Evaluation of A Self-Instructional Package for Teaching Tutors to Conduct Discrete-Trials

Teaching with Children with Autism

by

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Abstract

A widely used instructional method for teaching children with autism is Applied Behaviour Analysis (ABA), and a main component of ABA programming is discrete-trials teaching (DTT). DTT is made up of a series of brief teaching trials, with each trial including an antecedent (e.g., an instruction from the teacher), a response from the child, and an immediate consequence (e.g., a reinforcer provided for a correct response). Using a modified multiple-baseline design across participants, Experiment 1 assessed the effectiveness of a DTT self-instructional package (Fazzio & Martin, 2007) for teaching 4 pairs of newly-hired ABA tutors how to apply 21 components of DTT to teach 3 tasks to a confederate role-playing a child with autism. In Experiment 2, a group of 8 additional tutors were each independently presented with the same procedure. In both experiments, in Phase 1(baseline), tutors attempted to teach the 3 tasks to the confederate. In Phase 2 (manual), tutors mastered a 37-page self-instructional manual and once again attempted to teach the same 3 tasks to the confederate. Phase 3 was a within-subject AB design component. That is, if tutors did not meet a DTT mastery criterion of 80% after studying the manual in Phase 2, then they watched a brief video demonstration of a DTT expert teaching a task to a child role-playing a child with autism (Fazzio, 2007), and then once again attempted to teach the 3 tasks to the confederate. Across both experiments: a) The 16 tutors averaged 4.6 hours to master the self-instructional manual, and showed an average improvement in DTT accuracy of 32.2% from baseline; b) For the 13 tutors who did not meet the mastery criterion after reading the manual, their average DTT performance improved an additional 12% after watching the video; c) 13 of the 16 participants met mastery (3 after the manual and 10 after the manual plus video), and the other 3 tutors were very close to mastery. The results suggest that the training package is

a practical, economical and efficient method of instructing newly-hired tutors in ABA programs for children with autism.

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To Leigh-Anne

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Introduction

Developments in screening and diagnosing of children with autism as early as the preschool years have lead to an increase in the incidence of autism, and the current estimate of the prevalence of Autism Spectrum Disorders (ASDs) is 1 in 110 (Centres for Disease Control and Prevention, 2009). Early intensive behavioral intervention (EIBI), with an emphasis on applied behavior analysis (ABA) is considered to be the treatment of choice for children with autism (Department of Health, 1999, Eikeseth, 2009; Matson & Smith, 2008; also see the treatment section of Matson & Sturmey, 2011). This treatment approach has been correlated with a high demand for trained personnel (e.g., ABA tutors, education professionals, and parents) to deliver services based on ABA procedures. One of the most frequently used methods of teaching in ABA programming is discrete-trials teaching (DTT), which is a method of delivering training trials in rapid succession during a training session. Although in high demand, there is not a lot of published research investigating cost-efficient and effective strategies to train individuals how to deliver DTT treatment to children with autism. Some recent studies have examined the effectiveness of a self-instructional DTT package for training university students how to conduct DTT (Arnal et al., 2007; Fazzio, Martin, Arnal, & Yu, 2009; Thiessen et al., 2009). The current study assessed the effectiveness of that self-instructional training package for instructing newly-hired tutors in an ABA program for children with autism how to apply DTT to teach tasks to a confederate role-playing a child with autism.

Categorization of Autism

Early infantile autism was first documented in Leo Kanner's (1943) early accounts of systematic observations of 11 children with a previously unrecognizable

syndrome. Kanner (1943) described behavioral features that seemed to be characteristic of all 11 children and that also differentiated them from children with other psychiatric disorders. The characteristics of these children included: 1) inability to develop relationships with others; 2) delayed speech acquisition; 3) non-communicative use of speech, even after it developed; 4) delayed echolalia; 5) pronominal reversal; 6) repetitive and stereotyped play; 7) obsession with maintaining sameness; 8) lack of imagination; 9) good rote memory; and 10) normal physical appearance (Kanner).

The *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision (DSM-IV-TR)* categorizes autistic disorder (AD) as one of the most complex of the five pervasive developmental disorders (PDDs), which is now typically diagnosed before the age of 3 (American Psychiatric Association, 2000). The DSM-IV-TR refers to PDD as a range of developmental disorders with childhood onset that are characterized by: (a) abnormal language development; (b) qualitative impairments in communication skills and social interactions; and (c) rigid, repetitive behaviours and interests (APA, 2000). Since many of the PDD disorders have similar features to autism, albeit with varying degrees of symptom severity, autism was coined a "spectrum" disorder (Allen, 1988; Wing, 1988). The pervasive developmental disorders, or ASDs, range from a severe form, autistic disorder (AD), to a milder form, *Asperger's syndrome,* first described by German scientist, Dr. Hans Asperger in 1944 (Frith, 1991). Although Asperger's syndrome has the same features as autism, it has less severe symptoms and is typically not accompanied by language delay. If a child has symptoms of autism or Asperger's syndrome, but does not meet the specific criteria for either, the diagnosis is called pervasive developmental disorder - not otherwise specified (PDD-NOS). Other

very rare, but severe disorders that are included in the autism spectrum disorders are Rett's disorder and childhood disintegrative disorder.

In the upcoming 5th edition of the American Psychiatric Association's *Diagnostic and Statistical Manual* (DSM-V), ASD will be the diagnostic label used to include all of individuals presently labeled as having Autistic Disorder, Asperger's Disorder, Childhood Disintegrative Disorder, or Pervasive Developmental Disorder-Not Otherwise Specified (PDD-NOS). Rett's Disorder will not be included in the revised DSM (White, 2010). Children categorized as having ASD, as defined by the DSM-V, must meet Criteria 1, 2 and 3:

Criterion 1. Clinically significant, persistent deficits in social communication and interactions, as manifest by all of the following:

a. Marked deficits in nonverbal and verbal communication used for social interaction;

b. Lack of social reciprocity;

c. Failure to develop and maintain peer relationships appropriate to developmental level.

Criterion 2. Restricted, repetitive patterns of behavior, interests, and activities, as manifested by at least two of the following:

a. Stereotyped motor or verbal behaviors, or unusual sensory behaviors

b. Excessive adherence to routine and ritualized patterns of behavior

c. Restricted, fixated interests

Criterion 3. Symptoms must be present in early childhood (but may not become fully manifest until social demands exceed limited capacities).

To illustrate behavioral characteristics from Criteria 1 and 2, children who fit the diagnostic criteria are likely to show a combination of i*mpaired social interactions* (e.g., not making eye contact when someone talks to them), *impaired communication* (e.g., delay or lack of spoken language, repeating words or phrases out of context), *repetitive and stereotyped behaviors* (e.g., frequently spinning objects, or hand flapping), and they are likely to be *developmentally delayed in typical daily activities* (e.g. dressing and grooming). To further explain Criterion 3, in order to be diagnosed with ASD, the symptoms must be present early in development, typically prior to age 3, although the DSM-V makes it clear that they might not be "fully manifest" until later in life (American Psychiatric Association, 2010; White, 2010).

As indicated previously, incidence of ASD is very high. Although over 19,000 articles have been published on ASD in approximately the last decade (Matson & LoVullo, 2009), delivery of the most effective treatment methods for ASD continues to be a widely studied and somewhat controversial area of research. It is still unclear at this point what effect, if any, the new diagnostic criteria will have on treatment approaches for ASD. What is empirically-supported however, are the behavioral treatment methods for ASD and related disorders.

Behavioral Treatment of Autism

Lovaas (1987) pioneered a model based on behavioral principles for treating children with autism called the *Early Intervention Program* (EIP), which he conducted with 19 preschool children with autism. The EIP program: (a) was intensive (a child received approximately 40 hours per week of one-on-one teaching sessions for at least two years); (b) emphasized early intervention; (c) included extensive parent involvement; and (d) occurred in a natural setting, such as the child's home or school, versus a clinical

setting (Lovaas). Results of EIP treatment documented by Lovaas, and in a follow-up study by McEachin, Smith and Lovaas (1993), suggested significant changes in the developmental trajectory of participants. That is, 47% of children who received the EIB intervention achieved "normal functioning" according to standardized assessments and follow-up of school placement. In follow-up, eight of the children were "indistinguishable" from peers on measures of intelligence and adaptive skills, even at age 13 (Lovaas; McEachin et al.). Although Lovaas's research methodologies were criticized (e.g., Gresham & MacMillan, 1998; Schopler, Short, & Mesibov, 1989), this research built a foundation for others in search of effective early interventions to help individuals with autism and related disorders.

Applied behavior analysis (ABA). Based on over 40 years of research, the Surgeon General of the United States declared ABA as the treatment of choice for children with autism (Department of Health, 1999). Like Lovaas's (1987) EIB intervention, ABA uses systematic application of behavioral principles (e.g., differential reinforcement, prompting, fading, modeling) to produce meaningful changes in behavior (Martin & Pear, 2011). An advantage of ABA is that it can be used in a variety of settings, so that skills that the children acquire may generalize to other settings such as preschool. Early intervention programs that use direct, systematic, delivery of ABA techniques for approximately 35 hours per week for up to 2-3 years have resulted in dramatic gains in cognitive, social, and communication skills (Eikeseth, Smith, Jahr, & Eldevik, 2007; Howard, Sparkman, Cohen, Green, Stanislaw, 2005; Lovaas, 1987; McEachin, et al., 1993; Sallows & Graupner, 2005; Smith, Eikeseth, Klevstrand, & Lovaas 1997; Smith, Groen, & Wynn, 2000).

Discrete-Trials Teaching (DTT). A main vehicle for delivering ABA is DTT, a highly-structured teaching method. DTT is made up of a series of *discrete-trials*, small units of instruction that typically last 5-20 seconds. Each discrete trial is made up of five component parts: First, an instructor (e.g., therapist, teacher, parent) presents an antecedent cue, or discriminative stimulus (S^D), which can be a verbal instruction or another teaching stimulus. Second, the instructor may prompt the child (e.g., guide his/her hand) in order to minimize errors. Third, the instructor waits for the child's response, and fourth, then delivers an immediate and appropriate consequence; typically verbal praise and/or a small reinforcer (e.g., an edible) for correct behavior, or saying, "no" and removing teaching items to indicate an incorrect response. Finally, the instructor pauses for a 1-5 second inter-trial interval before presenting the antecedent for the next trial (Smith, 2001). DTT is typically presented in blocks of approximately 12-20 trials.

As part of an ABA program, DTT has been established as an effective intervention method for children with ASD (Green, 1996; Smith, 1999; 2001). DTT is useful for teaching children with ASD new discriminations such as responding correctly to a verbal statement such as, "What is it?" and for teaching new behaviors such as speech sounds and motor movements (Smith, 2001). Considering that a large number of instructors (parents, educators, and tutors) are typically needed to provide DTT training sessions in ABA early intervention programs for children with ASD, there is a need to develop efficient, effective and economical training procedures for teaching individuals how to apply DTT. However, although there is a demand for DTT-trained personnel, and hence a demand for DTT instruction, the literature reveals surprisingly few studies

evaluating the efficiency and effectiveness of training packages for teaching individuals how to deliver DTT to children with ASD (Thomson, Martin, Arnal, Fazzio, & Yu, 2009).

