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Evaluation of a Video Prompting and Fading Procedure for Teaching Dish Washing Skills to Adults with Developmental Disabilities

Jeff Sigafoos,[1,6] Mark O'Reilly,[2] Helen Cannella,[3] Chaturi Edrisinha,[2] Berenice de la Cruz,[2] Megha Upadhyaya,[2] Giulio E. Lancioni,[4] Anna Hundley,[5] Alonzo Andrews,[5] Carolyn Garver,[5] and David Young[5]

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We evaluated a video prompting and fading procedure for teaching three adults with developmental disabilities to wash dishes. Video prompting involved showing video clips depicting each step of the task. All three adults reached 90–100% correct when video prompting was implemented. Following acquisition, video prompting was withdrawn, but performance deteriorated. Subsequently, a 3-step fading procedure was implemented in which the separate video clips were merged to form larger, multi-step segments of video. Performance reached 80–100% correct as the video prompts were re-applied and then faded. Performance decreased at the 3-month follow-up when prompting was removed, but stabilized at 80–90% correct when the third step in the fading sequence was reinstated. These data suggest a promising approach for fading video prompts.

KEY WORDS: video prompting; prompt fading; daily living skills; adults; developmental disabilities.

Deficits in various domains of adaptive behavior functioning, such as the daily living skills domain, are characteristic of individuals with developmental disabilities (Jacobson & Ackerman, 1990; Kraijer, 2000). When adults with

[1]The University of Tasmania.
[2]The University of Texas at Austin.
[3]The Ohio State University.
[4]University of Bari, Italy.
[5]Autism Treatment Center of Texas, Dallas and San Antonio, TX.
[6]Correspondence should be directed to Jeff Sigafoos, School of Education, University of Tasmania, Private Bag 66, Hobart, Tasmania 7001, Australia; e-mail: Jeff.Sigafoos@utas.edu.au.

developmental disabilities present with substantial deficits in daily living skills, they may not be able to complete household chores, such as washing dishes or cleaning up after lunch. Deficits in these areas could increase health risks through exposure to unsanitary conditions. Failure to teach daily living skills is also counter-habilitative as this may limit the person's autonomy, independence, and behavioral development and negatively impact life satisfaction (Hayden, 1997). In terms of life satisfaction, Skinner (1986) argued that participation in the chores of daily living brings the person into contact with potentially reinforcing consequences associated with task completion. When adults with developmental disabilities lack daily living skills, they are disconnected from this potential source of reinforcement. Lack of daily living skills also makes the person more dependent on others and increases the overall burden of care for staff (Haveman, van Berkum, Rejinders, & Heller, 1997). For these reasons, acquisition of daily living skills has long been a priority for individuals with developmental disabilities (Belfiore & Mace, 1994).

Video modeling has been used with some success in teaching a range of adaptive behaviors to individuals with developmental disabilities, including communication (Charlop & Milstein, 1989; Wert & Neisworth, 2003), perspective taking (Charlop-Christy & Daneshvar, 2003), play (D'Ateno, Mangiapanello, & Taylor, 2003), and self-care skills (Murray & Epstein, 1981). Video modeling typically involves making a videotape of someone performing the target behavior or completing the designated task. The individual watches the entire video from beginning to end and is then given the opportunity to perform the behavior or complete the task in its entirety.

With respect to daily living skills, Rehfeldt, Dahman, Young, Cherry, and Davis (2003) evaluated a video modeling procedure for teaching meal preparation to three adults with moderate to severe mental retardation. Their video, which lasted 2.5 min, showed an adult making a sandwich following a 17-step task analysis. The three participants were verbally prompted to watch the entire video. After watching the video, the participants were given the opportunity to make a sandwich. Implementation of this video modeling procedure was associated with an increase in the percentage of steps completed correctly and eventual attainment of 100% correct for all three participants. Following acquisition, all three participants maintained high levels of performance, even though they did not watch the video prior to the 1-month follow-up session. These data suggest that once the skill had been acquired, the skill maintained for 1-month in the absence of video modeling.

For individuals who may have difficulty attending to a lengthy video, it may be helpful to break the video into smaller clips, with each clip showing only a portion of the task. This variation is known as video prompting (Le Grice & Blampied, 1994). With video prompting, a participant might be shown one step of the task and then given an opportunity to complete that step before the next step is shown.

