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## The use of picture communication system symbols to enhance independent completion of a task analysis

Heather Leigh House  
*University of Dayton*

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THE USE OF PICTURE COMMUNICATION SYSTEM SYMBOLS TO ENHANCE  
INDEPENDENT COMPLETION OF A TASK ANALYSIS

Thesis Submitted to The School of Education and Allied Professions of the  
UNIVERSITY OF DAYTON

In Partial Fulfillment of the Requirements for

The Degree

Education Specialist in School Psychology

by

Heather Leigh House

UNIVERSITY OF DAYTON

Dayton, OH

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APPROVED BY:



Hunley, Sawyer  
Faculty Advisor



Evans, James  
Committee Member



Morrison, Julie  
Committee Member

## ABSTRACT

### THE USE OF PICTURE COMMUNICATION SYSTEM SYMBOLS TO ENHANCE INDEPENDENT COMPLETION OF A TASK ANALYSIS

Name: House, Heather Leigh  
University of Dayton

Advisor: Dr. Sawyer Hunley

Picture communication system symbols paired with a task analysis were used in order to help increase the independence of task completion for students with severe cognitive impairments. This system pairs a picture symbol with each step of a task analysis to illustrate the steps that a student must go through in order to complete the task. Results of the study showed that the picture communication system symbols paired with a task analysis were rapidly successful for the students and significantly increased their percentage of independent task completion.

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## CHAPTER 1

### INTRODUCTION

Picture Communication System (PCS) symbols are used to enhance language and communication skills for all types of students, especially students with cognitive impairments. The compilation of over 4000 PCS symbols can be used to increase vocabulary and writing ability. Through the use of PCS symbols, a student can also increase independence of day-to-day life by making text more meaningful and comprehensible for a student who does not have reading capabilities.

#### *Purpose of the Study*

The purpose of the study is to determine if PCS symbols increase specific independent activities of students with cognitive impairments. PCS symbols were used to illustrate the steps of a task analysis and test the hypothesis that the use of PCS symbols increases task completion for a student with cognitive impairments.

#### *Significance of the Study*

In order to best serve students, individualized instruction must address the unique needs of the students. Some students with cognitive impairments are unable to complete day-to-day tasks typical of their non-disabled peers. If PCS symbols are used to illustrate a task analysis, and the students are able to break a task down step-by-step into a comprehensible process, it is likely that task completion will increase, thus increasing independence.

#### *Assumptions of the Study*

The following assumptions were inherent in this study:

- The task analyses were an accurate representation of the steps needed to complete the task that the student was being asked to complete.
- The task analyses and activities were administered with adequate standardization.
- The student will attend school frequently (95% or more) during the time of intervention.

#### *Limitations of the Study*

The use of single-subject designs restricts the degree to which the results obtained can be generalized to the larger population.

## CHAPTER 2

### LITERATURE REVIEW

#### *Introduction*

In 1973, Section 504 of The Rehabilitation Act was adopted (Thomas & Grimes, 2002). Section 504 prohibits the discrimination of students with disabilities in schools that receive federal financial assistance (Jacob & Hartshorne, 2003). Discrimination as defined in Subpart D of Section 504 requires that districts provide all students with a free and appropriate education (FAPE) (Prasse, 2002). Students with disabilities must be educated in the least restrictive environment and must be able to access learning (Free and Appropriate Education, 1999). In order for this to be possible, a student may require supplementary aids to support the learning process (State Board of Education, 2002).

Picture Communication System (PCS) symbols are the focus of the present study as an example of supplementary aids that can support the learning process. They represent written words in a task analysis to assist students with cognitive disabilities. Given that the visual pictures can be more readily linked to the student's vocabulary than the printed word, the pictures are paired with printed words to identify the meaning for each step required to complete a task (Biemiller & Siegal, 1997). The focus of the study is to increase task completion using PCS Symbols.

#### *Students with cognitive disabilities*

Students with cognitive disabilities are classified in one of the thirteen disability categories under IDEA-Part B (Jacob & Hartshorne, 2003). These students require special education and other related services due to their deficits in both cognitive and

adaptive capabilities. The students are not able to complete age-appropriate tasks, therefore hindering their independence.

### *Stages of Learning*

For students with severe disabilities, it is important to be able to carry out tasks that will allow them to have a higher level of independence to care for themselves. In order for a student to achieve the higher level of independence, the student must go through the four stages of learning: acquisition, fluency, maintenance, and generalization (Snell & Browning, 2000).

*Learning acquisition.* The first stage of learning is acquisition. The goal in the learning acquisition stage is to know the basic steps needed to complete a task (Snell & Brown, 2000). During the acquisition stage, the teacher instructs and responds with corrective praise (Browder, 2001). For example, when a student is learning how to wash his hands, he student successfully turns on the water. The teacher would model the procedure for the student. Then if the student successfully turns on the water, instead of just responding with "Good," the teacher would tell the student, "Good, you turned on the water." This helps to reinforce the steps that the student is taking to complete the task or skill during the acquisition stage (Browder, 2001).

*Learning fluency.* After the acquisition stage, the student must develop fluency in completing the task. This occurs through the provision of additional time, instruction, and practice to be able to complete the skill consistently and at an appropriate pace (Snell & Brown, 2000, p. 347). During this stage, prompting and modeling from the instructor can be reduced as the student becomes more fluent (Snell & Brown, 2000).

*Learning maintenance.* After the fluency stage is the maintenance stage. In this stage the student is asked to perform the task in various settings with increased independence from the instructor. It is also important to help a student self-manage any skills or prompts needed to complete the task during this stage (Snell & Brown, 2000).

