

Module: Discrete Trial Training (DTT)

STEP-BY-STEP INSTRUCTIONS

Steps for Implementation: Discrete Trial Training

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Discrete trial training (DTT) is a method of teaching in which the adult uses adult-directed, massed trial instruction, reinforcers chosen for their strength, and clear contingencies and repetition to teach new skills. DTT is a particularly strong method for developing a new response to a stimulus. Its limitations involve lack of reinforcement of learner spontaneity and difficulty with generalization. Thus, once a skill is learned in the DTT format, it is important to develop plans for teaching generalized use of the new skill across environments, materials, and people, and also to develop teaching plans for learner initiation of the new skill.

Using DTT for a learner with autism involves the following steps.

Step 1. Deciding What to Teach: Assessment and Summarizing Results

1. Teachers/practitioners decide which of the learner's IFSP or IEP objectives will be taught using a DTT approach.

Some learning objectives are better taught using DTT than others. Objectives that involve fine and gross motor skills, recreation, self care, cognitive, and academic skills are very often appropriate for DTT.

2. Teachers/practitioners discuss the planned use of DTT for the particular learning objective with other team members, especially parents/family members.

Team members who either have expertise in areas related to the objective or who will be teaching the skill should be consulted. This discussion could occur during the IEP/IFSP planning or progress review meeting.

3. Teachers/practitioners examine the target IEP/IFSP objective and refine if needed.

Since the DTT format relies on discrete behaviors which have a clear beginning, middle, and end, the learning objective needs to clearly state the desired antecedent, behavior, and criterion for mastery. For example, a language objective for a learner with ASD is to give two objects to an adult. To address this objective using DTT, teachers/practitioners would need to refine it so that the antecedent, behavior, and criterion for mastery are identified in the following ways.

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Antecedent: Adult says to the learner, “Give me two _____.”

Behavior: Learner gives two objects to the adult.

Criterion: Learner gives two objects to the adult during 80% of the trials.

This refined objective would then read:

When an adult asks Michael, to “give two” objects (antecedent phrase), Michael will pick up two objects and hand them to the adult (behavior phrase) in 80% of opportunities across three consecutive days (criterion).

Step 2. Breaking the Skill Down into Teachable Steps

1. Teachers/practitioners complete a task analysis of the skill, identify each step of the skill, and list steps in sequential order from entry to mastery level.

The cornerstone of DTT is the use of task analysis to break down skills into small teachable steps (Cohen, Amerine-Dickens, & Smith, 2006; Eikeseth, Smith, Jahr, & Eldevik, 2002). To complete a task analysis, each step of the skill is broken down and listed in sequential order. For example, a task analysis for an objective involving naming pictures in a book might look like this:

Target objective for a 4 year old: When looking at a book with an adult, Steffie will answer the adult’s question “What’s that?”, accompanied by a point to a picture, by naming 10 or more different pictures of animals and vehicles in five different unfamiliar books, during 90% of opportunities across three consecutive teaching sessions.

Mastery for each step is set at 90% correct independent response during three consecutive teaching periods.

Steps/Lesson Progression

1. Names 2-3 animal pictures with partial verbal prompt
2. Names 2-3 animal pictures independently
3. Expressively identify 2-3 animal pictures in one familiar book
4. Expressively identify 4-5 animal pictures on cards
5. Names 4-5 animal pictures in five different books
6. Names 2-3 vehicle pictures with partial verbal prompt
7. Names 2-3 vehicle pictures independently
8. Names 2-3 vehicle pictures in one familiar book
9. Names 4-5 vehicle pictures on cards
10. Names 4-5 vehicle pictures in five different books

For more information on how to complete a task analysis, please refer to the Evidence-Based Practice Brief: Task Analysis (National Professional Development Center on ASD, 2009).

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2. After completing a task analysis for each skill, teachers/practitioners list the steps clearly so any team member can complete the trials if necessary.

When listing the steps, the directions from the instructor (also called the stimulus or antecedent), the range of *responses* that are or are not acceptable, the *prompting* that may be required, and the *consequence* that the instructor must present to reinforce the desired behavior or to discourage an undesired behavior must be included.

