Teaching Laundry Skills to Individuals with Developmental Disabilities Using Video Prompting

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Video prompting is a training procedure used to teach a complex behavior by showing steps of a task analysis on video. The present study evaluated how many steps in the video model were required for the learner to acquire a 10 step laundry task. Participants were three individuals with mental retardation. Participants viewed the entire task on video and then progressively shorter segments until they performed all task steps. The results, evaluated in a multiple baseline across subjects design, showed that one individual learned the task with 2 video segments and another with 3 segments. The final participant needed a least to most prompting procedure to learn the skills.

Key words: video prompting, video modeling, task analysis, laundry skills

Introduction

To live as independently as possible, individuals with disabilities need to learn functional skills. For example, living in an apartment may require the person to learn how to prepare meals, wash clothes, and maintain his or her hygiene. To be employed, the individual must learn skills such as answering the phone, washing dishes, bagging items, or mopping the floor. A variety of training procedures has been evaluated for teaching skills to individuals with disabilities. One procedure that has been proven effective through several studies is video modeling (Charlop-Christy & Daneshvar, 2005; Charlop & Milstein, 1989; D’Ateno, Mangiapanello, & Taylor, 2003; Haring, Kennedy, Adams, & Pitts-Conway, 1987; Hine and Wolery, 2006; MacDonald, Clark, Garrigan, & Vangala, 2005; Nikopoulos & Keenan, 2003; Nikopoulos & Keenan, 2004; Reagan, Higbee, & Endcott, 2006; Rehfeldt, Dahman, Young, Cherry, & Davis 2006; Taylor, Levin, & Jasper, 1999). This procedure involves an individual viewing the target skill in segments or in its entirety on video and then performing the skill in a similar setting immediately following the video. Sometimes other techniques are embedded into the procedure such as various prompting hierarchies, feedback, time delay, and/or reinforcement (Ayres & Langone, 2005; Bellini & Akullian, 2007; Delano, 2007).

A number of studies have shown that video modeling techniques are an effective strategy for teaching skills such as perspective taking (Charlop-Christy & Daneshvar, 2005), purchasing skills (Nikopoulos & Keenan, 2003; Nikopoulos & Keenan, 2004), play skills (D’Ateno et al., 2003; MacDonald et al., 2005; Reagan et al., 2006; Taylor et al., 1999), cooking skills (Rehfeldt et al., 2003), self-help skills (Norman, Collins, & Schuster, 2001; Shipley-Benamou, Lutzker, & Taubman, 2002), and social skills (Charlop & Milstein, 1989) to individuals with developmental disabilities. Rehfeldt et al. (2003) demonstrated this procedure for teaching meal preparation skills to 3 adults with moderate to severe mental retardation. The participants watched a 2 ½ min video and then were cued to perform the task. Praise was delivered for correct responding after each step completed. Findings showed that the video modeling technique was effective for teaching preparation of a simple meal.

For some individuals watching the entire skill being performed at once does not lead to skill acquisition. These individuals may require the task to be broken down into steps that are more manageable. When a video model of a complex task is broken down into smaller units and each unit is viewed individually as a cue for the behavior, the process is called video prompting. Sigafoos et al. (2005) demonstrated this strategy when teaching microwave skills to three adults with moderate mental retardation. A 10-step task analysis was created for preparing popcorn in a microwave oven. The participants were then instructed to view one step of the task analysis at a time and complete the step immediately after watching the segment. No reinforcement was delivered for correct responding. Results showed that video prompting was an effective strategy for teaching microwave skills to 2 of the 3 individuals with moderate mental retardation, with maintenance of the skill at the 10-week follow-up. Similarly, Graves, Collins, and Shuster, (2005) demonstrated the effectiveness of video prompting with a constant time delay procedure for teaching
meal preparation skills to individuals with disabilities.

In a subsequent study Sigafoos et al., (2007) demonstrated that video segments could be chunked together after skill acquisition with video prompting. After the 3 men with autism and mild to moderate mental retardation learned a 10 step dishwashing task with video prompting, the authors faded the procedure by combining the videos into 3-step segments, 5 step segments, and then one whole 10 step segment. The levels of correct responding remained at 80% to 100% throughout the video chunking procedure suggesting that the fading procedure was effective strategy to decrease prompt dependency.

