DTT; however, the feedback and demonstration that was required for one participant defeated the purpose of a 'self-instructional' teaching method.

Scherman (2010) also evaluated the third edition of the manual. In this study, DTT was taught through a computer aided personalized system of instruction (CAPSI) with university students. With CAPSI, individuals can progress through units of material

sequentially, are required to demonstrate mastery before moving on, proceed at their own pace, and receive feedback on their performance (Martin & Pear, 2011). Moreover, the use of CAPSI is cost efficient, economical and is quite ‘self-instructional’ which promotes the purpose of the manual itself. Five university students were given 55 days to study and master the manual on their own time and in their preferred location (e.g., home). Assessments (Baseline and Post-treatment) were conducted in a testing room at the University of Manitoba. Participants required an average time of 12 hours and 48 minutes to read the manual, answer the study questions, take unit tests, peer review, and complete the self-practice exercises. Study time was self-reported. Mean DTT performance increased from 55% at Baseline to 85% at Post-training assessment (a 30% increase) with a confederate role-playing a child with autism. As the results demonstrated a considerable improvement in DTT accuracy, the combination of studying the manual with the use of CAPSI may be an effective way to learn DTT. Furthermore, the results were in support of the effectiveness of the 2009 version of the manual, which was more detailed. However, the amount of time required to master the manual (12 hours and 48 minutes) was not as time efficient in training individuals to conduct DTT as in the previous studies.

Self-Instructional Manual: Version 4. As demonstrated by Boris et al. (in press), and Scherman (2010), the 2009 version of the manual was effective in teaching DTT. However, the results of Thomson et al. (2010) with the 2007 version of the manual suggested that the use of video demonstrations have the potential to further promote DTT learning and accuracy in a self-instructional way. Therefore, there is value in combining

the manual and incorporating the video demonstrations into the manual so that the condition is more 'self-instructional'.

To address this issue, Fazzio and Martin (2010) revised the manual for a fourth time so that it is now designed to teach 20 components that comprise DTT. The manual consists of 65 pages, 12 Chapters, and 111 study questions. In Chapter 1, the reader is prompted that some of the study questions are boldfaced, and that "mastery of the boldfaced questions is essential to learning how to conduct DTT." The reader is also prompted to take a mastery test of the boldfaced questions after studying Chapters 1 through 6, and a second mastery test of the boldfaced questions after studying Chapters 7 through 12. Moreover, the manual includes the addition of incorporated video demonstrations so that after Chapters 8, 10, and 11, the reader is prompted to stop and attend to the video demonstrations, then to self-practice the material learned.

Statement of the Problem

As there is a need for rapid and effective methods to train individuals in DTT, and the demand for early behavioural interventions is high, the current study evaluated the fourth edition of the Fazzio and Martin (2010) combined manual and video demonstrations with newly-hired tutors at St. Amant. The participants' accuracy was assessed at Baseline where they taught a confederate role-playing a child with autism to perform three tasks commonly taught to children with autism: (a) pointing-to-named pictures, (b) identity matching, and (c) motor imitation. The tutors then studied and mastered the self-instructional manual in two parts. Part 1 consisted of Chapters 1 through 6 and included a total of 40 boldfaced study questions. A random selection of 10 questions from those Chapters was selected for the mastery test. Part 2 consisted of

Chapters 7 through 12 and included 35 boldfaced study questions. A random selection of 10 study questions from Part 2 was chosen for the second mastery test. Part 2 included the video demonstrations and self-practice exercises that were found after Chapters 8, 10, and 11. After mastering Part 2 of the manual, participants taught the same three tasks as in Baseline to a confederate role-playing a child with autism. There was a generalization phase with one tutor, where DTT accuracy was assessed when teaching DTT to a child with autism whom she had been assigned to work with in the St. Amant ABA Preschool Program for Children with Autism.

Method

Participants and Setting

Participants consisted of 13 newly-hired tutors (11 female, 2 male) recruited from the St. Amant ABA Preschool Program for Children with Autism. When initially hired, each tutor was mailed a recruitment letter from the Privacy Officer, or received the recruitment package at an administrative meeting. The letter invited the individual to participate in the study, in which they would receive DTT training during regularly paid work hours when he/she would otherwise be receiving training from the ABA Program staff. The letter emphasized that participation was voluntary, and participation in the study would in no way effect the individual's status at St. Amant. In an accompanying letter, the consent form was provided. If the tutor wished to participate in the study, then he/she was instructed to return the consent form by mail, or verbally indicate so to the staff conducting the administrative meeting. Background information including academic background, experience with children with autism, and experience with DTT, was collected from all participants. Eleven of the 13 participants had attended a post-secondary institution. Of those 11 participants, eight had a background in psychology,

ranging from taking one course, to holding an Honours degree. Three participants had prior experience with children with autism; one participant had a family member with autism, one provided respite services, and the other volunteered. One participant had prior exposure with DTT through canine training. Baseline assessments, training sessions, and post-training assessments were conducted in a testing room at St.Amant.

To recruit children with autism from the St.Amant ABA Preschool Program for Children with Autism for generalization assessments, a recruitment letter inviting the children to participate in the study was sent by the Privacy Officer of the ABA program to the parents/ legal guardians of the children to whom the new tutors had been assigned to work with. In an accompanied letter, the consent form was provided. The consent form emphasized that participation would be voluntary, and would not affect present or future services provided to the family by St.Amant. One consent form was returned after the initial recruitment packages were sent, so another round of recruitment packages were sent, approximately three months later. If consent was given, the form was returned to the St.Amant research office by mail and the parent/legal guardian of the child was contacted. One child with autism participated in the generalization phase of the study, who worked with Participant 2.

Materials

In Baseline, the participant received three, one-page summaries of procedural steps to teach each task: (a) pointing-to-named pictures, (b) identity matching, and (c) motor imitation, as well as the data sheets for these tasks in order to record responses of the confederate (see Appendix A). They also received picture flash cards to teach the tasks, edibles for reinforcement, and a pen. A scoring sheet, the Discrete-Trials Teaching

Evaluation Form (DTTEF; Fazzio, Arnal, & Martin, 2010) was used to record the participant's DTT performance (see Appendix B).

During training, the participant received a 65-page self-instructional manual on conducting DTT (Fazzio & Martin, 2010), blank paper, a pen, a highlighter, picture flash cards, edibles for reinforcement, and photocopies of the exercises and data sheets that would be used for self-practice after Chapters 8, 10, and 11. Additionally, a computer or video camera was provided in order to videotape the tutors' self-practice routine. The participant also had access to a computer while studying the manual to observe four video demonstrations. Part A of the video demonstrated how to prepare a teaching session. Part B demonstrated managing antecedents and consequences for correct responses on DTT trials. Part C demonstrated most-to-least prompt fading. Finally, Part D demonstrated managing antecedents and consequences for incorrect responses. There were two mastery tests administered to the participants. The first was based on Chapters 1 through 6 (Part 1). The second was based on Chapters 7 through 12 (Part 2). Each test consisted of 10 randomly selected questions that were boldfaced in the manual.

In the Post-training assessment, the participant received a one-page outline of the components of the DTTEF. They also received a data sheet for each task in order to record the responses of the confederate role-playing a child with autism, picture flash cards to teach the tasks, edibles for reinforcement, and a pen. The DTTEF was used to score the participant's DTT accuracy, and this session was also videotaped.

In the generalization phase, the participant received an outline of the 20 components of the DTTEF. The participant used a pen, data sheet, and stimuli for the respective assessment. Stimuli used in current ABA programming were used in the

generalization phase. For the matching task, toy cars were used, and the child was required to match a sample toy car to an array of three toy cars. For the imitation task, the exemplars consisted of the vocal instruction “do this” to imitate moving a plastic cup, zipping up a zip-lock bag, and jumping up and down.