Evaluating DTT Training Strategies

Participants receiving DTT instruction. The majority of research evaluating DTT training packages has focused on teaching DTT to individuals that already have some background or direct experience working with children with ASD. Most often, participants are paraprofessionals (e.g., Koegel, Glahn, & Nieminen, 1978; Koegel, Russo, & Rincover, 1977; Dib & Sturmey, 2007; Gilligan, Luiselli, & Pace, 2007) or parents (e.g., Crockett, Fleming, Doepke, & Stevens, 2007). Participants' amount of experience with children with ASD generally varies depending on factors such as the participants' relationship with the children (e.g., parent or teacher), their occupation (e.g., special education teacher, or university student), and their education level (e.g., high school diploma or Master's degree in special education). Participants who have some experience working with children with ASD have most often done some reading on behavioral teaching practices or received minimal training in ABA techniques, but do not have experience administering DTT (Leblanc, Ricciardi, & Luiselli, 2005). Alternately, a few studies in the literature have involved participants who do not have any experience with children with ASD. For example, Arnal et al. (2007) used a self-instructional DTT training manual to teach university students (with no prior experience with children with autism or with teaching DTT) how to conduct DTT to teach three training tasks to a confederate role-playing a child with autism. Given that very few studies have evaluated instructional packages for teaching DTT to individuals with minimal experience with

children with autism and DTT, and that there is a demand for effective DTT training strategies for such individuals, further research of this kind is needed.

Recipients of DTT. The majority of DTT research involves training participants how to deliver DTT intervention to children with autism and related disorders. Some studies have included children with autism as well as other developmental disabilities, such as global developmental delay and cerebral palsy (Downs, Downs, & Rau, 2008). DTT has also been used to facilitate skill development in preschoolers with developmental disabilities other than ASD (Downs, Downs, Johansen, & Fossum, 2007). Alternately, some studies have involved participants first teaching adult confederates role-playing children with autism versus teaching actual children with autism (Arnal et al., 2007, Fazzio, et al., 2009; Thiessen et al., 2008). In these studies, participants were university students with no prior experience with children with autism or DTT. Training participants to first teach a confederate is the most ethical option in these cases. That is, it could be detrimental to children with autism to receive DTT instruction from participants who are not fully qualified. Further, unlike ABA being reported as a validated method for the treatment of children with autism, no single method for instructing participants how to conduct DTT has been reported in the literature as the method of choice.

Training strategies. The literature reports various types of training packages that have been used to teach participants how to conduct DTT. For example, different studies used various amounts and combinations of different types of instruction (e.g., videotaped, verbal, written) and feedback (e.g., verbal, visual, written, rehearsal). Therefore, pinpointing what specific characteristics of the training that may have been responsible

for positive training results is very difficult (Thomson et al., 2009). A further limitation is that the descriptions of the procedures for instruction and feedback are often reported very briefly. Therefore, the training packages may be difficult to replicate systematically.

A common variation in training packages that differs across studies is the duration of training time that the DTT training packages required, which has ranged from a mean of two hours (Arnal et al., 2007; McBride & Schwartz, 2003) to approximately 35+ hours (Ryan & Hemmes, 2005). Moreover, similar to the limited descriptions of training methods in the research, the duration of the training is often not clearly stated. For example, Arco (1997) reported the number of training sessions, but did not report the length of time of each session. In other studies, neither number of sessions nor duration were mentioned (Gilligan, et al., 2007; Sarokoff & Sturmey, 2004).

Finally, another important variation in training across studies is the number of DTT components that were included in the training packages. For example, in a review of 20 DTT studies, the number of DTT items scored ranged from four to 30, and often not all of the DTT components were clearly stated (Thomson et al., 2009). A further limitation across the studies was a lack of a standardized tool for measuring DTT performance. Therefore, it is very difficult to compare the effectiveness of various DTT training strategies (Thomson et al.).

One of the first studies to describe DTT training procedures was conducted by Koegel et al. (1977). In baseline and post-training they assessed special education instructors' use of: (a) discrete trials; (b) presenting discriminative stimuli (S^Ds), (c) presenting prompts, (d) shaping, and (e) managing consequences. An interesting aspect of this research was the self-instructional component of the training package; a written

manual that described correct and incorrect use of those procedures. However, in addition to the manual, Koegel and colleagues (1977) also included a video that illustrated correct and incorrect implementation of the procedures, as well as a practice and feedback component. Participants were required to continue the practice and feedback component of the training until they reached mastery, which took approximately 25 hours. With this training package, participants demonstrated generalization to new children and new target skills. As a further assessment of their training package, Koegel and colleagues (1977) measured children's mean correct responding, which improved after receiving instruction from the participants that received the DTT training. Although this study reported favorable results, it did not report procedural reliability assessments of the training strategies, and the description of the method was somewhat limited so that it would be difficult to replicate.

Koegel et al. (1978) tested two models for the training of parents of children with autism. They used the same DTT components as the Koegel et al. (1977) study (i.e., discrete-trials, S^Ds, prompts, shaping, and managing consequences). The authors compared the effectiveness of a demonstration alone condition and a demonstration-plus-lecture condition. Like in Koegel et al. (1977), parents demonstrated generalization and the demonstration alone condition was effective for improving parents' implementation of procedures when they had modeled the trainer, but parents' DTT ability did not generalize to new tasks. Again, children's correct responding improved when parents implemented the procedure correctly. However the children's responding did not improve when parents' skills did not generalize. The fact that parents could improve their DTT performance through modeling the trainer's behavior (no additional

opportunities for feedback) has interesting implications for use of self-instructional DTT training strategies. That is, it is conceivable that self-instructional methods such as the use of videos demonstrating correct behavior may have the potential to decrease resources needed for training individuals how to conduct DTT.

Self-Instruction: An Effective DTT Training Strategy?

Very few recent studies have investigated self-instructional training methods for instructing individuals how to conduct DTT. Ryan and Hemmes (2005) developed a training manual but it differed from the Koegel and colleagues' manual (1977) in that DTT was not the main focus; the manual included additional information about autism, professional behavior, service delivery, etc. Ryan and Hemme's manual was also presented to participants in a workshop-type setting and used with many additional training methods: a) verbal, written and videotaped instructions, b) role-playing, c) feedback; praise for correct demonstration of DTT components and error correction for incorrect demonstration, d) modeling, and e) written and oral quizzes (2005). Because the manual was accompanied by so many other training strategies, it cannot be concluded whether or not this manual could be used for self-instruction alone. Further, given the additional time and resources that Ryan and Hemme's training package required it may not be the most economical method of DTT instruction.

Fazzio and Martin (2006) prepared a 21-page self-instructional manual on how to conduct DTT training sessions for children with autism. The manual contained self-test questions to assess mastery and DTT summary sheets. In an AB design, Arnal et al. (2007) assessed the effectiveness of the manual for teaching four university students to apply DTT to teach three tasks to a confederate role-playing a child with autism. Arnal et

al. (2007) found that after an average of 2.2 hours to master the manual, the four participants improved from a mean of 44% in baseline to a mean of 67% post-manual.

Using a modified multiple-baseline design across participants, Fazzio, et al. (2009) replicated the experiment by Arnal et al. (2007) with five additional participants. They found that participants mastered the manual after an average of 2.6 hours and participants' DTT accuracy while teaching a confederate improved from a mean of 34% in baseline to a mean of 66% (Fazzio et al.). DTT accuracy in these studies was measured using a 19-item checklist for conducting DTT. The results from these two studies suggest that the self-instructional DTT training manual may be a cost-efficient and effective method for teaching individuals how to conduct DTT.

Salem et al. (2009) extended this line of research by evaluating the self-instructional manual in conjunction with a 17-minute self-instructional training video (Fazzio, 2007). The video shows an expert in DTT demonstrating application of DTT to teach a typically developed child role-playing a child with autism. Salem et al. evaluated the self-instructional package in a multiple-baseline design across four university students who were assessed for teaching DTT to a confederate who role-played a child with autism. Following an average of 4.5 hours of studying the manual and watching the video, participants' correct application of DTT improved from a pre-training mean of 45.5% to a post-training mean of 78%. Two of the participants were also assessed in a generalization session in which they applied DTT to teach a child with autism, and their mean percentages of correct use of DTT were 74.8% and 73.9%.

Based on the results from these studies and feedback from participants, the initial manual by Fazzio and Martin (2006) was revised to a 37-page version of the manual

(Fazzio & Martin, 2007). The revised manual contains more study questions, and a self-practice component in which participants imagine teaching the DTT components learned in the manual. Using a modified multiple-baseline design across participants, Thiessen et al. (2009) investigated the effectiveness of the manual alone for teaching four university students to apply DTT to a confederate role-playing a child with autism. They also included a generalization phase in which participants whose DTT performance was at 80% accuracy or higher when teaching a confederate, attempted to apply DTT to teach a child with autism. Results showed that the four participant's DTT performance improved substantially and immediately following mastery of the self-instructional manual (52% in baseline to 88% post-manual). Performance dropped slightly in the generalization phase (77%). Overall, the self-instructional manual was an efficient tool for DTT self-instruction as training time averaged 4 hours and 34 minutes.

In summary, only a few studies have investigated procedures for training tutors and parents to conduct discrete-trials teaching with children with autism, and the few that have been reported have limitations. Even fewer studies have investigated the effectiveness of self-instructional strategies for teaching DTT. To date, no studies have investigated self-instructional strategies for training newly hired personnel in ABA programs for children with autism. Given the importance of tutors in ABA intervention programs for children with autism, it is essential that more research be conducted in this area.

Statement of the Problem

Although economical and effective DTT strategies are in high demand, there are relatively few studies in the literature addressing this topic. Given the high demand for

personnel trained in DTT to work in treatment programs for children with ASDs, I investigated the effectiveness of a self-instructional training package for instructing newly-hired ABA tutors in such a program how to apply DTT to teach three tasks to a confederate role-playing a child with autism. The self-instructional package that was used included two components: (a) a self-instructional training manual (Fazzio & Martin, 2007) that had been previously demonstrated to be effective for instructing university students how to conduct DTT in simulated teaching sessions with a confederate role-playing a child with autism, as well as in actual teaching sessions with a child with autism (Arnal et al., 2007; Fazzio et al., 2009; Thiessen et al., 2008); and (b) a video showing a DTT expert conducting DTT with a confederate role-playing a child with autism. In Experiment 1, I used a modified multiple-baseline design across a pair of tutors, replicated across three more pairs, to assess the effectiveness of the self-instructional package in three phases: (1) a baseline phase in which tutors were evaluated for their ability to use DTT to teach three tasks to a confederate, role-playing a child with autism; (2) a self-instructional manual (Fazzio & Martin, 2007) phase in which tutors mastered the manual and were reassessed for their ability to apply DTT with a confederate; and (3) for participants who did not meet a mastery criterion of 80% after Phase 2, they were presented with a self-instructional video on DTT (Fazzio, 2007), and were then reassessed for their ability to apply DTT while teaching a confederate. In Experiment 2, I assessed the self-instructional package with an additional eight individual tutors in an ABC design across the same three phases. With two of these participants, I was also able to assess for generalization of their ability to apply DTT to a child with autism. Given that the self-instructional package had been shown to be effective with

university students, I hypothesized that, in both experiments, after studying the manual/viewing the video, the tutor's DTT performance would improve considerably from baseline to post-training.

Method Common to Experiments 1 and 2

Participants and Setting

Prior to conducting the research, ethical approval was received from the University of Manitoba Psychology/Sociology Research Ethics Board (PSREB), protocol #P2008:046. Over a one-year period, newly hired ABA tutors from the StAmant Preschool ABA Program for Children with Autism, a government-funded home-based, early intervention program in which one-on-one teaching sessions are conducted daily in the clients' homes by tutors. The only prerequisite for tutors to apply for a tutor position in the StAmant ABA Program was a high school diploma. Across Experiments 1 and 2, 16 newly hired ABA tutors (15 females) were recruited. Fifteen of the 16 participants had some post-secondary education (range 1 to 6 years). None of the participants had any formal experience working with children with autism or applying DTT, although one participant had volunteered in a program for adults with autism, and one participant had some personal experience with a child with autism.