*Learning generalization.* The final stage in the learning process is demonstration of generalization of the skill. During this stage, the student continues to complete the task with a greater level of independence across many environments. A student has reached the goal of generalization when the skill is completed with varying people, settings, and materials without prompting from the instructor (Browder, 2001).

### *Task Analysis*

A task analysis can be especially useful for special educators. Special educators are challenged to find a way to provide systematic instruction to students with disabilities who have unique educational needs (Johnson & McDonnell, 2004). A task analysis provides information to assess and monitor individual student performance that is curriculum-based (Carter & Kemp, 1996). Furthermore, the information gained through data gathered via task analysis helps the instructor identify areas that require special attention in order for the student to master the task.

A task analysis involves identifying and defining a task in terms of observable behavior. These components are sequenced into the steps required to complete the task (Snell & Brown, 2000). The sequencing of steps allows an educator to also view all of the prerequisite skills that may be necessary in order to complete the task. Instruction methods and focus are determined by the steps of the task analysis a student is able to complete (Sattler, 2002). The instructional priority for a task analysis is to increase the

student participation in routines that are required through daily living (Browder, 1991).

There are several different types of task analyses: a component task analysis, a task complexity analysis, and a prerequisite task analysis (Carter & Kemp, 1996). The type of task analysis selected should meet the needs of the target student and should be geared to accomplish the task that the student is being asked to perform.

*Component task analysis.* A component task analysis requires that the task's skills be broken into sub-skills which are needed to complete the task (Carter & Kemp, 1996). In order to form this type of task analysis an instructor would directly observe the task being performed. The skills that are needed to complete the task are listed in order. A benefit of a component task analysis is that it can be done in the environment in which the task is being performed allowing for a better understanding of skill (Carter & Kemp, 1996). An example of a task that would be appropriate for a component task analysis would be a person brushing his or her teeth. This type of task analysis would be especially useful for a person with severe disabilities because of its ease of use for simple motor tasks and academic tasks (Carter & Kemp, 1996).

*Task complexity analysis.* A second type of task analysis is task complexity analysis. It is best suited to be used with a task in which the basic skills of the task have been gained but there needs to be an increase in fluency (Carter & Kemp, 1996). Like a component task analysis, the task complexity analysis is also observation based. The difference is that the skills are not broken into separate parts. The task is modified for the student in order to make it easier to perform. The modifications could include but are not limited to changing the performance conditions, level of behavior performed, or level of acceptable performance. An example would be a child batting during a baseball game.

The task could be modified to suit the child. The pitcher could move closer to the batter or throw the ball slower in order to simplify the task of hitting the ball.

*Prerequisite task analysis.* Another form of task analysis is prerequisite task analysis (Carter & Kemp, 1996). It differs from the previous task analyses in that it is not only for use with observable skills. A prerequisite task analysis would be desirable for an academic task that requires the student to use cognitive processes that could be completed through interacting sub-skills. The sequence of skills may change depending upon the student and the specific skills needed to perform the task. When using a prerequisite task analysis, it is important to remember a couple of key details. First, the steps of the task analysis are hypothetical and may change with each use. Second, varying sequencing should be considered to complete the task.

*Task analysis and skill development.* There has been no research to date to connect the use of a task analysis with PCS symbols. However, two studies have demonstrated the effectiveness of task analysis in increasing the level of independence on a given task for a person with severe disabilities (Mattie, 2001; Xin & Holmdal, 2003).

Mattie (2001) examined the use of task analyses to teach conversation skills for adults with moderate to severe disabilities. The adults were given instruction based on task analysis in order to prompt conversation. Mattie (2001) found that when a task analytic procedure was paired with imitation and reinforcement there was an increase in responses of the adults with severe disabilities during conversation.

Xin and Holmdal (2003) studied the effectiveness of task analysis with two seven-year old students with cognitive impairments. The students were learning counting skills through counting out the snacks for their class during snack time. The steps for counting

out the snacks were sequenced in a task analysis. The steps were then practiced with the two students each day. As a result, Xin and Holmdal (2003) found that the task analysis had helped the two students be able to complete 80% and 70% of the steps, respectively.

*Constructing and validating task analyses.* A task analysis should be validated to ensure that it is appropriate, complete, and individualized for each student. There are several ways to validate the construction of the task analysis. The first way to validate the steps of a task analysis would be to consult with someone knowledgeable in the task that you want to assess (Cooper, Heron, & Heward 1987). The instructor might find himself or herself in a situation where a task analysis has to be developed for a student with severe disabilities and the instructor doesn't have much experience in area (Browder, 1991). Consultation would be essential to ensure that the task analysis best meets the needs of the student.

Another method would be to do an observation of someone else completing the task for which the task analysis is being developed (Browder, 1991). This would allow for detection of skills that might not be readily recognized and included in the task analysis. It serves as a starting point for the development of the task analysis. The instructor can then determine what the student is able to do and define and work with those responses (Browder, 1991; Cooper et al., 1987). Also, it allows the preparer to take into account the environment in which the student will be asked to perform the task.

Another option to validate the construction of the task analysis would be a trial-and-error method (Cooper et al., 1987). Through actually carrying out the task, the instructor is able to figure out the steps needed in the task analysis first hand. The



revisions that are made allow for a comprehensive and appropriate task analysis (Cooper et al., 1987).

Task analyses are generally produced in step-by-step written form. They can be used by instructors to monitor student progress and also by a student to self-monitor personal progress. Some students may have cognitive impairments that impede their ability to read or understand the written word. In those cases, the task analyses have to be modified. The present study uses a modified task analysis. The written words that form the steps of the task analysis are paired with a supplementary aid, the PCS Symbols, in order to increase learning of the steps of the task analysis. This multifaceted intervention was developed to help students work through the stages of learning: acquisition and fluency which are expected to lead to learning maintenance and generalization. Task analysis has been chosen to work with students who have cognitive disabilities based upon its usefulness in assessing life skills and the targeting of specific skills or responses (Browder, 1991).

