Using Self-Directed Video Prompting to Teach Daily Living Skills to Individuals with Severe Autism.

Thesis

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By

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Abstract

Individuals with severe autism spectrum disorder and intellectual disability face poor outcomes in the area of self-determination and independence due to deficits in the areas of daily living skills. Utilizing video prompting is a way of teaching daily living skills and providing independence, and teaching students to self-direct their video prompts is a way to reduce instruction provided by a teacher or job coach. Three participants with severe autism and intellectual disability were taught three daily living skills using self-directed video prompting on an iPod Touch. Students were taught to load a dishwasher with instructor-delivered video prompts. After reaching mastery, they were taught using modeling followed by decreasing prompts to use the iPod Touch to watch prompts to Swiffer mop the kitchen floor. When they were at mastery on the second phase, they were allowed to self-direct their own video prompts to teach themselves to wipe the bathroom mirror. Results of the study demonstrate that all four students acquired the skills using video prompting. All three participants became more independent using the iPod Touch by the third phase, but weren't completely independent self-directing their video prompts.

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Fields of Study

Major Field: Educational Studies

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Chapter 1: Introduction

Individuals with severe autism face many struggles in their daily life. Autism is a spectrum disorder, and individuals who are diagnosed with autism can fall along the spectrum. It is characterized by sensory hyper- or hypo-stimulation, impaired verbal and nonverbal communication, obsessive interests, insistence on sameness, and repetitive behavior (APA; 2013). Any individual on the spectrum can exhibit all or some of these characteristics to varying degrees. The American Psychiatric Association (APA; 2013) breaks the spectrum into 3 levels. Level 3 is characterized by "severe deficits in verbal and nonverbal communication skills causing severe impairments in functioning" and "inflexibility in behavior, extreme difficulty coping with change, or other restrictive/repetitive behaviors markedly interfere (sic) with functioning in all spheres" (APA, 2013). People with severe autism have difficulties with communication, processing, and social skills that make it difficult for those of average intelligence to function in the world and live up to their full potential due to their challenges (Jacobson & Ackerman 1990). Approximately 25% of individuals diagnosed with autism have a comorbidity with intellectual disability (APA, 2013). All of these symptoms in their varying degrees make it difficult for them to function in school or work settings, learn new skills, participate in community activities, and perform daily living skills. (Jacobson & Ackerman 1990). Individuals with both autism and intellectual disability have more challenges in home and community settings, which makes them a population in need of interventions to build their independence (Tint, Maughan, & Weiss. 2017).

Daily living skills performed to care for oneself or one's living environment, and can include cleaning, cooking, bathing, doing laundry, and shopping, as well as many others. If

individuals are unable to independently complete these activities of daily living, other adults must do it for them, which may limit independent living choices and work opportunities for people with autism spectrum disorder. This reliance also creates a financial and physical burden on caregivers, as well as limiting the independence of the individual. They are also more vulnerable to abuse and neglect, because they are reliant on others to care for them but unable to speak up for themselves or report abuse. Limited independence also limits self-determination as that individual is less likely to make life decisions for themselves (Thomas 1979). It is crucial to focus on teaching independent daily living skills to people with autism and intellectual disability.

One method used to teach daily living skills to people with autism is video prompting (Cannella-Malone, Fleming, Chung, Wheeler, Basbagill, & Singh, 2011). Video prompting is the practice of taking a skill and breaking it into steps that are prompted by showing a video of that step. When that step is complete, the next step is shown via video (Cannella-Malone et al., 2011). Video prompting is a useful method for teaching skills to individuals with autism because it breaks the task into steps, which can be taught and practiced in isolation. It also presents the instruction in the form of a visual stimulus rather than a person delivering instruction. This is helpful for individuals who struggle with processing language such as those on the autism spectrum (Orem, Flagg, Roberts, Brian, & Roberts, 2005). Researchers have examined using video prompting to teach a variety of skills to individuals with cognitive disabilities. These studies have examined different ways of presenting the video prompts, the skills taught, and the environments in which they are taught. Wu and colleagues (2016) used video prompting to teach daily living skills to two individuals with developmental disabilities and fade out the prompt using a chunking method until the students reached mastery. Chunking is a method in which several prompts are combined into one video to lessen the amount of intervention used as the

individual is becoming more independent in the skill. The study examined different fading procedures to remove the need for the video prompts as the individual performed the task, thus allowing them to perform the task independently by the end of the study. As technology changes, the avenues for presenting video prompts change.

Previous studies taught students to perform daily living skills using a video program on a laptop (Mechling, 2012). They followed this with a study pointing to the benefit of portable devices including the iPod Touch, which is easily programmable, socially acceptable, and already in frequent use (Mechling, 2015). Researchers continue to find ways to allow individuals to learn with less instruction from others, utilize the technology more, and find more socially acceptable ways for people with disabilities to access the prompts.

Examining the use of mobile technologies in research is an important continuation, because there is less social stigma attached to looking at a personal device, there are many ways to present videos using this technology, and many individuals with disabilities are already using mobile technologies for other purposes, such as entertainment or communication, and already know how to use them. Cannella-Malone et al. (2013) used video prompting software on an iPod Touch to deliver video prompts. They followed a three phase method to teach students to self-direct the use of the video prompts. Students were able to use the technology to teach themselves to vacuum the floor by the final phase. The video prompts included voice-over instruction, so the students heard a verbal instruction while watching the step. This reduced the need for adult-delivered prompts and had the potential to allow individuals more independence in work settings. The participants were individuals with various intellectual disabilities, but none were diagnosed with autism.

This study seeks to determine if using modeling followed by decreasing prompts to teach participants to use a iPod Touch to self-direct video prompts to learn daily living skills on a population of adolescents with severe autism and intellectual would yield similar results as the three phase model to teach self-direction of video prompts. This study also seeks to determine if removing verbal prompts and using custom videos on a photo app to emulate practitioner use would be as effective.