There are several advantages to using video modeling or video prompting over other procedures when teaching skills to individuals with developmental disabilities. First, identical presentations of the skill will be guaranteed in each trial or session. If staff were required to physically model the behavior, the model may not be performed in the same way every time. Different staff may perform the task or different materials may be used. Second, depending on the individual, one perspective of viewing the demonstration of the skill may be more effective then the other. For example, the individual may prefer to watch only the hands of another individual, or the individual may benefit by watching a peer perform the skill instead of the staff or trainer. With video the person has already been taped to perform the skill each time. Also with video, one is able to zoom into the task at hand which may help prevent distractions. Third, using video modeling may also be cost-effective. Fewer staff are required to model the target behavior. This is especially true when the target behavior is social interaction with other peers or staff.

Although video modeling (viewing all steps in task analysis) and video prompting (viewing a single step at a time) have both been shown to be effective for teaching functional skills to individuals with disabilities, no research has identified the optimal method for teaching skills to particular individuals. The use of video modeling is most efficient because the whole task is prompted in each trial while video prompting is least efficient because each individual task step is prompted one at a time. For increasing the efficiency of training, it is important to identify which level of prompting or chunking is necessary for skill acquisition with individuals being trained. The purpose of the present study was to expand on the Sigafoos et al. (2005; 2007) studies and determine what levels of video chunking are required to teach individuals with developmental disabilities functional skills in a group home setting.

Method

Participants and Settings

The participants were three adults, between the ages of 17 and 29. Four other participants started the study but their participation was terminated when they completed the laundry task without assistance during baseline. The participants were chosen using the following criteria: they had a support plan goal to increase skills of daily living; could attend to a video independently; were 17 years of age or older; had a developmental disability; were ambulatory; and had adequate motor coordination with their hands to accomplish all steps independently. Training and assessments were conducted in the laundry room in the group home where the individuals lived. Sessions lasted up to 15 minutes and no more than 2 sessions were conducted daily.

Brian was a 29-year-old man diagnosed with autism and mental retardation. He also had a history of hearing impairment. Interviews from staff showed that Brian could read and use some ASL signs. Medications he was taking at the time of the study were Paroxetine for depression, Depakote for mood stabilizer, Desmopressin for enuresis, Benzotropine for tremors, and Trazadone for sleep disturbance. His support plan goal stated that Brian would like to be more independent in his home skills. During the day he attended an Adult Day Training program for six hours, five days a week. One functional skill that Brian was observed completing in the home was preparing coffee in a coffee machine.

Davey was a 17-year-old boy diagnosed with Attention Deficit Hyperactivity Disorder. He could use 1 to 2 word phrases to communicate. He had a history of Gastroesophageal Reflux Disease. Prescribed medications include Risperdal for problem behavior, Adderall for ADHD, Amphetamine salts for ADHD, Chlordiazepoxide for problem behavior, and Ranitidine for food allergy.
Davey's support plan stated that he would like to do more things for himself. He attended an exceptional center during the day. Functional skills that Davey was observed completing while in the home included wiping the table, mopping and sweeping the floor, and making his bed.

Sarah was a 25-year-old women diagnosed with autism, mental retardation, hypothyroidism, anemia, and behavior disorder. She used some ASL signs and a Dynavox to communicate. A Dynavox is a computer device with pictures. When a person touches a picture on the screen an audible voice says what the picture represents. This device helps those who are nonverbal or difficult to understand communicate their wants and needs. At the time of the study, Sarah was taking Nexium for elevated H. Pylori, Synthroid for hypothyroidism, Zelnorm to relieve constipation, Valporic acid for a mood stabilizer, Depo-Provera for hormone balance, Risperdal for an anti-psychotic, and Lexapro for anxiety. Her support plan goal stated she would like to increase her self-care skills, learn job skills, and have a meaningful day activity. Sarah attended an Adult Day Training Program five day a weeks, six hours each day. Functional skills that Sarah was observed doing while in the group home were toileting and washing her hands.

**Materials**

Materials used were a video camera to create the videos and to tape the sessions. A laptop was used for the participants to view the video of the target skill on a DVD. The video included the entire task analysis, and then the task analysis divided into halves, thirds, quarters, and so on until each step was shown individually. The video displayed the skill from the perspective of the participant. In other words, only the hands of the model were seen when most of the steps of the skill was performed on the video. Other materials included laundry supplies such as the washing machine, detergent, fabric softener, and the clothes the participant was to wash.