In one relevant study, Sigafoos et al. (2005) evaluated the use of a video prompting procedure for teaching three adults with developmental disabilities to make microwave popcorn. The video prompting procedure used by Sigafoos and colleagues involved showing a video clip of only one step of the popcorn making task and then giving participants the opportunity to complete that step of the task. After this, a video clip showing the next step of the task was presented and so forth until all 10 steps had been prompted. With this procedure, two of the three adults acquired the skills necessary to make microwave popcorn. The third participant did not acquire the task even with continued video prompting, although this appeared to be a reinforcement problem because he began to refuse all offers of popcorn over time. The two individuals who reached acquisition continued to perform 80–100% of the steps correctly even when video prompting was withdrawn and at the 10-week follow-up.

Interestingly, Sigafoos et al. (2005) demonstrated that video prompting could be withdrawn following acquisition with no apparent detriment to performance. This finding is consistent with that reported by Shipley-Benamou, Lutzker, and Taubman (2002) in a study involving three children with autism. These researchers also showed that the instructional videos used to teach daily living skills could be abruptly removed with no detriment in performance.

It is important to work towards eliminating the need for continued prompting so as to promote greater independence and prevent prompt dependency (Lovaas, 2003). While two studies (Shipley-Benamou et al., 2002; Sigafoos et al., 2005) suggest that video prompting and video modeling did not lead to prompt dependency, it is possible that this could be a problem in other cases. That is, for some participants, attempts to abruptly withdraw instructional video could be associated with a decrease in performance. This phenomenon is well documented in behavioral training programs for individuals with developmental disabilities that have used other types of instructional prompts, such as verbal instructions, gestures or pointing, and physical guidance (Green, 2001). Consequently, when prompts cannot be eliminated abruptly, it is generally recommended that they be faded gradually (Duker, Didden, & Sigafoos, 2004; Skinner, 1968).

Various techniques have been developed for fading the verbal, gesture, and physical prompts that are typically used in teaching individuals with developmental disabilities. Some of the more common fading procedures include least-to-most and most-to-least prompt hierarchies, time delay, and graduated guidance (see Duker et al., 2004 for a review). To date, there appears to be no research evaluating procedures for fading the use of video prompts and it is difficult to envisage how common prompt-fading strategies could be used to gradually withdraw video prompting. The present study was therefore designed to evaluate a novel procedure for fading video prompts.

The present study began as a systematic replication of Sigafoos et al. (2005) and was originally designed to extend the literature on video prompting by evaluating its effectiveness for teaching a different task (washing dishes) to three new

participants. However, following the initial intervention phase, abrupt removal of video prompting was associated with deterioration in performance for all three participants. In response to this problem, we designed and implemented a novel procedure for fading video prompting. The fading procedure involved gradually adding more steps to each video clip until all 10 steps of the task had been merged into a single video clip. After this, we removed video prompting completely. We hypothesized that this "chunking" procedure might be an effective strategy for maintaining performance without the need for step-by-step prompting, because it involved the gradual merging of each separate video clip into larger and more integrated task-analytic units (Haring & Kennedy, 1988). This hypothesis was extrapolated from theoretical work suggesting that the integration of separate responses into larger units may help to create more durable behavioral chains (Thompson & Lubinski, 1986), which we thought might, in turn, facilitate maintenance once correct performance of the task sequence had been acquired.

METHOD

Participants

Three adult men with developmental disabilities participated in this study. All three lived in community-based group homes and attended the same vocational training program during the day. Participants' domestic living skills were assessed using the Vineland Adaptive Behavior Scales—Interview Edition (Sparrow, Balla, & Cicchetti, 1984). Results indicated that all three participants had substantial deficits in adaptive behavior functioning, although they were able to feed themselves using a spoon, drink out of a cup, and had the motor skills necessary to wash dishes. With respect to dish washing, which was the target task in the present study, staff reported that they did not currently perform this skill correctly or independently. These three men were selected for this study because of their substantial deficits in domestic living skills and, more specifically because they were not independent with respect to washing dishes. A review of past habilitative records provided no evidence that these adults had ever received any systematic training to teach dish washing skills, although development of domestic living skills was listed as an instructional priority in their individualized service plans. In addition, the men were considered promising candidates for video prompting because their vision and acuity were within the normal range. Table 1 provides demographic information for each participant.