Previous studies using the iPod Touch to deliver video prompts did not solely use participants with severe autism. The number of individuals with autism has risen from 1 in every 2000 to 1 in every 150 children since the 1980s, and a quarter of that population also falls under intellectual disability (Lai, Lombardo, & Baron-Cohen, 2014). Individuals with autism and intellectual disability come with specific challenges that may not frequently present with individuals with other developmental disabilities such as repetitive behavior, language processing, or sensory issues (Orem, Flagg, Roberts, Brian, & Roberts, 2005). Two of the participants in this study also had behaviors that appeared to be anxiety which caused regression in other areas of their lives. This study seeks to examine how effective modeling followed by decreasing prompts to teach the use of the iPod touch to self-direct video prompting is for this particular population. In this study, there is no verbal voice over in the video prompt in an attempt to remove any struggle with language delay and only provide a visual prompt, since language processing is difficult for individuals with severe autism. The studies using self-directed video prompting previously done in this area had some sort of verbal prompting accompanying the prompts, which could be argued acts as a separate prompt by itself. This study attempts to remove the verbal prompting to test the video prompting in isolation with a population of individuals with autism and intellectual disability. Mechling et al. (2013) found

that although gains were made using prompting software, custom videos had better results. This study was done without a prompting software and used videos uploaded on an iPod Touch in order of steps to complete the task. The videos were filmed using the iPod Touch and stored in a folder in the photos app. This is to replicate how a teacher or job coach could simply film a step on a phone and provide access to the individual learning to perform a skill. Although a prompting software was successful in previous studies, not every school or vocational training program may have access to it or knowledge of it. As personal devices are prevalent among all members of the community, this study seeks to examine how a practitioner could easily film and program steps without uploading videos onto software so they could provide video prompting quickly and efficiently.

The research question asked in this study is if it would be possible to teach individuals with severe autism and intellectual disability by using modeling followed by decreasing prompts to use an iPod Touch to learn a daily living skill by self-directing video prompts.

Chapter 2:Method

Participants

The participants were three students with autism and intellectual disabilities who received services in special education classrooms. They all had Individualized Education Programs that focused on a functional curriculum for job and daily living skills, and all participants participated in the state's alternate assessment. The students were recommended by their classroom teacher, and they were selected because they could follow instructions to acquire new skills and were not yet independently performing the targeted daily living skills. Additionally, none of the participants had been exposed to video prompting as an instructional strategy.

Axel was a 17-year-old male from India with autism, aphasia, and a severe intellectual disability. He could read environmental sight words, write his name, and complete simple math problems with manipulatives, but he struggled with comprehension and applying skills to his daily life. He performed simple daily living tasks in the home setting, such as folding towels or unloading the dishwasher. He attended a private school that specialized in serving students with autism and was provided a functional curriculum designed for daily living and vocational skills. He used gestures and a Dynavox communication device, though his communication with the device was not effective, and during the sessions he never used it to communicate. He had episodes of behaviors his parents believed to be anxiety which affected his performance. According to his parents, he regressed in multiple areas of functioning including toileting, previously mastered skills such household chores, and self-care. He paced, engaged in self-stimulatory behavior, and generally had a difficult time completing any task. His parents reduced demands during these times and maintained a simple routine. He took a long time to start or complete tasks, and he had been known to show aggression, although this was not seen during

sessions.

Cecily was a 17- year-old African American female of Eritrean descent. She had autism, aphasia, and a severe intellectual disability. She could read some environmental sight words, recite numbers up to 20, and write her name. She could not solve simple math problems, tell time, or generalize academic skills into her daily life (e.g., reading environmental words in community settings). She attended a private school that specialized in serving students with autism and was provided a functional curriculum designed to teach daily living a vocational skills. She could perform some simple daily living tasks at home, such as unloading the dishwasher, or packing her backpack when prompted, but needed adult supervision to complete these tasks. She utilized an iPad equipped with Proloquo2go for communication, which she used to communicate basic wants and needs. She required multiple prompts to complete academic and daily living tasks and to stay on task. She occasionally engaged in aggressive behavior when presented with novel tasks or during a change in routine.

Sharon was a 19-year-old student who was born in India. She was diagnosed with autism and a moderate intellectual disability. She could read short passages and complete simple math problems, but struggled with comprehension and applying skills to daily life. She attended a transition program in her public school district that specialized in daily living skills and vocational training. She could perform daily living skills at home as part of a daily routine, such as switching the laundry or making her bed, with adult supervision and prompting. She used 2 to 3 word phrases to communicate her needs and wants. She was generally compliant and good natured but had periods of behaviors that her parents believed to be anxiety that directly affected her ability to function and learn. Her parents reported regression during periods of this behavior, which affected her eating and sleeping as well as made it difficult to perform previously

mastered skills. She engaged in self-stimulatory behavior more, had difficulty sitting still or completing any task, or would begin something and walk away from it, which was not typical of her behavior the rest of the time. When she exhibits this behavior, her parents often reduce demands and allowed her to take breaks while adhering to a daily routine.

Setting

This study was conducted in the participants' homes. The dishwasher and floor mopping tasks took place in the kitchen. Axel and Cecily's kitchens were both 12 ft by 10 ft rooms located on the first floor level of the house and had a linoleum floor. Axel's kitchen was open to the living room where the TV was placed. Each kitchen was equipped with a stove, dishwasher, and sink. Sharon's kitchen was similar, except it had an open layout with the living room and had a tile floor that was bordered by carpet. The mirror cleaning task took place in the downstairs bathroom by the kitchen. Axel's and Cecily's bathrooms had a small 3 ft by 2 ft mirror above a sink. Sharon's bathroom mirror was larger and was 5 ft by 3 ft. All sessions took place after school and on the weekends.

