

## **Module: Task Analysis**

### **Evidence-Based Practice Brief: Task Analysis**

**This evidence-based practice brief on task analysis includes the following components:**

- 1. Overview, which gives a quick summary of salient features of the practice, including what it is, who it can be used with, what skills it has been used with, settings for instruction, and additional literature documenting its use in practice**
- 2. Steps for Implementation, detailing how to implement the practice in a practitioner-friendly, step-by-step process**
- 3. Implementation Checklist, to be used to monitor fidelity of the use of the practice**
- 4. Evidence Base Summary, which details the NPDC-ASD criteria for inclusion as an evidence-based practice and the specific studies that meet the criteria for this practice**

## **Module: Task Analysis**

### **Overview of Task Analysis**

Franzone, E. (2009). *Overview of task analysis*. Madison, WI: National Professional Development Center on Autism Spectrum Disorders, Waisman Center, University of Wisconsin.

Task analysis is the process of breaking a skill into smaller, more manageable steps in order to teach the skill. Other practices, such as reinforcement, video modeling, or time delay, should be used to facilitate learning of the smaller steps. As the smaller steps are mastered, the learner becomes more and more independent in his/her ability to perform the larger skill.

#### **Evidence**

Task analysis meets the evidence-based practice criteria with five single-subject design studies, demonstrating its effectiveness for promoting appropriate behavior and communication skills for children at the preschool, elementary, and middle school levels.

#### **With what ages is task analysis effective?**

Task analysis can be used effectively with children with ASD, regardless of cognitive level and/or expressive communicative abilities. The evidence base shows that task analysis is an effective intervention for learners at the preschool (1 study), elementary and middle school levels (6 studies), and high school (1 study). It is reasonable to assume that it would be an effective practice for older learners as well. Task analysis can also be used to train professionals on how to interact with and/or teach their students with ASD.

#### **What skills or intervention goals can be addressed by task analysis?**

The research that constitutes the evidence base demonstrates that task analysis can be used to address issues in the academic, behavior, communication, and social domain. Any skill that can be broken down into smaller steps for teaching is an appropriate target for task analysis.

#### **In what settings can task analysis be effectively used?**

Task analysis can be used in school, home, or community settings. Generalization of skills is most likely when teaching occurs in multiple settings.

#### **Evidence Base**

The studies cited in this section provide the basis upon which this practice was determined to meet the NPDC on ASD's criteria as an evidence-based practice. This list is not exhaustive; other quality studies may exist that were not included.

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### **Preschool**

Matson, J., Taras, M., Seven, J., Love, S., & Fridley, D. (1990). Teaching self-help skills to autistic and mentally retarded children. *Research in Developmental Disabilities, 11*, 361-378.

### **Elementary and Middle School Age**

Alcantara, P. R. (1994). Effects of videotape instructional package on purchasing skills of children with autism. *Exceptional Children, 61*(1), 40-55.

Browder, D., Trela, K., & Jimenez, B. (2007). Training teachers to follow a task analysis to engage middle school students with moderate and severe developmental disabilities in grade appropriate literacy. *Focus on Autism and Other Developmental Disabilities, 22*(4), 206-219.

Hagopian, L., Farrell, D., & Amari, A. (1996). Treating total liquid refusal with backward chaining and fading. *Journal of Applied Behavior Analysis, 29*(4), 573-575.

Liber, D., Frea, W., & Symon, J. (2008). Using time-delay to improve social play skills with peers for children with autism. *Journal of Autism and Developmental Disorders, 38*, 312-323.

Luscre, D., & Center, D. (1996). Procedures for reducing dental fear in children with autism. *Journal of Autism and Developmental Disorders, 26*(5), 547-556.

Matson, J., Taras, M., Seven, J., Love, S., & Fridley, D. (1990). Teaching self-help skills to autistic and mentally retarded children. *Research in Developmental Disabilities, 11*, 361-378.

### **High School**

Haring, T. G., Kennedy, C. H., Adams, M. J., & Pitts-Conway, V. (1987). Teaching generalization of purchasing skills across community settings to autistic youth using videotape modeling. *Journal of Applied Behavior Analysis, 20*(1), 89-96.

