USING A PERFORMANCE EVALUATION TO DETERMINE AN

INDIVIDUALIZED INTERVENTION TO INCREASE STAFF TREATMENT

INTEGRITY OF DISCRETE TRIAL TEACHING

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A Thesis Submitted to the Temple University Graduate Board

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In Partial Fulfillment of the Requirements for the Degree

MASTER OF EDUCATION

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by Nicholas D. Dombrowski

May 2019

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ABSTRACT

Discrete Trial Teaching (DTT) is a teaching method that involves fast-paced trials designed to teach basic skills by breaking them into smaller components, typically conducted in a one-on-one setting. Treatment integrity has proven to be of great importance in DTT, with skill acquisition occurring at higher rates when treatment integrity is high. While research has shown that verbal and written feedback are effective in training staff to conduct DTT, there is still a need for research on the use of individualized interventions based on performance assessments. This study used a multiple-probe across participants design, and demonstrated that a one-on-one session including interventions such as feedback, practice, treatment integrity checklists, and/or antecedent interventions is an effective method for increasing treatment integrity and implementation of DTT. The three participants that took part in the individualized interventions all displayed increases in proficiency of delivering DTT trials.

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CHAPTER 1

INTRODUCTION

Discrete Trial Teaching (DTT) is an important and frequently-used intervention described by McEachin, Smith & Lovaas (1993) in the treatment of children with autism. It involves breaking down skills into component sets and systematically building upon previously acquired skills. It is important that the intervention be delivered in an accurate and effective way to promote skill acquisition (Lavie & Sturmie, 2002).

Eikeseth, Smith, Jahr, & Eldevik (2009) noted the overall importance of DTT in their one-year controlled comparison study on four- to seven-year-old children with autism. Their study found significant increases in IQ, language comprehension, expressive language, and adaptive behavior after receiving DTT. Additionally, a study by Dib, Sturmey, and Tiger (2007) found that when DTT was delivered with high fidelity maladaptive behaviors, including stereotypy, were reduced. These studies show the importance of DTT in a variety of settings. Although DTT is valuable for acquiring basic skills, it has also been shown that DTT also prepares the student for less restrictive educational settings. While DTT doesn't directly reduce maladaptive behaviors, it may increase engagement through fast paced instruction. By increasing engagement, students gain valuable skills, such as maintaining attention to tasks and following directions, that can allow them to eventually transition into more mainstream educational settings, such as a general-education classroom (Downs, Downs, Johansen & Fossum 2003).

Furthermore, a study by McEachin, Smith, and Lovaas (1993) showed that students who engaged in intensive DTT maintained their progress for several years after their treatment had ended and that many of the students were indistinguishable from typically developing classmates. This further demonstrates the effectiveness of DTT,

since it not only helps to meet short-term goals of teaching specific skills, but also prepares the student for a more typical learning environments. However, for DTT to have its greatest effect, it must be delivered a high level of treatment integrity.

Treatment Integrity

DiGennaro Reed, Reed, Baez, and Maguire (2011) noted that partial integrity failure can be just as detrimental to the student as total integrity failure. Using a combination of a multi-element design and a multiple baseline across participants design, different rates of treatment integrity were assessed for students' accuracy in responding during DTT sessions. DiGennaro and colleagues found very high rates of accuracy in student responses when staff implemented DTT with 0% errors. However, the researchers found little difference in student accuracy when exposed to 50% errors and 100% errors. This demonstrates that partial integrity failure can be just as detrimental as complete integrity failure. A possible limitation of this study was that only having two levels of treatment integrity failures does not give an indication how students would react to varying levels of failures.

Even when students are able to master their goals with treatment integrity failures, the time it takes to do so is far greater than if there were no treatment integrity failures. Carroll, Kodak, & Fisher (2013) conducted an alternating treatment design to evaluate the effects of low treatment integrity (67%) and high treatment integrity (100%). The study showed that students who mastered goals in the low treatment integrity phases took an average of double the number of instructional minutes to do so, compared to mastering goals with high treatment integrity. Although this shows that skills can still be mastered with low treatment integrity, it would have been beneficial to determine what treatment

integrity failures are occurring. Conducting an assessment to determine which errors are occurring may give insight into what is occurring within the sessions.

Pipken, Vollmer, and Sloman, (2010) showed that treatment integrity failures can also have a lasting negative effect, even when treatment integrity returns to 100% (Peter Pipken, Vollmer, & Sloman, 2010). Peter Pipken, Vollmer, & Sloman's (2010) study used a multiple baseline across conditions design to demonstrate that when a student was exposed to 50% treatment integrity after having been exposed to 100% treatment integrity, the level of correct response did not return after being returned to 100% treatment integrity. In fact, the level of correct response was lower upon returning from 50% treatment integrity than from the original baseline measurement. A potential limitation of this study was that the two contrived levels of treatment integrity failure (50 and 100%) does not create a realistic sense of what effects a range of treatment integrity failures may have on target behaviors.

Jenkins, Hirst, & DiGennaro Reed (2015) used a multi-element design to demonstrate the detrimental effect treatment integrity failures can have on a student's success. The study found that, when exposed to 50% or 0% treatment integrity, three out of the four subjects were completely unable master their goals. This shows the importance of treatment integrity in implementing DTT sessions, as low rates of integrity can have a detrimental effect on the student's progress, and on the student's future performance. Although this study shows that varying levels of treatment integrity failure can be detrimental, having only two levels does not give an accurate depiction of treatment integrity failures. This study would have benefited from having varying levels of treatment integrity, with levels higher than 50%.