Tasks and Materials

Three tasks were targeted in this study and were identified in collaboration with teaching staff and parents. The three tasks were washing dishes, Swiffer mopping the floor, and cleaning a bathroom mirror. Each task analysis was developed and tested by the researcher. The task analysis and duration of each task step for each task are presented in Tables 1.

The dish washing materials were two plates, two bowls, two cups, and two pieces of silverware that were used by the family and left for the student to clean. The detergent was a powder at Cecily's house, a pod at Sharon's house, and a gel at Axel's house. The video and teaching materials were modified to reflect the different detergents. The materials for Swiffer

mopping included a Swiffer mop and wipes that were brought to each house and left in the kitchen. The Swiffer mop is a 4 ft. pole with a pad where the wipes can be attached by little holes at the top of the pad that the wipe is pushed into. This type of mop was chosen because it is more accessible to use than a mop and bucket. The materials for the mirror cleaning task included generic glass cleaning spray and paper towels that were placed under the bathroom sink.

The students utilized two 4th generation iPod Touches that had a 9 cm touch screen with external volume control and external speaker capabilities. The videos were filmed on an iPhone 6 and emailed to the iPod Touches to be saved. The video prompts were uploaded to the photos application, and each skill had its own folder. The dish washing video was taken from both the participant's and spectator's perspective depending on the task. Steps that required a closer view (e.g., setting the dishwasher) were taken from the participant's perspective, which showed the performer's hand doing the step. Steps that required gross motor movements (e.g., closing the dishwasher, leaning over to place a dish) were filmed from the spectator perspective, showing the entire body of the performing doing the skill. The mopping and the mirror cleaning videos were taken from the spectator perspective to show the gross motor movements. The researcher performed the steps in the videos, which included the sounds of the task,s such as water running or dishes clinking, but not verbal prompts or descriptions.

Dependent Measures and Data Collection

Data were collected on correct completion of each step of the task during each phase of the study. Data were collected on a form listing each step and space was provided to indicate what prompting level was necessary. Data were collected by an instructor and an advanced graduate student affiliated with the university during each phase of the study. For a step to be scored as correct during baseline, it had to be completed correctly within 30 s of the verbal

Table 1. Task analyses and video duration (step and total) for dish washing, Swiffer mopping, and mirror washing

	Washing Dishes		**Swiffer Mopping**		**Washing Mirror**	
	Steps	s	Steps	s	Steps	s
1	Pick up a piece of silverware rinse if necessary	4	Open Swiffer pad container	6	Retrieve spray and paper towels	9
2	Place silverware in dishwasher	5	Pull out pad and place face down on floor	3	Pull off paper towel from roll	6
3	Pick up a piece of silverware rinse if necessary	4	Close container	7	Spray mirror	8
4	Place silverware in dishwasher	5	Open pad	4	Wipe mirror	10
5	Pick up a cup, rinse if necessary	6	Place Swiffer mop on pad	17	Throw paper towel in trash	5
6	Place cup in dishwasher	7	Attach mop to pad	7	Put spray and paper towel away	8
7	Pick up a cup, rinse if necessary	6	Mop back and forth at corner	22		
8	Place cup in dishwasher	7	Mop around furniture	21		
9	Pick up plate, rinse if necessary	8	Mop back and forth at wall/edge	13		
10	Place plate in dishwasher	7	Mop back and forth in center	12		
11	Pick up plate, rinse if necessary		Mop edges/walls	12		
12	Place plate in dishwasher	7	Mop back and forth at remaining corners and edge	13		
13	Pick up a bowl, rinse if necessary	7	Detach pad	12		
14	Place bowl in dishwasher	4	Throw away pad	7		
15	Pick up a bowl, rinse if necessary	7				
16	Place bowl in dishwasher	4				
17	Retrieve soap	18				
18	Open soap compartment	4				
19	Dispense soap (powder/pod/gel)	6				
20	Put soap away	16				
21	Close soap compartment	6				
22	Close dishwasher	8				
23	Push start	9				
		155		156		46

prompt or the end of the previous step. During intervention, the participant had to begin the step within 5 s of the end of the video prompt or previous step. In the final phase, students were given 30 s to begin the next step because they were self directing the video prompting. The students were allowed to look at the following video or watch the prompt again before beginning as part of allowing them to self-direct their instruction. Anecdotal data was taken on the prompting level needed for each step of self-direction.

Interobserver Agreement and Procedural Fidelity

Interobserver agreement (IOA) data were collected by an advanced graduate student in special education and applied behavior analysis. Training consisted of a review of the videos and data sheet followed by one session in a participant's house collecting data during the session and providing feedback. Data from this session were not included in the IOA calculation. The second observer recorded IOA and procedural fidelity data during 22.7% of sessions. Six observations were canceled due to participant unavailability and could not be rescheduled with the observer.

Mean IOA for Axel was 97.5% (range: 87–100%) across all phases. IOA for Sweeping had the lowest at 93.8% (range: 87.5–100%). IOA for Dishwashing was 97.2 % (range: 87-100%) and Cleaning the Mirror was 98.2% (range: 85-100%). Mean IOA for Cecily was 99.1% (range: 94.4–100%) across all phases. IOA for both Sweeping and Cleaning the Mirror was 100% across all sessions. IOA for Doing the Dishes was 97.2% (range: 94.4–100%). Mean IOA for Sharon was 97% (range: 87.5–100%). IOA for Doing the Dishes was 97.2% (range: 94.4–100%), 93.8% (range: 87.5–100%) for Sweeping, and 100% for Cleaning the Mirror. Procedural fidelity was 100% across all participants and conditions.

Experimental Design

A multiple probe across participants design (Cooper, Heron, & Heward, 2007) was used

to demonstrate experimental control. In the first phase (i.e., video prompting with error correction), baseline, video prompting with error correction, self-directed video prompting, and maintenance conditions were included. In the second phase (i.e., iPod Touch training), baseline and error correction conditions were included. In the final phase (i.e., self-directed video prompting), baseline, self-directed video prompting, error correction, and maintenance conditions were included.