### **Selected Additional References**

Alberto, P., & Troutman, A. (2003). *Applied behavior analysis for teachers*. Upper Saddle River, New Jersey: Merrill Prentice Hall.

Cameron, M. J., Shapiro, R. L., & Ainsleigh, S. A. (2005). Bicycle riding: Pedaling made possible through positive behavioral interventions. *Journal of Positive Behavior Interventions, 7*(3), 153-158.

Carter, M., & Kemp, C. P. (1996). Strategies for task analysis in special education. *Educational Psychology, 16*(2), 155-170.

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- Cooper, J., Heron, T., & Heward, W. (1987). *Applied Behavior Analysis*. Upper Saddle River, NJ: Merrill Prentice Hall.
- D'Ateno, P., Mangiapanello, K., & Taylor, B. (2003). Using video modeling to teach complicated play sequences to a preschooler with autism. *Journal of Positive Behavior Interventions*, 5(5), 5-11.
- Goodson, J., Sigafos, J., O'Reilly, M, Cannella, H., & Lancioni, G.E. (2006). Evaluation of a video-based error correction procedure for teaching a domestic skill to individuals with developmental disabilities. *Research in Developmental Disabilities*, 28, 458-467.
- Jerome, J., Frantino, E. P., & Sturmey, P. (2007). The effects of errorless learning and backward chaining on the acquisition of internet skills in adults with developmental disabilities. *Journal of Applied Behavior Analysis*, 40, 185-189.
- Krantz, P., & McClannahan, L. (1993). Teaching children with autism to initiate to peers: Effects of a script fading procedure. *Journal of Applied Behavior Analysis*, 26(1). 121-132.
- Stokes, J., Cameron, M., Dorsey, M., & Fleming, E. (2004). Task analysis, correspondence training, and general case instruction for teaching personal hygiene skills. *Behavioral Interventions*, 19, 121-135.
- Yamamoto, J., & Mochizuki, A. (1988). Acquisition and functional analysis of manding with autistic students. *Journal of Applied Behavior Analysis*, 21(1), 57-64.

## **Module: Task Analysis**

### **Evidence Base for Task Analysis**

The National Professional Development Center on ASD has adopted the following definition of evidence-based practices.

To be considered an evidence-based practice for individuals with ASD, efficacy must be established through peer-reviewed research in scientific journals using:

- *randomized or quasi-experimental design studies*. Two high quality experimental or quasi-experimental group design studies,
- *single-subject design studies*. Three different investigators or research groups must have conducted five high quality single subject design studies, or
- *combination of evidence*. One high quality randomized or quasi-experimental group design study and three high quality single subject design studies conducted by at least three different investigators or research groups (across the group and single subject design studies).

High quality randomized or quasi experimental design studies do not have critical design flaws that create confounds to the studies, and design features allow readers/consumers to rule out competing hypotheses for study findings. High quality in single subject design studies is reflected by a) the absence of critical design flaws that create confounds and b) the demonstration of experimental control at least three times in each study. This definition and criteria are based on the following sources:

Horner, R., Carr, E., Halle, J., McGee, G., Odom, S., & Wolery, M. (2005). The use of single subject research to identify evidence-based practice in special education. *Exceptional Children, 71*, 165-180.

Nathan, P., & Gorman, J. M. (2002). *A guide to treatments that work*. NY: Oxford University Press.

Odom, S. L., Brantlinger, E., Gersten, R., Horner, R. D., Thompson, B., & Harris, K. (2004). *Quality indicators for research in special education and guidelines for evidence-based practices: Executive summary*. Arlington, VA: Council for Exceptional Children Division for Research.

Rogers, S. J., & Vismara, L. A. (2008). Evidence based comprehensive treatments for early autism. *Journal of Clinical Child & Adolescent Psychology, 37*(1), 8-38.

Using these criteria, the empirical studies referenced below provide documentation for supporting task analysis as an evidence-based practice. This list is not exhaustive; other quality studies may exist that were not included.

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### **Preschool**

Matson, J., Taras, M., Seven, J., Love, S., & Fridley, D. (1990). Teaching self-help skills to autistic and mentally retarded children. *Research in Developmental Disabilities, 11*, 361-378.