In order to recruit participants, a letter from me was presented to the tutors at the administrative orientation to the ABA Program at StAmant. The letter invited tutors to receive DTT training from researchers during their paid work hours. The letter highlighted that tutor participation or lack thereof, would have no impact on their position as a tutor in the ABA program. Tutors indicated verbally, to the staff member conducting the administrative orientation, if they agreed to voluntarily participate in the DTT training

research. The staff person informed the experimenter of the names of the tutors who volunteered. Tutors were then contacted directly by the experimenter to discuss and obtain their written consent.

Two children with autism were also recruited so that two of the tutors' post-training DTT performance could be evaluated in the generalization phase. To recruit children with autism, a letter was sent by the StAmant Preschool ABA Program to the parents/legal guardians of children receiving services from the Preschool ABA Program. An accompanying letter was sent from the experimenter to obtain consent for the child's participation. The letter emphasized that participation would provide training sessions in addition to those provided by the ABA program, and that participation would not affect any services that the families were presently receiving or would receive in the future from StAmant. Thus, the parents were free to decline without revealing their identity to StAmant staff members who provide direct-care.

Training sessions for tutors took place at StAmant in a quiet testing room with a table, chairs and video camera. Teaching sessions for the children with autism took place in the child's home with the tutor who had been assigned to that child by the StAmant ABA Program. The experimenter was present during the generalization sessions and the child's parent(s) were also invited to attend.

Materials

Abbreviated instructions outlining procedures for using DTT to teach three tasks to children with autism were given to the tutors in the first phase of the study (baseline). The instructions consisted of 3 one-page summary guidelines outlining procedures for applying DTT to teach three training tasks from the curriculum for the StAmant

Preschool ABA Program for Children with Autism. The three tasks were: (a) *Task 1: Pointing-to-Named Objects, which* required the child to correctly point to pictures that were named by the instructor when three options were placed in front of a child (e.g., when pictures of a banana, a tree, and balloons were placed in front of a child, and the instructor said, "banana", the child pointed to the banana); (b) *Task 2: Identity Match-to-Sample,* which required the child to correctly match two pictures of objects (e.g., when pictures of a house, a dog, and a cat were placed in front of a child, and the child was given a picture of the cat and the instructor said, "match", the child matched the two pictures of the cat); and (c) *Task 3: Simple Motor Imitation,* which required the child to correctly perform a motor imitation (e.g., when the instructor said "do this", and touched his/her nose, the child did the same). The set of summary guidelines and data sheet given to a tutor for teaching Task 1 (Pointing-to-Named Objects) are presented in Appendices A and B.

In the second phase of each experiment, participants received a 38-page self-instructional manual on how to conduct DTT (Fazzio & Martin, 2007). The manual included sections on: (a) descriptions of some basic principles and procedures of ABA (e.g., positive reinforcement, extinction, shaping, fading); (b) how to prepare to conduct a teaching session; (c) how to manage antecedents and consequences for a correct response during a trial; (d) how to manage antecedents and consequences for an incorrect response during a trial; and (e) how to fade prompts within and across trials. Each section of the manual also included study questions as well as prompts for readers to "stop and practice", or imagine, performing the DTT components. The Table of Contents of the manual is presented in Appendix C.

In both experiments, upon completion of the self-instructional manual, if a participant did not meet a mastery criterion of 80%, he/she was shown a self-instructional training video (Fazzio, 2007). The 17-minute video briefly reviewed the information in the manual and also showed an expert in DTT demonstrating several trials of DTT to teach the matching task to a typically-developed child role-playing a child with autism. The video was divided into four parts. Part A illustrated the five components for preparing to conduct a teaching session (see Components 1-5 of the Discrete-Trials Teaching Evaluation Form, DTTEF, in Figure 1); Part B illustrated eight components for managing antecedents and consequences for correct responses on DTT trials (see Components 6-13 in Figure 1); Part C provided a demonstration of most-to-least prompt fading; and Part D provided a demonstration of managing antecedents and consequences for incorrect responses (see Components 6-10 and 14-20 in Figure 1).

Participants were also given additional training materials such as pens and paper for studying and recording the confederate's behavior on each task, picture flashcards for teaching the confederate, and small edibles to be used as reinforcers when attempting to teach the confederate. For reliability purposes a video camera was also used to record the tutor's attempts at teaching the three tasks to the confederate in all phases.

Target Behaviors and Data Collection

The dependent measure that was used to evaluate the effectiveness of the DTT self-instructional package included scoring the average correct DTT performance of tutors when attempting to teach three tasks to a confederate role-playing a child with autism. At least two observers recorded the tutors' correct and incorrect DTT behaviors using the DTTEF (Fazzio, Arnal, & Martin, 2007; see Figure 1). The DTTEF is a 21-

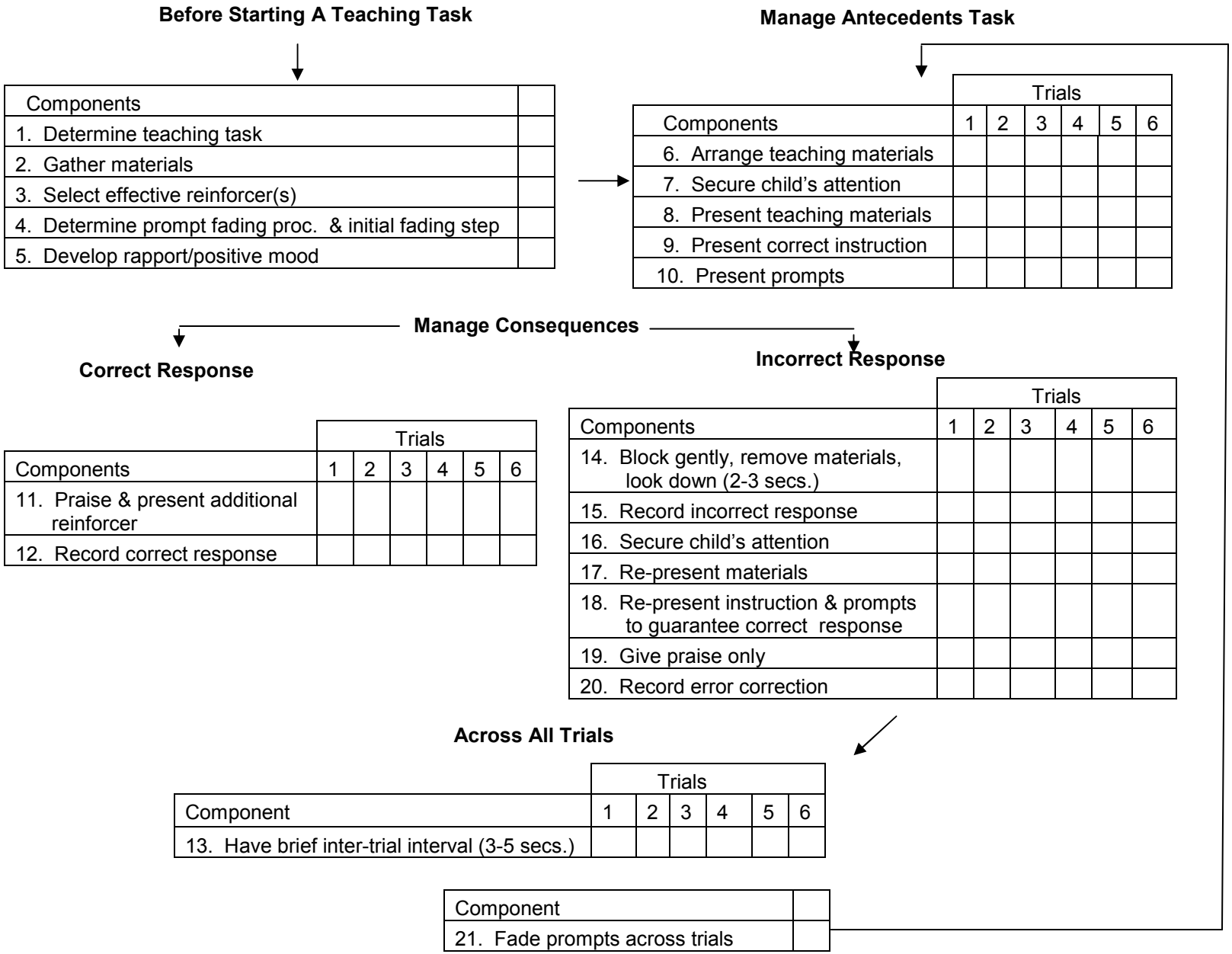

Figure 1. The 21 Components of the Discrete-Trials Teaching Evaluation Form (DTTEF).

component checklist that is based on the DTT self-instructional manual, and has been shown to have high face validity, high inter-observer reliability, significant discriminant validity and high convergent validity for live and videotaped scoring (Babel, Martin, Fazzio, Arnal, & Thomson, 2008; Jeanson et al., 2010). Each observer recorded tutors' correct and incorrect behavior on the DTTEF for 12 trials per task for three tasks in all phases of the study. The number of correct responses was used to score a tutor's average correct DTT performance. Sessions were videotaped, so that reliability checks (as described later) could be scored later from the video.

Research Design

As stated previously, newly-hired ABA tutors were recruited from the StAmant Preschool ABA Program for Children with Autism. During a typical year in the StAmant Program, tutors are typically hired one or two at a time to replace tutors who quit their jobs, or are promoted to become Senior Tutors. For a period of approximately one year, tutors were recruited upon being hired. If a pair of tutors was hired, and were able to be recruited, the self-instructional package was evaluated in a modified multiple-baseline design across the pair, as described below for Experiment 1. If a single tutor was hired, and was recruited, then the self-instructional package was evaluated in an ABC case study design, as described below for Experiment 2. A relatively brief window of time was available to evaluate the effectiveness of the self-instructional package with the newly-hired tutors. That is, the total time that the tutors were available to participate in the research was constrained to less than two days, during which time, they received a typical orientation from the StAmant ABA Program, as well as the DTT self-instructional training package.

As stated previously, across both experiments, a total of 16 newly-hired ABA tutors participated. Children with autism in the ABA program were also recruited so that the tutors' post-training DTT performance could be evaluated in a generalization phase. Unfortunately, due in part to a lack of response to recruitment by the parents of the children, and in part due to scheduling difficulties with the tutors after they had received DTT training, it was possible to conduct generalization sessions for only two participants in Experiment 2, as described below.

Experiment 1

In Experiment 1, a modified multiple-baseline design across a pair of tutors was used to evaluate the effectiveness of the self-instructional manual (Fazzio & Martin, 2007) and video (Fazzio, 2007) for teaching four pairs of newly-hired tutors' to implement DTT with a confederate role-playing a child with autism. The successful use of this design has been reported in published journal articles by Arnal et al. (2007), Fazzio et al. (2009), Salem et al. (2009), and Thiessen et al. (2009). A variation of this type of design has also been referred to as a multiple-probe design (Horner & Baer, 1978). An AB within-subjects design component was also included for some participants. That is, if a participant did not meet the mastery criterion of 80% correct DTT performance after mastering the self-instructional manual, then he/she watched a self-instructional video (Fazzio). Experiment 1 included three phases: (1) baseline; (2) manual/ post-manual assessment; and (3) video/post-video assessment.

Experiment 2

In Experiment 2, I used an ABC case-study design to assess the efficacy of the self-instructional package for teaching a group of eight additional newly hired tutors how

to apply DTT to teach a confederate role-playing a child with autism. These eight participants received the same three phases as the participants in Experiment 1 (baseline, manual/post-manual assessment, and video/post-video assessment). Two of the eight participants also took part in a generalization phase (described later).

Experimental Phases

Phase 1: Baseline. First, the experimenter introduced herself to the tutor and reviewed the consent form and the phases of the study. Once the tutor agreed to proceed, he/she was given 10 minutes to study a one-page summary guideline instruction sheet for teaching Task 1 (see Appendix A). Next, the tutor was given an opportunity to attempt to teach Task 1 to a confederate role-playing a child with autism during 12 simulated teaching trials. The tutor was also given the opportunity to record the confederate's responses on a corresponding data sheet (see Appendix B).

The same procedure was followed for the other two teaching tasks (which were described previously), so that the baseline phase consisted of a minimum of three sessions, 12 trials per session, (and an additional three sessions for the second participant of a pair in Experiment 1 for the modified multiple-baseline design). The order in which the three tasks were administered was counterbalanced across tutors, but remained constant within tutors. That is, the order in which tutors attempted to teach each of the three tasks was the same in baseline as it was in all subsequent phases.

Further, to ensure consistency across tutors, the confederate followed a script while role-playing a child with autism (one script for each task). There were planned errors incorporated into each script to ensure that the tutors came into contact with errors so that the components of the DTTEF corresponding to incorrect responses could be

scored. The scripts were created with feedback from an expert in DTT, certified by the Behavior Analyst Certification Board (BACB), based on her many observations of behaviors typically emitted by children with autism (e.g., lack of eye contact, etc). All of the baseline sessions were videotaped for performance assessment using the DTTEF.

Phase 2: Manual/Post-Manual Assessment. Following baseline, a tutor studied the 38-page self-instructional manual (Fazzio & Martin, 2007), which is organized in five sections (described previously). A tutor was asked to study a section, learn the answers to the study questions of that section, and take a mastery test consisting of a random sample of 50% of the study questions in that section. The mastery test was administered after the tutor completed studying a section and indicated that he/she was ready to be tested. For consistency, the experimenter immediately graded the mastery tests using a marking key. If the tutor did not respond correctly to all of the questions on the mastery test, he/she was asked to restudy the section of the manual corresponding to his/her incorrect answers, and was then asked to reattempt any questions that were not mastered.

After mastering the study questions for a section, a tutor engaged in a self-practice exercise. That is, the manual prompted the tutor to imagine that he/she was teaching a specific task to a child with autism, role-play the components of DTT that were read about in that section, and then rate himself/herself on each component on a practice rating sheet that was in the self-instructional manual. The experimenter was present to ensure that the self-practice exercise was completed, and the tutor was asked to show the completed self-practice rating sheet to me once they had completed it. The four self-practice exercises (copied from the manual) are shown in Appendices D, E, F, and G.

Once a tutor completed the self-instructional manual, he/she was once again asked

to attempt to teach the confederate the same three tasks as in baseline. All sessions were videotaped for performance assessment using the DTTEF.

Phase 3: Video/Post-Video Assessment. If a tutor did not meet a mastery criterion of 80% DTT accuracy after completing the manual, he/she was shown the demonstrational video (described previously) and then attempted to teach the three tasks to the confederate again. The mastery criterion was set at 80% based on feedback from one of the coauthors of the manual, who is BACB certified and has experience teaching and observing tutors in the StAmant Preschool ABA Program. In her view, a typically trained tutor in the StAmant ABA Program would likely regularly score in the 80% range when conducting DTT sessions with the children after several months of experience.

Once a tutor completed watching the video, he/she was once again asked to attempt to teach the confederate the same three tasks as in baseline. All sessions were videotaped for performance assessment using the DTTEF.

Phase 4 (Experiment 2 Only): Generalization (With Two Participants). For each of two participants in Experiment 2, consent was received from the parents of a child, to whom the tutor had been assigned to work with in the StAmant Program, for us to obtain DTTEF assessments of those tutors' ability to apply DTT to those two children. Both tutors attempted to teach a child with autism only after achieving a mastery criterion of ≥80% in Phase 3 (video) of Experiment 2. In each case, the tutor attempted to teach the same three tasks that had been taught to the confederate, but instead they were taught to a child with autism in the child's home. Prior to conducting the generalization sessions, the experimenter contacted the consultants who were assigned (by the StAmant ABA Program) to oversee each of the two children's programming to get their feedback

on whether or not the tasks that were used in all previous phases of the research were appropriate for each child's ability level. In each case, the consultants deemed that the tasks were appropriate. In addition, each tutor scored the child's performance using a data sheet such as the example shown in Appendix B. The sessions were videotaped for performance assessment using the DTTEF.

Reliability and Validity

Interobserver Agreement (IOA). To assess IOA, the experimenter scored each participant's videotaped performance on each task, in each phase, using the DTTEF. Next, 33% of the sessions were independently scored by another trained observer using the DTTEF. An agreement was defined as the observer and the experimenter scoring an item on the 21-item DTTEF checklist the same and a disagreement was defined as the observer and the experimenter scoring an item on the checklist differently. An IOA score for a session was calculated by dividing the number of agreements by the number of agreements plus disagreements and multiplying by 100% (Martin & Pear, 2011). Before observing any sessions with participants, the observer and the experimenter practiced scoring videotapes of participants (from previous DTT studies) conducting DTT sessions with a confederate role-playing a child with autism until the IOA score reached the commonly accepted level of at least 80% (Kazdin, 1994; Martin & Pear, 2011).

Procedural Integrity (PI). Very few DTT studies in the literature report procedural integrity (PI) scores, with the exception of four studies that reported 100% reliability (Arnal et al., 2007; Fazzio et al., 2009; Thiessen et al., 2008; McBride & Schwartz, 2003). To ensure treatment integrity, PI assessments were conducted on 100% of the sessions in the experiments. In order to obtain a PI score, an independent observer

(a research assistant) recorded the experimenter's behavior using a checklist that included all of the correct steps of the procedure. The observer recorded whether the experimenter's behavior was correct for each of the steps on the checklist for every component of a session. The PI score was computed by dividing the number of steps carried out correctly by the total number of steps in a session, and multiplying this result by 100%. PI assessments were also conducted on the confederate's script-following behavior and were assessed the same as for the experimenter's behavior.

Social Validity. Kadzin (1977) and Wolf (1978) introduced strategies to help researchers to answer questions about the social acceptability of their research, such as "What do the participants (and perhaps family members) think about the goals of the intervention?", and "What do they think about the procedures that were applied?", and "What do they think about the results?" In some of the previous studies on instructing individuals how to apply DTT to children with autism, a formal social validity assessment was included to help evaluate the above-mentioned questions (Arnal et al., 2007; Fazzio et al., 2009; Leblanc et al., 2005; McBride & Schwartz, 2003; Thiessen et al., 2008; Ryan & Hemmes, 2005), and in most instances, the results were positive.

To assess social validity in the current study, the experimenter administered an anonymous questionnaire (see Appendix H) to the tutors who received the DTT training. The questionnaire included questions to assess: (a) the importance of the goals of the study; (b) the effectiveness of the self-instructional manual as a teaching tool; and (c) the tutors' satisfaction with how well they learned how to conduct DTT.

Results

Experiment 1

Figure 2 illustrates the individual performance for each of Tutors 1-8 represented in four modified multiple-baseline designs (across pairs of tutors). Visual inspection of the graphed data according to the established guidelines for single-subject research designs (Martin & Pear, 2011) indicates that studying the self-instructional manual resulted in an immediate increase in accurate DTT performance from baseline to post-manual for all eight participants, and a sizeable increase for six of the eight tutors (Tutors 1, 3, 5, 6, 7, and 8). Across all eight participants, there were no overlapping data points among baseline and post-training scores, and baseline scores were relatively stable.

As shown in Figure 2, Tutor 1 showed a sizeable improvement in DTT accuracy after studying the manual, with a 52.2% increase from baseline. In baseline, Tutor 1 had an average of 31.3% correct DTT performance across the three tasks (matching, 20.4%; imitation, 37.4%; pointing, 36.1%) and showed an immediate improvement to an average of 83.5% across tasks (matching, 82.6%, imitation, 86.6%, pointing, 81.2%). Since Tutor 1 met the mastery criterion on all three tasks after studying the manual alone, she did not view the video.

Tutor 2, showed a moderate increase in DTT accuracy after studying the manual (17.8% increase from baseline). Given the nature of the modified multiple-baseline design, Tutor 2 performed each of the three tasks twice in baseline (three of the data points occurred at the same time Tutor 1 was training). Tutor 2 achieved an average DTT accuracy of 39.3% in baseline across tasks (imitation, 42.3%, 43.4%; pointing, 29.6% 32%; matching, 44.4%, 44.4%), which increased to 57.1% post-manual (imitation, 58.8%; pointing, 57.4%; matching, 55%). Since Tutor 2 did not achieve the mastery

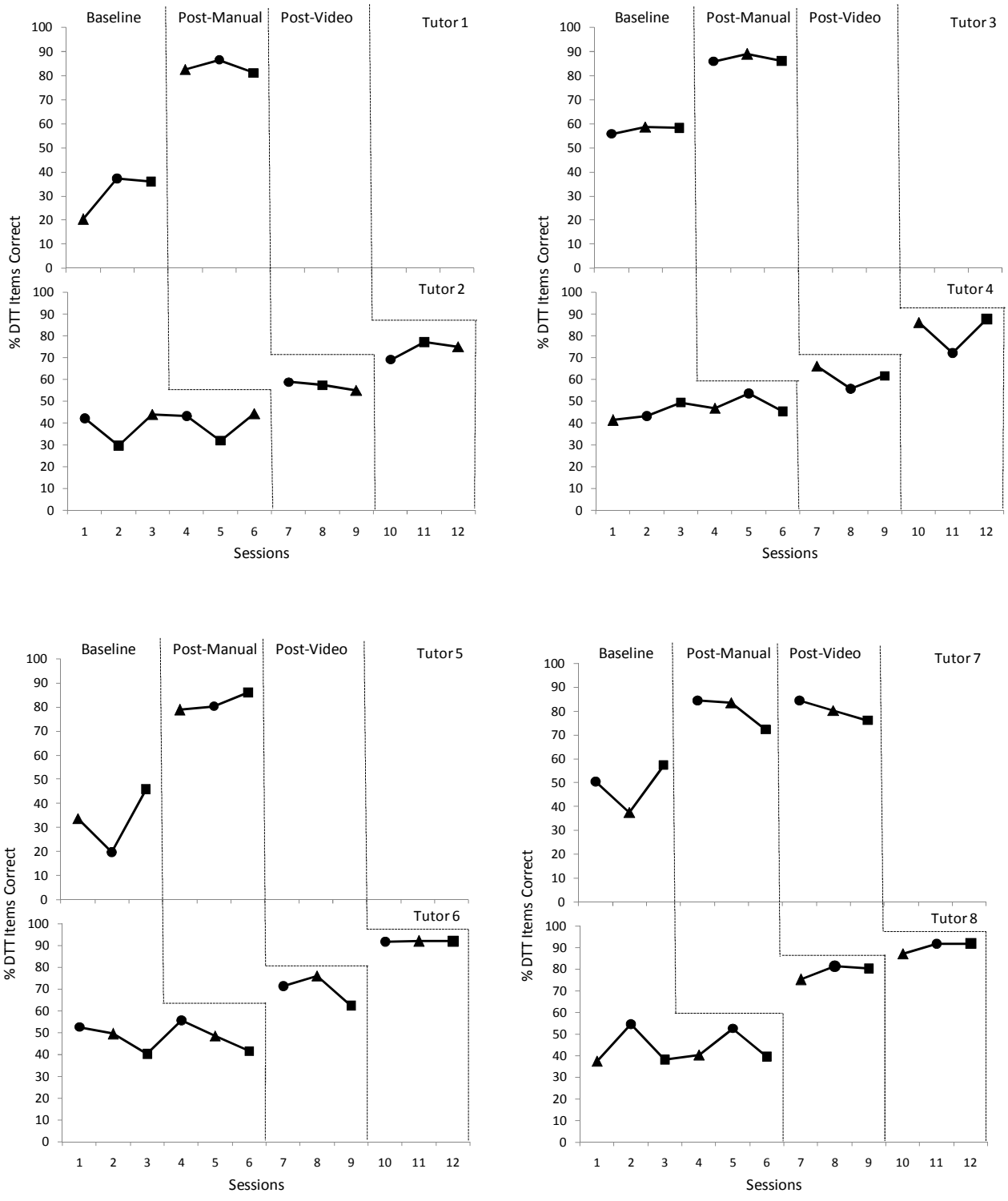

Figure 2. DTT accuracy of Tutors 1-8, represented as percentage of DTT items performed correctly on the 21-item DTTEF across three tasks (matching ▲, pointing ■, and imitation, ●) and across three phases (baseline, post-manual, and post-video).

criterion after studying the manual alone, she viewed the video which improved her accuracy an additional 16.7%. That is, post-video, Tutor 2's average DTT accuracy was 73.8% across tasks (imitation, 69.1%; pointing, 77.2%; matching, 75.2%). Although Tutor 2 did not meet the mastery criterion on any of the three tasks after viewing the video, Tutor 2 did not receive any additional training because she was required to start working in the StAmant Preschool ABA Program.

Tutor 3 showed considerable improvement in DTT performance after studying the manual, with a 29.3% increase from baseline. Tutor 3's average correct DTT performance in baseline was 57.7% across the three tasks (imitation, 55.9%; matching, 58.7%; pointing, 58.4%), which improved to 87.7% post-manual (imitation, 86%; matching, 89%; pointing, 86.1%). Since Tutor 3 met the mastery criterion after studying the manual alone, she did not view the video.

Much like Tutor 2, Tutor 4 showed moderate improvement in DTT accuracy after studying the manual, with a 14.5% increase from baseline. Tutor 4's DTT accuracy across two baseline sessions was 46.7% (matching, 41.3%, 46.8%; imitation, 43.3%, 53.6%; pointing, 49.5%, 45.5%), which increased to 61.2% post-manual (matching, 66.1%; imitation, 55.7%, pointing, 61.7%). Since Tutor 4 did not meet the mastery criterion on any of the tasks, she viewed the video, after which her average DTT performance was 80.7% across tasks (matching, 86.2%; imitation, 72.2%; pointing, 87.6%). This was an additional 20.8% increase from the post-manual phase. Although Tutor 4 did not meet the mastery criterion on one of the tasks (imitation), further training was not administered because Tutor 4 was required to start working in the StAmant Preschool ABA Program.

Comparable to Tutors 1 and 3, Tutor 5 showed considerable improvement in DTT accuracy after studying the manual with a 48.7% increase from baseline. That is, in baseline, Tutor 5 averaged 33.1% correct DTT performance across tasks (matching, 33.6%; imitation, 19.7%; pointing, 45.9%), which in post-manual, improved to an average of 81.8% across tasks (matching, 78.8%; imitation, 80.4%; pointing, 86.1%). Tutor 5 met the mastery criterion for the imitation and pointing tasks, but not for matching. However, given that Tutor 5's post-manual score for matching was only 1.2% off the mastery criterion, and because he had to start working in the StAmant Preschool ABA Program, he did not view the video. Tutor 5 was the only male participant across both Experiments 1 and 2.

Tutor 6 achieved a 25.8% increase in DTT accuracy from baseline after studying the manual. In baseline, Tutor 6's average DTT performance was 48.0% across tasks (imitation, 52.6%, 55.7%; matching, 49.5%, 48.6%; pointing, 40.2%, 41.6%), which in post-manual increased to an average of 73.8% across the three tasks (imitation, 71.4%; matching, 76.1%;pointing, 62.4%). Since Tutor 6's DTT accuracy on all three tasks was below the mastery criterion, she was required to watch the video, which lead to an additional 18.1% increase in DTT accuracy. Her average post-video DTT performance was 91.9% across tasks (imitation, 91.8%; matching, 92%; pointing, 92%).

After studying the manual, Tutor 7 showed considerable improvement in DTT accuracy, with a 31.6% increase from baseline. In baseline, Tutor 7's average correct DTT performance was 48.5% across tasks (imitation, 50.5; matching, 37.6%, pointing, 57.4%) which increased to an average of 80.1% post-manual (imitation, 84.5%; matching, 83.5%; pointing, 72.3%). Tutor 7 met the mastery criterion for imitation and

matching, but not for pointing, therefore, she viewed the video. Tutor 7's post-video average correct DTT performance was 80.3% across tasks (imitation, 84.5%; matching, 80.2%; pointing, 76.2%). Although performance increased slightly, Tutor 7 still did not reach the mastery criterion on the pointing task. However, because Tutor 7 had to start working in the StAmant Preschool ABA Program, no further training was administered.

Post-manual, Tutor 8 showed a considerable increase of 33.7% from baseline. Across the two baseline sessions, Tutor 8's average correct DTT performance was 45.2% (matching, 37.6%, 40.4%; imitation, 54.6%, 52.6%; pointing, 38.2%, 39.6%) and improved to an average of 78.9% post-manual (matching, 75.2%; imitation, 81.4%; pointing,80.2%). Tutor 8 also viewed the video since her performance on the matching task did not meet the mastery criterion. Post-video, Tutor 8's DTT accuracy averaged 90.3%, surpassing the mastery criterion on all tasks (matching, 87.2%, imitation, 91.8%, pointing, 91.8%).

After studying the manual, the average increase in correct DTT performance across the four pairs of tutors (Tutors 1-8) was 31.7% from baseline (see Appendix I for summary of each participant's average DTT performance). A paired-samples t-test indicated that the difference between the average scores in baseline ($M = 43.7$, $SD = 8.7$) and post-manual ($M = 74.9$, $SD = 10.9$) was statistically significant, $t(7)=6.48$, $p < .001$. Further, Cohen's effect size value ($d = 3.64$) suggested high practical significance.
As shown in Figure 3, three of the eight tutors achieved the 80% mastery criterion after studying the manual alone, and the average increase in DTT performance of these three tutors was 44.3% from baseline. The remaining five tutors did not meet the mastery criterion post-manual ($M = 69.5$, $SD = 10.3$), but did show an average increase of 24.7%

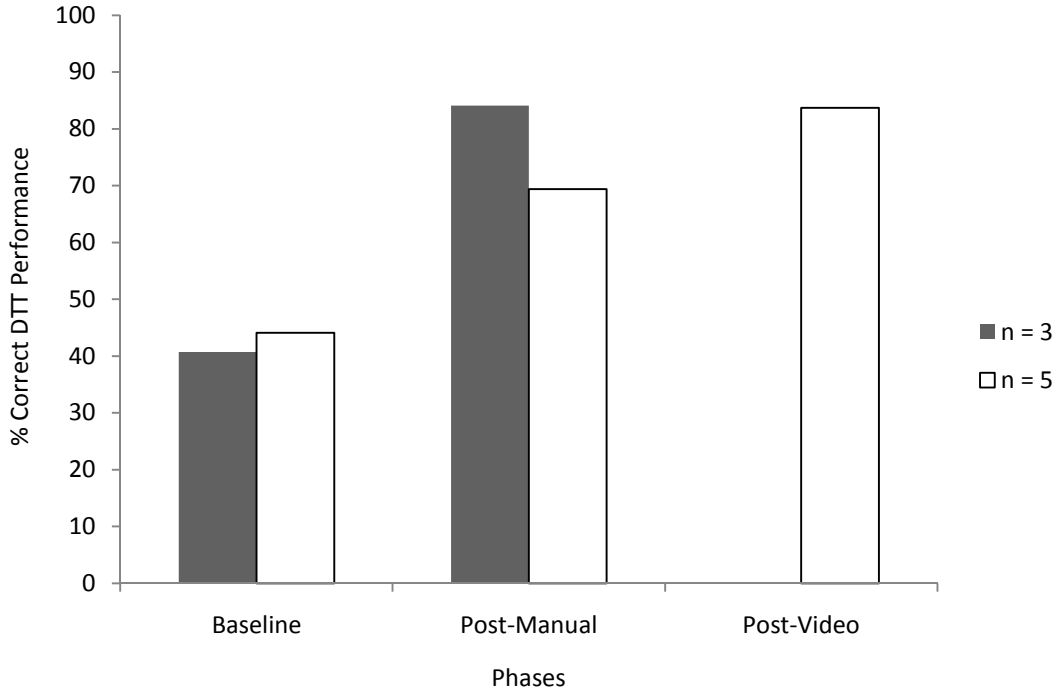

Figure 3. Average DTT accuracy of Tutors 1-8 across three tasks (pointing, matching, imitation), displayed as tutors who achieved ≥ 80% accuracy post-manual (n = 3), and tutors who did not achieve ≥ 80% post-manual, and who therefore participated in the video phase (n = 5).

from the baseline average (M = 45.5, SD = 3.72). These five tutors participated in an additional phase in which they were required to watch a video (described previously). After viewing the video, DTT accuracy across these five tutors improved an additional 14.3% (M = 83.7, SD = 7.5) (see Figure 3).

The order of the teaching tasks was randomized across participants to control for any possible order effects. As illustrated in Figure 4, average correct DTT performance across Tutors 1 to 8 was comparable for each of the tasks across the three phases. More specifically, across Tutors 1-8, the average DTT performance for matching, imitation and pointing were 41.9%, 46.8%, and 42.8% respectively in baseline; 75.8%, 75.6%, and 74.4% respectively in post-manual, and 84.2%, 81.9%, and 85% respectively in post-video. Given that the average DTT scores were similar across participants and across the three tasks and phases, it can be concluded that the tasks were of approximately equal difficulty for the tutors to perform.

Experiment 2

Figure 5 represents the data for each of Tutors 9-16. Visual inspection of the graphed data indicates that there was a clear and immediate increase in DTT accuracy for six of the eight tutors (Tutors 11, 12, 13, 14, 15, and 16) after the training manual was administered. Tutors 9 and 10 had baseline scores that appear to be ascending somewhat across tasks, however there were no overlapping data points among baseline and post-training scores.

After studying the manual, Tutor 9's DTT accuracy improved considerably, with a 32% increase from baseline. That is, in baseline Tutor 9's correct DTT performance averaged 40.9% across tasks (pointing, 35.4%; matching, 38.9%; imitation, 48.3%), which increased to 72.9% post-manual (pointing, 66%; matching, 74.3%; imitation,

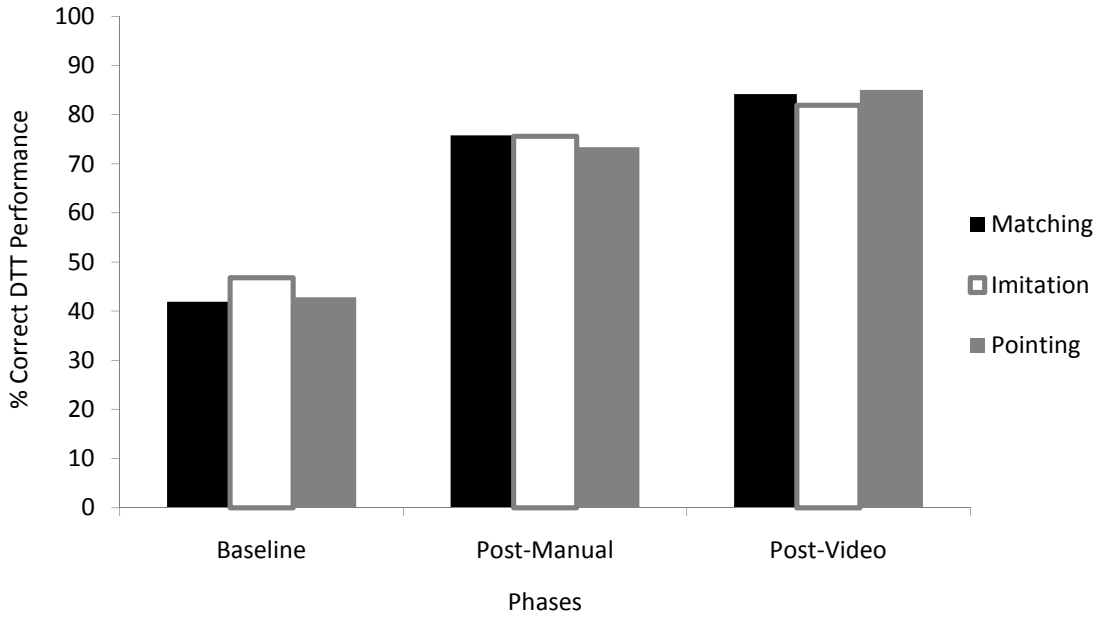

Figure 4. Average DTT accuracy across Tutors 1-8 represented by task (matching, imitation, and pointing) across phases (baseline, post-manual, and post-video).

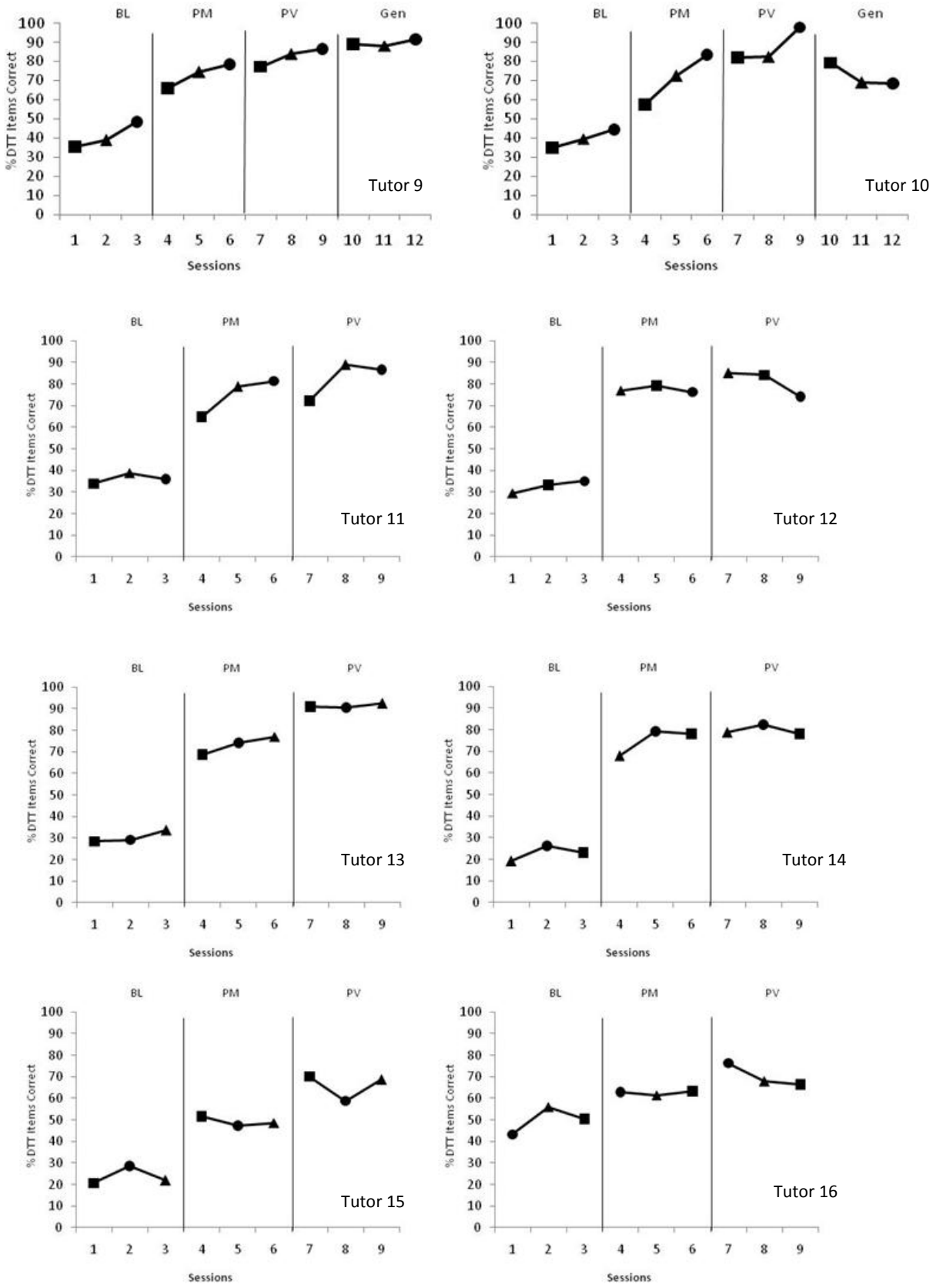

Figure 5. DTT accuracy of Tutors 9-16, represented as percentage of DTT items performed correctly on the 21-item DTTEF across three tasks (matching ▲, pointing ■, and imitation, ●) and across all phases (baseline, post-manual, and post-video, generalization).

78.4%). Since Tutor 9 did not meet the mastery criterion on any tasks after studying the manual, she viewed the video, which improved her average DTT performance to 82.5% (pointing, 77.2%; matching, 83.8%; imitation, 86.6%). Tutor 9 surpassed the mastery criterion on two of the three tasks, and was only 2.8% off for the pointing task. However, because Tutor 9 had to begin working in the StAmant Preschool ABA Program, no additional training could be administered to attempt to increase Tutor 9's performance on the pointing task. The parents of the child with autism with whom this tutor was assigned to work consented to participation in the study (generalization phase). Across the three tasks in generalization, Tutor 9's average correct DTT performance was 89.7% (pointing, 89.2%; matching, 88.2%; imitation, 91.7%).

After studying the manual, Tutor 10 showed similar improvement to Tutor 9, with a 31.5% average increase in DTT accuracy. In baseline, Tutor 10's average correct DTT performance was 39.6% across tasks (pointing, 34.8%; matching, 39.6%; imitation, 44.3%), which increased to an average of 71.1% post-manual across tasks (pointing, 57.4%; matching, 72.5%; imitation, 83.5%). Since Tutor 10 did not meet the mastery criterion on any of the three tasks after studying the manual she viewed the video, after which her DTT performance averaged 87.6% across tasks (pointing, 82.2%; matching, 82.6%; imitation, 83.5%). Tutor 10 was assigned to a child with autism whose parents gave consent to participate in the generalization session. Across the three tasks in generalization, Tutor 10's average correct DTT performance was 72% (pointing, 79.3%; matching, 68.9%; imitation, 68.5%), slightly lower than Tutor 9.

After studying the manual, Tutor 11 showed a sizeable increase of 38.7% in DTT accuracy from her baseline average across tasks (pointing, 33.9%; matching, 38.9%,

imitation, 36%). Her post-manual DTT accuracy was 75% across tasks (pointing, 64.8%; matching, 78.9%; imitation, 81.4%), meeting the mastery criterion on only one task. Therefore, Tutor 11 viewed the video, after which her DTT accuracy improved an additional 7.5%, for an average DTT correct performance of 82.6% across tasks (pointing, 72.3%; matching, 89%;. imitation, 86.6%). Tutor 11 did not meet the mastery criterion on one of the three tasks post-video (pointing), although no further training could be administered because Tutor 11 had to begin working in the StAmant ABA Preschool Program.

After studying the manual, Tutor 12 showed a sizeable increase of 44.8% in DTT accuracy. In baseline, Tutor 12's average correct DTT performance was 32.7% across tasks (matching, 29.6%; pointing, 33.3%; imitation, 35.1%), which increased to 77.5% post-manual across tasks (matching, 77.1%; pointing, 79.2%; imitation, 76.3%). Although Tutor 12 was close to meeting mastery on all three tasks, she viewed the video, after which her average correct DTT performance increased to 81.2% across tasks (matching, 85.3%; pointing, 84.3%; imitation, 74.2%).

Tutor 13 also showed a sizeable increase in DTT accuracy after studying the manual with a 42.9% increase from baseline. In baseline, she averaged 30.4% correct DTT performance across tasks (pointing, 28.5%; imitation, 29.2%; matching, 33.6%), which increased to 73.3% post-manual (pointing, 69.7%; imitation, 74.2%; matching, 77.1%). Tutor 13 did not meet the mastery criterion on any of the three tasks after the manual alone. Therefore, she viewed the video, after which her correct DTT performance increased an additional 17.6%, for an average of 90.9% (pointing, 91.1%; imitation, 90.7%; matching, 92.7%).

Tutor 14 showed the most sizeable improvement in DTT accuracy of all eight tutors, with an increase of 52.2% from baseline. In baseline, her average correct DTT performance was 22.9% (matching, 19.1%; imitation, 23.1%; pointing, 22.9%), which increased post-manual to 75.2% (matching, 67.9%; 79.4%; 78.2%). Although Tutor 14 was close to meeting the mastery criterion for two of the three tasks, her performance on matching was still quite low, therefore, she viewed the video after which her DTT performance average was 79.9% across tasks (matching, 78.9%; imitation, 82.5%; pointing, 78.2%).

Tutor 15 showed a more modest increase of 25.4% after studying the manual. Her baseline average was 23.8% across tasks (pointing, 20.7%; imitation, 28.6%, matching, 22%), which increased 49.2% post-manual across tasks (pointing, 51.5%; imitation, 47.4%; matching, 48.6%), and 65.9% post-video (pointing 70.1%; 58.8%; 68.8%).

Tutor 16 showed the least improvement of all eight tutors with only a 12.7 increase in DTT accuracy after studying the manual. However, her baseline average was the highest of all eight tutors, 49.9% across tasks (imitation; 43.3%; matching, 56%, pointing, 50.5%), which increased to 62.6% post-manual (imitation, 62.9%; matching, 61.5%; imitation, 63.4%). Tutor 16 did not meet mastery criterion on any of the three tasks post-manual so viewed the video, after which her DTT performance increased to an average of 70.2% across tasks (imitation, 76.3%; matching, 67.9%; pointing, 66.3%).

The average DTT performance across all three tasks and all phases for an additional eight tutors (Tutors 9-6) is shown in Figure 6. Overall, DTT accuracy across the eight tutors increased 35.1% after studying the manual. A paired-samples t-test

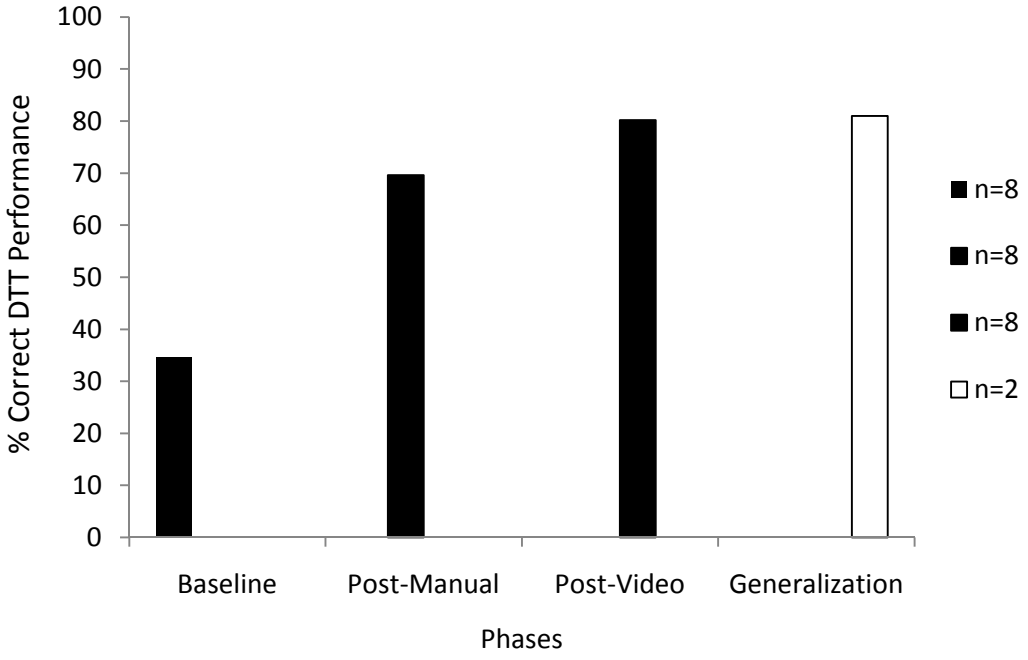

Figure 6. Average DTT accuracy of Tutors 9-16 across all three tasks (matching, pointing, imitation) and across three phases (baseline, post-manual, post-video), and average correct DTT performance for Tutors 9 and 10 across the same three tasks in an additional phase (generalization).

indicated that there was a statistically significant difference in the average DTT accuracy from baseline (M = 34.5, SD = 9.1) to post-manual (M = 69.6, SD = 9.4), $t(7) = 7.97$, $p < .001$. This improvement was practically significant according to Cohen's criteria (d = 3.85). All eight tutors participated in the video phase, which resulted in an additional 10.6% overall increase in DTT accuracy across tutors from post-manual (M = 69.6, SD = 9.4) to post-video (M = 80.2, SD = 8.3). This improvement also has practical significance according to Cohen's criteria (d = 1.12). Only two tutors (Tutors 9 and 10) were able to complete the generalization phase. Results were positive in that DTT accuracy was maintained at a very high level for Tutor 9, and at a level comparable to post-manual performance for Tutor 10. However, Tutor 10's generalization performance dropped somewhat from the post-video level. Across Tutors 9 and 10, generalization performance averaged 81% when teaching a child with autism.

As in Experiment 1, the order in which participants performed the three tasks was randomized. Figure 7 represents the average correct DTT performance across Tutors 9-16 by task. Performance was comparable across tasks in baseline (matching, 34.7%; pointing, 32.5%; imitation, 36.4%), post-manual (matching, 69.7%; pointing, 66.2%; imitation, 72.9%), and post-video (matching, 81.1%; pointing, 77.7%; imitation, 81.7%). Although only two tutors (Tutors 9 and 10) participated in the generalization phase, the average correct DTT performance across tasks was also comparable (matching, 78.6%; pointing, 84.3%; imitation, 77.6%) (see Figure 7).

Results Common to Experiments 1 and 2

Interobserver Agreement and Procedural Integrity

IOA was calculated for 33% of sessions and exceeded the commonly accepted

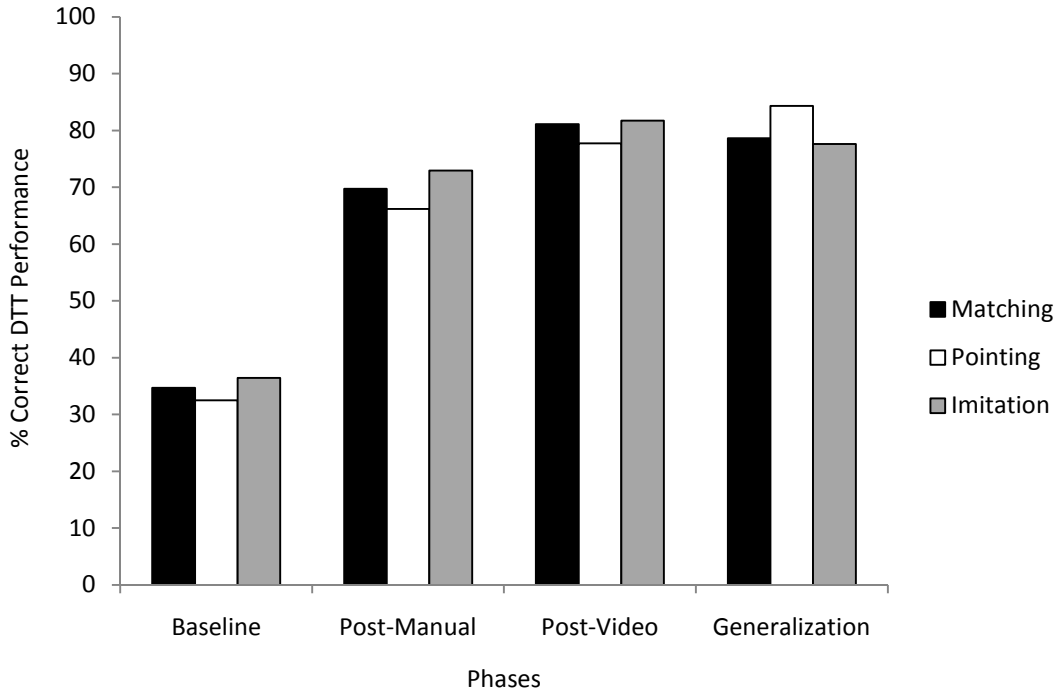

Figure 7. Average DTT accuracy across Tutors 9-16 represented by task (matching, imitation, and pointing) across three phases (baseline, post-manual, and post-video) and an additional phase (generalization) for Tutors 9 and 10.

value of 80% (Martin & Pear, 2011). The mean percent agreement was 89% and ranged from 75% to 99%. PI scores on the experimenter's behavior were calculated for every session and the mean percent accuracy was 100% for all sessions. PI scores were also calculated on the confederate's behavior for all sessions and averaged 97% with a range of 83% to 100%.

Training Time

In order to further evaluate the efficiency of the self-instructional package for teaching new tutors how to conduct DTT, the mean duration of the training phase was recorded for each participant. That is, the mean amount of time that it took to study the manual, master the study questions, practice the DTT components, complete the self-rating component and watch the videotape (if necessary) was recorded for each tutor and included brief breaks, and the mean was 4.3 hours (*SD* = 0.97).

Social Validity

Tutors' average scores across items on an anonymous social validity questionnaire (see Appendix H) were evaluated. The questionnaire was mailed to all 16 participants after completion of the study and there was a 50% response rate (eight tutors). Participants indicated their disagreement/ agreement on a 5-point scale (1= disagree, 3= neutral, 5 = agree) for each of four positive statements about the *goals* of the research, two positive statements about the *self-instructional procedures*, and four positive statements about the *effects* (the training value of the procedures). Results indicated high social validity with an overall mean rating of 4.4 (4.7 for the goals, 3.9 for the procedures, and 4.6 for the effects). Given that only 50% of the participants responded, these results should be interpreted with caution. For example, individuals

who returned their completed questionnaires may have been more motivated or satisfied with the study overall.

Discussion

The current research aimed to address the need for effective and efficient strategies to teach individuals how to conduct DTT with children with autism. The results contribute to an existing body of research that has validated the effectiveness of the self-instructional manual to teach university students how to conduct DTT with confederates as well as children with autism (Arnal et al., 2007, Fazzio, et al., 2009; Thiessen et al., 2009).

The research findings upon which this study was based have been very positive with university students. In an AB design across seven students, Arnal et al. found that DTT accuracy increased an average of 23% from baseline after studying the first version of the self-instructional manual (Fazzio & Martin, 2006). Fazzio et al. replicated these results in a multiple-baseline design across five students, in which the average DTT accuracy increased 32% from baseline, and further increased with an additional 35 minutes of a feedback-plus-demonstration session. Based on the findings by Arnal et al. and Fazzio et al., the self-instructional manual was revised. In a study of the second version of the self-instructional manual (Fazzio & Martin, 2007) using a modified multiple-baseline design across four university students, Thiessen et al. (2009) found that individual's DTT accuracy improved an average of 36% from baseline, and DTT accuracy was maintained at an average of 77% in generalization sessions. The combined results of Experiments 1 and 2 with tutors were comparable to past research on the two versions of the DTT self-instructional manual with university students, in that the average

increase in DTT accuracy across tutors after studying the manual alone was 31.7% in Experiment 1, and 35.1% Experiment 2.

Similar to the feedback-plus demonstration phase in Fazzio et al. (2009), which was successful in further increasing DTT performance in a short time (35 minutes), the video in the current study resulted in additional increases in DTT accuracy in both Experiment 1 (13.4%) and Experiment 2 (10%). This increase was also achieved in a relatively short time (after viewing a 17-minute video). Since only three out of the 16 tutors met mastery after the manual alone, and 10 out of the 13 remaining participants met mastery after the additional video phase, this has important implications for the effectiveness of the video component. Macurik, O'Kane, Malanga and Reid (2008) offer further support for using video as a training strategy. In a between-subject random group design, these authors compared the effectiveness, efficiency, and acceptability of video versus live training as components of a program for training support staff in delivering intervention plans for individuals with challenging behavior. The video training was found to be as effective as live training, as well as an efficient mode of instruction. Somewhat surprisingly however, staff rated the acceptability of video training slightly less favorable than live training. Based on subjective feedback from the participants in the current study, it seemed that many of the tutors preferred a visual component to help them to achieve mastery of DTT. These results, and the increasing popularity of video usage in training situations, suggest that further research might consider evaluating the video training component alone or as a baseline measure.

As in previous research on the self-instructional manual, it took a relatively short

time for the tutors to master the material, and given the self-instructional nature of the manual and video, few resources were needed to administer the training. These two factors combined suggest that the training strategy is an efficient and cost-effective strategy. This has important implications for clinical agencies that train staff to deliver DTT to children with autism. This study also had high social validity, high inter-observer agreement, and high treatment integrity. It should be noted however, that due to the relatively low response rate for social validity, a potential response bias might exist. That is, the tutors who completed and returned the questionnaire by mail may have been more satisfied with the study than those tutors who did not return the questionnaire.

In Experiment 1 with a multiple-baseline across a pair of participants replicated across a total of four pairs, the results demonstrated a clear experimental effect of the self-instructional manual with all eight participants, and an added (although smaller) effect of the demonstration video with the five participants who received the video. Thus, Experiment 1 demonstrated strong internal validity. Across both experiments, some level of treatment effect was demonstrated with all 16 participants, thus, the current research also demonstrates external validity in that the treatment effect generalized to a novel population, newly-hired tutors. Compared to the population assessed in previous studies (university students), the current population (newly-hired tutors) was potentially more representative of a random sample of tutors. That is, tutors varied in age, and did not necessarily have any post-secondary education. Unlike university students, who are familiar with studying and test-taking to master material, the tutors were not necessarily proficient in these skills. However, since comparable effects were still found in a more diverse population, this offers further support for the external validity of the training

strategy. This is an especially important finding considering the demand for personnel trained to deliver DTT to children with autism in ABA programs, who have varying levels of education and experience.

This research has several limitations. First, both experiments assessed the effectiveness of the self-instructional manual for teaching tutors to apply DTT while teaching a confederate who role-played a child with autism, but only two participants were assessed for generalization of their DTT skills while teaching a child with autism. Although the two participants in Experiment 2 showed positive results when conducting DTT with a child with autism, data from additional participants would enhance these findings. Second, although participants were assessed for their ability to apply DTT to teach three tasks that are common in training programs for children with autism, it would be desirable to assess their ability to teach additional tasks. Third, for ethical reasons, the two tutors who participated in the generalization phase were not assessed while attempting to teach a child with autism in baseline. Fourth, except for the two tutors who attempted to teach the child with autism during the generalization phase, no follow-up measures were taken. Finally, the self-instructional manual was not assessed in a purely self-instructional manner. That is, studying of the manual, completing the mastery tests, and completing the practice exercises was experimenter-facilitated. In order to assess the true stand-alone effectiveness of the manual and video, future research should assess the self-instructional package with participants who would study the package completely independently, without the assistance of an experimenter to monitor test taking and role-playing after each section of the manual.

Considering the findings of the current research that only three out of the 16 tutors

met mastery after the manual alone, and 10 of the other 13 participants met mastery after the additional video phase, the authors of the manual (Fazzio & Martin, 2007) and video (Fazzio, 2007) might be encouraged to incorporate the video into several chapters of the self-instructional manual. Future research might then evaluate the combined training package with additional tutors, and with parents of children with autism. Future research should also further assess the generalizablity of the results when teaching DTT to children with autism and across novel tasks.

Overall, the results of the present study offer further support for the potential of the self-instructional training package as an efficient, effective and cost-effective method of training individuals how to conduct DTT for children with autism. The positive results obtained with tutors are especially encouraging in a field where rapid and effective training strategies are in high demand.

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Appendix A

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 all 3 pictures when they are named.

- 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.

Appendix B

Project:

Participant #: _____
Confederate: _____

Baseline ☐
Post-Manual ☐
Post-Video ☐
Generalization ☐

Data Sheet for Discrete-Trials Teaching

POINTING TO NAMED PICTURES

Targets: **Banana**
Dog
Balloons

Date: _____

Insert ✓ to indicate the child's response

Trials	Position of			Item to give to child	Correct Independent	Correct Prompted	Error	Correct on Error Correction
	Banana	Balloons	Dog					
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**				

Appendix C

Table of Contents

Appendix D

Self-Practice Exercise at End of Chapter 2

STOP AND PRACTICE

Before studying the next chapter, take the following steps to ensure that you are completely comfortable with your ability to perform the preceding components correctly. If you are studying the manual on your own, use your imagination. Pretend that you will be teaching the matching task to a particular child. Role-play Components 1, 2, 3, and 5 for the matching task. Then role-play those components for the pointing-to-named-items task. Finally, role-play those components for the task of teaching the child to imitate simple actions. Rate yourself on each component on the following practice rating sheet. Continue practicing until you perform all components correctly for each of the three tasks.

If you have a training partner who is also studying the manual, ask your partner to role-play a child with autism while you role-play the teacher. Role-play Components 1, 2, 3, and 5 for each of the three tasks, and ask your partner to rate your performance on the practice rating sheet. Continue practicing until you perform all components correctly for each of the three tasks. Then reverse roles and repeat the above.

My Practice Rating Sheet

CHECKLIST FOR DISCRETE-TRIALS TEACHING	Did I do the components correctly? (Y=Yes, N=No)		
Part I: Before Starting a Teaching Session	Practice Trial 1	Practice Trial 2	Practice Trial 3
1. Determine Teaching Task			
2. Gather Materials			
3. Select Effective Reinforcer(s)			
4. Determine Prompt Fading Procedure and Initial Fading Step (Discussed in Chapter 5)			
5. Develop Rapport/Positive Mood			

Appendix E

Self-Practice Exercise at End of Chapter 3

STOP AND PRACTICE

Before reading the next chapter, take the following steps to ensure that you are completely comfortable with your ability to perform components 6 thru 13 correctly. If you are studying the manual on your own, use your imagination. Pretend that you are teaching the matching task to a particular child. Role-play components 6 thru 13 for the matching task, and assume that the child responds correctly. Then role-play those eight components for the pointing-to-named items task. Finally, role-play those eight components for the task of teaching the child to imitate simple actions. After you role-play the teaching of a task, rate yourself on each component on the following practice rating sheet. Continue practicing until you perform all components correctly for each of the three tasks.

If you have a training partner who is also studying the manual, ask your partner to role-play a child with autism while you role-play the teacher. Role-play the teaching of each of the three tasks. After role-playing a task, ask your partner to rate your performance on the following practice rating sheet. Continue practicing until you perform components 6 thru 13 correctly for each of the three tasks. Then reverse roles and repeat the above.

My Practice Rating Sheet

CHECKLIST FOR DISCRETE-TRIALS TEACHING (Managing Antecedents and Consequences Following Correct Responses)	Did I do the components correctly? (Y=Yes, N=No)		
Part II: On Each Trial	Practice Trial 1	Practice Trial 2	Practice Trial 3
A) Manage the Antecedents			
6. Check the data sheet for the arrangement of teaching materials			
7. Secure the child's attention			
8. Present the teaching materials			
9. Present the correct instruction			
10. Present prompts			
B1) Manage Consequences for Correct Response			
11. Following a correct response, praise and present an additional reinforcer			
C1) Record the Response			
12. Record correct response immediately/accurately			
~~**D) (Discussed in Chapter 4)**~~			
E) Allow Brief Pause			
13. Allow brief inter-trial interval of 3-5 seconds			

Appendix F

Self-Practice Exercise at End of Chapter 4

STOP AND PRACTICE

Before reading the next chapter, take the following steps to ensure that you are completely comfortable with your ability to perform the preceding components correctly. If you are studying the manual on your own, use your imagination. Role-play the following tasks:

- Role-play the components for a teaching trial while pretending that you are teaching the matching task, and assume that the child responds incorrectly on the trial, and correctly during the error correction.

- Role-play the components for a teaching trial while pretending that you are teaching the pointing-to-named items task, and assume that the child responds incorrectly on the trial, and correctly during the error correction.

- Role-play the components for a teaching trial while pretending that you are teaching the child to imitate simple actions, and assume that the child responds incorrectly on the trial, and correctly during the error correction.

After you role-play each task, rate yourself on the practice rating sheet on the next page. Continue practicing until you perform all components correctly for each of the three tasks.

If you have a training partner who is also studying the manual, ask your partner to role-play a child with autism while you role-play the teacher. Role-play the three tasks as described above, and ask your partner to rate your performance on the practice rating sheet after role-playing each task. Continue practicing until you perform all components correctly for each of the three tasks. Then reverse roles and repeat the above.

My Practice Rating Sheet

CHECKLIST FOR DISCRETE-TRIALS TEACHING (Managing Antecedent and Consequences Following an Incorrect Response)	Did I do the components correctly? (Y=Yes, N=No)		
Part II: On Each Trial	Practice Trial 1	Practice Trial 2	Practice Trial 3
A) Manage the Antecedents			
6. Check the data sheet for the arrangement of teaching materials			
7. Secure the child's attention			
8. Present the Teaching Materials			
9. Present the correct instruction			
10. Present Prompts			
B1) Manage Consequences for Correct Responses			
11. Following a correct response, praise and present an additional reinforcer			
C1) Record the Response			
12. Record response immediately/accurately			
B2) Manage Consequences for an Incorrect Response			
14. Following an incorrect response, block gently if possible, remove materials and show a neutral expression for 2 or 3 seconds			
C2) Record the Response			
15. Record the incorrect response immediately/ accurately			
D) Error Correction Following an Error			
16. Secure the child's attention			
17. Re-present the materials			
18. Re-present the instruction and prompt immediately to guarantee correct response			
19. Praise only			
20. Record error correction immediately/accurately			
E) Allow Brief Pause			
13. Allow brief inter-trial interval of 3-5 seconds			

Appendix G

Self-Practice Exercise at End of Chapter 5

STOP AND PRACTICE

Let's suppose that for Component 1 above, you will be teaching a child to match pictures. In order to "Gather Materials" (Component 2), for the purpose of practicing, obtain 6 pieces of paper. On each of two pieces draw a cat, on two pieces draw a tree, and on two pieces draw a house. Also, make a photocopy of the data sheet on the next page. In order to "Select Effective Reinforcers (Component 3), place a dozen or so small pieces of paper in a bowl and pretend that each piece is a candy that the child likes. Assume that you will be using the data sheet presented on the next page, and that your supervisor has assessed the child and determined that you will be using most-to-least prompt fading. Note the fading steps and rules specified on the data sheet.

If you are studying the manual on your own, use your imagination. Organize the "materials," "reinforcers," and the data sheet on a table, and assume that you have completed Component 5 (Develop Rapport/Positive Mood). On the data sheet on the next page, note that the child responded correctly on the 1st three trials with a full prompt, made an error on Trial 4 with partial prompt 1, and then responded correctly on trials 5 and 6 with partial prompt 1. Do your "imaginary" practicing by starting with Trial 7. Role-play the teaching of the matching task (as specified on the data sheet) and pretend that the child responds correctly on every trial. Practice most-to-least prompt fading. At the end of every trial, score yourself on the practice rating sheet. Continue practicing until you perform all components correctly, and note that that will take several trials because of Component 21, which requires you to fade prompts across trials.

Data Sheet for Matching

Most-to-Least Fading Steps:

-Full guidance and pointing to correct drawing (Full prompt: F)
-Light guidance and pointing to correct drawing (Partial prompt: P1)
-Pointing to correct drawing only (Partial prompt: P2)
-No prompt

Fading Rules:

-Following 3 correct responses at a step, proceed to next fading step
-Following 2 consecutive errors, return to previous fading step

Instructions at start of each trial: say "Match"

Trials	Position of Drawings			Drawing to give to child	Correct Independent	Correct Prompted	Error	Correct on Error Correction
	Cat	House	Tree					
1	R	M	L	Cat		✓F		
2	L	R	M	House		✓F		
3	M	L	R	Tree		✓F		
4	R	M	L	House			✓P1	✓
5	L	R	M	Tree		✓P1		
6	M	L	R	House		✓P1		
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				
13	R	M	L	House				
14	L	R	M	Tree				
15	M	L	R	Cat				
16	R	M	L	Tree				
17	L	R	M	Cat				
18	M	L	R	Tree				

If you have a training partner who is also studying the manual, ask your partner to role-play a child with autism while you role-play the teacher. Role-play the teaching of matching as described previously and ask your partner to rate your performance on the practice rating sheet until you perform all components correctly (note that that will require several trials because of Component 21). Then reverse roles and repeat the above.

My Practice Rating Sheet

CHECKLIST FOR DISCRETE-TRIALS TEACHING (Managing Antecedents and Consequences Following a Correct Response)	Did I do the components correctly? (Y=Yes, N=No)					
Part II: On Each Trial	My rating	My rating	My rating	My rating	My rating	My rating
A) Manage the Antecedents						
6. Check the data sheet for the arrangement of teaching materials						
7. Secure the child's attention						
8. Present the Teaching Materials						
9. Present the correct instruction						
10. Present Prompts						
B1) Manage Consequences for Correct Response						
11. Following a correct response, praise and present an additional reinforcer						
C1) Record the Response						
12. Record correct response immediately/ accurately						
B2) Manage Consequences for an Incorrect Response						
Item 14.						
C2) Record the Response						
Item 15.						
D) Error Correction Following an Error						
Items 16, 17, 18, 19, 20						
E) Allow Brief Pause						
13. Allow brief inter-trial interval of 3-5 seconds						
Part III: Fade Prompts Across Trials						
21. Fade prompts across trials as described on the data sheet.						

Appendix H

Social Validity Questionnaire

Please complete this anonymous questionnaire to assist the researcher in evaluating the social importance of the research that you participated in. Place an "x" in the column that represents how much you agree or disagree with each statement. If you place an x under the 5, that indicates that you completely agree, 1 indicates that you completely disagree, and 3 indicates that you are neutral, or do not agree or disagree.

	1 Disagree	2 Somewhat Disagree	3 Neutral	4 Somewhat 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.					
9. I have learned a new and important skill by participating in this study.					
10. I would recommend this training opportunity to other individuals who work with children with autism.					

Appendix I

DTT Performance Accuracy for All Participants Across All Tasks and Phases

	Average DTT Performance Across Phases			
Participant	Baseline	Post-Manual	Post-Video	Generalization
		Experiment 1		
1	31.3	83.5	-	-
2	39.3	57.1	73.8	-
3	57.7	87.0	-	-
4	46.7	61.2	-	-
5	33.1	81.8	-	-
6	48.0	70.0	91.9	-
7	48.5	80.1	80.3	-
8	45.2	78.9	90.3	-
		Experiment 2		
1	40.9	72.9	82.5	89.7
2	39.6	71.1	87.6	72.0
3	36.3	75.0	82.6	-
4	32.7	77.5	81.2	-
5	30.4	73.3	90.9	-
6	22.9	75.2	79.9	-
7	23.8	49.2	65.9	-
8	49.9	62.6	70.2	-