Reviewing other evaluations/assessments may be useful to provide information about current levels of proficiency and where your teaching steps might start. Evaluations that could be referenced include:

- speech/language,
- reading/literacy, and
- gross/fine motor.

Reviewing a curriculum tool may be helpful if additional assistance is needed to decide on the steps. Curriculum assessments can be helpful as guides for refining objectives, creating a hierarchy of skills, determining a baseline level of a skill, deciding on an age appropriate demonstration of the skill, and making decisions about what skills to teach and when to teach them.

Examples of curriculum-based assessment guides include:

- *Teaching Developmentally Disabled Learners: The Me Book* (Lovaas, 1981)
- *Teaching Individuals with Developmental Delays* (Lovaas, 2003)
- *A Work in Progress* (Leaf & McEachin, 1999)
- *Behavioral Intervention for Young Learners with Autism* (Maurice, Green, & Luce, 1996)
- *Assessment of Basic Learning and Language Skills* (Partington & Sundberg, 1998)

Step 3. Setting-up the Data Collection System

1. Teachers/practitioners select data sheets specifically designed for the skill being taught.

One of the defining characteristics of a high quality discrete trial training program is the collection of trial by trial data. When setting up the DTT instruction plan, it is important to have data sheets specifically designed for the skill being taught. Different skills require different approaches to measurement. Sometimes it is possible to combine two different types of data sheets onto one document. For example, a data sheet that is considered *self graphing* means that you mark the trial-by-trial data directly into graphing squares. Data sheets of this sort can be helpful because there are fewer steps to show the data

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in both a trial-by-trial and visual format. See sample data sheets that accompany this document. Table 1 provides a list of materials that should be considered when setting up a data collection system.

Table 1. Suggested Materials to Include in the Data Collection System

Trial by trial data sheets which contain: • a place for documenting prompt level (Please see Prompting Brief) • key for abbreviations • criteria for mastery • places to record the dates when trials are introduced and mastered
Graphing sheets
Data sheets which are both trial-by-trial and graphing in one (i.e., self graphing)
Data sheets for recording interfering behaviors
Other necessary data sheets (toileting, food intake, etc.)
Summary sheet for each session
Space designated for parent, therapist, and school communication

Step 4. Designating Location(s)

1. Teachers/practitioners generate a list of possible locations in which the teaching can take place.

Selecting an appropriate location or locations for teaching is a very important part of planning DTT instruction. When the team meets either during the IEP/IFSP meeting or separately, it might be helpful to generate a list of possible locations where the teaching can take place. Each location should be carefully examined to determine the advantages and disadvantages of that location. Considerations might include:

- a quiet place without too many distractions,
- sufficient space for instruction and for breaks,
- easy access to peers for generalization, and
- adequate lighting and seating (seat and table that fits the learner's body, with feet and back supported by the chair and hips, knees, ankles, and elbows at 90 degrees).

2. Teachers/practitioners select location(s) for DTT.

Often, two or more locations are better than one, because multiple locations can be helpful when working toward generalization.

Step 5. Gathering Materials

1. Teachers/practitioners assemble materials to be used during the teaching.

Having the correct materials will make your program easier and more efficient to run. Below is a list of materials that will be helpful in setting up your program:

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- Notebooks/ binders for data collection and team communication
- Preference list or menu based on preference assessment
- Variety of tangible reinforcers (edible and non-edible)
- Pictures or icons of preferred social activities (reinforcers)
- Instructional materials (letters, shapes, colors)
- Object related materials (blocks, toys, real life materials)
- Pens, pencils, markers
- Bins for storage which can be clearly labeled

Step 6. Delivering the Trials

1. Teachers/practitioners assist the learner to transition to the teaching location.

When it is time to start the trials, learners must transition to the teaching area. To help transition learners to the DTT trials, it is sometimes helpful to give them a warning (i.e., “five more minutes of play time”) or other cues that are meaningful and motivating. When thinking about different ways to cue transitions, remember the goal of generalization. The more natural and commonly occurring the cue is (i.e., an actual clock instead of a timer), the more likely it is that learners will generalize the ability to transition from one activity to another.