Arkoosh, Derby, Wacker, Berg, McLaughlin, & Baretto (2007) conducted a study in which they used a multiple baseline across dyad design to evaluate the long-term effects of treatment integrity on the intervention's effectiveness. The study found a clear correlation between treatment integrity and the reduction of aberrant behaviors, with levels of aberrant behavior such as hand flapping as low as 7.51% with high levels of treatment integrity. A limitation of this study was that it did not use an assessment to determine if certain errors had more of an effect on aberrant behaviors in students. For example, if errors in pacing were occurring, this would likely allow for more aberrant behaviors to occur.

Practitioners who select to incorporate DTT into student programming should ensure that high treatment integrity is maintained to ensure that DTT is being implemented properly (Thompson, Martin, Arnal, Fazzio, & Yu, 2009). In order to properly address treatment integrity failures, it is necessary to have means to evaluate staff's performance in order to select the most appropriate intervention.

<div align="center">Organizational Behavior Management</div>

The field of Organizational Behavior Management (OBM) is rooted in Applied Behavior Analysis (ABA) but focuses on organizational problems such as lack of productivity and skill or performance deficits in work settings, using the behavioral principles of ABA (Austin, Casella & Wilder 2009).

Mager and Pipe (1970) developed a model, based in OBM, by which to evaluate deficiencies in workplace performance. This model evaluates facets of the desired skills, such as whether proper reinforcement is in place, if the desired performance is actually being punished, if the skill has been properly trained in the first place, or if there are potential barriers to the skill being implemented correctly. If a performance issue is due

to a skill deficit, effective training of the skill may be the most appropriate intervention to increase treatment integrity. If treatment integrity is inadequate due to a performance deficit, then antecedent, consequence, or other motivational interventions may be more appropriate. This model was particularly important to the current study, as this model was used to determine if there was a skill deficit or performance deficit in place.

<div align="center">Training Methods</div>

Past studies on staff training have been successful in using training packages with methods such as checklists of criteria, modeling, practice sessions, and feedback to increase accuracy in the implementation of DTT sessions (Lavie & Sturmey, 2002; Sakaroff & Sturmey, 2004).

Sakaroff and Sturmey (2004) used a training package that included a checklist, modeling, and feedback on practice sessions. The treatment package was used to train staff to conduct DTT sessions. In a multiple baseline across participants design, the researchers demonstrated the effectiveness of the training package, with the staff's accuracy increasing from an average of 46% in baseline, to an average of 98% post training. The studies by Sakaroff and Sturmey (2004) and Lavie and Sturmey (2002) were related to this study due to their use of a training package to increase treatment integrity.

Behavioral Skills Training (BST) is a training package that has been found to be effective. Parsons, Rollyson and Reid (2013), used a multiple Baseline across participants design to demonstrate that using the eight steps of behavioral skills training increased the percentage of steps of behavioral skills correctly completed by the participants. The eight steps of behavioral skills training included; providing the rationale for the target skill being trained, vocally describing the steps of the target skill, providing trainees with

written summary of target skill steps, demonstrating the target skill, observing and record trainee correct vs. incorrect performance of target skill, providing supportive and corrective feedback, and repeating the last three steps until the trainee correctly performs the target skill. After completing the behavioral skills training, the participants increased their proficiency in the target skills from 0-50% to 88-100%. Parsons, Rollyson & Reid's (2013) study was important to the current study, as the steps in the behavioral skills training very closely resembled the desired steps in the current study's intervention for skill deficit. A limitation of this study, however, was that the use of a training package made it impossible to know if one portion of the intervention is more or less effective.

Performance Feedback

Feedback was found to be successful in increasing DTT accuracy in several studies (e.g. Lavie & Sturmey, 2002; Sakaroff & Sturmey, 2004, Leblanc, Ricciardi & Luiselli 2005). For example, Leblanc, Ricciardi, and Luiselli (2005) used a multiple - baseline design to show that an 8-10 minute feedback session, targeting deficits found in the teacher's implementation of DTT sessions, increased the staff's proficiency. The intervention was terminated when the teachers reached 90% fidelity, and each of the teachers reached the terminal criteria in 4 sessions or less.

DiGennaro, Martens, and Kleinmann (2007) used a multiple-baseline across dyad design to evaluate the difference between using written feedback alone and written feedback in conjunction with practice sessions in increasing staff accuracy in conducting interventions and lowering student problem behavior. The researchers found higher rates of teacher accuracy and lower rates of student problem behavior, when using written feedback in conjunction with practice sessions. Similarly, In Lavie and Sturmey's (2002) study, the researchers used a training package of a checklist, modeling, and feedback on

practice sessions to train staff to conduct a paired stimulus preference assessment in a multiple Baseline across participants design. The training package was successful, as the staff's accuracy increased from 16-20% accuracy in Baseline, to 98-100% accuracy after the intervention. However, a limitation for each of these studies is that using the training methods as a package, it is difficult to parametrically evaluate the effectiveness of the treatment package.

Some gaps in the literature on effective staff training and treatment integrity interventions include a lack of research on treatment integrity as it pertains to the success of DTT sessions. McIntyre, Gresham, DiGennaro, & Reed (2007) performed a literature review and noted that while 95% of studies reviewed provided the operational definitions of the target behaviors, only 30% offered treatment integrity data. This is a deficit in the research literature, especially with evidence supporting the fact that students show higher rates of progress when DTT sessions are carried out with high rates of accuracy (Arkoosh et. al. 2007; Carroll, Kodak & Fisher 2013; DiGennaro Reed, Reed, Baez, and Maguire 2011; Jenkins, Hirst, & DiGennaro Reed 2015; Peter Pipken, Vollmer, & Sloman 2010). Furthermore, there is little research on the use of treatment packages including behavioral skills training or antecedent interventions, depending on the performance assessment, with most studies evaluating the use of verbal and written feedback (Lavie & Sturmey 2004; Sakaroff & Sturmey 2002).