Procedure

Three phases were conducted in this study, instructor delivered video prompting with error correction, self-directed video prompting with instructional support, and self-directed video prompting without instructional support. Each phase introduced a novel skill. Baseline sessions were conducted at the start of each phase to determine if the students could complete the skills independently. In the first phase, the instructor delivered video prompting followed by least-to-most prompting as error correction to teach the participant to load the dishwasher. The second phase involved the participant using the technology to self-direct their prompts to mop the floor, but included instructional error correction to ensure the participant learned each step in the task analysis. The final phase involved participants using the technology independently and without instructional support to learn the task of cleaning a bathroom mirror. Follow-up sessions for each skill were conducted to test maintenance.

Phase 1

Instructor-directed video prompting with error correction (loading the dishwasher). The purpose of this phase was to teach the participants a new skill using video prompting. The instructor delivered the video prompts and provided least-to-most prompting for error correction. Prompting was used to ensure the participants were not learning errors while they were using

video prompting.

Baseline. During baseline, the participants were brought to the kitchen and given the instruction to "wash the dishes," with an instructional gesture from the sink to the dishwasher. A multiple opportunity method was utilized (Cooper, Heron, & Heward, 2007). If the participant did not respond, or began a step incorrectly, the instructor interrupted the response, blocked the participant's view of the task, completed the step, then prompted the participant to proceed to the next step with the prompt of "continue" or "keep going." This continued until completion of the skill. The participant was given non-specific verbal praise at the end of each baseline session regardless of performance.

Instructor-delivered video prompting with error correction. During intervention sessions, participants were brought to their kitchen. The instructor held the iPod Touch positioned between the sink and the dishwasher and gave the prompt, "watch this." When the clip ended, the instructor paused the iPod Touch and said "now you do it." The participant was then given the opportunity to complete the step. If the participant did not respond within 5 s, or responded incorrectly, the instructor interrupted the participant said "not quite, let's watch this again," and replayed the video clip. If the participant did not respond within 5 s or responded incorrectly a second time, the instructor used least-to-most prompting to help the participant complete the skill correctly. This involved using the least invasive prompt to help them perform the task and increasing the prompt as needed until they were able to perform that particular part of the skill. Once a participant completed 80% of the steps independently across two or more trials, they moved to phase 2 of the study.

Phase 2

Self-directed video with instructional support (Swiffer mopping the floor). This

phase involved using modeling followed by decreasing prompts to train the participants to self-direct the videos on the iPod Touch.

Baseline. During baseline, the Swiffer mop was leaning against a counter and the pads were on the floor in the kitchen. The participant was brought to the kitchen and asked to "mop the floor." As in phase 1, a multiple opportunity method was used. If the participant did not correctly start a step within 5 s, or began to respond incorrectly, the instructor interrupted the participant, blocked their view, and completed that step of the task. The instructor then said "keep going." This process continued until the task was completed. Participants were given verbal praise for participating at the end of each session regardless of performance.

Acquisition of self-directed video prompting. During intervention, the participant was taught to hold and operate the iPod Touch and to manipulate the video clips using modeling followed by decreasing prompts. The targeted skills were using the home key and swiping to open the home screen, touching the photos app, finding the correct video file, selecting the first video, playing and pausing the video, and swiping to the following video. For each session, the participant was brought to the kitchen, handed the iPod Touch, and prompted to start the video. The participant was taught to watch the clip, perform the task, and swipe to the next video when the step was complete. If after 5 s they did not begin or they began to make an error, the instructor interrupted the participant and modeled the correct way to perform that specific skill with the iPod Touch such as pushing play or swiping. Decreasing prompts were provided thereafter until the participant was able to independently use the iPod Touch. Error correction was provided in the form of decreasing prompts throughout this phase. When participants completed 80% the task correctly and used the iPod with at least 80% accuracy, they continued on to phase 3.

Phase 3

Self-directed iPod Touch use (wiping the bathroom mirror). This phase involved the participant instructing themselves in the novel skill using the iPod Touch with no instructional support (i.e., error correction).

Baseline. During baseline, the same procedure as the previous two phases was followed except the participant was asked to wipe the bathroom mirror.

Self-directed video prompting. In this phase, the participant was given the iPod Touch, prompted to watch the video, and expected to self-direct their video use. If the participant made an error, or did not respond within 30s of the video prompt, a verbal prompt to "watch the video" or gestural prompt pointing to the iPod Touch was provided depending on the responsiveness of the participant. Time delay was used because the participants were supposed to self-direct their instruction. If the participant did not navigate to the video, or there was a technical issue that needed troubleshooting (e.g., the participant touched the wrong application), the researcher pulled up the correct video and gave a verbal cue to "watch the video." If the participant made an error after being redirected to the video, decreasing prompts were provided similar to phase 2 for that step and then the participant was allowed to continue the task.

Follow-up

During each phase, maintenance data were collected in a manner similar to baseline. The participants were brought into the kitchen or bathroom and prompted to begin the task. Unlike baseline, the iPod Touch was left in view, but participants were not prompted to use it. They were not prompted or given any error correction.

Chapter 3: Results

In this study, three experiments were conducted with three participants with autism. In the first, I present three replications demonstrating the effects of teacher-directed video prompting (see Figure 1). In the second, I present three replications of the effects of self-directed video prompting with significant support (see Figure 2). In the final experiment, I present three replications of the effects of self-directed video prompting with limited support (see Figure 3) Overall, there are nine effects out of nine total opportunities.

Unloading Dishwasher (Instructor Delivered).

Axel. During baseline, Axel performed an average of 53.5% of steps independently (range: 43–63%). Once he began intervention, his performance increased from 82% to 95% of the tasks performed independently within five sessions. He maintained 95% accuracy for three sessions, and when probed for maintenance, he performed the skill with 100% accuracy. After the third intervention session, he performed the skill without the use of the prompt. Although no attempt was made to fade the video prompt, he completed the task without the video. During maintenance, he only needed to see the first step and then finished the task independently, though he did require a prompt to stop pouring the dishwashing liquid.