**Target Behaviors and Data Collection**

Laundry skills were the target behaviors investigated in this study. The steps completed correctly in the task analysis were the dependent measure. See Table 1 for the task analysis of the laundry skills. Data were collected on each step in the task analysis using the multiple opportunity method in which the participant was presented with the SD for each step in the sequence regardless of whether the previous step was completed correctly. If the step was not completed or completed incorrectly by the participant, the trainer completed the step so that the next SD was present. The participant was distracted so he or she did not see the trainer perform the step. In each phase, for a step to be counted as correct, it must be started within 5 seconds of the trainer delivering the cue to start the task. Data were collected at least 3 times per week. The time was decided because the participants typically had their clothes washed every two to three days weekly. First and second year students from the Applied Behavior Analysis Master’s Program were chosen as research assistants. They assisted as trainer and data collector across sessions.

An assessment session began with the trainer directing the participant into the laundry room. A basket of clothes was present on the floor in front of the washing machine. The trainer then delivered the cue, "(Name), wash the clothes." The participant had the opportunity to perform each step correctly. For example, the first step was to open the door of the washer. If the step was completed correctly the trainer waited for the following step to be performed. After every third, sixth, and tenth step performed, the trainer stated "(Name), thanks for participating." If the step was performed incorrectly the trainer distracted the participant and completed the step which provided the SD for the next step to be performed. To get the participant's attention back to the washer, the trainer prompted the participant by saying,
“(Name), finish washing the clothes,” giving the participant the opportunity to perform the remaining steps in the task analysis. This way participant had the opportunity to perform all steps in the task analysis.

**Interobserver Agreement**

Videotaping of the assessment sessions occurred for all sessions. An independent observer viewed the videos for interobserver agreement. Agreements divided by agreements plus disagreement on the ten steps of the task analysis determined the percentage of agreements for the target behavior. Mean overall agreement across participants was 97%. Brian’s mean agreement score was 98% (range, 90% to 100%). Davey’s mean agreement score was 95%, (range, 80% to 100%) and Sarah’s mean agreement score was 97% (range, 90% to 100%).

**Experimental Design and Procedure**

A multiple baseline design was used to evaluate the video prompting procedure. After the participants or their guardians signed the consent forms, the participant was involved in baseline assessments of the laundry skills. Following baseline, the participants participated in the video prompting training phases. Follow-up sessions were completed 2 weeks after the training sessions.

Baseline. The trainer instructed each participant to complete the task analysis of the skill and assessed the skill using the multiple opportunity method. At minimum the trainer conducted three sessions before beginning training. Because Brian was hearing impaired, a piece of paper which stated, ‘Brian wash the clothes’, was presented as a cue to start performing the skill, and a piece of paper was presented after every third, sixth, and tenth step which stated, ‘Brian, thanks for participating.’

Intervention 1. The trainer instructed the participant to stand by the washing machine with a basket of clothes on the floor. The trainer then delivered the cue either verbally or on a piece of paper which stated “(Name), watch the video”. The video, no longer than 20 seconds, was viewed on a laptop. The video displayed the entire task analysis of the skill. At the end of the video segment, the cue, “(Name), wash the clothes,” was delivered. The participant then had the opportunity to perform the skill as described above. After every third, sixth, and tenth step, the trainer stated, “(Name), thanks for participating” which was generally contingent on participating but not on any particular step completed in order to rule out positive reinforcement as a variable which may also have led to skill acquisition. Praise was also written on paper for Brian. If their was not an increasing trend in performance or if the participant did not perform all steps in the task for two consecutive sessions (the training criterion) the participant advanced to the next intervention.

Intervention 2. This phase was performed only if the participant did not meet criterion in the first phase. All procedures were the same except the steps were divided into two 5-step segments. The participant viewed the task of only the first five steps on video. The cue was delivered and then the individual had the opportunity to complete the task. Then the following 5 steps were shown on video and the participant had the opportunity to complete the task.

Intervention 3. This phase was implemented only if the participant did not meet criterion in intervention 2. All procedures were the same except the steps were divided into three 3 and 4 step segments. The first 4 steps were shown and then the following segments had 3 steps.

Intervention 4. This phase was implemented only if the participant did not meet criterion in Intervention 3. All procedures were identical except the segments were divided into five 2 step segments.

Intervention 5. This phase was implemented if the individual did not meet criterion in Intervention 4. All procedures were identical except each of the 10 steps was viewed individually.