Procedure

I used a modified multiple-baseline design across a pair of participants, replicated across six pairs and an AB design with one individual to evaluate the effectiveness of the revised 2010 DTT self-instructional package for teaching newly-hired tutors at St. Amant to apply DTT. The protocol and procedure of the study was approved by the University of Manitoba Psychology/Sociology Research Ethics Board, and the St. Amant Research Access Committee.

Phase 1: Baseline. Participants were taken to a private testing room at St. Amant. First, a participant was provided with a brief introduction to the project and a timeline for the study. Next, the participant was asked to read three, one-page summaries of procedural steps to teach three tasks to a child with autism: a) pointing-to-named pictures (when three options are placed in front of the child) , (b) identity matching (e.g., when a picture of a dog, a house, and a tree are placed in front of a child, and the child is given a picture of the dog, the correct response is to match the pictures of the dog by placing one picture on top of the other), and (c) motor imitation (e.g., a teacher will touch his or her nose, and say “do this”). The tasks were selected from the curriculum for the St. Amant ABA Preschool Program for Children with Autism and were the tasks used in the previous studies. Once the participant indicated that he/she had finished reading the summary for a task, he/she attempted to teach 12 trials of that task to a confederate role-

playing a child with autism. The confederate followed a script for each task (see Appendix C), indicating how to respond to the instruction (e.g., correctly or incorrectly), what prompting level was required in order to respond, and if the confederate was to be attending or not attending to the instructor. Next, the second teaching task summary was introduced. The participant studied the summary page, and then proceeded to teach 12 trials of that task to the confederate. This process was repeated with the last teaching task. The orders of the tasks that the tutor taught to the confederate were randomized for each participant and across assessments. A participant's DTT accuracy was evaluated with the DTTEF.

Phase 2: Training. After Baseline, the participant was sitting at a table and was introduced to the self-instructional manual. The participant was asked to study Chapters 1 through 6 (Part 1), which provided an introduction to autism, and described basic learning principles and techniques that provide an important foundation for DTT (e.g., positive reinforcement, common teaching tasks, antecedents for responses, and fading prompts). Throughout the manual, the participant was presented with two types of study questions. The first type of question prompted the participant to learn background information about ABA. The second type, which were presented in bold font, required the participant to learn material that is essential to learn in order to successfully conduct DTT. While studying Part 1 of the manual, the participant was prompted to study and learn the boldfaced questions as they were encountered, and that they were to be tested on those questions after completion of Chapter 6. After each chapter, the manual prompted the participant to go back and retest himself/herself on the boldfaced questions, and to be sure that the questions could be answered with 100% accuracy before proceeding to the

next chapter.

After the participant indicated that he/she was finished studying Chapters 1 through 6, then he/she took a mastery test of the boldfaced questions presented in those chapters. There were 40 boldfaced questions presented throughout Chapters 1 through 6, and 10 were randomly selected for the test. The test was graded upon completion by the primary researcher, and to obtain mastery, the participant was required to answer each question correctly. If 100% accuracy was not obtained, then the participant was asked to restudy the material for the incorrect question(s) only, and rewrite the answers to those question(s).

Next, the participant studied and mastered Chapters 7 through 12 (Part 2), which covered specific steps for conducting DTT sessions with children with autism (e.g., learning to take data, managing consequences, and error correction), and strategies for decreasing challenging or problem behaviours of children with autism. While studying Part 2 of the manual, the participant was prompted to study the boldfaced questions as they were encountered, and that they would be tested on those questions after completion of Chapter 12. After each chapter in Part 2, the manual prompted the participant to go back and retest himself/herself on the boldfaced questions, being sure to be able to answer them with 100% accuracy before proceeding to the next chapter.

In Part 2 of the manual, the participant was prompted to stop and watch four video demonstrations. After the video demonstrations, they were prompted to stop and engage in self-practice exercises corresponding to the material. After mastering the study questions in Chapter 8, then the participant was prompted to watch Part A of a video demonstration on preparing to conduct a teaching session. After watching the

demonstration, the participant was prompted to “stop and practice” the material learned where he/she was required to make stimuli with paper provided, and to role-play the six components of preparing to conduct a DTT teaching session using a datasheet provided (see Appendix D). The manual instructed the participant to use their imagination, and role-play the 6 components, and on a data sheet, check off each component as it was completed. The participant was left in the testing room, and instructed to engage in the self-practice activities as they were encountered in the manual, and were instructed to use the data sheets provided to record their self-practice activities. After mastering the study questions in Chapter 10, the participant was prompted to stop and watch Part B of the video on managing antecedents and consequences for correct responses, and Part C of the video, a demonstration of most-to-least prompt fading. After watching the videos, the participant was prompted to engage in a role-play activity provided in the manual involving the components of the DTTEF that had been covered, and to score his/her performance using the DTTEF. Specifically, the participant was instructed to practice teaching identity matching to a child. The participant was required to conduct and record eight trials of the task with an imaginary child. Furthermore, the participant was required to rate his/her performance using a data sheet provided, and to practice until he/she had mastered the components. The fourth video demonstration was presented after mastery of Chapter 11 study questions, where the participant was prompted to watch Part D of the video, which demonstrated managing antecedents and consequences for incorrect responses. The participant was prompted to stop and practice and role-play DTT trials of teaching a pointing-to-named pictures task, and to score his/her performance. When

completed, he/she was to repeat the exercise for teaching imitating a simple-actions task, and then to proceed to Chapter 12.

Once the participant had finished studying and mastering the study questions in Chapter 12, he/she was tested on Part 2 of the manual. There were 35 boldfaced questions in Chapters 6 through 12, and 10 were randomly selected for testing. The test was graded upon completion, and to obtain mastery, the participant needed to answer each question correctly. If 100% accuracy was not obtained, the participant was asked to restudy the material for the incorrect question(s) and rewrite the answer to the question(s).

Phase 3: Post-training assessment. Following mastery of Part 2 of the manual, the Post-training assessment was completed. The participant attempted to teach a confederate role-playing a child with autism 12 trials of each of the same three tasks that were attempted at Baseline (pointing-to-named pictures, identity matching, and motor imitation). The participant was provided with a data sheet for each task to record the responses of the confederate, picture flash cards to teach the tasks, edibles as reinforcers, and a pen. Additionally, the participant was provided with a summary sheet containing the 20 components of the DTTEF. The DTTEF was used to score the participant's DTT performance.

Phase 4: Generalization. Permission was received for generalization sessions to be conducted with only one child, so that only Participant 2 participated in this phase. The participant was required to achieve 80% DTT accuracy in Post-training on a task in order to teach that task in the generalization phase, and did so for identity matching and

motor imitation. Participant 2 was assessed in a generalization phase 32 days following the Post-training assessment.

Inter-Observer Agreement (IOA)

To assess IOA, I scored each participant's performance using the DTTEF. A second trained observer scored 42% of the sessions using the DTTEF. An agreement occurred when the observer and I and scored an item the same (e.g., as correct or incorrect). A disagreement occurred when the observer and I scored an item differently (e.g., one of us scored the item as correct while the other scored the item as incorrect). Percent agreement was computed for each scored session by dividing the number of agreements by the number of disagreements plus agreements, and multiplying by 100% (Martin & Pear, 2011). The mean percent agreement was 95%, ranging from 76% to 100%. Although a score of 76 % agreement is not ideal, it occurred in Baseline where it is more difficult to determine that the participant is doing and when trials begin and end. Without this outlier, agreement ranged from 88% to 100%.

Procedural Integrity (PI)

To ensure the procedure was followed correctly, I followed a script. There were specific scripts for each phase of the study (Introduction, Baseline; see Appendix E, Intervention, Post-study assessment, and Generalization). An observer recorded whether the procedure was followed as planned using the appropriate procedural reliability sheet for the phase of the study. For a phase, PI was determined by computing the percent of steps that were administered correctly during that session. PI was completed for 32% of the sessions, and averaged 100%. Confederate PI was taken for sessions, confederate PI 33.3% of the sessions. The confederate's PI averaged 95%, ranging from 82% to 100%.