The present study sought to determine the effectiveness using a performance evaluation to determine an individualized intervention package or antecedent management to increase treatment integrity in conducting DTT sessions in a school setting. The packages included treatment integrity checklists, feedback and behavioral skills training, or antecedent interventions, depending on the performance assessment.

This study should benefit students with autism, who have been shown to make drastic improvements in many areas with the use of effective DTT sessions. This study also benefits educators who carry out DTT sessions (Eikeseth, Smith, Jahr, & Eldevik, 2009) by ensuring that they have been properly trained and that they have necessary resources available to aid them in carrying out DTT sessions. Having proper training methods in place is immensely helpful to ensure that staff immediately implements the procedure properly to reduce any difficulties the student may have in adjusting to the procedure.

<div align="center">Research Question</div>

Will a performance assessment identify an effective intervention package for increasing treatment integrity?

CHAPTER 2

METHOD

Participants and Setting

The participants were three teacher's assistants employed in a special needs classroom within a public school in southeastern Pennsylvania. The participants all had previous experience with carrying out DTT sessions as part of their regular work duties. The participants had all received the same training program prior to the beginning of each school year. (Refer to Table 1 for specific information on each participant.) The setting was the student's classroom, where their DTT sessions normally took place. The classrooms contained areas for group instruction, as well as tables for 1:1 DTT sessions. The classrooms also contained toys, games, and activities for the students to use during free play and break times. The areas for DTT sessions are 5'x5 in dimension and contained one table and two chairs for the teacher and student to sit. The areas also contained the students' program materials, flashcards to be used in the DTT session, any tangible materials necessary (e.g., puzzles, beads for threading, shape sorters), and tangible/edible reinforcers for the students. There were also two additional staff and two additional students in the room who did not take part in the study. Additional materials included data sheets and pens for the teacher to collect data on the student's session, data sheets for the experimenter to track the teacher's DTT implementation, and a list of operational definitions of the correct implementation of DTT sessions. The school was an elementary school in Bucks County Pennsylvania with both regular education and special education classrooms.

Table 1

Participant Demographic Information

Participant	Age	Gender	Race	Years of Experience	Education
Dana	25	Female	Caucasian	2	Bachelor's Degree
Theresa	28	Female	Caucasian	4	High School
Terry	42	Female	Caucasian	10	Bachelor's Degree

Participants were selected based on the recommendation of the classroom teacher, and students selected were the students with whom the participants spend the majority of their time working. The targets used for the sessions were chosen from the student's normal curriculum (e.g., identifying objects by feature, function, and class, and sight word identification). The students' targets were all receptive identification using picture cards, and included number identification, color identification, and identifying feature/function/class of an object.

An iPad was used to video-tape the sessions, and only the teacher's performance was video recorded. The students did not appear in the video.

<div align="center">Dependent Variable</div>

The dependent variable was the percentage of steps correctly performed in a DTT session. A treatment integrity checklist was used to collect data on the dependent variable. (Refer to Appendix A for the treatment integrity checklist). The steps for the DTT session are as follows: (a) Gain the child's attention by using phrases such as, "eyes" or "check in;" (b) Present the target for the student to respond to; (c) Allow no more than a five sec interval between trials; (d) After a correct response, proceed to the

next trial. For an incorrect response, repeat the previous steps. When the student provides a correct response to the prompt, the steps are as follows: (a) Provide reinforcement within one sec for verbal praise, within three sec for tangible reinforcer such as food; (b) Vary praise statements (e.g., pair praise statements with tangible reinforcers; (c) Record data after reinforcement, but before next trial. When the student provides an incorrect response to the prompt, the steps are as follows: (a) immediately stop incorrect response and restart; (b) Deliver discriminative stimulus and correct prompt; (c) If the response is correct, restart the trial with discriminative stimulus only; (d) If response is incorrect, repeat trial with discriminative stimulus and prompt until correct response is occurring independently; (e) Intersperse this trial several times during the session.

To determine the percentage of steps correct, the number of correct steps were divided by the total number of steps, and then multiplied by 100.

Data Collection

Data were collected using the treatment integrity checklist shown in Appendix A. The participant was asked to conduct a DTT sessions with 10 trials from the students' normal curriculum. The experimenter sat approximately 3 feet from the participant and student and collected data using the treatment integrity checklist. For each trial, the observer marked (+) for each step correctly implemented, and marked (–) for each step incorrectly implemented. If the student responded correctly in the initial trial, the observer proceeded to the table titled "Managing Consequences for Correct Responses." If the student responded incorrectly in the initial trial, the observer proceeded to the table titled "Managing Consequences for Incorrect Responses," and the corresponding following table, and then calculated the percentage as described above.

Baseline Procedure

Baseline

Initial Baseline data were collected in three probes per participant. Staff were asked to conduct a DTT session using targets from the student's normal curriculum to the best of their ability and given no other instructions. Each session consisted of 10 complete DTT trials as described in the dependent variable section above. The staff was seated at a table in the student's classroom, in a 1:1 setting with the student, with all of the necessary materials available, including instructional materials and reinforcers. The staff member chose targets from the student's materials. The session began with the staff member calling the student to the table to begin working and beginning the DTT trials. The session ended after the 10 trials were completed, and the student was told she or he could take a break for free - play activities. The experimenter observed the sessions and collected data using a treatment integrity checklist to determine the percentage of steps implemented correctly. The Baseline sessions were conducted before the role play condition to determine the participants' current proficiency in administering DTT for 10 complete trials. Additional Baseline sessions were conducted after the role-play to ensure stability. Due to a lapse in data collection caused by a lack of access to the participants, two additional Baseline probes were collected 6 weeks after performance assessment to check for stability. This is indicated as Baseline 2 on the below graph. Participants who scored below 85% accuracy proceeded to the performance assessment phase of the study. This criterion was modeled after a study by Lavie and Sturmey (2002).