Intervention 6. For Brian only, an additional intervention was added which was identical to Intervention 5 with the addition of the written cue on the video. Each step on video showed the trainer showing the card with the written cue to the participant.

Intervention 7 - Least-to-most prompting procedure. Because Brian did not perform to criterion using the video prompting procedure, a procedure was added so that he could benefit from
At the start of each session a piece of paper was held up which stated, “Brian, wash the clothes”. If no responding occurred or incorrect responding occurred, the trainer pointed to the next step. If still no responding occurred, a light touch prompt was delivered. The trainer tapped Brian’s hand and then pointed to the next step to be performed. If still no response, the trainer used physical assistance (hand over hand assistance). The trainer took Brian’s hand and physically performed the step with him. For example, if the dial needed to be turned, the trainer put her hand over Brian’s hand and turned the dial to the designated spot. Praise which stated, “Brian, thanks for participating” was delivered after all steps were completed to not interrupt the chain of steps.

Follow-up. Two weeks following the training sessions, follow-up occurred in the group home where the individual lived which was the same as the baseline and training setting. Assessments were identical to baseline.

Results
The results of this study showed that 2 of the 3 participants learned how to wash clothes in a washing machine with the use of the video prompting procedure alone. Sarah acquired the skill by watching 5 steps at a time (Intervention 2). Davey acquired the skill by Intervention 3, watching 3 and 4 steps at a time. Brian required video prompting plus least-to-most prompting to complete the steps independently. Figure 1 shows the results.
Davey scored 40% or lower in baseline. The first intervention, watching the entire video, increased responding at first, but then responding dropped over three assessments to 20%. At Intervention 2, his performance increased to 100% but then leveled off to 80%. When Intervention 3 was introduced, criterion was met in 4 sessions. At the two week follow-up, Davey scored 80%.

Sarah also completed 40% or less of the steps in baseline. At Intervention 1, responding increased but eventually dropped to 20%. At Intervention 2, responding again increased immediately, and criterion was met at the sixth session in the Intervention. At the two week follow-up, Sarah scored 100%.

Brian did not respond during baseline or during any of the Interventions involving the video prompting procedure. Least-to-most prompting was added and responding increased to 80%.

To evaluate treatment integrity, all training sessions were videotaped and the researcher recorded the percentage of training behaviors completed correctly by the trainer. The following training behaviors were recorded: the trainer had the participant standing beside the washing machine before the video was viewed; the trainer delivered the cue before the segment of the step or steps was viewed by video; the trainer again cued for the participant to perform the step or steps that he or she had previously viewed; the trainer gave the participant 5 seconds to start performing the skill; the trainer praised the participant for correct responding; and the trainer completed the step as unobtrusively as possible if required. Scoring took place for each segment viewed on video. The mean score for treatment integrity during each participant’s sessions were as follows: 99.9% for Brian; 98% for Davey; and 99% for Sarah. Interobserver agreement was also collected which resulted in a mean of 100% for Brian, 98% (range, 95% to 100%) for Davey, and 99% (95% to 100%) for Sarah.

Discussion
Overall, the results of the study showed that different levels of video chunking were needed for different individuals. Davey required the steps to be broken down into 3 and 4 step segments before he could perform the skill 100% of the time for 2 consecutive sessions. Sarah only needed the steps to be broken down into 5-step segments. Brian needed the least-to-most prompting to start performing the skills.

The findings expand on the Sigafoos et al. (2007) study by showing that each person does not need to view each step individually to perform the skill to criterion. Some may be able to view the whole video. Others may be able to perform the skills with seeing 5 steps at a time, and others may need the steps to be broken down even further. Unfortunately, it is not possible to know in advance which level of chunking will be needed with a particular individual. In this study, the most efficient method was tried first (whole video) followed by increasingly less efficient strategies (halves of the video, then thirds, and so forth). In this way, it could be determined which level was necessary for the particular individuals involved in the study. This approach is one way to determine the most efficient level of video chunking necessary for an individual to benefit from video modeling of complex skills.

Criterion was not met in follow-up for Davey for a couple reasons. First, the steps missed were putting the detergent into the washer and putting the cap on the detergent. Because Davey attempted to put more than one capful of detergent into the washer, the step of putting the detergent into the washer was scored as incorrect. After distracting and presenting the SD for the next step, Davey continued to put more detergent into the cap. Only after distracting again and presenting the SD, which was the cap on the detergent, did Davey then continue with the following steps independently. The possible reason for the incorrect response may have been that the SD for putting detergent in the washer and putting the cap on the detergent were exactly the same. This may have led to some confusion. Also Davey did have a history of repetitive behaviors, and pouring more than one capful of detergent may have been an instance of repetitive behavior.