Results

The Self-Instructional Package

Participants required an average of 3 hours and 56 minutes to master the manual, ranging from 3 hours and 15 minutes to 5 hours and 15 minutes. This included study time, taking the two mastery tests, self-practice activities, and watching the video demonstrations. On mastery test 1, participants averaged 97.6% accuracy, ranging from 90% to 100%. On mastery test 2, participants averaged 98.4%, ranging from 90% to 100%. The maximum number of questions that had to be re-tested was one question until mastery was achieved, and re-testing occurred for six participants.

Participants' scores across tasks in Baseline assessments and in Post-training assessments were averaged and compared. Additionally, the data were analyzed by visual inspection of the graphs, as described by Martin and Pear (2011). As demonstrated in Figures 1 and 2, the Baseline scores remain relatively stable across sessions.

Performance improved just slightly over time only for Participants 3, 9, and 13, however, for Participants 3 and 13, the effect from baseline to post-training was still sizable.

Comparing Baseline and Post-training data points, scores increased immediately and sizably following the treatment package, with the exception of Participant 12. This suggests that improvement in performance was due to the self-instructional package.

As demonstrated in Figure 1, Participant 1 showed sizable improvement in DTT accuracy after exposure to the self-instructional package. During Baseline, Participant 1 averaged 46% (matching, 39.8%; pointing, 49.1%; imitation, 49%). In the Post-training assessment, Participant 1 averaged 89.3% (matching, 88.7%; pointing 88.7%; imitation

Figure 1. Percent of DTT items performed correct on the 20-item DTTEF (matching ▲, pointing ■, imitation ●) for Participants 1-7; Baseline (BL), Post-Manual (PM), and Generalization (GEN).

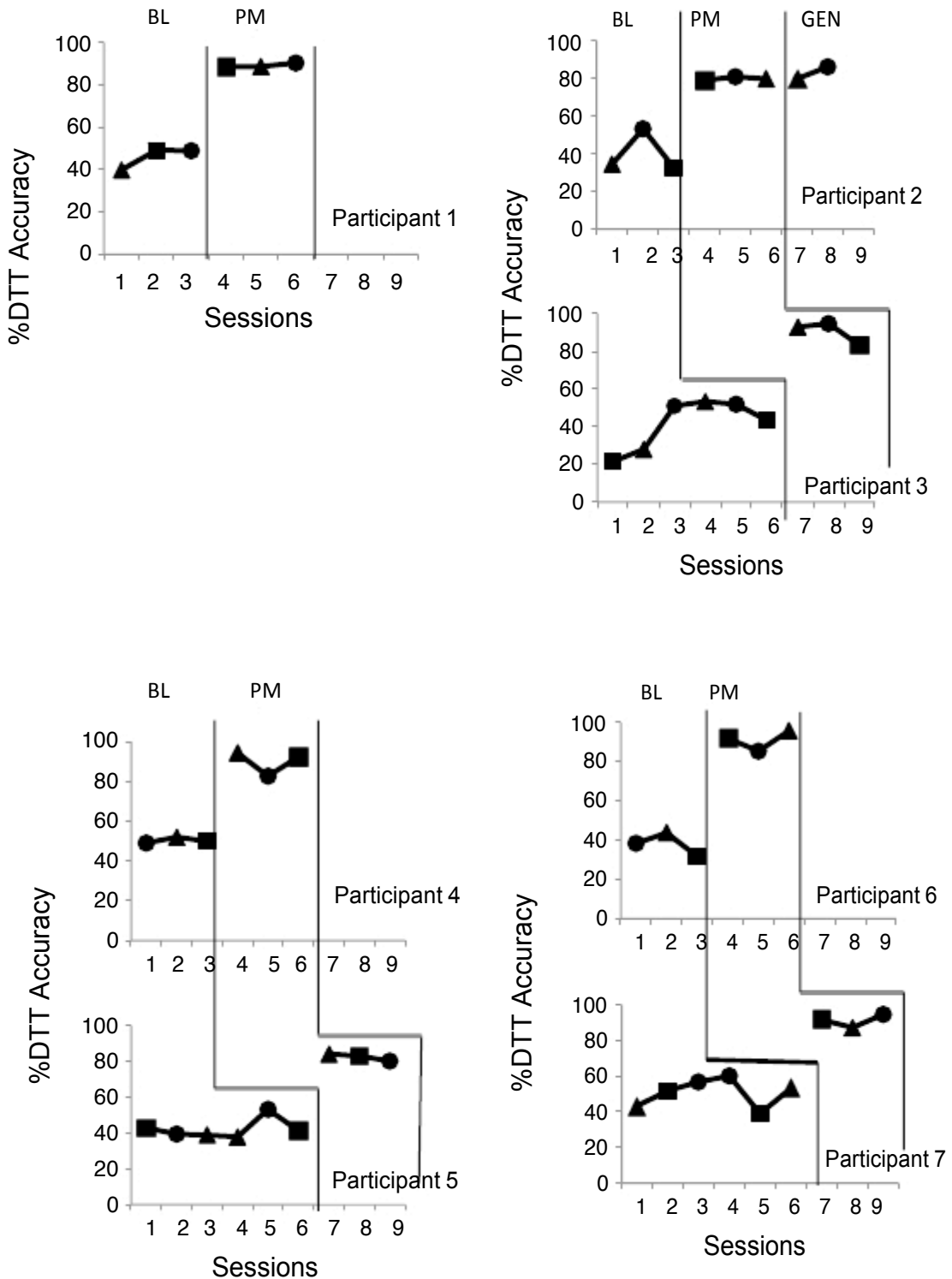
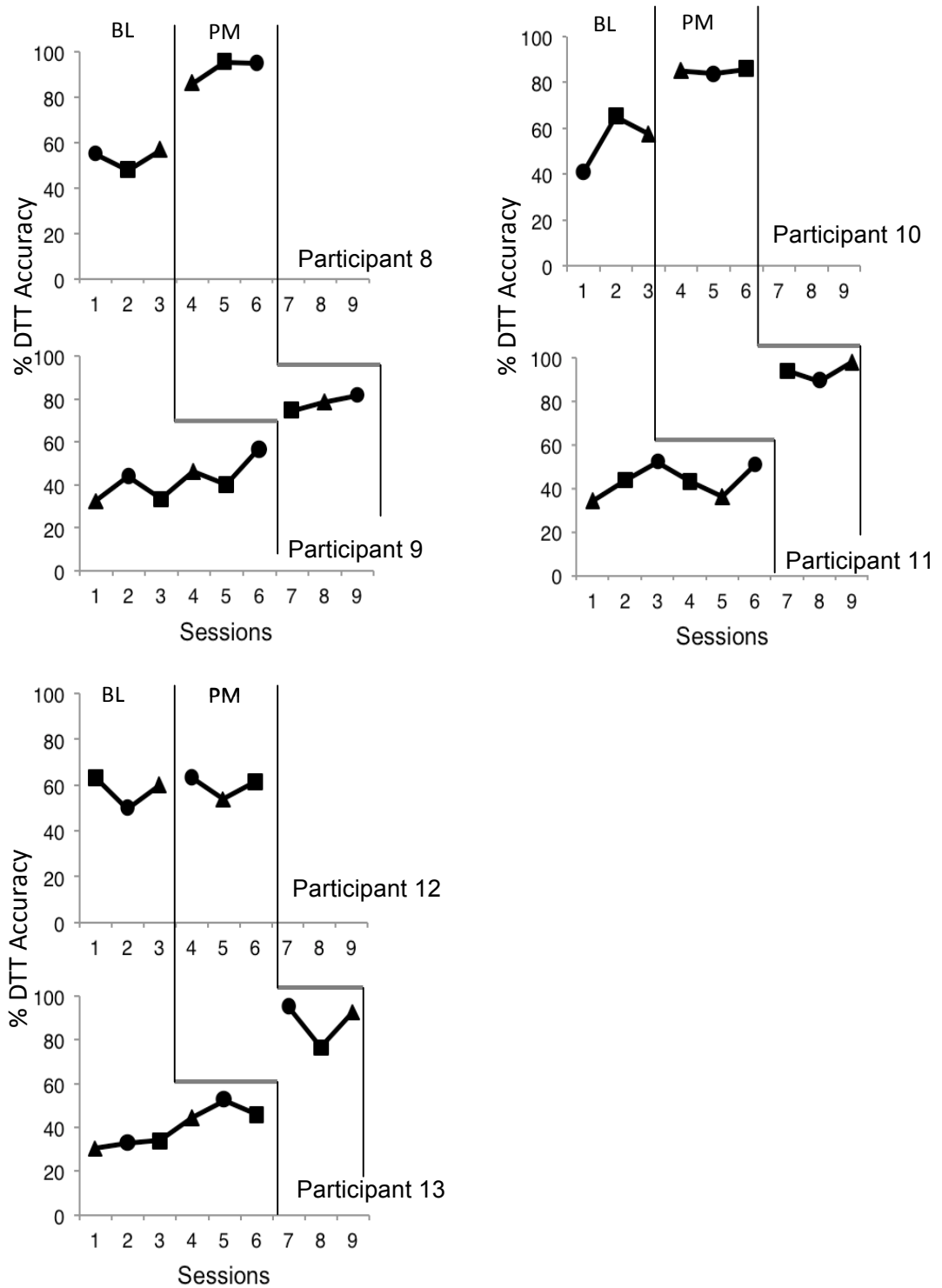