#### *Picture Exchange Communication System*

Some students may be unable to understand or communicate the spoken word. Both PECS and PCS are used to enhance the language and communication skills for students with cognitive impairments. Picture exchange communication systems (PECS) are a means to augment the spoken word and to help communicate the idea of the word (Tissot & Evans, 2003). The students use the PECS cards as an alternative form of communication in exchange for a desired outcome or activity (Tissot & Evans, 2003). The symbols used in the system are two or three-dimensional representations that allow the student to gain a foundation that may increase comprehension.

According to Tincani (2004), students that learn to use the PECS are able to use the system independently and may even acquire some speech through their use. Tincani's (2004) study examined the use of sign language and/or picture communication symbols for two students with autism spectrum disorders. The students were provided with stimuli and the PECS that corresponded with the stimuli. Tincani (2004) found that for students without hand-motor deficits, picture communication systems may be beneficial. The students were able to use the PECS in exchange for the item that they were trying to gain.

Magiati and Howlin (2003) investigated the use of PECS to increase adaptive behavior and spontaneous communication. They found that there were significant improvements with the use of PECS. These improvements were seen most significantly soon after implementation and then gradually increasing over time indicating that the improvements were due to the training with the PECS. Also, parents stated that they had seen some generalization of the skills with their children being more independent at home during meal times. Further follow-up interviews with teachers showed that they believed that the PECS provided a means of effective communication allowing the students to gain confidence and become more independent (Magiati & Howlin, 2003).

Magiati and Howlin's (2003) results were supported by the findings of Tissot and Evans (2003). Tissot and Evans (2003) investigated the effects of PECS for students who were visual learners. They pointed out that a student may have difficulty understanding verbal instructions, but may be able to understand the meaning of instructions with a more visual cue (Tissot & Evans, 2003).

Schwartz et al. (1998) found that the skills that the students were learning through PECS could be generalized across settings and could also be acquired quickly. Eighteen preschool students with significant disabilities were participants in this study. The students were given PECS cards to use during snack time and free choice time. The cards were used to help the students increase the number of decisions that they were able to make and also increase their level of independence. Schwartz et al. (1998) supported Magiati and Howlin's (2003) results that the PECS cards helped increase a student's spontaneous communication. Forty-four percent of the students in the Schwarz et al. (1998) study demonstrated an increase in spoken language.

Many of the PECS studies were based upon indirect methods of data gathering, primarily through teacher and parent questionnaires. Although informative, such indirect methods can be affected by the perceptions of the reporter. Direct measures of improvement in task completion would provide a stronger case for efficacy of the picture symbols. One such way to do this would be through direct observation of skill acquisition and through the use of a step-by-step checklist structured by a task analysis.

#### *Picture Communication System*

Picture communication system (PCS) symbols, developed by Mayer-Johnson (Mayer-Johnson, 2005), are a means of visual learning. PCS is a system which employs picture communication symbols to communicate discrete thoughts or words instead of using the picture exchange communication system (PECS) card to exchange for a desired item. The picture symbols are used to help students to identify the written word associated with the picture symbol.

PCS symbols are useful for students with cognitive impairments to increase communication skills and to learn how to read. Biemiller and Siegal (1997) studied the effects of a reading program using picture communication symbols. Over a two year period, they found significant improvements not only with sight word recognition, but also in the students' attention to the printed word that corresponded with the picture communication symbol (Biemiller & Siegal, 1997).

The program Boardmaker Plus! was used in the current study because it features over 4500 picture communication symbols to illustrate day-to-day activities, people, and objects. It allows a person to search for a picture symbol to illustrate anything that a person might want to communicate.

Research has been conducted to examine the use of a task analysis to aid students with cognitive impairments with completing a task. The PECS has been shown to help communication skills for students with cognitive impairments. The PCS was developed to move beyond communication for the purpose of obtaining something into the development of specific skills for individuals with cognitive impairments. The present study was designed to investigate the use of PCS symbols paired with a task analysis to depict the steps needed to complete the task. The dependent variable is the level of independence for task completion, as measured by the proportion of steps completed. The purpose of the study is to determine whether PCS symbols when paired with task analyses increase specific independent activities of students with cognitive impairments.

## CHAPTER 3

### METHODS

#### *Participants*

Four students from each of two special education classrooms were identified to participate in the study for a total of eight students. The students ranged in ages from 5-10 years old and all have an education classification of multiple disabilities. The intervention specialist in each of the two classrooms conducted the intervention and was responsible for collecting the assessment data and recording the level and type of independence for each step of the task analysis.

The students participating in this study attended school in a district located in Midwest Ohio. The district serves a population of 6,816 Pre-K to Grade 12 students. It educates 900 pupils with special needs and 175 students with English as the non-native language. The community has a population of 38,212 (US Census, 2000), and is located on the fringes of both a mid-size urban city and an Air Force Base. The district operates seven elementary schools, two middle schools, and one high school (grades 9-12). Participants for the study were recruited from one of the elementary schools. The school enrolls 410 students Grades K-5. The school is composed of a predominantly white population (76.5%), 48.5% female and 51.5% male, 83.4% non-disabled and 16.6% disabled, and economically nondisadvantaged (75.7%).

#### *Materials*

PCS symbols were used to illustrate each step of the task analysis during the intervention phase. The symbols for each step were selected by the student's teacher. No

instruction on the meaning of the symbols was provided because the teacher selected symbols that were known to be understandable and recognizable to the student. The PCS symbols came from the Boardmaker Plus! computer program by Mayer-Johnson.