Setting

The study was conducted in the kitchen of the vocational training center. The kitchen was equipped with a refrigerator, coffee maker, sink, countertop,

Table 1. Demographic Information for Each Participant, Including Diagnoses, IQ, and Vineland Age Equivalency Scores (years:months) for the Social, Communication, and Daily Living Skills Domains

Name	Age	Diagnoses	IQ	Social	Commun.	Daily living
Ray	33	autism, moderate mental retardation	45	0:1	1:2	4:2
John	27	autism, mild mental retardation	69	2:1	1:11	2:11
Curt	28	autism, moderate mental retardation	46	4:11	3:10	8:9

microwave oven, storage cabinets, and a rubbish bin. Sessions were conducted during mid-morning break-times that lasted about 10 min. At these break-times, participants were given coffee and a cookie, both of which appeared to be highly preferred as evidenced by the fact that they readily consumed and never refused the items.

Task and Materials

We decided to teach these individuals to wash the dishes they had used for their snack (i.e., a cup, plate, and spoon). Washing dishes was selected as the target activity because it was a necessary task related to their break-time routine. During break-time, the participants used a standard set of utensils (i.e., plate, cup, and spoon) for their snack. Intervention therefore focused on teaching the participants to wash, dry, and store these items. In addition to these utensils, a sponge, plastic bottle of dish soap, and a towel were placed to the side of the kitchen sink prior to each session. A task analysis for washing dishes was selected from the Murdock Center Program Library (Wheeler et al., 1997). This task analysis was adapted to make it consistent with the materials available in the kitchen. Table 2 shows the task analysis used in this study.

Each step of the task analysis was initially filmed as an individual video clip using a digital camera (Sony DSC-F828 Cyber-shot). Steps 7 and 8 were combined into a single video clip. The clips were filmed from the performer's perspective. That is, when participants viewed a video clip, they saw it from the perspective

Table 2. Task Analysis for Washing Dishes

Steps in the Task Analysis
1. Plug the drain.
2. Turn on the faucet.
3. Squirt soap into the sink.
4. When the sink is about 1/4 full, turn off the faucet.
5. Place the plate, cup, and spoon in the sink.
6. Use the sponge to wash all three items.
7. Remove all three items from the sink and rinse.
8. Place all three items on the counter.
9. Dry each item with a towel.
10. Place the dry plate, cup, and spoon in the cupboard.

Table 3. Duration of the Video Clips for Each Phase of the Study

Step in task analysis	Video prompting	4-chunk	2-chunk	1-chunk
1	8 s	23 s	35 s	2 min 4 s
2	5 s			
3	10 s			
4	4 s	34 s		
5	8 s			
6	22 s		1 min 29 s	
7–8 (shown as one clip)	22 s	22 s		
9	30 s	45 s		
10	15 s			

of the performer completing the task, not from the perspective of a spectator watching someone else complete the task. Others have used this same 'subjective viewpoint' when creating instructional videos for teaching daily living (Graves, Collins, Schuster, & Kleinert, 2005; Shipley-Benamou et al., 2002; Sigafoos et al., 2005) and self-care skills (Norman, Collins, & Schuster, 2001) to individuals with developmental disabilities. Each video clip showed one or two steps and lasted from 4 s (Step 4) to 30 s (Step 9) with a mean duration of 14 s (see Table 3).

In addition to demonstrating the actions required for completing the step, each clip also included a one-sentence voice-over instruction. One of the co-authors, familiar to the participants, provided the voice-over instruction. For example, the clip for Step 1 consisted of an over-the-shoulder shot of the performer's hand picking up the sink plug and plugging the sink. While doing this, the voice-over instructed the participant to: *First, plug the sink*. As another example, the clip for Step 5 showed the performer's right hand and forearm putting the plate, cup, and spoon into the sink. The camera for this shot was positioned behind and slightly to the right of the performer so that when viewing this clip, the participant saw a hand—and part of the performer's arm—placing first the cup, then the spoon, and finally, the plate into the sink of soapy water. The voice-over instruction for this step was: *Now, put the dishes in the sink*.

The set of video clips were shown to the participants on a portable Windows XP-based Mercury MiniMerc^{TM} computer. The video clips were shown on the computer using commercially available software (i.e., Windows Media Player^{TM}). The computer screen measured 18.5 × 24.5 cm.