Cecily. Cecily performed an average of 56% (range: 22–30%) of the steps of unloading the dishwasher accurately during baseline over the course of five sessions. Once intervention was introduced, her performance improved from 72% to 100% accuracy in five sessions with three sessions at 100%.

Sharon. During the five baseline sessions, Sharon performed an average of 33% of the steps accurately (range: 22–42%). Once intervention began, her performance improved to 71% accuracy and then to 100% accuracy over the eight subsequent sessions. Sharon continued to

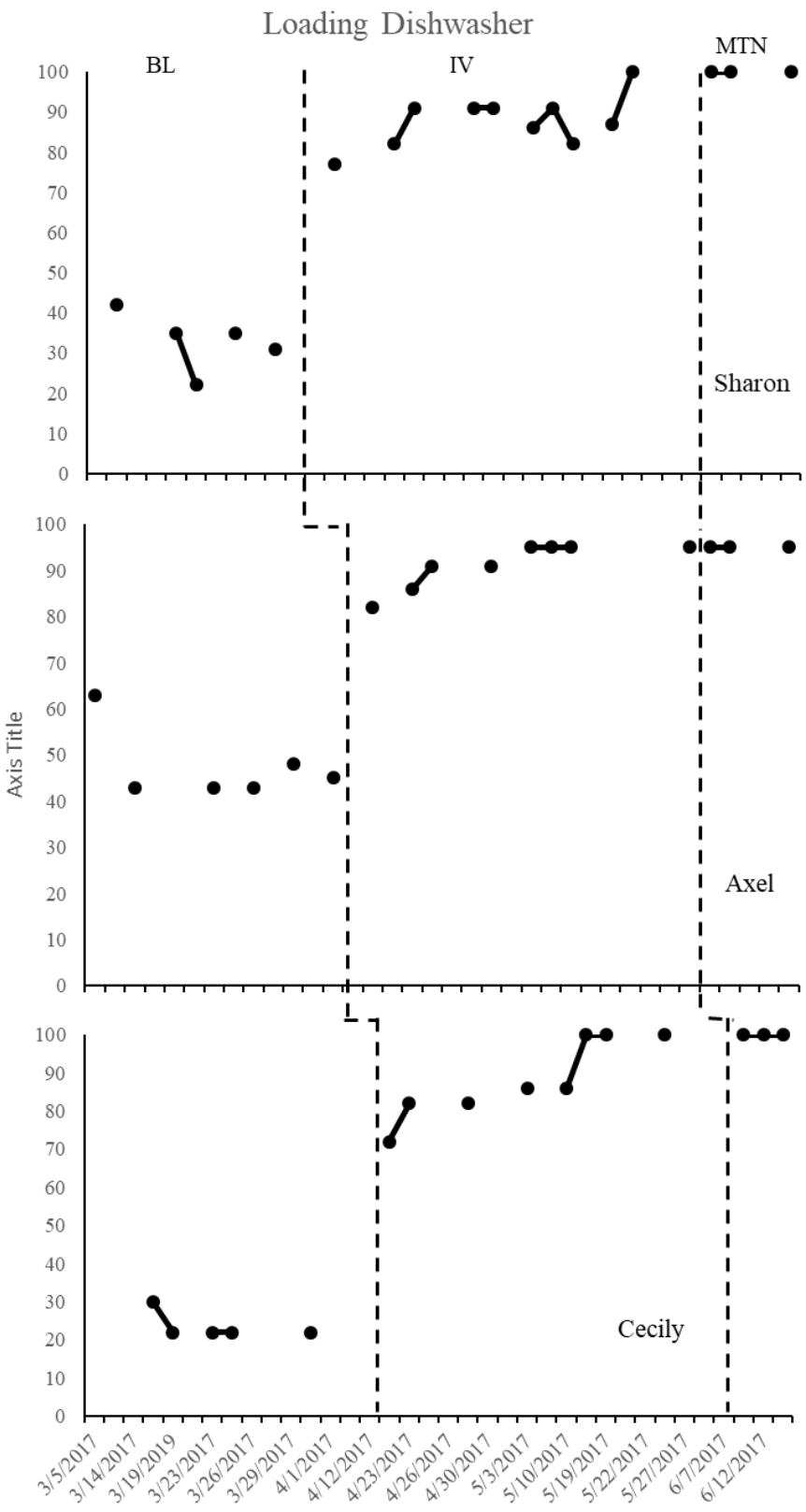

Figure 1. Participants' responding to loading the dishwasher.

need the video prompts throughout the intervention, but by the end of this phase, she only used the video prompt to start the task and one video in the middle.

Swiffer Mopping (Self-Directed with Instructional Support).

Axel. Axel performed none of the steps for using a Swiffer to mop the floor during the five baseline sessions. During intervention, his performance increased from 38 to 92% of the steps performed correctly within five sessions. His performance remained at 92% accuracy for all maintenance probes. By the time he met the mastery criterion, he needed a gestural prompt to watch the video of the thirteenth step of taking off the Swiffer pad so he could stop mopping and finish the last steps.

Cecily. Cecily performed 2.3% of steps in the five baseline sessions accurately (range: 0–3%). Once she began intervention, her performance immediately to 100% accuracy. During the fourth session, she performed only 85% of the steps independently. Her mother said that Cecily was having a "difficult day," and she exhibited distress in other areas of our session. The following session she performed the skill at 100% accuracy again. She did not need the video prompt for most of the skill by the end of this phase.

Sharon. Sharon performed none of the steps during baseline. Once she started intervention, her performance improved from 65% to 92% of steps performed independently over seven sessions. She continued to perform 92% of the steps correctly due to missing parts of the floor, such as the edges, without further prompting. Video prompts were faded to the first step at the beginning and a video to stop mopping and remove the pad at the end of the task analysis.