The PCS symbols from Mayer-Johnson were selected for use in the study because of the need for research to examine the effectiveness of the PCS symbols. In contrast, much research has been conducted on the use of PECS. This research study attempts to determine if similar, significant results can be shown with the use of picture symbols and a task analysis.

A treatment integrity checklist was created based on the task analysis. The intervention specialist completed the checklist after each intervention session to ensure proper implementation and procedure of the baseline and intervention periods.

### *Design*

Eight single-case AB designs were conducted and the aggregated results were used to determine the impact of using the PCS symbols in a task analysis structure of varying tasks. This design was chosen to ensure that the results of the intervention were due to the use of PCS and not due to coincidental events that have taken place over the course of the study.

In the present experiment, all students began the three week baseline period at the same time. In contrast to a multiple-baseline design, the treatment phase for all students was initiated at the same time. Due to logistical constraints, this was deemed acceptable as the students were located in two separate classrooms, with two separate teachers, and there was variety across the types of tasks that students were asked to complete. The independent variable was the PCS symbols that are used to illustrate each step of the task.

The dependent variable was the proportion of steps on the task analysis that the student completed.

#### *Task Analysis Procedure*

Tasks were chosen for each participant based on student need and inability to complete a required task. Task analyses were conducted for all students in the study. Task analyses were conducted for: completing a P.M. checklist, brushing teeth, washing hands, and making a peanut butter and jelly sandwich (See Appendix A). In order to ensure validity, a team of two teachers and two intervention specialists developed the task analyses. The intervention specialists worked closely with the participants each day and had knowledge of each student's motor capabilities to ensure that he or she had the ability to complete the step of the task targeted.

Table 1. Participants and Targeted Task

<b>Student</b>	<b>Task Targeted</b>
Peter	Hand Washing
Rebecca	Brushing Teeth
Sarah	Making Sandwich
Henry	P.M. Checklist
John	Making Sandwich
Teresa	Making Sandwich
Kevin	Brushing Teeth
Stephanie	Brushing Teeth

Each member of the team created a task analysis for the skill being examined. The task analyses were then compiled and compared. Validity was further ensured through observations of peers without disabilities performing the task and comparing them with the steps in the task analysis. Each step included the PCS symbols as well as the written word that corresponds with the PCS symbol and was placed on a flip card to be held by the intervention specialist and shown in order to the student.

Each intervention was implemented with each student on the same days each week during the same time period. All materials were provided for the student at the beginning of the intervention so that the focus was on the student's task completion. A treatment integrity checklist prompted the correct procedure and was used to monitor adherence to the protocol (See Appendix B).

The first step in the procedure was to inform the student that it was time to complete the task that has been selected. This was done both verbally and visually by pointing to the PCS symbol indicating the task. Next, the first step for completing the task was modeled for the student. If the student did not respond to the prompt within five seconds, the intervention specialist asked the student to try to figure it out. If the student was able to then do the step independently, the intervention specialist gave verbal reinforcement and then had the student move onto the next step by flipping to the next card. If the student was not able to complete the step the intervention specialist verbally instructed the student on the step and visually instructed by pointing to the PCS symbols on the card. If the student still continued to struggle, the intervention specialist physically showed the student how to complete the step and then moved onto the next step.



Data were monitored and recorded by the intervention specialist on a task analysis data chart which listed the steps of the task analysis that the student was asked to perform (See Appendix C). If the student was able to complete the step correctly, a plus mark was logged, and a minus mark was logged for incorrect completion.

Level of independence has four categories and level and type of prompting was recorded upon completion of the task analysis. A “C” was recorded if the student required continuous prompting throughout the task analysis. Continuous prompting was defined as prompting for every step of the task analysis. An “F” was recorded if the student required frequent prompting throughout the task analysis. Frequent prompting was defined as needing prompting for over half of the steps of the task analysis but not all the steps. An “L” was recorded if the student required limited prompting throughout the task analysis. Limited prompting was defined as prompting for less than half of the task analysis. An “I” was recorded if the student was able to complete the task analysis independently. Independence was defined for students who required no prompting throughout the task analysis.

Type of independence has three categories and was recorded upon completion of each step of the task analysis. If the student hesitated for five seconds after being shown the step, the student will receive a verbal prompt which was recorded with a “V.” If the student was still not able to complete the step, the steps of the task analysis were gestured to him or her by pointing to the PCS symbols on the card. This was recorded with a “G” for gestural. The intervention specialist physically showed the student how to complete the step if the second step did not lead to success. This was recorded with a “P” for physical.

### *Data Collection*

Informed consent was obtained from the parents/guardians of all students involved in the study (See Appendix D). Baseline data were collected for three weeks and the intervention phase began immediately following the baseline period. Data were collected twice a week.

During the intervention phase, the intervention specialist showed the student each step of the task analysis on a laminated card. Upon completion of each step, the previous card was removed and the card with the next step was shown to the student. The number of steps that the student completed and the level and the type of independence were recorded. If the student was unable to complete a step, a verbal prompting or physical demonstration of the step was offered by the intervention specialist. The treatment integrity checklist was completed following each intervention session.

### *Data Analysis*

Visual inspection of time-series analysis data was used to summarize and analyze the results obtained from the intervention. The percentage of non-overlapping data points was calculated to provide additional information regarding the efficacy of the intervention. The percentage of independence for completing the individualized task was calculated.

## CHAPTER 4

### RESULTS

Each student was given an individualized task to complete. Baseline data were collected for three weeks during which time each student was asked to complete the individualized task without any aid. After the baseline period, each student began an intervention period for five weeks. During the intervention period, the students used the PCS Symbols based on the task analysis to complete the individualized task.