Dependent Measure and Data Collection

The dependent variable for this study was the percentage of steps in the dish washing task analysis that were completed correctly. Using the task analysis shown in Table 2 as a data sheet, we recorded whether each step of the task was completed correctly or not on a session-by-session basis. During baseline, to be

scored as correct, the first step (i.e., plugging the drain) had to be completed within 30 s of the initial instruction (e.g., *Okay Ray, can you wash those dishes?*) and all subsequent steps had to be initiated and completed within 30 s of having completed the previous step. During intervention, steps had to be completed within 30 s of viewing the video clip for that step to be scored as correct.

Sessions

Data were collected two times each week during designated sessions that occurred as part of the participants' morning break-time. Sessions lasted approximately 10 min. At the start of each session, the participants were given a cookie on the plate and a cup of coffee. Participants could add cream and sugar to the coffee using the spoon. Sessions were conducted individually with each participant to avoid the possibility that the person might learn by watching one of the other participants receiving training.

Experimental Design

To demonstrate a functional relation between implementation of video prompting and increases in the percentage of steps completed correctly, the initial baseline and video prompting phases were arranged according to a multiple-baseline across subjects design (Kennedy, 2005). Following the initial phase of video prompting, we reintroduced baseline conditions (i.e., no video prompting) to assess whether or not video prompting could be abruptly withdrawn following acquisition of the skill. However, because performance deteriorated with this manipulation, we then implemented the video fading procedure. Follow-up sessions were conducted at 1, 2, and 3 months without using any video prompting. However, because performance had deteriorated at these follow-up sessions, three final follow-up sessions were conducted at 3 months with the 1-chunk video prompting procedure in place.

Procedures

Baseline 1

During baseline, participants were brought to the kitchen one at a time and positioned to stand in front of the sink. The trainer gave the participant a cookie on the plate and a cup of coffee with the spoon so that cream and sugar could be added to the cup. Participants were then given a few minutes to consume the cookie and coffee, as they would ordinarily do at break-time. When finished with the snack, the trainer said: *Okay [name], can you wash those dishes?* while simultaneously pointing to the plate, cup, and spoon. During each baseline session, the trainer and

reliability observer (when available) recorded whether the participant correctly completed each step in the task analysis. The session terminated if the participant failed to initiate the first step of the task within 30 s of the initial instruction or failed to initiate subsequent steps within 30 s of having completed a previous step in the task. A step was scored as being completed correctly if all components of the step were done. For example, Step 5 instructed participants to place the plate, cup, and spoon in the sink. If only two of the three items were placed in the sink, this step would have been scored as incorrect. Steps done out of order were not counted as incorrect, as long as the step was completed correctly. For example, if participants squirted soap into the sink (Step 3) before turning on the faucet (Step 2), these steps were both counted as correct. Any errors, such as the failure to wash all three items, were ignored. Following completion of the session, participants were thanked for washing their dishes, irrespective of their performance during the session.

Video Prompting 1 (VP1)

During this phase, participants were brought to the kitchen individually during their morning break-time and positioned to stand in front of the counter near the sink. As in baseline, the participants were given a cookie and a cup of coffee. In addition, the Mercury computer was placed on the counter approximately 50 cm to the right of the sink, which made the screen easily visible to participants. After finishing the snack, the trainer pointed to the computer screen and said, *Okay, [name], watch this*. The trainer then played the video clip showing the first step of the dish washing task analysis. When the video clip ended, the trainer said, *Okay, [name], now you do it*. At this point, the participant was given 30 s to complete the step. If the participant failed to complete the step within 30 s or made an error, the trainer completed the step correctly and as unobtrusively as possible so as to prevent the participant from seeing the step being completed correctly. After this, the trainer pointed to the computer screen and said, *Okay [name], watch this*. The trainer then played the video clip depicting the next step in the task analysis. This same process was followed until all of the video clips had been shown in sequence. Following completion of the session, participants were thanked for washing their dishes, irrespective of their performance during the session. This phase continued until the participants correctly completed 90–100% of the steps across 4–6 consecutive sessions.

Baseline 2 (Video Withdrawn)

Once the participants reached the training criterion, use of the video prompting procedure was removed. The procedures in place during this phase were identical to those of *Baseline 1*.

Video Prompting 2 (VP2)

Following *Baseline 2*, the video prompting procedure was reinstated in an attempt to bring the participants back up to criterion-level performance. This was necessary because data from *Baseline 2* sessions showed that performance had deteriorated compared to that attained at the end of the previous phase of *Video Prompting 1*. The procedures in place during this phase were identical to those of *Video Prompting 1*.