### **Elementary and Middle School Age**

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### **High School**

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### **Task Analysis: Steps for Implementation**

Szidon, K., & Franzone, E. (2009). *Task Analysis*. Madison, WI: National Professional Development Center on Autism Spectrum Disorders, Waisman Center, University of Wisconsin.

Task analysis is the process of breaking a skill down into smaller, more manageable components. Once a task analysis is complete, it can be used to teach learners with ASD a skill that is too challenging to teach all at once. Other practices, such as discrete trial training, video modeling, and reinforcement, can be used to teach the individual components, building one upon another, until the skill is complete.

#### **Step 1. Identifying the Target Skill**

1. Teachers/practitioners identify the target skill that they want to teach the learner with ASD.

Using the learner's Individual Education Plan (IEP)/Individual Family Service Plan (IFSP) goals, teachers/practitioners should identify the skill that the learner needs to acquire. The target skill should consist of a series of chained **discrete** steps. A single discrete skill is not appropriate for task analysis, nor is a task with multiple variables and/or outcomes.

#### **EXAMPLE #1**

Too simple: Turning on the sink faucet (discrete skill)

Just right: Washing dishes

Too complex: Preparing, serving, and cleaning up dinner (multiple variables and multiple outcomes)

#### **EXAMPLE #2**

Too simple: Pushing the "on" button on the computer (discrete skill)

Just right: Logging onto the computer and starting a familiar program

Too complex: Logging onto the computer and creating a personal web page (multiple variables and multiple outcomes)

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Of course, all instruction should be individualized. For example, a skill that may be too complex for one learner may be manageable for another. Skills that require a task analysis typically consist of multiple components that comprise a larger skill (e.g., washing dishes, putting on a coat).

Task analysis is frequently used to teach self-help and other adaptive skills.

### ***Step 2. Identifying the Prerequisite Skills of the Learner and the Materials Needed to Teach the Task***

1. Teachers/practitioners determine whether the learner has the required prerequisite skills needed to learn the task.
2. **Teachers/practitioners define the necessary materials needed to teach the task.**

Using the learner's present level of performance on IEP/IFSP goals, teachers/practitioners should identify the prerequisite skills that are necessary for the learner to have in order to perform the target skill. Often this is done by collecting **baseline data** on performance of the target skill. The skills that are already mastered do not need to be included as part of the task analysis.

Once the prerequisite skills are identified, the instructor can decide how much detail the task analysis will include. For example, if he or she is teaching coin counting, the teacher would first assess whether learner could identify coins and their values and whether he or she could count by 1's, 5's and 10's. These skills are the prerequisites to coin counting. If the prerequisite skills are not mastered, they should be included as part of the task analysis. Sometimes, if there are too many prerequisite skills that need to be learned, the target skill itself might need to be redefined. In the example of coin counting, if a learner does not identify coins and their values and/or counting by 1's, 5's, and 10's, these skills should be taught before teaching the skill of coin counting.

After identifying the prerequisite skills that the learner knows and the skills that need to be taught, the instructor should identify the materials he or she will need to teach the task. The materials will depend on the unique needs of the learner as well as the resources available to the instructor. For coin counting, one might select a set of simulated coins, purchasing items, and worksheets. If the students have less ability to generalize skills to **in vivo** environments, the instructor might choose to use real coins, and school and community based instruction in which to practice purchasing real items.

### ***Step 3. Breaking the Skill into Components***

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In Step 3, teachers and other practitioners break the skill down into smaller steps so that a learner can successfully demonstrate the skill by following the steps.

1. Teachers/practitioners segment the target skill into more manageable components by:
  - a. completing the skill themselves and recording each step or
  - b. observing another person (in real time or via video) complete the activity and recording the steps.
2. Teachers/practitioners confirm that each component consists of a discrete skill.