Figure 2. Percent of DTT items performed correct on the 20-item DTTEF (matching ▲, pointing ■, imitation ●) for Participants 8-13; Baseline (BL), Post-Manual (PM).



90.5%). Thus, there was a 43.3% increase in DTT accuracy, and the mastery criterion of 80% was achieved for all three tasks.

Participant 2 showed a sizable improvement in DTT accuracy after exposure to the self-instructional package. During Baseline, Participant 2 averaged 40.2% (matching, 34.4%; pointing, 32.7%; imitation, 53.4%). In the Post- training assessment, DTT accuracy averaged 80.1% (matching, 80%; pointing, 79.1%, imitation, 81.1%). Participant 2's DTT accuracy improved a sizable mean of 39.8%, meeting the mastery criterion for all three tasks.

Participant 3's DTT performance also increased sizably from Baseline to Post-training assessment. As Participant 3 was paired with Participant 2 in a modified multiple-baseline design, Participant 3 completed the Baseline phase twice. That is, Participant 3 completed the three tasks comprising one Baseline phase (identity matching, pointing-to-named pictures, and motor imitation) and then completed the same three tasks again at approximately the same time that Participant 2 was finished training. During Baseline, Participant 3 averaged 41.6% in DTT accuracy (matching, 28%, 53.4%; pointing, 21.5%, 43.6%; imitation, 51%, 51.9%). After exposure to the self-instructional package, Participant 3's DTT accuracy increased to an average of 90.4% (matching, 93%; pointing, 83.3% imitation, 94.9%), improving a sizable mean of 48.8% in DTT accuracy. Participant 3 met the mastery criterion for all three tasks.

Like Participants 1, 2, and 3, Participant 4 demonstrated substantial improvement in DTT accuracy. At Baseline, Participant 4 had a mean score of 50.3% (matching, 52%; pointing, 50%; imitation, 49%). After exposure to the self-instructional package, DTT accuracy improved to a mean of 89.8% (matching, 94.3%; pointing, 92.3%; imitation,

82.7%), a 39.5% increase in DTT accuracy. Participant 4 met the mastery criterion for all three tasks.

Additionally, Participant 5's DTT accuracy increased from Baseline to Post-assessment. Across two Baseline phases, mean DTT accuracy averaged 42.4% (matching, 39.9%, 37.8%; pointing, 42.7%, 41.3%; imitation, 39.4%, 53.1%). At the Post-training assessment, scores averaged 82.4% (matching, 84%; pointing, 83%; imitation 80.2%). Thus Participant 5's DTT accuracy increased sizably, at a mean of 40%, and Participant 5 met the mastery criterion for all three tasks.

Participant 6's DTT accuracy increased substantially from Baseline to Post-training. At Baseline, Participant 6's mean DTT accuracy was 37.9% (matching, 43.8%; pointing, 31.6%; imitation, 38.4%). Following exposure to the self-instructional package, DTT accuracy increased to a mean of 90.9% (matching, 95.6%; pointing, 91.7%; imitation, 85.3%), demonstrating a mean improvement in DTT accuracy of 53%, the largest improvement of all the participants. Participant 6 met the mastery criterion for all three tasks.

Similar to previous participants, Participant 7 improved in DTT accuracy from Baseline to Post-assessment. Across two Baseline phases, DTT accuracy averaged 50.6% (matching 43.2%, 53%; pointing, 51.7%, 39%; imitation 56.8%, 60%). After exposure to the self-instructional package, mean DTT accuracy improved to 90.9% (matching, 87%; pointing, 91.3%; imitation, 94.5%). Thus Participant 7's mean DTT accuracy increased 40.3%, and Participant 7 met the mastery criterion for all three tasks.

As demonstrated in Figure 2, Participant 8's DTT accuracy improved from Baseline to Post-assessment. During Baseline, mean DTT accuracy was 53.3%

(matching, 57%; pointing, 48%; imitation, 55%). At the Post-training assessment, mean DTT accuracy increased to 92.3% (matching, 86.6%; pointing, 95.6%; imitation, 94.8%). Thus, Participant 8's mean DTT accuracy improved 39% following exposure to the self-instructional package. Moreover, like the previous participants, the mastery criterion was met for all three tasks.

Participant 9 demonstrated a moderate improvement in DTT accuracy after exposure to the self-instructional package. Across two Baseline sessions, scores averaged 42.3% (matching, 32.6%, 46.3%; pointing, 33.6%, 40.3%; imitation, 44%, 56.8%). Post-training scores averaged 78.5% (matching, 78.7%; pointing, 75%; imitation, 81.9%). Thus participant 9's DTT accuracy increased 36.2% from Baseline to Post-training. Although there was a sizable increase in DTT accuracy from Baseline to Post-training, this participant met the mastery criterion for only one of the three tasks.

Like Participant 9, Participant 10 demonstrated a moderate Post-training improvement in DTT accuracy. Baseline scores averaged 54.7% (matching, 57.7%; pointing, 65.5%; imitation, 40.9%). After training, mean DTT accuracy was 85% (matching, 85.3%; pointing 86.2%; imitation, 83.6%), improving 30.3%. Participant 10 met the mastery criterion for all three tasks.

Across two Baseline phases, Participant 11 averaged 43.5% DTT accuracy (matching, 34.5%, 36.3%; pointing, 43.9%, 43.1%; imitation, 52.3%, 50.9%). After exposure to the self-instructional package, mean DTT accuracy increased sizably to 94% (matching, 98.1%; pointing, 94.2%; imitation, 89.6%), improving 50.5%. Participant 11 met the mastery criterion for all three tasks.