2. Teachers/practitioners obtain the learner’s attention and, together, select reinforcers.

After the learner is seated, practitioners should make certain that they have the learner’s attention. If necessary, the practitioner may need to show the learner an array of reinforcers to choose from. Reinforcers may include:

- a desired toy or object,
- an action or movement that the student enjoys,
- a picture or icon of a pleasurable activity that can take place after the trial is completed (i.e., shooting hoops),
- food or drink (this should be used cautiously),
- a few seconds of video or music, and
- a token that can be exchanged for a tangible reinforcer.

3. Teachers/practitioners provide the instruction or other Sd (antecedent) and wait for a response.

For example, the cue for naming pictures (e.g., “What’s this?”) given by the adult to the 4 year old is the stimulus or instruction for the response.

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4. If the learner responds **appropriately** ((for example, by saying, “dog” after the teacher points to a picture of the dog and says, “What’s this?”) , teachers/practitioners deliver a reinforcing consequence or reinforcer and mark the trial as correct.
5. If the learner does not respond to or responds incorrectly, teachers/practitioners do one of the following:
 - a. Provide corrective feedback and begin the trial again, presenting the antecedent or cue.
 - b. prompt the learner to respond correctly, reinforce, and record the result of the prompted trial,
 - c. provide another trial, with reduced or no prompting, reinforce appropriately and record.

There are many different prompts that can be used for various teaching tasks, including full physical prompts (hand over hand), partial physical prompts (light touch, often to ‘guide’ the learner’s arm), modeling or demonstration (the adult responds correctly to get the learner to imitate the correct response), verbal prompts (the adult models the verbal response), and partial verbal (the adult partially verbalizes the correct response, e.g., “ba” to prompt “ball”). After the response is given and/or prompted, the learner’s response should be recorded on the data sheet. For more information on prompting please consult the *NPDC Evidence Based Practice brief and module on Prompting* (2009) for a more complete description of prompting procedures.

6. Teachers/practitioners immediately repeat the same instruction in the same way as above for the targeted number of trials: rewarding, correcting, prompting, and recording for each trial.
7. When DTT instruction begins for a new skill, teachers/practitioners may need to reinforce every positive response from the learner with both social and tangible reinforcement.

As the learner’s correct responding increases, teachers/practitioners can reduce the rate of tangible reinforcement. Later, the learner may respond to several trials before receiving a tangible reinforcer, and ultimately, should find social rewards sufficiently powerful for learning.

Step 7. Massed Trial Teaching

A primary characteristic of DTT is the massed trial approach (the features of a learning trial are described in the subsequent steps). This means that teachers/practitioners

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repeat the same learning trial several times in a row, ensuring that the learner is successful multiple times at whatever step of the skill is being taught.

1. Teachers/practitioners begin the teaching episode with a *maintenance trial* (demonstration of a skill already mastered) and record the result.
2. Teachers/practitioners present the teaching step, if the learner passes the maintenance trial.
3. If the learner responds correctly on the first trial, teachers/practitioners repeat the teaching step several more times and record the results.
4. Teachers/practitioners present a more difficult level if the learner has reached the mastery criterion for the step (e.g., 90% success for three consecutive teaching sessions).
5. If the learner does not pass the trial step correctly, teachers/practitioners administer the trial again.
6. If the learner is successful, teachers/practitioners repeat items 3 and 4 above until mastery is accomplished.
7. If the learner is unsuccessful, teacher/practitioners repeat the trial adding an increased level of assistance (for example a physical rather than verbal prompt) to assure that the learner performs the skill and is reinforced.
8. Teachers/practitioners repeat the step, continuing to add the prompts, 3-5 more times.
9. If the learner is consistently successful, teachers/practitioners repeat the trial without the prompt several more times.
10. If the learner continues to fail the unprompted trials, teachers/practitioners will add the prompt again for several more successful trials before ending the teaching for the day.
11. Teachers/practitioners review mastered steps (maintenance trials) once or twice during each session and teach new steps following the massed trials format until all steps of the skill have been mastered.