The present study used a laptop to display the steps of the skill. The use of a laptop to show the video may have been an advantage or a disadvantage, depending on the individual involved. It may have been an advantage because the participant was standing in front of the washer when the video was viewed. At times the
participants looked at the materials viewed in the video and then looked at the same materials in the environment. For example, when Sarah saw the detergent being taken down from the shelf in the video, she then looked up at the detergent on the shelf in the laundry room. Sarah also may have responded better to the laptop because she has used a Dynavox communication device in the past. At times she touched materials on the screen of the laptop as she would touch the screen of her Dynavox. A disadvantage of using a laptop may have been that a participant had not viewed a video on laptop in the past and thus it may not have had stimulus control over the individual’s behavior. Although one criterion for inclusion into the study was that the participants could attend to a video, it was not determined in advance whether they could attend to a video presented via laptop. Davey had been observed playing video games on a computer and watching movies on TV but not on a laptop. Brian was observed only watching shows on the TV.

There were several limitations to the study. One was dealing effectively with Brian’s hearing impairment. Because Brian was hearing impaired, another strategy besides a vocal delivery of the cue was needed to deliver the cue to begin washing clothes or to watch the video. Staff and managers stated that Brian could read. Therefore, the trainer used a card with the cue in writing. Although Brian used American Sign language (ASL) signs to spell the letters on the card, he did not perform any of the steps in the washing task after being cued with the card. Even when using the least-to-most prompting strategy, responding did not occur until the trainer used a gestural prompt for the first step, suggesting that the verbal prompt (delivered in writing) did not exert stimulus control over his behavior. It is possible that Brian could not read the words on the cue card. Using ASL signs to deliver the cue may have been more effective in getting the correct response.

Using the multiple opportunity method assessment of the behaviors in the washing clothes task gave the participant an opportunity to perform each step even if the previous step was performed incorrectly or not at all. It is also possible that this method inadvertently assisted in teaching laundry skills because the learner saw the outcome of every step as the SD for the following step. For example, when the participant did not open the cap of the detergent, the data collector distracted the participant and the trainer then took the detergent off the shelf, opened the cap and set the detergent on the edge of the washer. When the participant was cued to finish washing the clothes, the presence of the open bottle of detergent sitting on the washer may have signaled the next step. The presence of the open detergent over repeated sessions may have been enough to signal to the participant that something should be done with the detergent. Alternatively seeing the open bottle of detergent may have made the participant more likely to open the lid to the detergent in the next assessment.

There are a number of areas for future research. One idea is to show the entire skill on video over a large number of sessions to determine if the repetition of watching the video leads to skill acquisition. When Sarah and Davey viewed the first chunk of skills in the video segment, the following segments were sometimes not needed because they performed the following steps independently without needing to watch the remainder of the steps on video. It would also be interesting to determine whether only the steps that were missed previously needed to be shown to acquire the skill. Another area for future research would be to add a preferred video segment for the participants to watch before viewing the skill. Watching a preferred video may have gotten the participant to view the video more closely, with the possibility that acquisition of the skill would occur quicker. Another area for future research would be to conduct a comparison of the efficiency of video modeling or video prompting to the use of most to least or least to most prompting strategies. It may be that the use of video is no more efficient than more standard prompting strategies. Future research should try to answer this question. In this study, follow-up was conducted 2 weeks after training. Sarah maintained the skill at 100%, but Davey decreased to 80%. Future research should look at measuring maintenance over longer periods of time to determine if the video prompting procedure was sufficient to teach a functional skill which maintains over months.

In conclusion, this study extends previous research evaluating video prompting to teach a functional skill to individuals with developmental disabilities. Some individuals may learn skills using video
prompting better than others. All individuals may not need to view each step individually to acquire the skill. Overall, it is important to assess each person individually to determine what procedure will be most effective and efficient for that person. This procedure should be considered if the person can attend to and imitate the actions in a video. Furthermore, it should be considered when the focus is on skill acquisition rather than compliance training as video prompting or modeling does not seem particularly useful as an intervention for individuals who refuse to complete a task.

References