Performance Assessment

Following Baseline, a role play was conducted to assess the staff performance. The role play was conducted to determine whether or not the participant possessed the

skills to conduct a DTT session under ideal conditions, so as to ascertain whether the deficit was skill based or performance based (Mager & Pipe 1970). In the role play, the experimenter took the place of the student, and the staff member had all necessary materials to conduct a DTT session, with the target skills being the same ones targeted with the participant's student. The role play was necessary to determine if the participant was able to conduct a DTT session under ideal conditions. The session consisted of 10 complete DTT trials from the student's materials. The sessions began with the experimenter sitting in the student's place at the table, and the participant sitting in her/ his normal seat. During each role play, the experimenter produced six correct responses and four incorrect responses. The correct and incorrect responses were delivered randomly. No feedback was given during role play. The session ended after the 10 trials were completed, with no limit on the amount of time for the session. If the staff member performed the task in the role-play at 85% accuracy, she engaged in an intervention for performance deficit. If they were not able to perform the task at 85% accuracy in the role play, then she/he engaged in an intervention for skill deficit.

Intervention Procedures

Intervention for Performance Deficit

If the participant scored higher than 85% in the role-play, she/ he took part in the intervention for performance deficit. In the intervention for performance deficit, the experimenter conducted an interview with the participant to determine why the performance deficit exists (Mager & Pipe 1970). In the interview, the experimenter asked the staff member about potential barriers to success, and for suggestions on how to increase her/his proficiency. See Appendix B for questionnaire used during the interview. An individualized intervention was then developed for the staff member based on the

results of the interview. Data were then collected by the experimenter with the individualized intervention in place, with a follow-up probe being conducted one week later. One of the participants in the study met the criteria for the intervention for performance deficit, scoring 91% average treatment integrity in the role-play. In this case, the participant cited issues with the student engaging in maladaptive behaviors between trials, resulting in increased inter-trial times. To prevent this, Theraputty™ (a malleable putty toy often used for fine motor interventions) was given to the student after the completion of each trial and taken away at the start of the next trial, to ensure the student stayed in his seat and was engaged during breaks between trials.

Intervention for Skill Deficit

In the intervention for skill deficit, the participant was first be given feedback on the Baseline observation and results from the role-play session. First, written feedback was given to the staff member, outlining both the strengths and weaknesses they demonstrated in both the Baseline and role-play conditions, which the experimenter discussed verbally with the staff member. (Refer to Appendix B for an example of written feedback.) This was in the form of a paper document with bullet points listing first the strengths, then the areas that needed improvement. The document given to each staff member was approximately one page long. The staff member was then given a treatment integrity checklist, describing how to properly conduct each step of the DTT session. The staff member read the treatment integrity checklist, then the experimenter asked if the staff member had any questions about the procedure. The staff member then engaged in a role-play with the experimenter, with the treatment integrity checklist being placed on the table during the session so that the staff member could reference it if necessary, with feedback being given by the experimenter. Feedback was delivered

verbally during the trials, with the experimenter giving corrective feedback for steps carried out incorrectly, and praise given intermittently when the trials were carried out correctly. For the role play, the same materials and targets were used from the initial role play, consisting of 10 complete trials, with the experimenter producing six correct responses and four incorrect responses, selected randomly. Training sessions were conducted until the staff member reached 95% of steps in the treatment integrity form being implemented correctly.

After 95% accuracy was reached, data were collected on a natural DTT session with the student during the typical school day, with follow up probes being conducted until stability is reached. Stability was determined by a visual analysis of the data by the experimenter, with a subjective determination being made for stability. Two of the participants in the study met the criteria for the intervention for skill deficit, scoring below 85% in the role-play.

Experimental Design

The study used a multiple-probe across participants design. Conditions were changed when stability in the data was reached. A visual analysis of the graphed data was used to determine stability, with a subjective determination being made by the researcher. When the data for each participant were stable across three sessions, the intervention for the next participant was started.

Inter Observer Agreement Data

Inter observer agreement (IOA) data were collected in 42% of the sessions across all conditions and participants. These sessions were selected randomly. The teacher's behavior was video recorded for each IOA session, and the IOA observer collected data on the video session to be compared to the primary observer's data.

The IOA observer was a Board-Certified Behavior Analyst who was familiar with DTT, and trained in a 1:1 training session. A checklist of the correct steps was provided, and the experimenter demonstrated the steps being correctly implemented. The observer then observed a video of a model DTT session, in which the experimenter conducted a ten trial DTT session, and was asked to mark whether or not each step was implemented properly, and was then graded by the experimenter. Criteria for mastery were met when the observer reached 90% accuracy.

To collect IOA data, the primary and secondary observer observed the same session via video at the same time and recorded whether each step was correctly implemented on a checklist. To calculate IOA data, the number of steps that the primary and secondary observer agreed upon was divided by the total number of agreements and disagreements, and that number was multiplied by 100 for each session.

For Dana, IOA were collected in two Baseline sessions, with an average of 97% agreement and a range of 96-99%. IOA were then collected during the roleplay session, with 100% agreement. In the probes for stability, IOA were collected twice with an average of 94% and a range of 91-97%. In the post intervention probes, IOA were collected 4 times with an average of 94% agreement and a range of 90-98%.