As seen in Figure 2, Participant 12's graph exhibited overlapping data points from Baseline to Post-training, showing little to no change in DTT accuracy. Participant 12's Baseline scores averaged 57.9% (matching, 60.2%; pointing, 63.5%; imitation, 50%), and Post-training scores averaged 59.7% (matching, 53.8%; pointing, 61.7%, imitation, 63.5%). This change in DTT accuracy only averaged 1.8% improvement. Specifically, Participant 12's matching task score, and pointing-to-named pictures score decreased from Baseline to the Post-training assessment, 6.4%, and 1.8%, respectively. However, this participant's imitation task score increased slightly, 13.5%. Participant 12 did not meet the mastery criterion for any of the three tasks.

Although Participant 12's improvement in DTT accuracy was small, Participant 13 displayed no overlapping data points, demonstrating a sizable improvement in DTT accuracy from Baseline to Post-training. Across two Baseline phases, DTT accuracy averaged 40.1% (matching, 30.4%, 44.5%; pointing, 33.9%, 46%; imitation, 32.9%, 52.8%). After exposure to the self-instructional manual, mean DTT accuracy increased to 88.1% (matching, 92.7%; pointing, 76.5%; imitation, 95.2%). Thus, Participant 13's DTT accuracy improved 48%, and the mastery criterion was met for two of the three tasks.

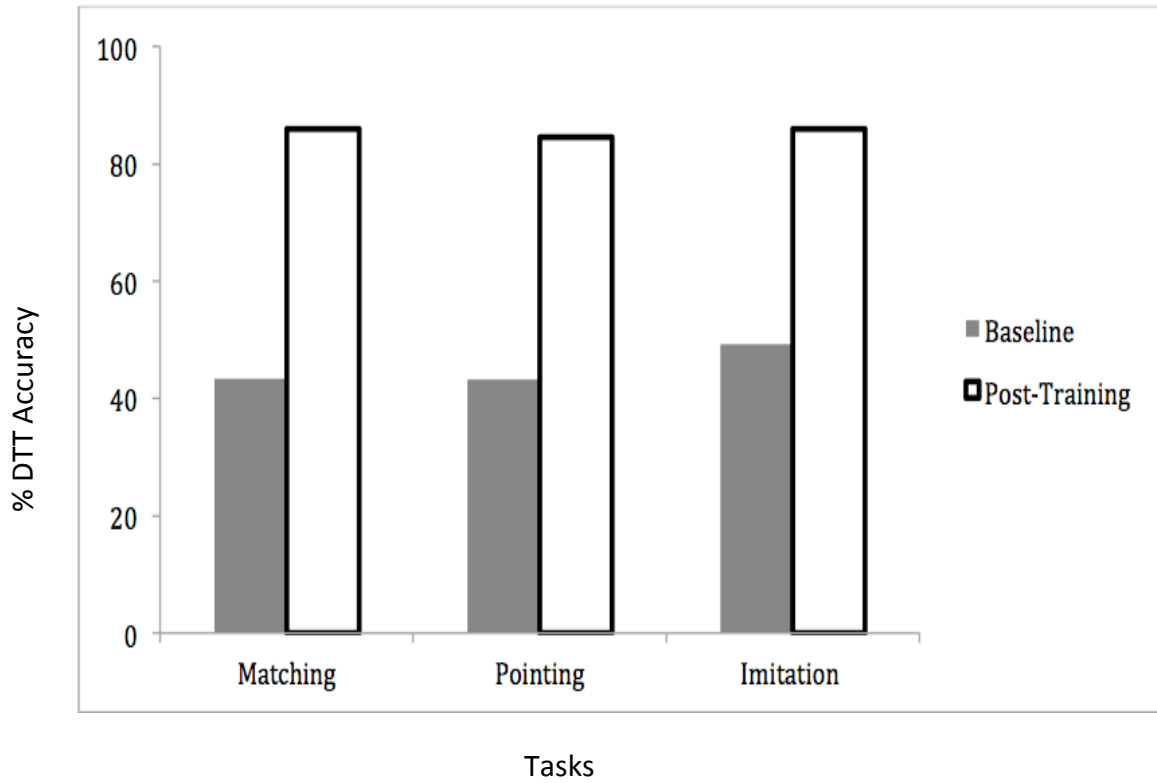
After exposure to the self-instructional package, the average increase in DTT accuracy was 39.3% (Baseline, 46.2%; Post-training, 85.5%). A paired samples *t*-test was conducted to determine if the differences in scores from Baseline ($M = 46.2$, $SD = 6.4$) and Post-training ($M = 85.5$, $SD = 9.1$) were statistically significant. Results indicated that the improvements from Baseline to Post-training were in fact statistically significant, $t(12) = 10.9$, $p < .001$.

Overall 9 of the 13 participants met the mastery criterion of 80% DTT accuracy on all three tasks in Post-assessment. Two participants met criterion on two of the three tasks, one participant met the criterion on one task, and Participant 12 did not meet criterion on any of the tasks. Comparing the three tasks assessed in Baseline and Post-training (identity matching, pointing-to-named pictures and motor imitation), Figure 3 reveals that the mean DTT accuracy across the tasks was similar. Specifically, during Baseline assessments, participants averaged 43.4% during the matching task, 43.2% during the Pointing-to-named pictures task, and 49.3% DTT accuracy in the imitation task ($SD = 3.5$). Furthermore, during Post-training assessments, participants averaged 85.9% during the matching task, 84.5% during the pointing-to-named pictures task, and 86% in the imitation task ($SD = 0.84$). Thus, the mean scores across tasks were similar, suggesting that the level of difficulty of each task was similar.

Generalization

Due to a lack of successful recruitment of the children with autism to which the participants had been assigned to work with, only one generalization assessment was completed. Participant 2 partook in the generalization phase, teaching identity matching and motor imitation tasks on which she had achieved at least 80% DTT accuracy during the Post-training assessment. In Generalization, DTT accuracy was 80.1% for the matching task, and 86.4% for the imitation task. Thus, DTT accuracy remained stable for the matching task (DTT accuracy being 79.9% at Post-assessment), and increased slightly (5.3%) in the imitation task. Furthermore, DTT accuracy met the mastery criterion of 80%, 32 days later.

Figure 3. Average DTT accuracy across Tutors 1-13 represented by task (matching, pointing, and imitation) across phases (Baseline and Post-training).



Self-practice Activities

Self-practice activities were videotaped and scored using the DTTEF. As the self-practice activities were not monitored, the way in which tutors interpreted and followed instructions varied, as did how they engaged in the activities. In the first self-practice exercise, Participants 1, 4, 5, 6, 7, 9 and 11 scored 100% accuracy when role-playing the six components on how to conduct a teaching session. Participant 8 scored 80% accuracy, and Participant 10 scored 83% accuracy. Participants 2, 3, 12, and 13's performances were not able to be scored using the DTTEF. Participants 2, 12, and 13 did not engage in the activity, but sat quiet and appeared to be thinking. Participant 3 spoke into the camera and attempted to verbally indicate what she would do to conduct a teaching session by describing procedural steps.

The second self-practice activity required the tutor to engage in role-playing the identity matching task. Participant 1 scored 92.8% accuracy, Participant 4 scored 75% accuracy, Participant 5 scored 69.6% accuracy, Participant 6 scored 63% accuracy, Participant 7 scored 68% accuracy, Participant 8 scored 66.7% accuracy, and Participant 10 scored 65% accuracy. Participants 2, 12 and 13 did not fully engage in the activity; it appeared that they sat there thinking and did not perform the trials. Participants 9 and 11 did not record their activity. Like the previous activity, Participant 3 verbally indicated what she would do during a matching task.