All students showed an increase in their level of independence for the task completion. Peter had a baseline mean rate of independent completion of 16.2% which increased to a mean rate for independent completion of 69.6% by the end of the intervention period. Rebecca's baseline mean of zero rose to an intervention mean rate of 82.4%. Sarah also had a baseline mean completion of zero and had an intervention mean of independent completion of the task of 76.6%. Henry's baseline mean completion of zero increased to an intervention mean of number 73.6%. John had a baseline mean completion of 1.8% which rose to 94.4% during the intervention period. Teresa had a baseline mean rate of independent completion of zero which increased to an intervention independent completion of the task of 86.9%. Kevin had a baseline mean rate of independent completion of 22.0% which increased to a mean rate for independent completion during the intervention period of 99.3%. Stephanie's baseline mean completion of 8.5% increased to an intervention mean of 100%. Figures 1 through 8 provide a graphic display of the baseline and intervention data.

Table 2. Student Means and Percentage of Nonoverlapping Data Points

Student	Baseline Mean	Intervention Mean	% Nonoverlapping Data Points
Peter	16.2	69.6	100.0
Rebecca	0.0	82.4	100.0
Sarah	0.0	67.0	85.7
Henry	0.0	73.6	100.0
John	1.8	94.4	100.0
Teresa	0.0	86.9	87.5
Kevin	22.0	99.3	100.0
Stephanie	8.5	100.0	100.0