### *TASK ANALYSIS EXAMPLE #1: Brushing Teeth (Matson et al., 1990)*

- a. Obtains materials
- b. Takes cap off toothpaste
- c. Puts paste on brush
- d. Replaces toothpaste cap
- e. Wets brush
- f. Brushes left outer surfaces
- g. Brushes front outer surfaces
- h. Brushes right outer surfaces
- i. Brushes lower right chewing surfaces
- j. Brushes lower left chewing surfaces
- k. Brushes upper left chewing surfaces
- l. Brushes upper right chewing surfaces
- m. Brushes upper right inside surfaces
- n. Brushes upper front inside surfaces
- o. Brushes upper left inside surfaces
- p. Brushes lower left inside surfaces
- q. Brushes lower front inside surfaces
- r. Brushes lower right inside surfaces
- s. Rinses toothbrush
- t. Wipes mouth and hands
- u. Returns materials

### *EXAMPLE TASK ANALYSIS #2: Setting the Table (Goodson et al., 2006)*

- a. Puts down the placemat
- b. Places the large plate in the center of the placemat
- c. Puts the small plate in the upper left hand side of the placemat
- d. Puts the butter knife on the small plate
- e. Places the napkin to the left of the large plate

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- f. Puts the knife and spoon to the right of the large plate
- g. Puts the fork to the left of the large plate on the napkin
- h. Puts the dessert spoon and fork horizontally at the top of the large plate
- i. Puts the glass to the upper right of the large plate near the tip of the knife

### *EXAMPLE TASK ANALYSIS #3: Play Activity with Trains (Liber et al., 2008)*

- a. Asks peer to play
- b. Tells peer, "Let's play trains"
- c. Gives peer at least two tracks
- d. Tells peer, "Let's make a train"
- e. Asks peer for train pieces
- f. Puts train pieces together with peer's pieces
- g. Asks peer for animals to put on train
- h. Moves train around track
- i. Tells peer, "Your turn!"
- j. Tells peer, "That was fun!"

### **Step 4. Confirming that the Task is Completely Analyzed**

In Step 4, teachers/practitioners confirm that the component steps of the target skill are represented accurately and completely.

1. Teachers/practitioners confirm that the task is completely analyzed by having someone follow the steps verbatim.

By having a colleague or another student follow the steps of the task analysis, teachers/practitioners can make certain that all steps of the skill are included and that the end result is accurate and complete. Even if a skill is relatively simple, it is easy to leave out steps. Having another person follow the steps exactly as written confirms whether the task analysis is accurate. If needed, teachers/practitioners revise the component steps based on the feedback obtained through the trial.

### **Step 5. Determining How the Skill Will be Taught**

In Step 5, teachers/practitioners decide how the steps identified in the task analysis will be taught. In deciding, the teacher/practitioner needs to decide whether the task is manageable or needs to be broken down into phases, the procedure they will use for chaining the behavior (total task, backwards, or forward chaining), and the evidence-based practice they will use to teach the skill. Before making these decisions, it is important to consider learner differences, goals, and experiences. Using professional judgment and understanding the learner's individual needs are important when selecting the most appropriate evidence-based practice and implementation strategy.

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1. Teachers/practitioners select the appropriate teaching method by matching the method to:
  - a. the learner's temperament,
  - b. the learner's learning style,
  - c. the history of what has and has not worked for this learner,
  - d. the learner's IEP/IFSP, and
  - e. the environments within which the learner functions.
  
2. Teachers/practitioners present the steps of the task analysis to learners in an age and developmentally-appropriate manner.

Teachers/practitioners must decide how the steps of the task analysis will be represented for learners. A learner who reads may have the steps written out. Another learner may require pictures to represent the steps. Yet another learner may benefit from a video model. Regardless of the format, the steps should be provided in an efficient, clearly understood manner that does not attract undue attention to learners

### ***Step 6. Implementing Intervention and Monitoring Progress***

As noted in Step 5, a number of evidence-based practices, including prompting and reinforcement, may be appropriate for teaching specific skills. Please use resources (steps, implementation checklists, and data collection sheets) developed by the National Professional Development Center on ASD in this module to assist in teaching skills and monitoring learner progress.

1. Teachers/practitioners implement the evidence-based practices identified as appropriate to teach the target skills using the steps for implementation and implementation checklist for the selected practices.
  