The last self-practice activity required tutors to role-play all the components of the DTTEF for the remaining two tasks, pointing-to- named objects, and motor imitation. For pointing-to-named pictures, Participant 1 scored 82.5% accuracy, Participant 5 scored 72.2% accuracy, Participant 7 scored 77.5% in accuracy, Participant 8 scored

66.3% accuracy, and Participant 10 scored 81% in accuracy. Participant 3 spoke into the camera, Participants 2 and 11 chose not to record the activity, and Participants 4, 6, 9, 12, and 13 sat in silence and appeared to be thinking. For the second component of Self-practice exercise 3, participants were instructed to role-play an imitation task. Participant 1 scored 89.9% accuracy, Participant 7 scored 66.7% accuracy, Participant 8 scored 81.3% accuracy, and Participant 10 scored 78% accuracy. Participant 6 engaged in hand motions. Participants 2, 11, 12, and 13 did not record the activity. The remaining participants (3, 4, 5, and 9) sat in silence.

Pearson correlations were computed to compare DTTEF scores during self-practice and DTTEF scores during post-training assessment for the participants who completed all three self-practice activities (e.g., involving matching, pointing, and imitation tasks). These participants consisted of Participant 1, Participant 7, Participant 8, and Participant 10. The results were not statistically significant, $p > .05$ (Participant 1, $r = .25$; Participant 7, $r = .026$; Participant 8, $r = .411$; Participant 10, $r = .05$).

Social Validity

Social validity questionnaires were completed by all the participants. There were 10 items that were addressed, examining the goals, procedure, and effects of the study (see Appendix F). Participants rated the items on a scale of 1 to 5 (1 = *disagree* and 5 = *agree*). As demonstrated by the results of the social validity questionnaire, participants rated the goals of the study to be of importance, with an average rating of 4.98 for Items 1-4. They found the procedures, specifically the manual, helpful and effective in teaching them to conduct DTT with children with autism, with an average rating of 4.85 for Item 5. Participants believed that the video demonstrations were useful, with an

average rating of 4.92 for Item 6. Moreover, participants rated the effects of the study to be positive and stated that they would recommend this training opportunity to other individuals who work with children with autism, with an average rating of 4.94 for Items 7-10.

Discussion

It was hypothesized that studying and mastering the self-instructional package would sizably improve tutors' accuracy in conducting DTT when teaching three tasks to a confederate role playing a child with autism. As shown in Figures 1 and 2, 12 of the 13 participants demonstrated an improvement in DTT accuracy following exposure to the self-instructional package. Overall, there was a sizable, mean improvement of 39.3% from Baseline to Post-assessment (46.2% to 85.5%). In the generalization phase, Participant 2 was observed teaching two tasks to a child with autism to whom she had been assigned to work with. Follow-up DTT accuracy remained high, and was comparable to Post-training assessment scores, demonstrating that Participant 2's DTT accuracy remained stable over time. The current study possessed strong IOA scores (95%), strong experimenter PI scores (100%), and strong confederate PI scores (96%). These measures are components that were not always included, or clearly stated, in previous self-instructional DTT studies, as cited in the review by Thomson et al. (2009).

The self-instructional package took a short amount of time to complete (an average of 3 hours and 56 minutes). This included reading the material, taking mastery tests, watching the video demonstrations, and engaging in the self-practice activities. Furthermore, the results of this study are consistent with the previous research on the self-instructional manual. Previous studies examining the three versions of the self-

instructional manual, such as Arnal et al. (2007), Fazzino, et al. (2009), Thiessen et al. (2009), and Boris et al. (in press) have also provided positive results regarding the effectiveness of the manual as a training tool. Arnal et al. examined the first version of the manual and used a video demonstration in which the participants scored the accuracy of, and subsequently received feedback on their scoring. With this method of feedback, participants' DTT accuracy improved by a large mean of 46%. Fazzino et al. (2009) replicated the previous study, including a feedback and demonstration component if participants did not achieve the 90% mastery in Post-training. Mean DTT accuracy increased 27%, and four out of the five participants required at least one session of feedback and demonstration. After feedback and demonstration, DTT performance increased to a mean of 92%. Thiessen et al. examined the effectiveness of the second version of the manual. These researchers found that DTT accuracy increased 36% from Baseline to Post-training, and in a generalization phase participants' DTT accuracy was 77%. Similar to Fazzino et al., when evaluating the third version of the manual, Boris et al. (in press) used the component of feedback and demonstration when the mastery criterion was not met. Only one of three participants required feedback and demonstration for mastery, with mean DTT accuracy increasing 37%. As demonstrated by the increases in DTT accuracy following exposure to the self-instructional manual, the concept of using the self-instructional manual as a training tool is effective for teaching individuals to conduct DTT. However, the previous studies' use of feedback and/or demonstration requires the time and the resources of an available facilitator, which defeats the purpose of a self-instructional manual or package as a training tool. Unlike the previous studies which included feedback and/or demonstration sessions from the

experimenter, the current study of the fourth version of the manual implemented a more 'self-instructional' method of teaching DTT. This included the self-instructional manual, the video demonstrations, and the self-practice exercises.

The modifications that were made to the fourth version of the manual likely had a positive effect on participants' DTT accuracy. Specifically, the fourth version of the manual is designed to teach 20 components of DTT, with 65 pages, 12 Chapters, and 111 study questions. There are four video demonstrations and self-practice activities that are incorporated into the manual. Also, there are key questions that are presented in bold font that participants are required to learn and master in order to successfully conduct DTT. The reason that the fourth version of the manual was particularly effective is likely due to the combined self-instructional manual and video demonstrations of DTT. The video demonstrations appeared to act as a model for participants in Post-training, as it was observed that participants would often recite phrases or lines that were used in the video demonstrations during their post-training assessment. Specifically, on the social validity questionnaire, 12 participants rated the video demonstrations as an effective component in the study, giving this item a score of 5/5. The remaining participant gave this item a score of 4/5. Another reason why the fourth version of the manual was likely effective is the focus on essential (bold-faced) study questions while studying the manual. This may have increased DTT knowledge and retaining of that knowledge, as opposed to studying a larger, broader, number of questions. Overall, the self-instructional package, incorporating the video demonstrations and self-practice activities into the manual, is more 'self-instructional', which is beneficial to agencies that require an efficient and rapid training tool.

The current study has several limitations. First, only one generalization assessment was conducted due to lack of successful recruitment of the children with autism to which the tutors had been assigned to work with. Although Participant 2's DTT performance remained stable from Post-training to the Generalization assessment, additional generalization data would strengthen this finding. Second, other methods of training occurred between the time of the Post-training and Generalization phases. For example, Participant 2 was trained by a senior tutor and ABA consultant during that period of time, so it is unclear the degree to which the self-instructional package alone affected the stability of the scores in the generalization assessment. Third, Participant 12 showed almost no improvement from Baseline to Post-training. Perhaps Participant 12's Post-training scores may have been negatively affected by the participant's nervousness, and from being videotaped and observed by two individuals. Additionally, as Participant 12 appeared to be rushing through the Post-training assessment trials at the end of the training shift, the time of day could have affected her performance. Fourth, the way in which participants participated and engaged in the self-practice activities differed (e.g., not fully completing the activities, talking out loud, sitting in silence, or not recording their behaviour). Participants were instructed to engage in the self-practice activities in the manual. However, only four participants followed the instructions entirely and engaged in all self-practice activities. Three participants engaged in two of the exercises, two participants engaged in one of the exercises, two participants spoke out loud, and two sat in silence. Therefore, it is unclear of the degree to which the self-practice activities had an effect on overall DTT performance, and if they are a beneficial component of the self-instructional package. A reason that participants may not have fully engaged in the

self-practice activities is that they may have not felt comfortable practicing alone. Also, they did not have teaching materials provided to them (e.g., matching cards), as they did in Baseline assessments.

Future research should examine the generalizability of the current self-instructional package for teaching children with autism, as it was very limited in the current study. Other training populations to be evaluated include parents of children with autism and educational assistants. Also, due to the fact that the majority of the participants in the current study did not engage in the self-practice exercises adequately, future research should examine ways to improve participants' use of the self-practice exercises or examine if they are even needed at all.