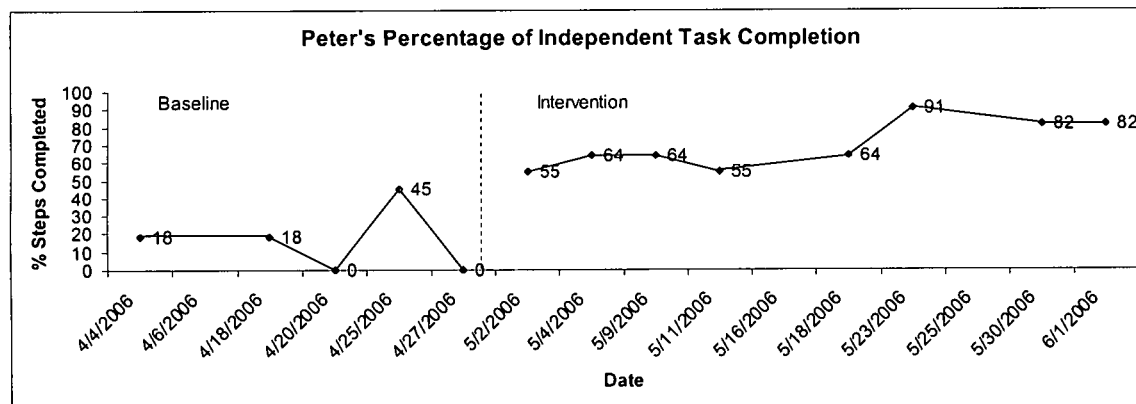


Figure 1. Percentage of independent task completion for Peter

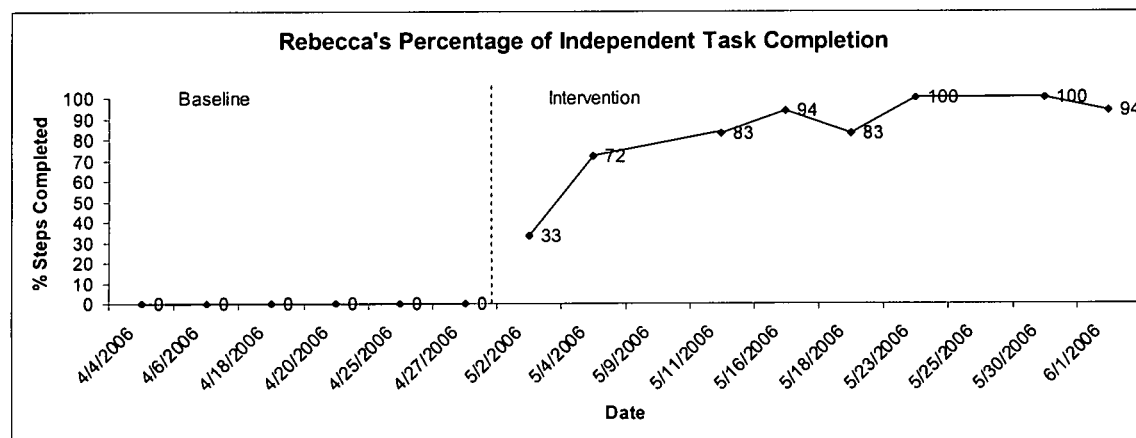


Figure 2. Percentage of independent task completion for Rebecca

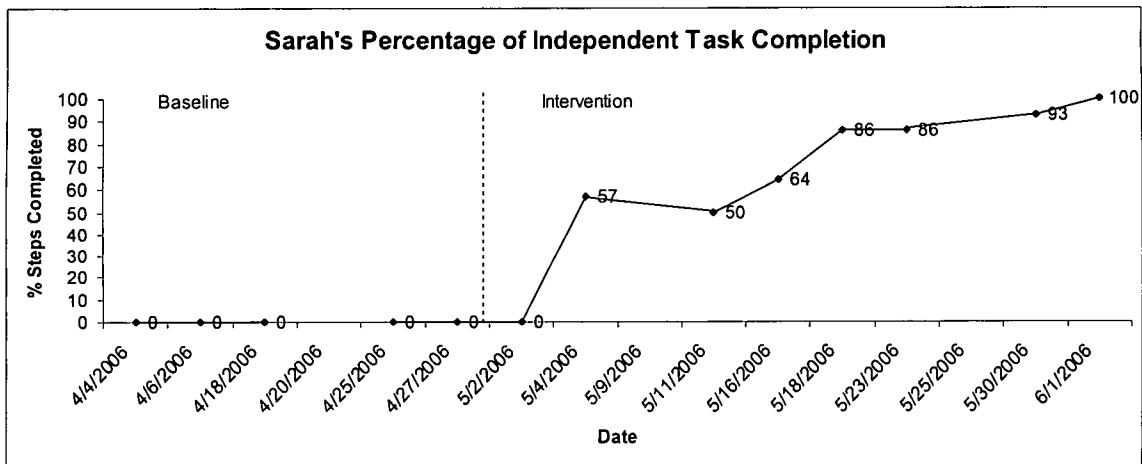


Figure 3. Percentage of independent task completion for Sarah

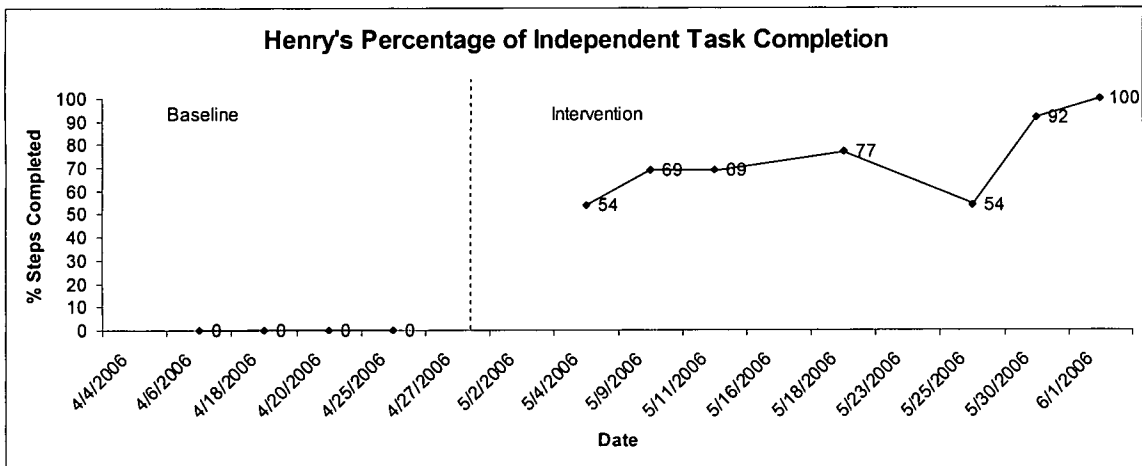


Figure 4. Percentage of independent task completion for Henry

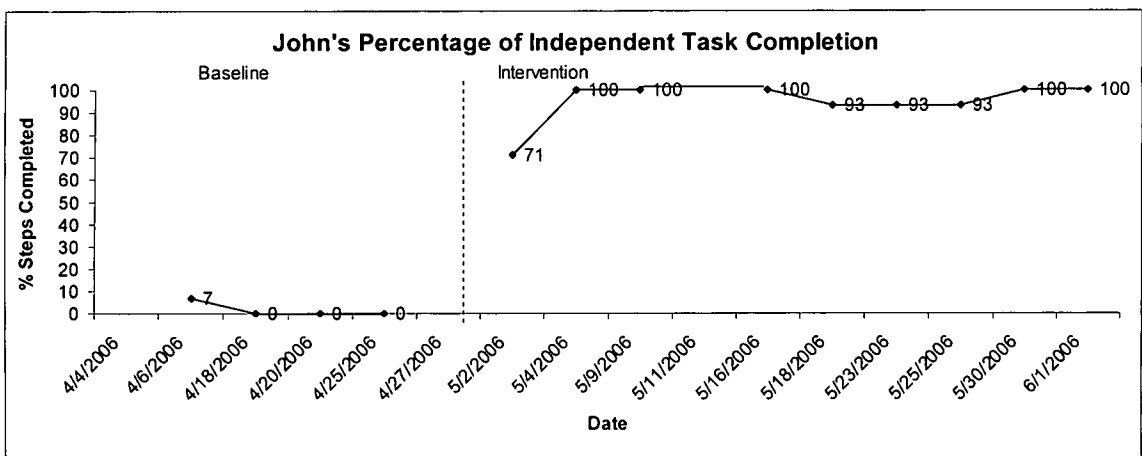


Figure 5. Percentage of independent task completion for John

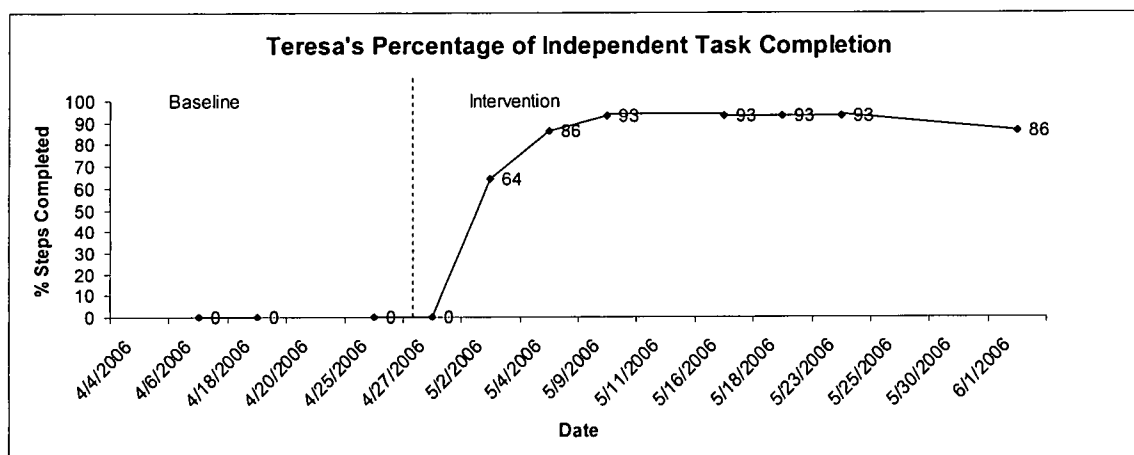


Figure 6. Percentage of independent task completion for Teresa

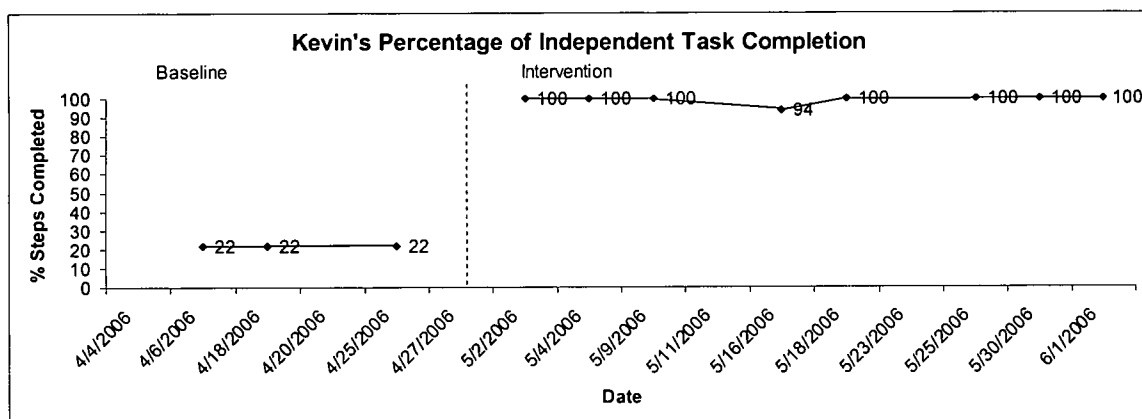


Figure 7. Percentage of independent task completion for Kevin

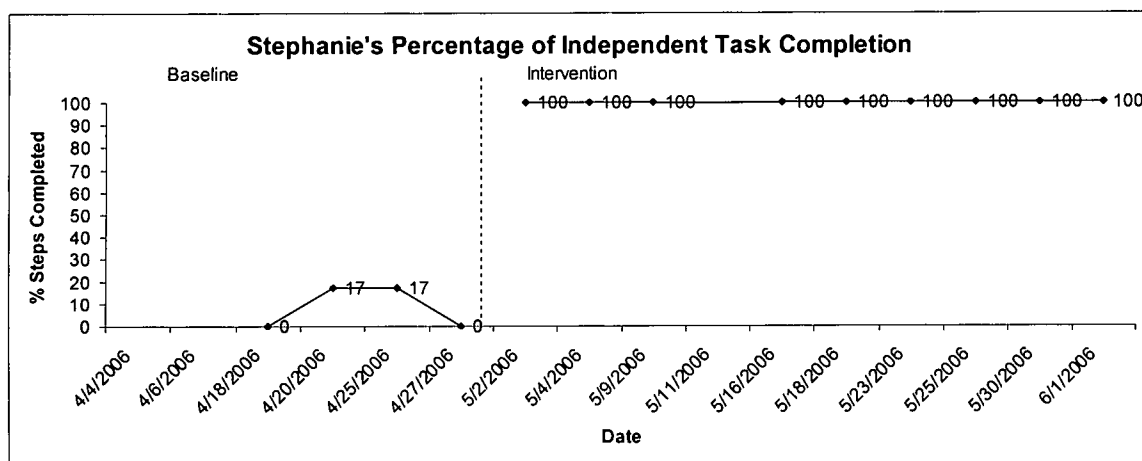


Figure 8. Percentage of independent task completion for Stephanie

The percentage of nonoverlapping data points was calculated for all participants. Six of the eight participants (Peter, Rebecca, Henry, John, Kevin, and Stephanie) had one hundred percent of nonoverlapping data points. The other two participants, Sarah and Teresa, had 85.71 percent and 87.5 percent nonoverlapping data points respectively.

The results of the study indicate that picture communication symbols paired with the steps of the task analysis increase the level of independent task completion for a student with cognitive impairments.

## CHAPTER 5

### DISCUSSION

The results of this study suggest the use of PCS symbols used to illustrate a task analysis was effective in increasing students' level of independence in the completion of basic tasks. Large intervention effects were obtained for all eight participants, as determined by a visual inspection of the time-series analysis data and percentage of nonoverlapping data points.

One possible limitation to the study is the implementation of the intervention phase to all participants at the same time although it was deemed to be acceptable because the students were in separate classrooms. Some learning might have taken place during the treatment phase that could have had an impact on the results. A multiple baseline design would have controlled for the impact of extraneous variables; the presence of which cannot be determined in this study.

Future research needs to be completed to further validate the findings and also to see if similar results can be found when the student is required to complete other tasks. Follow-up needs to be conducted to examine if the students are generalizing the task completion throughout the day and in different areas. Also, future research should formally assess teacher acceptability of the use of PCS symbols paired with a task analysis.

The use of PCS symbols in the current study supports their use as an appropriate and successful supplementary aid. Their use could lead to a greater level of independence for students with cognitive impairments in the home, community, and



school. At home and in the community, PCS symbols could be used with a task analysis to help increase independence with everyday tasks that a person needs throughout the day. In school, PCS symbols could be used with a task analysis for more school based tasks that are required of a student. Schedules, preparation for classes, as well as academic tasks could be broken down into a task analysis and paired with PCS symbols.