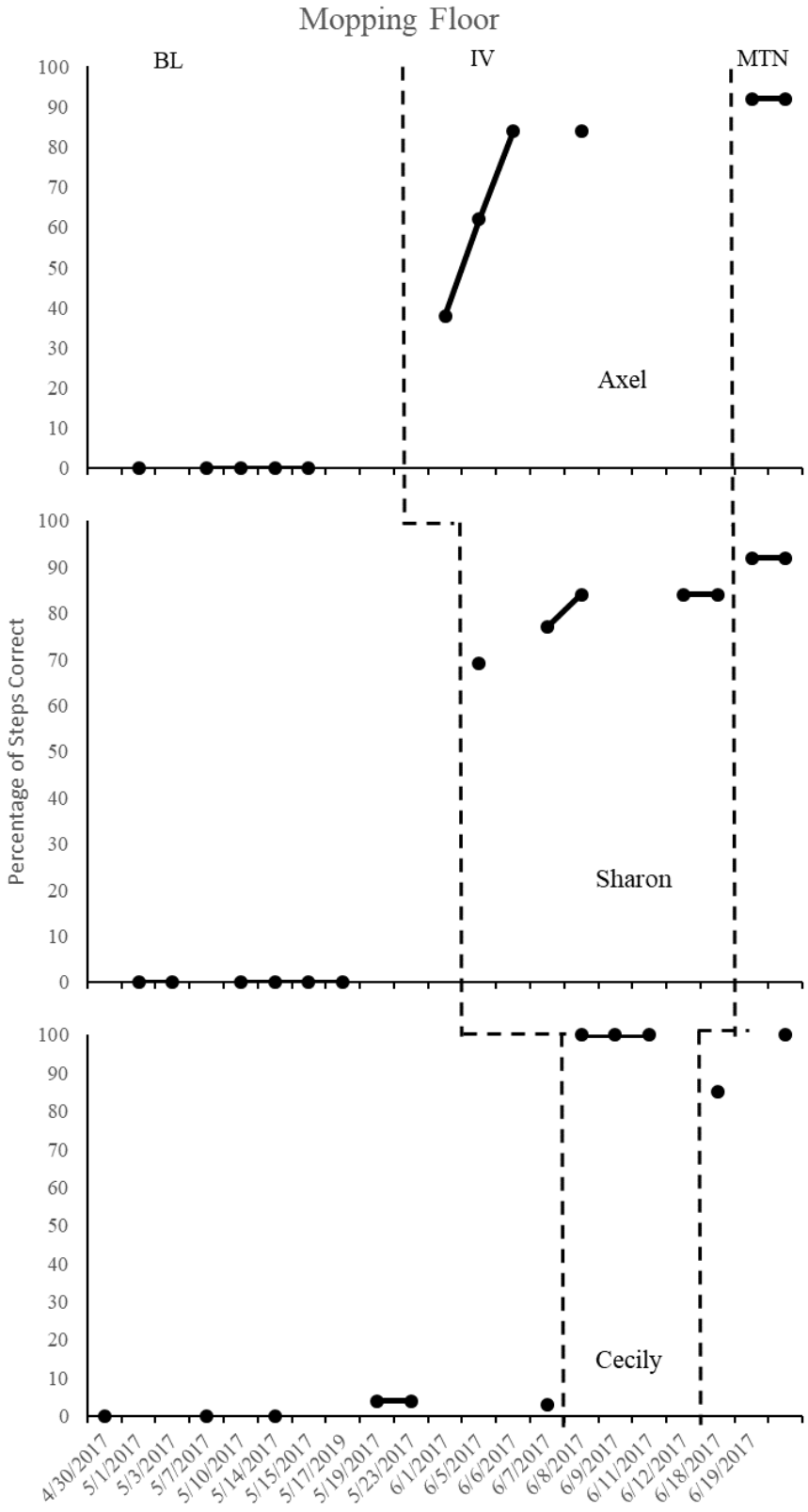

Figure 2. Participants' responding to mopping the floor.

Cleaning Bathroom Mirror (Self-Directed With Limited Instructional Support).

Axel. During baseline, Axel performed the task with 0% accuracy for all five sessions. Once he began intervention, his performance increased from 64% to 100% of steps performed accurately within four sessions, and he had one more maintenance probe at 100% accuracy following mastery. He needed the video of the first three steps of the task analysis and faded the rest after the third session.

Cecily. During five baseline sessions, Cecily performed 0% of the steps accurately. Once we introduced the videos, her performance improved from 66% to 100% of the steps performed accurately in two sessions. Her performance dropped to 66% during the fourth session, and she finished the final session with 100% accuracy. When she achieved the mastery criterion, she needed the video prompt for the first step and then completed the entire sequence independently without watching the video.

Sharon. Sharon performed an average of 3.2% of the steps accurately over five baseline sessions (range: 0–16%). Once she began intervention, her performance improved from 83% to 100% accuracy in three sessions and followed up with two more sessions at 100% accuracy. Videos were faded to the first and third steps. The first step was to begin and collect the needed materials as they were located under the sink where she had not used them before this task. She also needed the video for the third step (i.e., to spray the mirror).