For Theresa, IOA were collected in two Baseline sessions, with an average of 88% agreement and a range of 85-91%. IOA were then collected during the roleplay session, with 94% agreement. In the probes for stability, IOA were collected three times with an average of 92% and a range of 88-95%. In the post intervention probes, IOA were collected twice with an average of 97% agreement and a range of 95-98%.

For Terry, IOA were collected in two Baseline sessions, with an average of 100% agreement. IOA were then collected during the roleplay session, with 98% agreement. In

the probes for stability, IOA were collected twice with an average of 96% and a range of

92-100%. In the post intervention probes, IOA were collected 4 times with an average of

97% agreement and a range of 95-98%.

<div align="center">Treatment Integrity</div>

Treatment integrity data were collected using an integrity checklist for the

independent variable (Appendix C). The researcher was video recorded in 67% of

sessions in which the interventions were implemented. The sessions in which treatment

integrity data were collected were the two sessions in which the intervention for skill

deficit was used. The integrity observer, who was the same person as the IOA observer,

was trained in a 1:1 training session with the experimenter. A checklist of steps in the

intervention was provided, as well as a demonstration of the steps being implemented

correctly. See Appendix B for treatment integrity checklist. The integrity observer then

observed a model intervention session and was asked to mark whether each step of the

intervention was implemented correctly. After the session was completed, the checklist

was then graded by the experimenter. Criteria were met when the observer reached 90%

accuracy. To collect integrity data, the integrity observer observed the experimenter and

record each step of the intervention being correctly implemented. To calculate treatment

integrity data, the number of correct steps was divided by the total number of steps, and

that number was multiplied by 100. Treatment integrity was an average of 97.5%, with a

range of 95-100%.

<div align="center">Social Validity</div>

Social validity was measured using a questionnaire that contained questions using

a 5-point Likert scale, as well as a space for any additional comments (Appendix D).

Copies of the questionnaire were given to the head teacher in the classroom along with

envelopes. The teacher was then asked to distribute the questionnaires to each of the participants. The participants were asked to fill out the questionnaire, then seal it in the envelope and return it to the head teacher to ensure anonymity. The sealed envelopes were then returned to the experimenter. This took place after data collection for the experiment had ended to ensure that the experiment had taken place in full.

CHAPTER 3

RESULTS

The overall results of this study show that the individualized intervention was successful for each participant. Two of the three participants (Dana and Terry) took part in the intervention for skill deficit, while the third participant (Theresa) took part in the intervention for performance deficit, which focused on antecedent management. All three participants met mastery criteria immediately after one session of the intervention, and they maintained their proficiency in additional Baseline sessions.

Dana

During the initial Baseline condition, Dana was 58% (range = 55-63%). During the role-play condition, Dana correctly completed 70% of the steps correctly, indicating the need for the skill deficit intervention. In Baseline 2 probes, which took place 6 weeks after the previous Baseline due to lack of experimenter access to the classroom, Dana was 63% (range = 61-65%). Dana committed errors primarily in pacing the session, allowing too much time to lapse between trials. Dana then took part in the skill deficit intervention for one session, where the primary problem of instructional pacing was addressed during training and feedback. After the intervention, Dana was 95% (range = 92-98%). Dana met the mastery criteria after one session of the intervention. Data were collected after completing the checklist intervention to check for mastery, then follow up probes were conducted with the student. The trendline in the data showed an increase after the intervention, with data remaining stable both before and after the intervention. Levels were very stable before the intervention, with a range of 55-65% in the Baseline condition. Post intervention, the data were again stable, but higher, with a range of 92-98%. The intervention had an immediate effect, with only one training session being

necessary, and the data remained at a high level. The percentage of non-overlapping data for Dana was 100%.

<div align="center">Theresa</div>

During the initial Baseline condition, Theresa was 79% (range = 78-80%) of steps correctly. During the role-play condition, Theresa correctly completed 91% of the steps correctly, indicating the need for the performance deficit intervention. In the Baseline 2 probes, which took place 6 weeks after the previous Baseline due to lack of access to the classroom, Theresa was 79% (range = 77-82%). Theresa then took part in the performance deficit intervention, where it was determined that the student engaging in escape behavior between trials was the cause of instructional pacing problems. Upon discussing strategies with the participant, it was decided that putty would kept on the table that the student could play with after each trial. The participant would then move the putty away before presenting the next trial. With this intervention in place, Theresa was 94% (range = 89-98%). Since Theresa did not take part in the one-on-one intervention, the intervention was immediately put into place for follow up probes with the student, and mastery was achieved immediately. Data were stable in Baseline with a range of 77-82%, and the trend line showed an increase after the individual intervention was put into place. Although there was more variation in the data with Theresa than the other participants, the data were still very high and stable with a range of 89-98% in the post intervention phase. The percentage of non-overlapping data for Theresa was 100%.

<div align="center">Terry</div>

During the initial Baseline condition, Terry was 74% (range = 72-74%) of steps correctly. During the role-play condition, Terry correctly completed 76% of the steps