2. Teachers/practitioners follow appropriate data collection procedures to monitor learner progress for the specific evidence-based practices chosen to teach the target skills.

### **References**

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Goodson, J., Sigafoos, J., O'Reilly, M, Cannella, H., & Lancioni, G.E. (2006). Evaluation of a video-based error correction procedure for teaching a domestic skill to individuals with developmental disabilities. *Research in Developmental Disabilities, 28*, 458-467.

Liber, D., Frea, W., & Symon, J. (2008). Using time-delay to improve social play skills with peers for children with autism. *Journal of Autism and Developmental Disorders, 38*, 312-323.

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**Implementation Checklist for Task Analysis**

Franzone, E. (2009). *Implementation checklist for task analysis*. Madison, WI: The National Professional Development Center on Autism Spectrum Disorders, Waisman Center, University of Wisconsin.

**Instructions:** The Implementation Checklist includes each step in the use of Task Analysis. Please complete all of the requested information including the site and state, individual being observed, and the learner’s initials. To assure that a practice is being implemented as intended, an observation is *always* preferable. This may not always be possible. Thus, items may be scored based on observations with the implementer, discussions and/or record review as appropriate. Within the table, record a 2 (implemented), 1 (partially implemented), 0 (did not implement), or NA (not applicable) next to each step observed to indicate to what extent the step was implemented/addressed during your observation. Use the last page of the checklist to record the target skill, your comments, whether others were present, and plans for next steps for each observation.

Site: \_\_\_\_\_ State: \_\_\_\_\_

Individual(s) Observed: \_\_\_\_\_ Learner’s Initials: \_\_\_\_\_

**Skills below can be implemented by a practitioner, parent, or other team member**

	Observation	1	2	3	4	5	6	7	8
	Date								
	Observer’s Initials								
<b><i>Planning (Steps 1 – 5)</i></b>									
<b>Step 1. Identify the Target Skill</b>	<b>Score**</b>								
1. Identify the target skill that individual wants to teach the learner with ASD.									
<b>Step 2. Identifying the Prerequisite Skills of the Learner and the Materials Needed to Teach the Task</b>									
1. Determine whether the learner has the required prerequisite skills needed to learn the task.									
2. Define the necessary materials needed to teach the task.									

\*\* Scoring Key: 2 = implemented; 1 = partially implemented; 0 = did not implement; NA = not applicable

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	Observation	1	2	3	4	5	6	7	8
	Date								
	Observer's Initial's								
<b>Step 3. Breaking the Skill into Components</b>	<b>Score**</b>								
1. Segment the target skill into more manageable components by:  a. completing the skill themselves and recording each step or  b. observing another person (in real time or via video) complete the activity and recording the steps.									
2. Confirm that each component consists of a discrete skill.									
<b>Step 4. Confirming that the Task is Completely Analyzed</b>									
1. Confirm that the task is completely analyzed by having someone follow the steps verbatim.									
<b>Step 5. Determining How the Skill Will be Taught</b>									
1. Select the appropriate teaching method by matching the method to:									
a. The learners temperament,									
b. The learners learning style,									
c. The history of what has and has not worked for this learner,									
d. The learners IEP/IFSP, and									
e. The environment within with the learner functions.									
2. Present the steps of the task analysis to learners in an age and developmentally-appropriate manner.									

\*\*Scoring Key: 2 = implemented; 1 = partially implemented; 0 = did not implement; NA = not applicable

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	Observation	1	2	3	4	5	6	7	8
	Date								
	Observer's Initials								
<b><i>Intervention and Progress Monitoring (Step 6)</i></b>									
<b>Step 6. Implementing Intervention and Monitoring Progress (cont.)</b>	<b>Score**</b>								
1. Implement the evidence-based practices identified as appropriate to teach the target skills using the steps for implementation and implementation checklist for the selected practices.									
2. Follow appropriate data collection procedures to monitor learner progress for the specific evidence-based practices chosen to teach the target skills.									

\*\*Scoring Key: 2 = implemented; 1 = partially implemented; 0 = did not implement; NA = not applicable

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Date	Observer Initials	Targeted Skill/Behavior, Comments, and Plans for Next Steps
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