Video Chunking

Once criterion levels of performance had been re-established in the second installment of *Video Prompting (VP2)*, *Video Chunking* began. This chunking process followed a 3-level sequence in the attempt to fade the video prompts. First, the video clips used in the previous *Video Prompting* phase were merged to create four larger chunks of video (*4 chunk*). Specifically, Steps 1–3 were merged to form the first chunk; Steps 4–6 formed the second chunk; Steps 7–8 formed the third chunk; and Steps 9–10 were merged to create the fourth chunk. For the sessions in this phase, the trainer played the first chunk of video (Steps 1–3). When the video clip ended, the trainer said, *Okay, [name], now you do it*. At this point, the participant was given time to complete each of the steps shown in that chunk of video. If the participant failed to complete the first step of the chunk within 30 or if he made an error, the trainer unobtrusively completed that step correctly, told the participant *Now you do it*, and allowed the participant to continue with the remaining steps of the chunk. When the first video chunk had been completed, the trainer pointed to the computer screen and said, *Okay [name], watch this*. The trainer then played the second chunk of video depicting the next group of steps in the task analysis. This same process was followed until all four separate chunks of video had been shown. Following completion of the session, participants were thanked for washing their dishes irrespective of their performance during the session. This phase continued for three sessions, and then the second level of fading (*2 chunk*) was implemented.

For the second level of fading (*2 chunk*), the video clips were merged to create two larger chunks of video. Specifically, Steps 1–5 were merged to form the first chunk and Steps 6–10 the second chunk. The procedure for showing and completing steps was the same as in the previous (*4 chunk*) fading level. The 2-chunk video clips were implemented for three sessions and then the final (*1 chunk*) fading level was introduced.

For the third and final level of fading (*1 chunk*), a single chunk of video was created that showed all 10 steps in an uninterrupted sequence. The procedure for showing this video clip and completing steps was the same as in the previous (*2 chunk*) level of video fading. The 1-chunk video clip was used for three sessions and then baseline conditions were reinstated.

As in the baseline conditions, the order of task completion did not determine if an individual step had been completed correctly or not. For example, one of the participants combined Steps 6, 7, and 8 by washing, rinsing, and placing each dish on the counter separately. In other words, he would wash, rinse, and place the plate on the counter, then the spoon, and finally the glass. While these steps were not done in the order specified in the task analysis, the overall performance was counted as correct because each step was completed correctly. Additionally, unlike in the *Video Prompting* phase, only the initial step in the chunk was completed by the trainer if the participant made an error or did not complete the step correctly within 30 s.

Baseline 3 (Video Withdrawn)

After moving through all three levels of the *Video Chunking* phase, baseline conditions were reinstated to determine if performance could now be maintained without the need for continued video prompting. The procedures used in these sessions were identical to those of the previous two baseline phases.

Follow-up

To assess maintenance without video prompting, follow-up sessions were conducted with each participant. These follow-up sessions occurred 1, 2, and 3 months after the end of *Baseline 3*. The procedures in place during the follow-up were identical to those of the previous baseline phase.

Follow-up with 1-Chunk Video Prompting

Three final follow-up sessions were conducted at 3 months using the 1-chunk video clip. This final level of video prompting procedure was reintroduced in an attempt to boost performance to the 90–100% correct level, which had been achieved in previous phases when video prompting was used. This was considered necessary because data from the previous follow-up sessions showed that performance had deteriorated, especially for Ray. The procedures in place during this phase were identical to those in the *Video Chunking* phase involving the 1-chunk video clip.

Inter-observer Agreement

Reliability observers collected data on the number of steps performed correctly during at least 36% of the sessions in each phase of the study (range 36–89%). Observers were advanced graduate students who were trained to collect data by providing them with the task analysis data sheet, verbally explaining the procedures, and answering any questions they had about the process. This training