In summary, the self-instructional package (Fazzio & Martin, 2010) was found to be effective in improving individuals accuracy in DTT performance. Specifically, this manual produced a substantial and statistically significant increase in DTT performance (a 39.5% increase). The findings of the current study have positive implications for facilities, such as St. Amant, and a variety of agencies that serve children with autism, who are required to rapidly train staff, and where turnover rates tend to be high. The current study did not rely on a feedback and demonstration method from the experimenter, or introduce the intervention of the video demonstrations after failure to achieve the mastery criterion. Therefore, the current study possessed a more 'self-instructional' approach to teaching DTT, and used fewer external resources than previous evaluations of the manual. Thus, the self-instructional package was an effective, efficient, and economical strategy for teaching tutors to conduct DTT.

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Appendix A

Abbreviated Instructions and Data Sheets for Three Teaching Tasks

**Abbreviated Instructions for Teaching Children with Autism
to Point to Pictures When Named Using Discrete-Trials Teaching**

For this task you will role-play a tutor who is attempting to teach a child with autism who has minimal language skills. Do your best at providing what you think would be appropriate instructions, prompts or cues, and consequences while attempting to teach the “child”, based on the guidelines listed below.

Here are three pictures. Your task is to teach this person (who will be role-playing a child with autism) to point to the correct picture after you place the three pictures on the table and name one of them. Across trials, try to teach the “child” to point to each picture as they are named.

Take a few minutes and study the attached data sheet. Then return to this page and read the “Summary of Steps” below.

Summary of Steps

1. Arrange necessary materials.
2. Decide what you will use as consequences for correct responses and consequences for incorrect responses
3. On each trial:
 - a. Secure the child’s attention.
 - b. Present the correct materials
 - c. Present the correct instruction.
 - d. Provide whatever extra help (i.e., prompts or cues) you think are necessary for the child to respond correctly.
 - e. Once the “child: responds, provide what you consider to be an appropriate feedback or reward for a correct response, or provide an appropriate reaction for an error
 - f. Across trials gradually provide less and less prompts or cues (i.e., fade out the extra prompts)
 - i. By prompting less,
 - ii. By delaying your prompts
 - g. Continue in this manner until you have conducted 12 teaching trials. After each response by the “child”, record the child’s performance as directed on the attached data sheet. This task typically takes approximately 10-15 minutes to complete. Please let us know when you have finished.

Data Sheet for Pointing-To-Named Pictures

<u>Materials Required:</u> Pictures of a banana, balloons, and a dog. teacher.	<u>Child's Response on Each Trial:</u> Points to the item named by teacher.
<u>Set-Up for Each Trial:</u> A row of three pictures on the table in front in picture.	<u>Instructions at start of each trial:</u> Teacher says, "(name of object)" of the child.

<u>Prompts or Cues to Consider Using:</u> 1. Full prompt (F): Full physical guidance 2. Partial prompt 1 (P1): Light physical guidance and pointing to correct picture 3. Partial prompt 2 (P2): Gestural prompt, pointing to correct picture only 4. No prompt (NP)
--

On each trial, record child's response as correct (✓) or error (✗) in the appropriate column, and indicate prompting level (F, P1, P2, or NP).

Teaching Trials	Position of Pictures on Table <u>Banana Balloons Dog</u>			Name of Item to Say	Standard Trials		Error Correction Trials (next trial after an error)	
					Correct	Error	Correct	Error
1	R	M	L	Banana				
2	L	R	M	Balloons				
3	M	L	R	Dog				
4	R	M	L	Balloons				
5	L	R	M	Dog				
6	M	L	R	Balloons				
7	R	M	L	Banana				
8	L	R	M	Dog				
9	M	L	R	Banana				
10	R	M	L	Balloons				
11	L	R	M	Banana				
12	M	L	R	Dog				

Abbreviated Instructions for Teaching Children with Autism to Match Pictures
Using Discrete-Trials Teaching

For this task you will role-play a tutor who is attempting to teach a child with autism who has minimal language skills. Do your best at providing what you think would be appropriate instructions, prompts or cues, and consequences while attempting to teach the child, based on the guidelines listed below.

Here are three pictures. Your task is to teach this person (who will be role-playing a child with autism) to place a card on top of the identical card presented on the table when you say “Match” and give him/her a picture. Across trials, try to teach the “child” to match the three pictures.

After each response by the “child”, record on the attached Data Sheet if the “child” responded correctly independently, responded correctly with prompts or cues, or made an error. Place a checkmark like this ✓ in the appropriate column.

Summary of Steps

1. Arrange necessary materials.
2. Decide what you will use as consequences for correct responses and consequences for incorrect responses
3. On each trial:
 - a. Secure the child’s attention.
 - b. Present the correct materials
 - c. Present the correct instruction.
 - d. Provide whatever extra help (i.e., prompts or cues) you think are necessary for the child to respond correctly.
 - e. Once the “child” responds, provide what you consider to be an appropriate feedback or reward for a correct response, or provide an appropriate reaction for an error
 - f. Across trials gradually provide less and less prompts or cues (i.e., fade out the extra prompts)
 - i. By prompting less,
 - ii. By delaying your prompts
 - g. Continue in this manner until you have conducted 12 teaching trials. Record the results below. This task typically takes approximately 10-15 minutes to complete. Please let us know when you have finished.

Data Sheet for Matching

<p><u>Materials Required:</u> Double pictures of a cat, a house, and a tree.</p>	<p><u>Child’s Response on Each Trial:</u> Accept picture from teacher and place it on top of corresponding picture on the table.</p>
<p><u>Set-Up for Each Trial:</u> A row of three pictures on the table in front of the child.</p>	<p><u>Instructions at start of each trial:</u> Say “Match.”</p>

<p><u>Prompts or Cues to Consider Using:</u> 1. Full prompt (F): Full physical guidance 2. Partial prompt 1 (P1): Light physical guidance and pointing to correct picture 3. Partial prompt 2 (P2): Gestural prompt, pointing to correct picture only 4. No prompt (NP)</p>

On each trial, record child’s response as correct (✓) or error (✗) in the appropriate column, and indicate prompting level (F, P1, P2, or NP).

Teaching Trials	Position of Pictures on Table			Picture to give to child	Standard Trials		Error Correction Trials (next trial after an error)	
	Cat	House	Tree		Correct	Error	Correct	Error
1	R	M	L	Cat				
2	L	R	M	House				
3	M	L	R	Tree				
4	R	M	L	House				
5	L	R	M	Tree				
6	M	L	R	House				
7	R	M	L	Cat				
8	L	R	M	Tree				
9	M	L	R	Cat				
10	R	M	L	House				
11	L	R	M	Cat				
12	M	L	R	House				

**Abbreviated Instructions for Teaching Children with Autism to Imitate
Simple Actions Using Discrete-Trials Teaching**

For this task you will role-play a tutor who is attempting to teach a child with autism who has minimal language skills. Do your best at providing what you think would be appropriate instructions, prompts or cues, and consequences while attempting to teach the child, based on the guidelines listed below.

Your task is to teach this person (who will be role-playing a child with autism) to imitate some actions you will present using your arms and hands, immediately after you present the action. The actions are: clapping, raising both arms (arms up), and placing one hand on top of the other on the lap. Across trials, try to teach the “child” to imitate the three actions.

After each response by the “child”, record on the attached Data Sheet if the “child” responded correctly independently, responded correctly with prompts or cues, or made an error. Place a checkmark like this ✓ in the appropriate column.