In DTT (and all other kinds of learning), it is extremely important that most trials be reinforced. ***For more information about how to implement reinforcement with learners with ASD, please refer to the Evidence-Based Practice Brief: Reinforcement (National Professional Development Center on ASD, 2009).*** Failed trials lead to behavior problems. Thus, in the face of learner failures, the adult moves quickly to simplify the task so that the learner can be reinforced. For example, if a learner was having a hard time labeling new or novel pictures the teacher/practitioner could ask the learner to label known pictures which are easy for the learner to identify. When the learner identifies the known pictures correctly, the teacher/practitioner can reinforce the correct answers.

Once the step being targeted is at mastery criteria, that step will be carried out only once or twice a session, for maintenance, and the next step becomes the targeted step. This process of reviewing mastered, or maintenance skills, and teaching the new step

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using massed trials, continues until all steps are mastered. At that point, the objective is mastered.

Step 8. Conducting Discrimination Training

Another part of DTT consists of teaching a learner a new response to a stimulus. When teaching a new response, the learner must first be taught to discriminate the stimulus from others. Teaching a learner the concept of “blue” involves teaching the learner to first discriminate the color blue from all others, and then to perform a specific behavior in response to the instruction. The steps for teaching the learner to discriminate a novel stimulus are as follows:

1. Teachers/practitioners present the new stimulus to the learner, provide the instruction, prompt the target skill/behavior, and reinforce.
2. Teachers/practitioners systematically fade prompts until the learner independently and consistently performs the skill with the one stimulus object.
3. Teachers/practitioners present the target stimulus as usual, but also present another stimulus, the distracter, in the periphery; give the instruction; elicit the behavior; and reinforce.

For example, if you are teaching the color blue and using a blue block, then a red block would be a good distracter. It should vary from the target only on the specific dimension you are teaching. Assuming the learner responds correctly, change the position of the distracter on each trial, moving it closer to the target, until the two are side by side. Once the learner is consistently responding correctly, move the two stimuli around, reversing sides, placing them vertically, etc, until the learner passes consistently. Adjusting the presentation of antecedent stimuli (order, proximity, sequence, etc.) is called random rotation.

4. Teachers/practitioners add a different distracter. Once the learner performs correctly, use all three stimuli for the trials.

Keep the positions consistent until the learner is consistently correct, and then start changing the positions, assuring that the learner ends up with consistently correct responses to each change. Finally, vary the positions randomly (random rotation), so that the learner is clearly discriminating the target stimulus.

5. Teachers/practitioners teach generalized use of the skill or concept by:
 - a. teaching discrimination of multiple stimuli.

Teachers/practitioners will need to re-teach the concept with several different stimuli (blue blocks, blue crayons, blue cars, etc.) in order to be sure that the

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learner understands the concept. You can “probe” the learner’s understanding by introducing a new set of materials that vary only by the dimension you are teaching and asking for the target item (e.g., provide several different colored crayons and give the instruction for indicating the blue one). If the learner selects the correct item without being taught, you have evidence that the learner has generalized the concept. From that point forward, review the skill with a variety of different items. If the learner does not choose correctly, then re-teach the steps above with a new set of materials (it will go more quickly this time!). Once the learner demonstrates mastery with new materials, probe again. Continue in this fashion until the learner shows a generalized concept.

b. teaching skill applied to multiple situations.

For skills that are mastered at the teaching table, begin to practice the skill in other situations (when playing on the floor), in a different room in the house, when coloring, etc.). If the learner does not respond correctly, conduct teaching trials in that location following the failure. The goal is for the learner to demonstrate the behavior in multiple situations and with multiple different stimuli.

Step 9. Review and Modify

1. Teachers/practitioners continuously review the learner’s progress and modify the program to reflect the progress the learner has made.
2. Teachers/practitioners modify the program to reflect the progress the learner has made by changing steps (either to higher or lower levels) if needed.
3. Teachers/practitioners should review mastered programs and continue to teach them as *‘maintenance’* trials.
4. Maintenance trials are specifically targeted for generalization. Generalization may mean:
 - a. practicing the trials in other settings,
 - b. with different adults,
 - c. with different reinforcers, and/or
 - d. with different instructions/stimuli.
5. Educational team meets regularly to report on the learner’s progress and identify potential changes to the learner’s program.