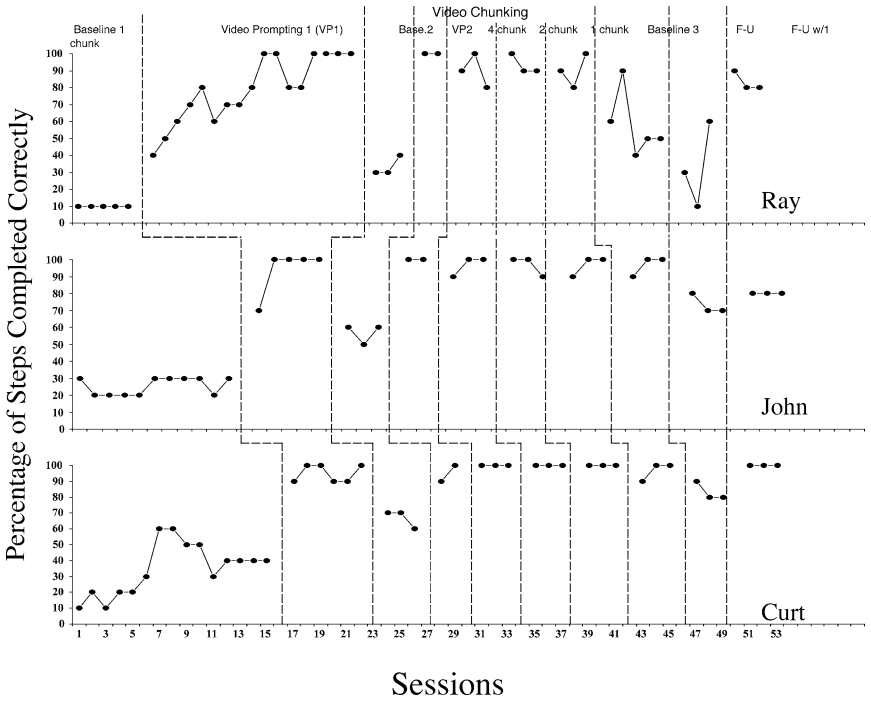

Fig. 1. Percentage of steps completed correctly across sessions for Ray, John, and Curt.

of observers required about 10 min. Agreement between the trainer and reliability observer on the steps performed correctly was calculated on a session-by-session basis using the formula: Agreements/(Agreements + Disagreements) × 100%. The resulting percentages of agreement ranged from 90–100% with a mean of 99%.

RESULTS

Figure 1 shows the percentage of steps completed correctly by Ray, John, and Curt for each session. Sessions 47–49 are the follow-up sessions without video prompting, which were conducted at 1, 2, and 3 months, respectively. Sessions 50–53 were also completed at the 3-month follow-up, but these sessions included implementation of video prompting using the 1-chunk video clip.

Ray

During *Baseline 1*, Ray consistently completed 10% of the steps correctly during five sessions. Generally, he would either turn on the faucet (Step 2) or

place the dishes in the sink (Step 5). When *Video Prompting* 1 was introduced on Session 6, Ray showed an immediate increase to 40%, followed by a gradual increase to 100% over the next nine sessions. He reached the acquisition criterion (90–100% over four successive sessions) in 17 sessions with the video prompting procedure. When video prompting was removed (*Baseline 2*), Ray's performance decreased to 30–40%. Unlike the first baseline phase, however, the steps that he completed correctly during this second baseline varied among the following set of five steps: (a) turning on the faucet (Step 2), (b) turning off the faucet (Step 4), (c) rinsing items (Step 7), (d) placing rinsed items on the counter (Step 8), and less frequently, (e) putting the dishes away (Step 10). When video prompting (VP2) was reintroduced, he correctly completed 100% of the steps during both sessions. With *Video Chunking*, he correctly completed 80–100% of the steps, as the number of video chunks shown decreased from 4 to 2 to 1. During these fading sessions, his errors typically consisted of not using the sponge to wash all three items, and/or failing to dry all three items with the towel. When the 1-chunk video was removed for *Baseline 3* and *Follow-up*, Ray's performance was variable, but showed a decreasing trend. During these two phases, he made many errors, but would consistently turn the water on and off (Steps 2 and 4), and usually also place the dishes in the sink (Step 5), rinse (Step 7), and put the dishes in the cupboard (Step 10). When the 1-chunk video was reinstated for the final three follow-up sessions, Ray completed 80–90% of the steps correctly. His most common error over these final three sessions was failure to wash (Step 6) and/or dry all three items (Step 9). Instead, he would typically wash and/or dry only one or two of the three items.