correctly, indicating the need for the skill deficit intervention. In Baseline probes, Terry was 70% (range = 67-73%). In the Baseline 2, which took place 6 weeks after the previous Baseline due to lack of access to the classroom, Terry was 73% (range = 71-75%). Terry committed errors primarily in the delivery of reinforcers and did not offer reinforcers after a correct response. Terry then took part in the skill deficit intervention, where the primary problem of delivery of reinforcement was addressed by conducting a one-to-one training session in the intervention for skill deficit. After the intervention, Terry was 97% (range = 95-98%). Terry met the mastery criteria after one session of the intervention. Data were collected after completing the checklist intervention to check for mastery, then follow up probes were conducted with the student. The trendline in the data showed an increase after the intervention, with data remaining stable both before and after the intervention. Levels were stable before the intervention, with a range of 67-74% in the Baseline condition. Post intervention, the data were again stable, but higher, with a range of 95-98%. The intervention had an immediate effect, with only one training session being necessary, and the data remained at a high level. The percentage of non-overlapping data for Terry was 100%.
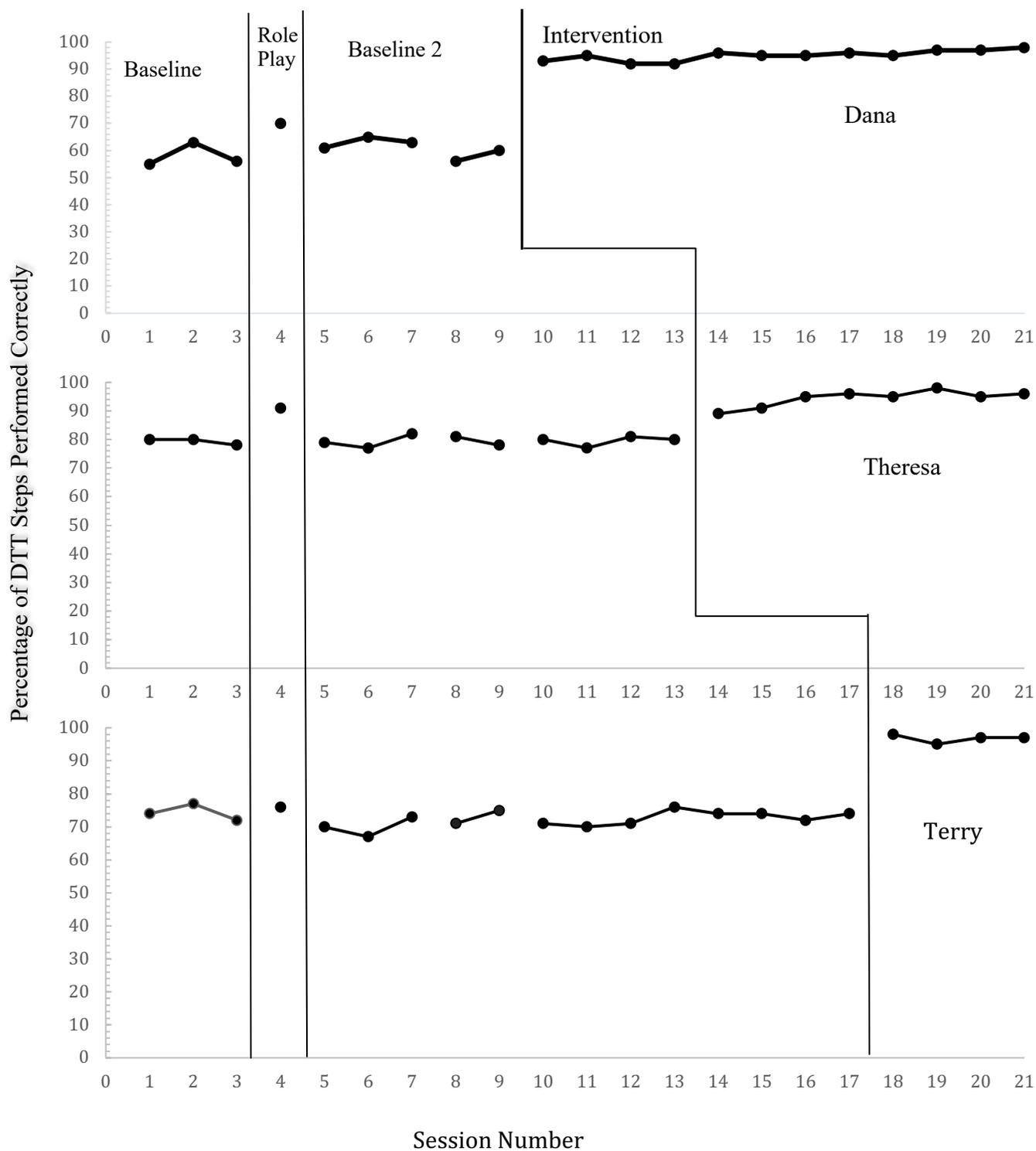
Figure 1. Percentage of DTT steps carried out correctly across Baseline, Role-play and Intervention conditions.

Social Validity

The participants reported that they felt the intervention was helpful to them and that the training they received would help them carry out their job. Furthermore, they reported that having the treatment integrity checklist to refer to was helpful, as it gave them a concrete reference of what was expected. In response to the survey, the participants answered that the study focused on an important matter, and that the training methods used are applicable to their job. Furthermore, when asked if the study would help in completing daily work, all three participants reported that it would. When asked if it will be possible to use the procedures on a daily basis, two of the participants reported that it would be possible, while one participant rated her answer a three out of five, stating in the comments that she was unsure due to the unpredictable nature of student behaviors. However, when asked if taking part in the study would benefit the students and if it increased proficiency in discrete trial teaching, all three participants reported that they strongly agreed. Finally, all three participants strongly agreed that the study was carried out in a professional manner.

CHAPTER 4

DISCUSSION

The study examined the effectiveness of an individualized training package on increasing staff treatment integrity when carrying out DTT sessions. The study sought to expand on previous studies that used feedback in conjunction with interventions such as modeling, practice sessions, and integrity checklists (DiGennaro, Martens, & Kleinmann, 2007; Lavie & Sturmey, 2002; Sakaroff & Sturmey, 2004). This study determined that the use of a one-on-one intervention including feedback, practice sessions, and an integrity checklist is an effective method of increasing DTT treatment integrity for 2 participants (Dana and Terry). An individualized intervention based on a specific performance deficit was effective for the third participant (Theresa) as the use of Theraputty™ during the lapse between trials decreasing the student's maladaptive behavior, keeping the session at an appropriate pace. The three participants completed an average of 66% of steps correctly during Baseline, with an average of 96% of steps being completed correctly after taking part in the intervention.