Summary of Steps

1. Arrange necessary materials.
2. Decide what you will use as consequences for correct responses and consequences for incorrect responses
3. On each trial:
 - a. Secure the child’s attention.
 - b. Present the correct materials
 - c. Present the correct instruction.
 - d. Provide whatever extra help (i.e., prompts or cues) you think are necessary for the child to respond correctly.
 - e. Once the “child: responds, provide what you consider to be an appropriate feedback or reward for a correct response, or provide an appropriate reaction for an error
 - f. Across trials gradually provide less and less prompts or cues (i.e., fade out the extra prompts)
 - i. By prompting less, ii. By delaying your prompts
 - g. Continue in this manner until you have conducted 12 teaching trials. Record the results below. This task typically takes approximately 10-15 minutes to complete. Please let us know when you have finished

Data Sheet for Imitation of Simple Actions

<u>Materials Required</u> None.	<u>Child's response on each trial</u> Model instructor response.
<u>Set up for each trial</u> Child will imitate you.	<u>Instruction</u> Teacher says "Do this"

Prompts or Cues to Consider Using:—

1. Full prompt (F): Full physical guidance
2. Partial prompt 1 (P1): Light physical guidance
3. Partial prompt 2 (P2): Gestural prompt, pointing to the child's hand that was previously guided
4. No prompt (NP)

On each trial, record child's response as correct (✓) or error (✗) in the appropriate column, and indicate prompting level (F, P1, P2, or NP).

Teaching Trials	Action to Model for Child	Standard Trials		Error Correction Trials (next trial after an error)	
		Correct	Error	Correct	Error
1	Arms Up				
2	Arms Up				
3	Hands Ready				
4	Clap				
5	Hands Ready				
6	Clap				
7	Hands Ready				
8	Arms Up				
9	Clap				
10	Arms Up				
11	Hands Ready				
12	Clap				

Appendix B

DTTEF SCORE FORM

SCORING

✓ = performed correctly

X = performed incorrectly

/ = did not apply

INSTRUCTIONS FOR SCORING

Score “Preparing to Conduct a Session”, Components 1-6, using the space below. During a DTT session, score the components for conducting DTT trials, Components 7-19, on the other side of this form. Following a DTT session, score Component 20 by examining the fading procedure and data sheet used by the teacher and record your results on the other side of this form.

COMPONENTS

SCORE

Part I: Prepare to Conduct a Teaching Session	
1. Determine Teaching Task	
2. Gather Teaching Materials	
3. Select at Least 3 Reinforcers	
4. Arrange the Teaching Setting	
5. Determine the Prompt-Fading Procedure and the Initial Fading Step	
6. Invite Child to the Table and Give a Reinforcer Choice	

Appendix C

Confederate Script for the Matching Task

Matching	1	Matching	2
Attending	A	Attending	A
Prompt Level	FP	Prompt Level	FP
Correct vs. Incorrect	C	Correct vs. Incorrect	C
Matching	4	Matching	3
Attending	A	Attending	NA Turn away
Prompt Level	FP	Prompt Level	P1
Correct vs. Incorrect	C	Correct vs. Incorrect	C
Matching	5	Matching	6
Attending	A	Attending	A
Prompt Level	P1	Prompt Level	P1
Correct vs. Incorrect	C	Correct vs. Incorrect	C
Matching	7	Matching	8
Attending	A	Attending	A
Prompt Level	P2	Prompt Level	P2
Correct vs. Incorrect	E	Correct vs. Incorrect	C
Matching	9	Matching	10
Attending	NA CEILING	Attending	A
Prompt Level	P2	Prompt Level	P2
Correct vs. Incorrect	C	Correct vs. Incorrect	C
Matching	11	Matching	12
Attending	A	Attending	A
Prompt Level	NP	Prompt Level	NP
Correct vs. Incorrect	E	Correct vs. Incorrect	E
ERROR CORRECTION	7	ERROR CORRECTION	11
Attending	A	Attending	A
Prompting Level	P1	Prompting Level	P2
Correct vs. Incorrect	C	Correct vs. Incorrect	C

Appendix D

Self-practice Exercise

<p><u>Session</u></p> <p><u>Part I: Prepare to Conduct a Teaching</u></p>	<p><u>Did I role-play the Components Correctly?(Y= YES, N= NO)</u></p>
<p>1. <u>Determine Teaching Task</u> (Take 6 pieces of paper and on 2 of them write Cat, and on 2 of them write House, and on 2 of them write Tree. Pretend that they are photographs. You will use them in this and in subsequent role-playing sessions)</p>	
<p>2. <u>Gather Teaching Materials</u> - procedure sheet - data sheet and pen/pencil - task materials (Pretend that your data sheet is the blank copy of the data sheet for matching on the next page.)</p>	
<p>3. <u>Select At Least 3 Reinforcers</u> - Tokens, edibles, activities, toys, type of praise? (Obtain a bowl, and put a dozen or so small pieces of paper in it, and pretend that each piece is an edible that the child that you will be teaching likes. You will also use this bowl of “edibles” in subsequent role-playing sessions.)</p>	
<p>4. <u>Arrange the Teaching Setting</u> (Find a room with a table and 2 chairs so that you can role-play conducting a session. Then review the photograph on p. 17 showing the teacher sitting at a table with a child. Before proceeding to the next step, role-play arranging the data sheet, extra pictures, and the bowl of reinforcers as illustrated in the photograph on p. 17.)</p>	
<p>5. <u>Determine the prompt-fading procedure and the Initial Fading Step</u> - see the data sheet on p. 39</p>	
<p>6. <u>Invite Child to the Table and Give a Reinforcer Choice</u> - positive interaction with child and child sitting appropriately - child given a reinforcer choice (Role-play these activities.)</p>	

Appendix E

Procedural Integrity: Baseline

**PROCEDURAL RELIABILITY DATA SHEET
PRE-STUDY ASSESSMENT**

Participant #: _____ **Date:** _____ **Start Time:** _____

Observer: _____ **End time:** _____

Record if the experimenter followed this script when conducting this phase

	Task 1	Task 2	Task 3
1. Prepared area: appropriate for the task			
2. Sat down with participant and reviewed outline of activities (Used the overview sheet & provide copy to participant). 3. Introduced confederate and explained that he/she is working off a script and will not eat the edibles.			
4. Instructed participant:	Task 1	Task 2	Task 3
<i>“Now you will have 10 minutes to read through a one- page summary guide for a task and then attempt to teach that task to [confederate’s name], who will be role-playing a child with autism. If you are ready before the 10 minues are up then let me know.”</i>			
When the participant is ready to teach, say <i>“This session will be recorded for data analysis and will be observed live. Your performance will be scored but we cannot provide any feedback at this point.”</i>			
<i>“We cannot help you during any of this, so please save any questions you have until the end of the session.”</i>			
	Task 1	Task 2	Task 3
5. Provided participant with summary guideline sheet			
6. Timed participant’s study time (10 minutes)			
7. Instructed Participant <i>“10 minutes are up. You can now attempt to teach (confederate). Let me know when you are finished.”</i>			
8. When participant has completed teaching attempt, thank them and proceed to next task			
9. When participant has completed task 3, thank them and confirm a brief break , and the time to start the next step on the overview sheet.			

Appendix F

Social Validity Questionnaire

	1 Disagree	2 Some- what Disagree	3 Neutral	4 Some- what Agree	5 Agree
Goals					
1. I think that the goal of the study, to train tutors to conduct teaching sessions with children with autism is important.					
2. I think that the goal of teaching tutors how to prompt correct responses when teaching children with autism is important.					
3. I think that the goal of teaching tutors to reinforce correct responses while teaching children with autism is important.					
4. I think that the goal of teaching tutors to correct errors made during teaching trials with children with autism is important.					
Procedures					
5. I found the self-instructional manual to teach tutors how to conduct discrete-trials teaching with children with autism effective.					
6. I found the videotaped demonstration on teaching tutors how to conduct discrete-trials teaching with children with autism effective (if applicable).					
Effects					
7. I have learned to conduct discrete-trials teaching of three skills with children with autism.					
8. I think that what I have learned will help me as a tutor to teach children with autism.					