John

During *Baseline 1*, John completed 20–30% of the steps correctly. Specifically, he would consistently turn on the faucet (Step 2), turn off the faucet (Step 4), and place the dishes in the sink (Step 5). When *Video Prompting 1 (VP1)* was introduced on Session 12, John showed an immediate increase to 70% correct, followed by a rapid increase to 100% correct, which was maintained over the next four sessions. He therefore reached acquisition criterion in five sessions. When video prompting was removed (*Baseline 2*), John's performance decreased to 50–60% correct. His most common errors during this second baseline included failure to: (a) plug the drain in the sink (Step 1), (b) squirt soap into the sink (Step 3), (c) use the sponge to wash the items (Step 6), and (d) rinse all three items (Step 7). He also sometimes did not place all three items in the sink (Step 5). When video prompting (*VP2*) was reintroduced, he correctly completed 100% of the steps during both sessions. With *Video Chunking*, he correctly completed 90–100% of the steps, as the number of video chunks shown decreased from 4 to 2 to 1. During these fading sessions, his only error was failure to rinse all three items. When the

1-chunk video was removed for *Baseline 3*, he completed 90–100% of the steps correctly, but this level of performance decreased to 70–80% at the 1, 2, and 3 month follow-up sessions when video prompting was not implemented. His errors during these follow-up sessions involved failing to rinse or dry all three items. Instead, he would often rinse or dry only one or two of the three items. When the 1-chunk video was reinstated for the final three follow-up sessions, John was correct on 80% of the steps. His errors during these final three sessions tended to involve washing, rinsing, and/or drying only one or two of the three items.

Curt

During the initial sessions of *Baseline 1*, Curt showed a gradually accelerating trend in the percentage of steps completed correctly from 10% initially to a high of 60% (Sessions 7 and 8). After this, his performance stabilized at 40% correct over the final four sessions of this initial baseline phase. The steps that he correctly completed during *Baseline 1* included: (a) turning on and off the faucet (Steps 2 and 4), (b) washing the items with the sponge (Step 6), and placing the washed dishes on the counter (Step 8). When *Video Prompting* (VP1) was first introduced on Session 16, Curt showed an immediate increase to 90% correct, followed by a further increase to 100% and then a stable trend at 90–100% for the reminder of this phase. His only error during this phase was failure to rinse all three items. Instead, he would typically rinse only one or two of the three items. When video prompting was removed (*Baseline 2*), Curt's performance decreased to 60–70% correct. His errors during this second baseline phase included failure to: (a) plug the sink (Step 1), (b) squirt soap into the sink (Step 3), (c) put all three items in the sink (Step 5), and (d) rinse all three items (Step 7). When video prompting was reinstated for the next two sessions (*VP2*), Curt was correct on 90–100% of the steps. After this, during sessions when the video chunking process was implemented, he never made an error and his performance remained at 90% correct or above during the third baseline phase (*Baseline 3*), even though no video prompting was used. However, his level of performance decreased to 80–90% correct during follow-up sessions that occurred at 1, 2, and 3 months when video prompting was not used. With the reintroduction of 1-chunk prompting for the final three sessions of the 3-month follow-up, Curt was again errorless in his performance of the dish washing task analysis.

DISCUSSION

Each participant reached acquisition on the dish washing task analysis when the step-by-step video prompting procedure was implemented. Indeed, each participant showed large and immediate increases in the percentage of steps performed

correctly as soon as the video prompting procedure was introduced. Additionally, all three adults reached and maintained a high level of performance (90–100% correct) after relatively few (≤ 10) exposures to the video prompting procedure. These trends, when viewed in light of the multiple-baseline design (and when compared to the lower and stable performances observed during the initial baseline phase), provide a convincing demonstration of a positive intervention effect. Overall, data from the first two phases of the study suggest that the video prompting procedure was effective in teaching these three adults how to wash dishes.

These results systematically replicate previous studies that have also found promising results using instructional videos (e.g., Graves et al., 2005; Le Grice & Blampied, 1994; Norman et al., 2001, Rehfeldt et al., 2003; Shipley-Benamou et al., 2002; Sigafoos et al., 2005; Tiong, Blampied, & Le Grice, 1992). Our study extends the literature by demonstrating successful use of video prompting for teaching three adults with autism and mental retardation to wash dishes. The applied relevance of the study is enhanced by the fact that training occurred in the participants' existing place of employment. Additionally, the task was appropriate to the setting and represented the final component in the participant's break-time routine.