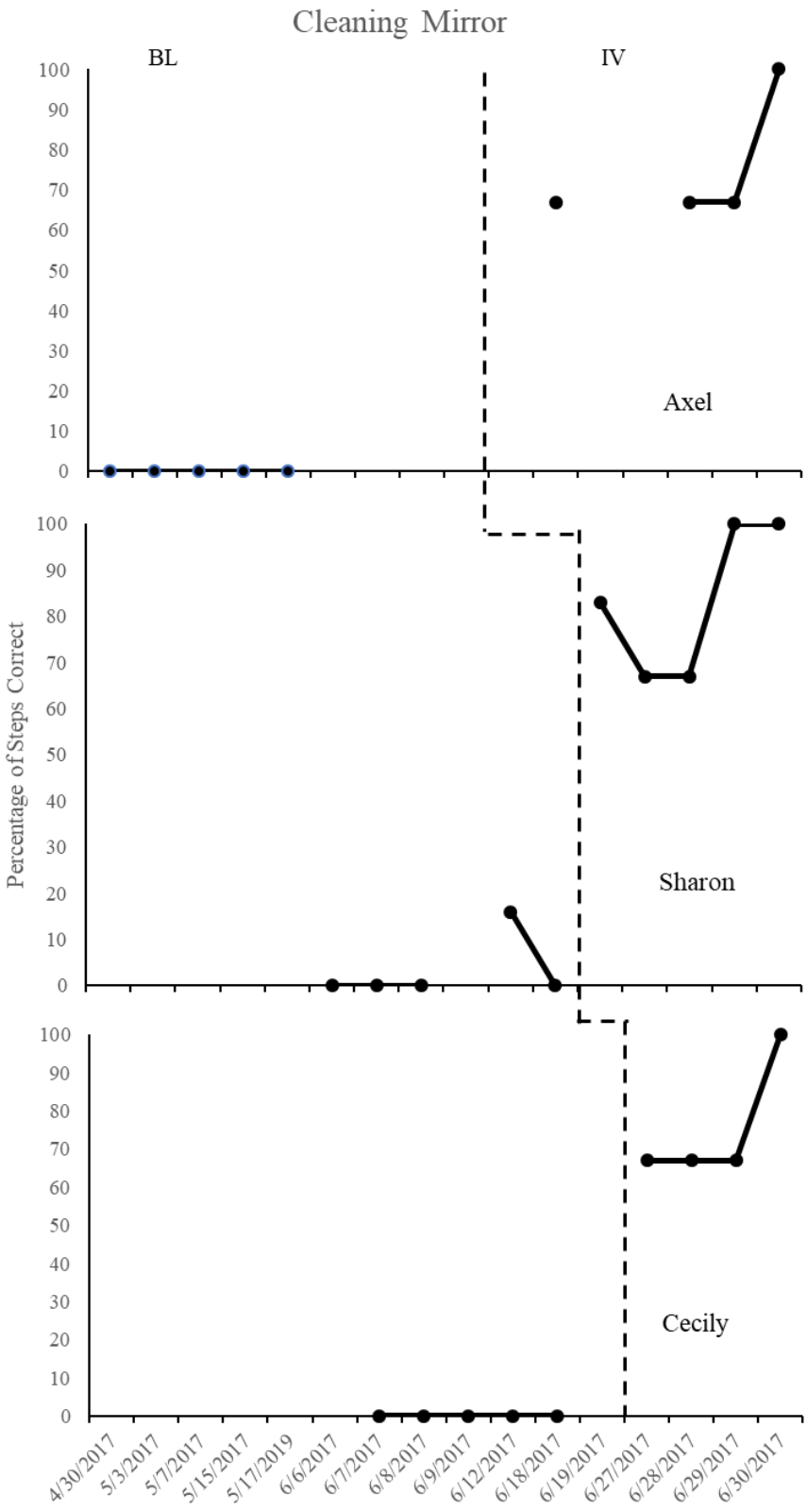

Figure 3. Participants' responding to cleaning a mirror.

Self-direction

Axel. Axel did not become independent with the use of the technology by the final phase. Anecdotal data showed he needed some prompting to direct him to the video, although this was greatly reduced from the second phase. He needed a prompt to look at the video during steps that he took a long time to complete, including spraying and wiping the mirror. This prompt was faded to a simple gestural cue to the phone on these two steps or a verbal cue to "watch the video."

Cecily. Cecily did not become independent in the use of the technology in the final phase. Anecdotal data showed it was necessary to provide a gestural prompt pointing to the iPod Touch to use the video for the first step to pull out the spray and towel placed under the counter throughout each session. She did not need the video to finish the skill.

Sharon. Sharon did not achieve independence with the technology by the final phase. Anecdotal data showed it was necessary to use least-to-most prompting in her final phase to direct her to the iPod Touch for the initial video, and a gestural cue to swipe to the next video to take paper towels from the roll and spray the mirror.

Chapter 4: Discussion

All three of the participants reached mastery of three different skills using video prompting. In some cases, such as Sharon loading the dishwasher, or Axel cleaning the bathroom mirror, they showed immediate and significant progress from baseline after introduction of the video prompts. As the intention of this study was to allow participants to self-direct instruction using video prompting, that goal was not reached in this study with complete mastery. The participants became more independent with the technology, and taught themselves to perform the skill using the technology, but still needed the instructor to prompt them to use the technology, although only minimally in the final phase. By the final phase, the only error correction that was needed was to direct them to the video, and the video was the only intervention they needed to perform the skill as opposed to needing prompting to perform the actual skill.

Although the purpose of the study was to teach the participants to self-direct instruction in daily living skills rather than to fade out video prompting, the participants often faded the prompting on their own. Sharon used the video as a prompt to stay on task more than how to perform the step. She did not need the same videos to complete the task, and often looked at them in the middle of a task she was completing but slowed down or began to become distracted on. Axel needed the video prompt to end a task rather than to begin a task. Only one or two videos of the entire task were needed to perform the task by the end of each phase for all participants.

Limitations

None of the participants became completely independent with the technology during the final phase. They did not require any prompting outside of error correction directed to the video to acquire the skill, but needed instructional support to prompt them to watch the video at certain

times during the skill, or to troubleshoot pressing the wrong button or starting the wrong video. Mastery level for the technology was set at 80% accuracy to progress to the third phase, but perhaps a higher level of mastery would have allowed the students to become independent in self-directing the video prompts.