Research on the use of PECS has shown it to be a successful means of enhancing communication to obtain desired things. However, it has been used as more of a supplemental means of communication for students with language difficulties rather than a means for students to learn and enhance task completion. The use of PCS symbols paired with a task analysis has proven to be a successful learning tool that encourages independence on tasks at home, in the community, and at school. Supplementary aids, such as PCS symbols paired with a task analysis, enable a student to become less reliant on others and have the ability to succeed. The successful results of the study indicate that the use of PCS symbols paired with a task analysis needs to be utilized more often and expanded into more areas of a student's life in order to give as many opportunities for independent achievement as are possible.

## APPENDIX A TASK ANALYSES

### Washing Hands Task Analysis

1. Go to sink
2. Turn on water
3. Squeeze one pump of liquid soap
4. Put hands under water
5. Rub hands with soap
6. Put hands under water
7. Rinse hands
8. Turn off water
9. Get paper towel
10. Rub hands on paper towel
11. Throw towel away

### PM Checklist Task Analysis

1. Go to mailboxes
2. Pull out tray
3. Carry tray to table
4. Go get backpack
5. Carry backpack to table
6. Unzip backpack
7. Take papers out of tray
8. Put papers in backpack

9. Zip backpack
10. Carry tray to mailboxes
11. Put tray in
12. Return to table
13. Sit down on chair

#### Make a Peanut Butter and Jelly Sandwich Task Analysis

1. Take two slices of bread out
2. Put two slices of bread on plate
3. Open jar of peanut butter
4. Hold knife
5. Scoop peanut butter with knife
6. Spread peanut butter on bread slice
7. Put knife on table
8. Open jar of jelly
9. Hold spoon
10. Scoop jelly with spoon
11. Spread jelly on bread slice
12. Put spoon on table
13. Put two slices of bread together
14. Put sandwich on plate

#### Brushing Teeth Task Analysis

1. Hold toothbrush
2. Turn on water

3. Wet toothbrush
4. Turn off water
5. Hold toothpaste
6. Open toothpaste
7. Put toothpaste on toothbrush
8. Brush front teeth
9. Brush back teeth
10. Brush bottom teeth
11. Brush tongue
12. Rinse toothbrush
13. Put toothbrush on counter
14. Fill cup with water
15. Rinse mouth
16. Spit in sink
17. Put cup on counter

## APPENDIX B TREATMENT INTEGRITY CHECKLIST

### CHECKLIST FOR TASK ANALYSIS IMPLEMENTATION

#### Treatment Integrity Checklist For Implementation of Task Analysis Intervention

*This checklist may be used to determine whether the task analysis interventions are implemented correctly. Use the following notation to indicate whether each item was observed, not observed or not applicable.*

- 1 = Behavior was observed  
0 = Behavior was not observed  
NA = not applicable

#### **Classroom information**

Observer's Name \_\_\_\_\_ Date \_\_\_\_\_  
Teacher Observed \_\_\_\_\_ Time \_\_\_\_\_  
Student Number \_\_\_\_\_

#### **Classroom Set-Up**

\_\_\_\_ Student is observed in his/her instructional environment

#### **Student Materials**

\_\_\_\_ Student has access to necessary task materials (i.e. toothbrush)  
\_\_\_\_ Student provided visual task analysis for each step of the task

#### **Task Completion**

\_\_\_\_ Staff person initiates contact with target student only  
\_\_\_\_ Staff person says, "Its time to (state name of task.)"  
\_\_\_\_ Staff person points to name of task on picture chart  
\_\_\_\_ Staff person says, "Start here.", while pointing to picture step one.  
\_\_\_\_ If student does not understand what to do or hesitates longer than 5 seconds, the staff person says, "Can you figure it out?" If the student figures it out independently, the staff person says, "Good. What's next?" OR if the student continues to struggle: "That step is \_\_\_\_\_. What's next?"

#### **Classroom Management**

\_\_\_\_ Teacher prompts students to begin task

- ☐ Student appears to be on task
- ☐ Teacher monitors student while performing the task

## APPENDIX C TASK ANALYSIS DATA CHART

Student Initials: \_\_\_\_\_

Date of Performance: \_\_\_\_\_

Task (Circle One): **PM Checklist** **Hand Washing** **Brushing Teeth** **Making Sandwich**

<u>Step</u>	Did the student complete the step independently? Check one.		Prompting Type	Other
	YES	NO		
01				
02				
03				
04				
05				
06				
07				
08				
09				
10				
11				
12				
13				
14				
15				
16				
17				
18				

## APPENDIX D INFORMED CONSENT FORM

Dear Parent:

Your child is being asked to participate in a research study to fulfill requirements of a graduate degree program at the University of Dayton. The study includes being asked to complete a common task that is used in your child's classroom everyday. The goal is for your child to be able to carry out the task more independently by using pictures which represent the step-by-step process for completing the task.

Participation is strictly voluntary and may be discontinued at anytime with no penalty to your child. Volunteer child name and all other identifiable information will be kept strictly confidential. There are no potential risks involved in the study.

To give your consent for your child's participation in the research study, complete the information below.

Volunteer Child Name:

---

Name

Date

Parent Signature:

---

Name

Date

Should you have any questions you may contact:

Heather House  
Graduate Student  
University of Dayton  
937-416-2900

Dr. Sawyer Hunley  
Professor  
University of Dayton  
937-229-3624

Mr. Nieberding  
RI Contract & Grants  
University of Dayton  
937-229-2113



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