The training packages worked well for Dana and Terry due to the differential reinforcement of appropriately carrying out the DTT sessions. The checklist created a discriminative stimulus to carry out each step correctly during training, while receiving feedback offered reinforcement when the trials were paced correctly, and reinforcement was delivered to the student appropriately. Furthermore, Theresa's case, there was an abolishing operation in place of the student engaging in maladaptive behaviors that impeded the implementation of DTT trials. The management of antecedents, through the use of Theraputty™ between trials, eliminated the abolishing operation and allowed Theresa to carry out the sessions appropriately.

A limitation of this study was that, although the participants met the criteria to take part in the study, they already demonstrated some proficiency in completing DTT sessions, with most of the steps being carried out correctly, and the only areas that needed improvement were pacing and delivery of reinforcement. Furthermore, each participant demonstrated one clear area of deficiency in completing DTT sessions, either not pacing the session properly or not delivering reinforcement properly. This may have made it easier for the intervention to be immediately effective due to only having one area that needed to be improved. Dana and Terry committed errors in pacing and delivery of reinforcement, respectively. These errors likely occurred due to a lack of evaluations and follow up trainings in their work environment, allowing these errors to go unnoticed. This intervention addressed these errors by determining what specific errors were occurring, and focusing on correcting those errors. It may give a better indication of the effectiveness of the intervention to seek participants with less proficiency and with multiple areas of deficiency. This could be done by seeking out participants who had not received prior training, were new to the field, or by surveying education facilities to seek out staff members who were proven to not be proficient in DTT.

Furthermore, there was a long lapse in the data collection, as the experimenter did not have access to the classroom for approximately six weeks due to the head teacher in the room being ill. Additionally, it would have been helpful to conduct more Baseline probes after the intervention to test for retention a month or more after the intervention took place.

Another limitation of this study was that it used a training package rather than a specific intervention. This creates a level of uncertainty as to what portion of the intervention was actually effective, or if one portion was more effective than another. An

area for future research would be to omit certain aspects of the training package to see if one or several portions are more or less effective.

Although the results of the social validity data were favorable, there were some limitations with social validity data collection. Since social validity data were only collected after the completion of the study, it did not give an indication of how important these skills were to the participants before taking part in the study. Additionally, social validity data were not collected from the head teacher in the room. It would have been beneficial to gain the viewpoint of how the teacher/supervisor in the room felt that the study helped the staff, and could be used in the future. In the future, it would be beneficial to collect social validity data before and after the study, as well as collecting it from the participants, teacher/supervisor, as well as the parents of the students.

A further limitation was the students' proficiency in the instructional targets being used for the study. All of the students in the study were already familiar with the targets, creating few incorrect responses during the sessions. This may have made it easier for the participants to score well in treatment integrity, as the student producing more incorrect responses can make the implementation of DTT more complicated. It would be beneficial in the future for the students to work on novel targets during the sessions.

An area for future research would be using this intervention as an initial training method for people who are new to the field. This could be done by using the one-on-one training session described in this study to train new staff without previous training. A multi-element, simultaneous treatment design could be used to compare rates of acquisition between participants when using the one-on-one training session, and a more traditional form of training, such as verbal feedback. Furthermore, future research would be beneficial to determine if this intervention would be effective across different settings,

such as school and home settings, as well as across different age groups and functioning levels of students. Additionally, replicating this study across more participants would be helpful to determine efficacy, as the current study only utilized three participants.

The social validity evaluation taken after the study was completed showed a favorable opinion from the participants. The participants all felt that taking part in the study would help them carry out their work duties, and that their increased proficiency would be a benefit to the students with whom they worked. This was significant as it showed that the staff felt that the interventions were effective in helping them properly conduct DTT sessions. Furthermore, the participants commented that having concrete expectations in the form of the treatment integrity checklist was helpful.

In conclusion, this study demonstrated that a one-on-one training session including feedback, practice sessions, and integrity checklists was an effective method for training staff to conduct discrete trial sessions, evidenced by the increased treatment integrity demonstrated by the participants. This intervention was effective due to the systematic method of determining exactly where the deficits were, and what the cause of them was. In addition, the one-to-one training session provided a detailed and personalized intervention to ensure that skills were being mastered. The use of a treatment integrity checklist promotes standardization, as it offers each staff person with a uniform, a physical list of criteria, making it easier for them to carry out each step as prescribed. Furthermore, while the specific intervention was tailored to the areas of need, the current study created a systematic method to assessing staff performance, and addressing the areas that needed improvement. This systematic approach makes this study easily replicated, and the data collection materials offer a tool that could be used in a variety of settings, such as home or school setting, in either an experimental or

supervisory role. This study was also successful due to the fact that it was tailored specifically to each participant. This ensured that the intervention applied directly to the participant, and was significant to them in helping to improve their ability to carry out their work.

The use of a multiple probe design showed the effectiveness of the treatment, as the data among the staff remained stable until after each intervention was used, demonstrating that nothing in the environment had changed to cause an increase in their proficiency. Furthermore, the study's high treatment integrity, with an average of 97.5% and a range of 95-100%, show that the intervention was carried out correctly. Furthermore, a treatment integrity checklist would offer a tool for regular evaluation of staff performance in administering DTT.