Axel and Sharon also had periods of behavior highlighted by regression that could affect their ability to complete tasks previously known to them on a regular basis (Williams, Leader, Mannion, & Chen, 2015). Although they acquired all the information, they had some sessions of the study that they regressed. Both of them had some variability in their first and second phase baseline due to regression during these periods of time. When the participants were reportedly having a day exhibiting regression, they responded well to the video prompts more than verbal or physical prompts, and they complied with the video prompt faster than a verbal prompt.

More time on the final phase would have been preferred to fade out the prompting for the video to allow participants to become completely independent. Circumstances arose that affected the availability of the researcher at the end of phase 3 that did not allow maintenance data to be collected, but the participants had reached 100% accuracy on the skill with lessening need for prompting, which was a promising trend. It is believed that maintenance sessions would have shown complete or near complete fading of the prompting needed to use the technology.

Future Research

The participants often needed another prompt to be completely successful in each of these tasks, such as a visual prompt for mopping, or a verbal or gestural redirection to the phone to end a step and begin another. During sessions with Axel, he often needed a verbal prompt to stop pouring the dishwashing liquid or stop spraying the mirror. Although the task was successfully completed, in a real life scenario the overuse of materials would be impractical and

wasteful. A replication of this study with the use of a visual prompt for the mopping, or a verbal prompt for ending a task could examine how to get a participant to complete mastery of a task in a vocational or daily living setting, because it is possible that the participants in this study could have acquired the skill of mopping the floor in fewer trials and acquired the skill independently if we had a built in visual cue such as dry erase marker on the floor to show the boundaries to be mopped. In the third phase of spraying and wiping the mirror or the first phase of pouring the dishwashing liquid, a built in verbal cue such as a voice recording of "1... 2... 3... stop" could also have allowed the students to acquire the skill faster and more completely. This cannot be fully determined without future study.

Participants who were showing behaviors of anxiety and regression appeared to respond better to the video prompts than verbal prompts. Parents reported that when they completed similar tasks with their child it took longer and they had to work harder to get the tasks started. It was noticed during the sessions that the verbal prompt of "let's mop the floor" or "let's load the dishwasher" usually had to be repeated multiple times to get students to the work area, but when we began the video prompting they often got right to work. No data were taken on latency between the offset of the video prompt and onset of the participant beginning the step, so future study would be needed to examine this phenomenon. Studies comparing the latency of a response from video prompting to verbal prompting, or studies comparing the time it takes for a student to calm down when upset using video prompting and verbal prompting would be useful for teachers, parents, and other practitioners.

Individuals with autism have a variety of needs outside of deficits in daily living skills. These include social skills, communication, and sensory dysregulation that require intervention to utilize effective and appropriate methods to manage (Williams et al.,2015). Practitioners use

other methods to teach appropriate social skills, alternative communication, and appropriate ways to manage sensory input. Video prompting could be an intervention used to learn social skills such as reciprocal questioning or appropriate greetings. It could be utilized to teach methods of alternate communication such as using an AAC device to request, or using a visual to request a break. It could also be used to teach an appropriate replacement behavior such as requesting pressure or skin brushing in lieu of self-injury. There are many areas that instruction using video prompting could be utilized for individuals with autism.

Video prompting is a useful and easy tool to teach students daily living skills (Sigafoos et al., 2006). Teachers can easily use a cell phone or class iPad to film steps in a task and play it back for students. Studies of efficacy of practitioners using this method across multiple subjects and skill sets could show how organizations can best use this method across multiple participants in various settings. Comparison studies of prompting software and videos filmed in the photo section may also determine ease of use and efficacy for practitioners.

Given that the level of mastery for independence in the use of technology was 80%, a study with a higher level of mastery in the use of technology may result in complete independence in a final phase with self-directed instruction. This could allow practitioners to know how long to teach the technology before allowing individuals to self-direct instruction.

Practical Implications

Previous studies (e.g., Wu, Cannella-Malone, Wheaton, & Tullis, 2014) have shown that video prompting is an effective way to teach adolescents daily living skills while fading out the video prompt. A study done by Malone and colleagues (2013) successfully taught students to self-direct the video prompts to acquire daily living skills. The data in this study shows that it continues to be an effective way to deliver instruction, but some instructional support is still

needed to use the video prompts to self-direct instruction given the population and delivery of video prompts. In a community setting, this would mean that an adult may need to be present, although not necessarily delivering instruction or engaged with the participant for the entire time they are performing a skill. It may be possible to instruct multiple individuals using this method if instructional support is all that is needed to instruct them using video prompting.

The intervention was easy to implement, as all it required was filming someone performing the skill using technology that is widely available. This could easily be emulated in a classroom or vocational training setting. A teacher or trainer could pull out a personal cell phone or a student's iPad, film part of a task and play it back. It could be a responsive teaching tool as it could easily be used in the moment a student is struggling. The use of this technology as a prompt in a work setting is less stigmatizing than a visual checklist or a job coach delivering prompts. Many students are already comfortable navigating this technology and already carry a device around with them.

Summary

Individuals with severe autism and showing communication, sensory, and processing issues can greatly benefit from video prompting as an intervention. Video prompting is an easy way to provide visual prompting in the moment to a variety of skills that individuals with severe autism show deficits in. This can allow these individuals to become more independent and have better life outcomes.

The participants demonstrated growth with all of the targeted skills and became more independent using the technology. The participants immediately showed growth upon introduction of the videos and either quickly mastered or came close to mastering the skills. The participants in this study had difficulty in independently guiding the video prompt for themselves

and knowing when to end a step of the task and moving on to the next; further prompting was needed. They all become more independent than they first began and showed significant growth in the skills they were being taught. Despite the limitations, this is still a valuable intervention that can give students more independence in acquiring and completing a skill.

Video prompting is an easy method to teach skills to individuals with disabilities that is effective, not socially stigmatizing, as well as time and staff reducing. There are many areas of further study that can further examine how video prompting can be beneficial to individuals with autism, and this study has shown one. Video prompting is becoming a valuable asset for this demographic as well as others that is being used across a variety of disabilities, skills, and methods of presentation.

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