While the number of published studies on video prompting is still relatively small, the available evidence provides empirical support for this procedure, given that in each of these several studies it has been consistently effective in promoting skill acquisition. However, while video prompting has been used with success to teach correct task performance, there is some conflicting evidence in the literature on whether or not video prompting facilitates independence and prevents prompt dependency (cf. Shipley-Benamou et al., 2002; Sigafoos et al., 2005). Independence in this context refers to maintenance of correct task performance after acquisition with instructional videos, but in the absence of continued use of the videos. Promoting independence is important because it may not always be possible or desirable to provide video models or prompts. For example, if performance deteriorates after acquisition—when video prompting is abruptly withdrawn—it suggests a certain degree of prompt dependency has emerged. In such cases, there will be need for the implementation of additional procedures to fade video prompts.

Sigafoos et al. (2005) showed that video prompting could be withdrawn completely following acquisition with no detriment in performance. However, this finding was limited to two of the three adults in their study who acquired the skill (making microwave popcorn) with video prompting. The third adult failed to acquire the skill with video prompting and so there was no opportunity to investigate the effects of withdrawing video prompting with him. In contrast, data from the present study revealed fairly large reductions in performance across all three participants when video prompting was abruptly withdrawn in *Baseline 2*. This finding suggests that, despite having learned to wash dishes correctly with video prompting, the participants remained somewhat dependent on video prompting.

In an effort to promote greater independence and reduce prompt dependency, we therefore designed and implemented a 3-step chunking procedure. This procedure was viewed as one way of fading the number of video clips used in prompting. Data from the *Video Chunking* phase of the study showed that task performance was maintained at 80–100% correct, even as the number of steps shown in each video clip increased from 1 or 2 to 10. This chunking procedure therefore appeared to be an effective way of reducing the number of separate video clips. Specifically, instead of continuing with the step-by-step video prompting, by the end of the 3-step chunking process, participants were watching the entire sequence of steps in one single video clip. We anticipated that after this, the 1-chunk video clip could be eliminated altogether, thereby resulting in a level of independence that was previously lacking. This chunking or fading process was expected to facilitate independence because the once separate steps were being integrated into a more seamless response chain. This appeared to be the case for John and Curt, but not for Ray. John and Curt continued to perform at 90–100% correct during *Baseline 3*, when the 1-chunk video prompting was no longer used. Ray's performance, on the other hand, decreased to 30–40% correct without the 1-chunk prompting. Similar trends were evident during follow-up without video prompting at 1, 2, and 3 months, but performance improved when the 1-chunk video clip was reintroduced at 3 months.

The trends from the final phases of the study suggest that while complete independence was not maintained without some level of video prompting, it was possible to reduce the number of separate video clips that were used as part of the prompting procedure. This would seem of practical benefit as it makes the training procedure less onerous for staff because instead of having to show each step separately, they might be able to present a single multi-step clip, while maintaining correct performance. Not only is this likely to make for quicker sessions, but there is also less inter-step disruption, which could hinder the formation of an integrated response chain (Duker et al., 2004).

It is possible that that the lack of maintenance when video prompting was withdrawn was related to the step-by-step nature of the prompting procedure. This procedure may have established a faulty behavioral chain because the participant was required to re-orient to the video monitor after each step. If so, the chunking procedure may have been effective in promoting maintenance because it reduced the number of times this potentially disruptive orienting response as required. Future research should investigate this issue. One way to do so might be to compare the step-by-step procedure used in the present study with a variation in which video prompts were incorporated into a forward or backward chaining procedure (Duker et al., 2004).

One limitation in our analysis of the chunking process is that we did not determine whether acquisition would have occurred if we had started with the 1-chunk video. If so, the chunking process would not have been necessary. However, we thought it unlikely that the participants would have learned if instruction had

begun with the 1-chunk video clip because they had substantial deficits in adaptive behavior functioning, lacked dish washing skills, and had not been exposed to video prompting before. Still, future research should compare acquisition with video clips that present varying numbers of steps.

In summary, the video prompting and fading procedures used in the present study appeared to be effective in teaching an important daily living skill. When using this technology, it may be necessary to implement additional fading procedures in cases where removal of video prompts results in a decrease in correct task completion. The present study suggests one procedure that might be used for the purpose of fading video prompts. While this procedure appears promising, future research is needed to determine its strengths and limitations. Other procedures for fading video prompts should also be developed and evaluated.

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