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APPENDIX A

TREATMENT INTEGRITY CHECKLIST

Date:_____   Participant:_____   Observer:_____

Session #:_____   Phase:_____

Instructions: For each trial, mark (+) for each step correctly implemented, and mark (−) for each step incorrectly implemented. If the student responds correctly in the initial trial, proceed to the table titled " Managing Consequences for Correct Responses". If the student responds incorrectly in the initial trial, proceed to the table titled "Managing Consequences for Incorrect Responses", and the corresponding following table.

	Managing Antecedents	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**Total**	**Percent**
A	Gain Child's Attention												
B	Presentation of correct verbal and nonverbal Sd												
C	Pacing, no more than 5 seconds												
D	Correct Interspersal of Trials												

Managing Consequences for <u>Correct</u> Responses

	Managing Consequences	1	2	3	4	5	6	7	8	9	10	Total	Percent
A	Provides consequence immediately												
B	Edibles are paired with praise & Praise statements are varied												
C	Records data correctly												
D	Correct Interspersal of Trials												

Managing Consequences for <u>Incorrect</u> Responses

	Managing Consequences	1	2	3	4	5	6	7	8	9	10	Total	Percent
A	Ends trial – blocking materials/looking away												
B	Records data correctly and before presentation of next trial												
C	Pacing , no more than 5 seconds												
D	Regains child's Attention												
E	Represent correct verbal/nonverbal instruction with prompt (prompt must be simultaneous)												
F	Prompt simultaneous or immediately after SD												

Correct Response After Incorrect Response

		1	2	3	4	5	6	7	8	9	10	Total	Percent
G	Consequence Immediate/praise only												
H	Records correct data												

Incorrect Response After Incorrect Response

		1	2	3	4	5	6	7	8	9	10	Total	Percent
G	Ends Trial – blocking materials												
H	Records data correctly and before presentation of next trial												
I	Pacing (no more than 5 seconds between trials)												
J	Regain child's attention												
K	Represent correct verbal/nonverbal instruction with prompt (prompt must be simultaneous)												
L	Prompt simultaneous or immediately after SD												
M	Only Provide Praise Immediately												
N	Record correct Data												

APPENDIX B

WRITTEN FEEDBACK

Areas of Strength

1. Keeping the student engaged and delivering the trials quickly

2. Offering clear discriminative stimulus

3. Materials always presented properly

Areas for Improvement

1. Remember to always provide reinforcement for correct responses

2. Remember to pair verbal praise with edible reinforcers

3. Always make a clear end to the trial before re-presenting the trial after an incorrect response.

APPENDIX C

TREATMENT INTEGRITY DATA SHEET

Steps of Intervention	Check if performed correctly
The intervention will take place in a private setting.	
First greet the participant, thank them for taking the time to take part in the study.	
Arrange the iPad that will be used to record the session so that the experimenter and participant are both on camera	
The video will begin recording after greeting the participant	
Provide written feedback. This will be a printed document discussing steps performed correctly first, followed by steps performed incorrectly.	
Offer praise on carrying out steps correctly.	
Give specific praise on each item (e.g. "you do an excellent job of providing reinforcement immediately after the response instead of allowing a lapse.")	
Spend approximately 30 seconds discussing each correct step, then ask the participant if they have any questions.	
Verbally discuss steps the need improvement. Start with empathetic statement (e.g. "I know that it can be difficult to keep track of all the steps for each trial, and overall you performed well, but there are some areas that need improvement.")	
Give specific details on how the step should be completed versus how the participant completed it. (e.g. "There should be no more than a 5 second space between trials, and you were allowing 7 to 9 seconds between trials, you can try to work on that by offering verbal praise at the same time that you are clearing the cards from that trial")	
Spend approximately one minute discussing each incorrect step, then ask the participant if they have any questions.	
Provide written copy of treatment integrity checklist to participant.	
Spend approximately 30 seconds discussing each step (e.g. "Make sure you are providing praise immediately after a correct response giving a high five or saying great job.")	
After discussing each step, ask the participant if they have any questions.	

Conduct role-play with experimenter taking place of the student. Role-play will be 10 complete trials, with the experimenter providing 6 correct responses and 4 incorrect responses.	
The participant will be instructed to carry out a DTT session as if the experimenter is the student, and will be informed that feedback will be given after the ten trials and that they will be given time to ask questions. Feedback on incorrect steps will not be given until after the trials are complete	
The experimenter will collect data during the role-play, marking down incorrect steps on the same data sheet that was used in Baseline.	
After 10 trials, feedback will be given on steps carried out incorrectly using the same steps as in Step 7.	
Role-plays will be repeated until participant achieves 95% accuracy.	
If 5 complete role plays are carried out and the participant has not reached 95% accuracy, the session will be terminated and will be repeated the next day.	
After the session is complete, video recording will be stopped, and the participant will again be thanked for their time.	

APPENDIX D

SOCIAL VALIDITY QUESTIONNAIRE

Please circle the number that you feel most accurately describes your opinion of the questions.

1) This study focused on an important matter.

   Strongly Disagree   1   2   3   4   5   Strongly Agree

2) The training methods used in the study are applicable to my job.

   Strongly Disagree   1   2   3   4   5   Strongly Agree

3) The procedures I learned in the study will help me in my daily work.

   Strongly Disagree   1   2   3   4   5   Strongly Agree

4) It will be possible to use these procedures on a daily basis.

   Strongly Disagree   1   2   3   4   5   Strongly Agree

5) The procedures I learned in this study will benefit the students I work with.

   Strongly Disagree   1   2   3   4   5   Strongly Agree

6) The study was carried out in a professional manner.

   Strongly Disagree   1   2   3   4   5   Strongly Agree

7) The study increased my proficiency in discrete trial teaching.

Strongly Disagree   1   2   3   4   5   Strongly Agree Additional

Comments: