Behavior Analysis in Practice (2020) 13:40–52
https://doi.org/10.1007/s40617-019-00402-0

RESEARCH ARTICLE

A Comparison of Video Modeling and Video Prompting by Adolescents with ASD

Erika M. Thomas[1] · Ruth M. DeBar[1] · Jason C. Vladescu[1] · Dawn Buffington Townsend[2]

Published online: 16 January 2020

Abstract

Video-based instruction has been effective in teaching a range of skills, including functional living skills, to individuals with autism spectrum disorder. Few studies have compared the efficacy and efficiency across video modality—specifically, comparing video modeling to video prompting. Consequently, practitioners have little empirical guidance when selecting between procedural variations of video-based instruction. Using an adaptive alternating-treatments design with a baseline, we evaluated the comparative effectiveness of point-of-view video modeling and video prompting on the percentage of meal preparation tasks completed correctly and on-task behavior with 4 adolescents with autism spectrum disorder. We found video modeling to be effective and efficient in the acquisition of meal preparation skills across 3 of the 4 participants. Across participants, video prompting resulted in more errors than video modeling did. Skills generalized to an untrained location and were maintained at a 3-week follow-up. Stakeholders reported procedures, goals, and outcomes as socially valid.

Keywords Autism spectrum disorder · Adolescents · Functional living skills · Video modeling · Video prompting

Functional living skills remain an important area to address for individuals with autism spectrum disorder (ASD) and include a range of skills important for community participation, including consumer skills (e.g., purchasing skills), office and vocational skills, domestic skills (e.g., food preparation), and self-help skills (e.g., dressing; Ayres, Lowery, & Douglas, 2011). There is a link between functional living skills and independence, whereby independence of functional living skills impacts performance in current and future environments (Ayres et al., 2011).

Modeling has proven to be effective when teaching individuals with ASD and related disorders (e.g., DeQuinzio, Buffington Townsend, Sturmey, & Poulson, 2007; Egel, Richman, & Koegel, 1981). Modeling has been used to teach lengthy response chains (e.g., spelling a name using tiles, using a computer game; Werts, Caldwell, & Wolery, 1996), appropriate affective responses (e.g., DeQuinzio et al., 2007; Gena, McClannahan, & Poulson, 1996), and discrimination tasks (e.g., Egel et al., 1981). Although it is more resource intensive, video-based instruction (VBI)—specifically video modeling (VM)—has been found to be superior to in-vivo modeling (Charlop-Christy, Le, & Freeman, 2000).

Based on modeling, VBI refers to a range of procedures that involve presenting a video as the primary independent variable (Rayner, Denholm, & Sigafoos, 2009). VBI has shown to be effective at establishing a range of adaptive skills, including making purchases in the community (e.g., Haring, Kennedy, Adams, & Pitts-Conway, 1987) and teaching employment interview skills (Hayes et al., 2015). VBI offers several advantages over other instructional strategies when teaching individuals with ASD. Benefits include enhancing relevant stimulus features of the instructional setting while minimizing irrelevant stimulus features, which may help to reduce overselectivity (Hayes et al., 2015). Further, VBI may be useful when resources (i.e., staff) are limited and when staff members lack formal training and expertise (Charlop, Lang, & Rispoli, 2018; LeBlanc et al., 2003; Rayner et al., 2009). Variations of VBI include VM and video prompting (VP).

✉ Ruth M. DeBar
rdebar@caldwell.edu

[1] Department of Applied Behavior Analysis, Caldwell University, 120 Bloomfield Ave, Caldwell, NJ 07006, USA

[2] Institute for Educational Achievement, New Milford, NJ, USA

VM involves viewing a video that demonstrates completion of a task or engagement in a target behavior, then having an opportunity to complete the task or engage in the behavior (e.g., Charlop & Milstein, 1989; Delano, 2007). It has been used to teach vocational skills (e.g., Allen, Wallace, Greene, Bowen, & Burke, 2010a; Allen, Wallace, Renes, Bowen, & Burke, 2010b), daily living skills (e.g., Drysdale, Lee, Anderson, & Moore, 2014; Mechling, Gast, & Seid, 2009; Shipley-Benamou, Lutzker, & Taubman, 2002), appropriate transitions (Cihak, Fahrenkrog, Ayres, & Smith, 2010), and leisure skills (e.g., Blum-Dimaya, Reeve, Reeve, & Hoch, 2010; Hammond, Whatley, Ayres, & Gast, 2010; Macpherson, Charlop, & Miltenberger, 2015) successfully to individuals with ASD and related disorders.

VP consists of presenting a series of brief video clips of discrete steps of a behavior chain (e.g., Mechling et al., 2009) with opportunities to perform the step immediately following each viewing. VP, in conjunction with other instructional procedures (e.g., behavior-specific praise; Adamo et al., 2015), has been effective in establishing daily living skills (e.g., Bereznak, Ayres, Mechling, & Alexander, 2012; Cannella-Malone, Brooks, & Tullis, 2013; Johnson, Blood, Freeman, & Simmons, 2013; Sigafoos et al., 2007), vocational tasks (e.g., Van Laarhoven, Johnson, Van Laarhoven-Myers, Grider, & Grider, 2009), appropriate transitioning (Mechling & Savidge, 2011), meal preparation (e.g., Payne, Cannella-Malone, Tullis, & Sabielny, 2012), and academic tasks (e.g., Hart & Whalon, 2012; Jowett, Moore, & Anderson, 2012).

Few studies have directly compared VM and VP (e.g., Cannella-Malone et al., 2006; Cannella-Malone et al., 2011; Taber-Doughty et al., 2011). By comparing the effectiveness and efficiency of VBI, outcomes may help clinicians when selecting among VBI variations. Cannella-Malone et al. (2006) evaluated the comparative effectiveness of VM and VP on table setting and putting away groceries with adults with developmental disabilities. Tasks were counterbalanced across participants and were assigned to VM or VP using videos filmed from a point-of-view perspective (e.g., the videos or clips depicted only the hands of someone completing the task or step). It was found that VP was more effective across participants. Tasks initially taught via VM were later taught via VP. Although effective, treatment integrity measures were lacking. Additional limitations included the omission of generalization, maintenance, and social validity measures. In addition, the authors did not report any efficiency measures (i.e., the number of errors or sessions to criterion), which could aid in the selection of an intervention.

Cannella-Malone et al. (2011) replicated and extended previous research by using VP, VM, VP plus an error correction, and in-vivo training (if needed) to teach laundry skills and dishwashing to adults with severe developmental disabilities. VP was shown to be more effective across six of the seven participants. For one participant, neither VP nor VM was effective in establishing the skill, although in-vivo instruction was found to be effective. As with the 2006 study, limitations included the lack of treatment integrity and the omission of generalization, maintenance, and social validity measures.

In a subsequent study, VM and VP, in conjunction with a system of least prompts when needed, were compared when teaching three individuals with mild intellectual disabilities cooking skills on an iPod® (Taber-Doughty et al., 2011). During VM, participants viewed the videos and were required to wait for 5 min before beginning the task. After the 5 min, participants were given a paper copy of the recipe and were asked to prepare the meal. During VP, participants were presented with the iPod® and were instructed to pause the video after each step to perform that step; participants were also instructed to rewind and replay a step if they required an additional viewing. Across VBI, the experimenters would provide prompts as necessary when assistance was required. Results were mixed across participants, with marginal differences observed across instructional strategies. For two of the participants, VM was found to be slightly more effective. For a third participant, VP was found to be slightly more effective. Limitations included the lack of assessment of generalization.

We extended previous research by comparing the effectiveness of VM and VP to teach meal preparation tasks to adolescents with ASD. We sought to evaluate (a) the efficacy and efficiency (i.e., number of errors) of VM and VP on meal preparation steps correctly and independently completed by adolescents with ASD, (b) the comparative effects of VM and VP on on-task behaviors, (c) whether meal preparation tasks would generalize to untrained environments and maintain during a 3-week follow-up, and (d) whether teachers and graduate students reported procedures, goals, and outcomes as socially valid.

Method

Participants

Based on teacher report and parental support for the continued development of leisure skills, participants were invited to participate. Four young adults with a diagnosis of ASD from an independent evaluator participated. Inclusionary criteria for participation required (a) a generalized repertoire of motor and object imitation verified by the first author, (b) a daily living skills goal included in his or her individualized education plan or individualized service plan, and (c) a history of independent schedule-following behavior. Participants had a history of using textually based daily schedules across their school day.

Participants had a history of preparing a minimum of four meals that included a maximum of 15 steps using a textual schedule (i.e., Brian, Megan, and Chris) or a pictorial and textual schedule (i.e., Amanda). Participants were reported to have a generalized gross motor imitation repertoire, which was verified via a preexperimental assessment. Participants did not have a history of using VBI. Amanda engaged in problem behaviors (i.e., aggression, self-injury). Brian and Megan both engaged in low levels of stereotypy. All participants used motivational systems throughout their school day.

Prior to the start of the study, the Home Skills Assessment Protocol of the Assessment of Functional Living Skills (Partington & Mueller, 2013) was completed across meals at home and in cooking domains. The Peabody Picture Vocabulary Test, Fourth Edition (Dunn & Dunn, 2007), and the Adaptive Behavior Assessment System, Second Edition (Harrison & Oakland, 2003), were also completed across participants. See Table 1 for assessment outcomes.

Setting, Sessions, and Materials

Participants attended a private school that taught daily living, academic, and vocational skills using principles of applied behavior analysis. The study took place in the kitchen of the school (approximately 5 m by 5 m), which included two high tables and six chairs, a T-shaped counter with a microwave, an oven, a stove, a refrigerator, and two sinks.

Sessions were conducted one to four times per day during regular school hours. The duration of sessions was dependent on the number of errors emitted, condition, and meal preparation (e.g., microwave time, boiling water). Across baseline, probes, VM, and VP, sessions did not exceed 29 min 46 s (range 15 s to 29 min 46 s). Session length during baseline and probe sessions ranged from 16 s to 21 min 48 s. Across VM and VP, session duration ranged from 4 min 13 s to 29 min 46 s.

An Apple second-generation iPad® was used to display videos using the Photo Stream™ application. Video models and video prompts were recorded and shown from the point-of-view perspective. Video models ranged from 1 min 48 s to 5 min 38 s in duration; video prompts ranged from 4 s to 77 s in duration (see Table 2). Video prompts depicted each step of the task analysis for that meal. All videos were recorded in the classroom where participants would prepare the meals using the same materials and equipment.

Based on student-specific schedule-following history, recipes were individualized per participant. Recipes are shown in Figure 1. The format of the recipes was tailored based on the visual supports typically used across daily and leisure schedules. Brian, Megan, and Chris's recipes were created in a numerical vertical format presented in size-12 Cambria font text. Amanda's recipes were presented with size-12 Cambria font text, with one to three pictures (ranging in size from 1.5-1.61 cm to 2.15-3.68 cm).

Table 1 Participant information

	Age (Year:Month)	PPVT: Standard Score	ABAS-II: General Adaptive Composite Score	AFLS: Meals at Home Module	AFLS: Cooking Module
Brian	18:0	24	40	21/58	24/136
Megan	16:6	56	40	26/58	30/136
Chris	21:8	49	80	21/58	23/136
Amanda	20:9	20	40	25/58	34/136

Note. PPVT = Peabody Picture Vocabulary Test, Fourth Edition (Dunn & Dunn, 2007); ABAS-II = Adaptive Behavior Assessment System, Second Edition (Harrison & Oakland, 2003); AFLS = Assessment of Functional Living Skills (Partington & Mueller, 2013).

Dependent Variables

The primary dependent variable was the number of meal preparation steps independently and correctly completed. Data were collected and summarized as the percentage of task components completed correctly and independently in the absence of VBI. Data were collected during probe sessions conducted prior to VM or VP sessions. The mastery criterion per task was three consecutive sessions at 100%.

In addition, the percentage of intervals scored with on-task behavior was collected using a 6-s momentary time sample across the length of the task. Data were collected during VBI (i.e., during VM or VP) and were summarized as the percentage of intervals scored for on-task behavior. To be scored as on task, the participant was required to be physically oriented toward relevant materials (i.e., face within 45° of the iPad®) or physically engaged in the target step or steps of the task analysis. On-task behavior also included complying with an instruction.

To assess the efficiency of each instructional method, the number of errors across interventions was collected and calculated by recording the frequency of errors per session. An error was defined as an incorrect response, no response for 30 s, or engaging in a response that prevented the consumption of the meal.

Experimental Design

An adapted alternating-treatments design with a baseline was used to evaluate the comparative effectiveness of VM and VP, as well as a control condition (Sindelar, Rosenberg, & Wilson, 1985). Tasks were equated by the number of task steps across participants (Cannella-Malone et al., 2006; Cannella-Malone et al., 2011).

Table 2 Recipes across conditions

	Video Modeling (Duration of Video in Seconds)	Video Prompting (Range of Duration in Seconds)
Brian	mac and cheese (198 s)	pasta (6–23 s)
Megan	shrimp lettuce wrap (279 s)	veggie stir-fry (4–42 s)
Chris	waffles with strawberries (338 s)	blueberry oatmeal (6–36 s)
Amanda	English muffin with Nutella (87 s)	NutriBullet smoothie (9–31 s)

Procedure

Preexperimental Assessments Prior to the onset of the study, a video-based generalized imitation assessment, a preference assessment, and a meal preparation assessment were conducted with each participant.

Video-based generalized imitation assessment (GMI) To assess a participant's generalized imitation repertoire when presented with a video model, a video model was presented on an iPad® of an adult model demonstrating one- to two-step gross motor imitation or imitation with objects (specific targets available from the corresponding author) from a spectator's point of view. Five video models were shown per session. To be scored as a correct response, the participant was required to perform the action within 5 s of the video model. Praise and preferred tangibles or edibles (described next) were delivered for each correct and independent imitated response. If the participant did not imitate the target response within 5 s, the experimenter replayed the video clip for a second time. If the participant did not imitate the correct response upon the second presentation, the response was scored as incorrect. The mastery criterion was 90% independence across two consecutive sessions. When participants scored below 50% correct and independent responses across two sessions, graduated guidance was implemented. Brian and Amanda required training to independently imitate videos. Amanda met the mastery criterion after three sessions, and Brian required five sessions of training to mastery.

Preference assessments Teachers of participants were presented with the Reinforcement Assessment for Individuals With Severe Disabilities (RAIS-D; Fisher, Piazza, Bowman, & Amari, 1996) to identify preferred tangibles and edibles. Information obtained from the RAIS-D was used to identify items assessed within a multiple-stimulus without-replacement assessment (MSWO; DeLeon & Iwata, 1996). Highly preferred items or activities (one tangible and one edible per participant) were restricted to experimental sessions and were delivered for correct responding during the video-based GMI assessment. During VBI, when the target food item was not made to completion and during baseline, control, and probe sessions, a choice between highly preferred items or activities was vocally presented at the end of sessions. Preferred items were McDonald's™ fries and an iPad® for Brian, YouTube™ and a hula hoop for Megan, pretzels and a word search for Chris, and Oreos and a snowman stuffed animal for Amanda.

Each condition was assigned a condition-specific correlate based on the results of a color paired-preference assessment (Fisher et al., 1992). Six colors (red, green, blue, yellow, orange, and purple) were presented in pairs to participants. This was conducted to assign moderately preferred colors to each condition to aid in the discrimination of the conditions; specifically, colors selected between 40% and 60% of opportunities were randomly assigned to VM, VP, and control conditions (data available upon request). For Brian, red, blue, and yellow were assigned to VM, VP, and control conditions, respectively. Blue, green, and purple were assigned to VM, VP, and control conditions, respectively, for Megan. Yellow, orange, and green were assigned to VM, VP, and control conditions, respectively, for Chris, and purple, yellow, and orange were assigned to VM, VP, and control conditions, respectively, for Amanda.

Meal preference assessment To identify food preferences and moderately preferred meals and corresponding recipes, a survey was provided to parents. The meal preference survey and data are available upon request. The top five recipes were selected for inclusion in a formal preference assessment using an MSWO (DeLeon & Iwata, 1996). Meals selected between 40% and 60% of opportunities, or the three meals selected the most similar amount of opportunities, were selected for inclusion in the study. Moderately preferred meals were selected to control for preference across meals targeted during VBI instruction. Meals per participant and condition are listed in Table 2.

General procedures Across conditions, we escorted each participant to the kitchen and instructed, "Time to cook [target food]." Prior to beginning each session, participants were presented with a choice of color swatches and asked, "What do you want to cook today?" When the participants selected a color within 10 s, the experimenter presented the corresponding recipe on an adjacent counter. The participant then had the opportunity to prepare the meal. In subsequent sessions, a choice of remaining colors was presented until one color remained. Session termination criteria across baseline, control, generalization, and maintenance conditions included any error in meal preparation that prevented the consumption of the food item or a period of inactivity that exceeded 30 s.

Mac and Cheese
1. Get Mac and Cheese and open
2. Take out Cheese packet
3. Get 1 cup water and put into cup
4. Get spoon and stir macaroni
5. Put cup into microwave and set for 3 minutes
6. When microwave rings, take out cup
7. Get scissors and cup open cheese
8. Pour cheese over pasta and stir
9. Throw away garbage and put away materials

Popcorn
1. Get popcorn box
2. Take out 1 bag and open
3. Place correct side up in microwave
4. Start microwave for 3 minutes
5. Get small container and butter
6. Measure 1 tbsp butter and put into dish
7. Get large bowl
8. When microwave rings, take out popcorn
9. Pinch top of bag to open and pour popcorn into large bowl
10. Put butter in microwave for 20 sec
11. Pour butter over popcorn and put container in sink

Pasta
1. Get pasta, sauce and saucepan
2. Get 1 cup measuring cup and strainer
3. Fill saucepan with water nd put on stove
4. Turn on stove to HIGH then set timer for 7 minutes
5. When timer rings, measure 1 cup pasta and put into saucepan
6. Get wooden spoon, stir pasta and set timer for 5 minutes
7. When timer rings, turn off stove and put saucepan into sink
8. Pour pasta into strainer then put saucepan in sink
9. Pour cooked pasta into bowl and put strainer in sink
10. Pour sauce over pasta then throw away bag
11. Get fork, stir pasta and clean up materials

Broccoli and Cheese
1. Fill saucepan with an inch of water
2. Bring water to a boil
3. Cut broccoli stem off and cut into pieces
4. Add broccoli to boiling water for 5 minutes
5. Strain broccoli and put on plate
6. Get cheese and add 1/4 cup cheese to broccoli

Shrimp Lettuce Wrap
1. Peel and cut shrimp into small pieces
2. Add 2 tbsp white wine vinegar and 1 tsp garlic to shrimp
3. Add 2 tbsp lemon juice and one shake for each dill weed, salt and pepper
4. Mix together seasoning and shrimp
5. Lay flat one piece of lettuce from head
6. Pour shrimp into lettuce and wrap

Veggie Stir Fry
1. Pour 2 tsp olive oil into skillet and turn to HIGH on stove
2. Put frozen veggies into skillet and stir
3. Set timer for 7 min
4. Mix together 2 tbsp soy sauce, 1 tsp onion salt, and 1 tbsp brown sugar in bowl
5. Add 2 tsp peanut butter and stir until smooth
6. Add mixture to skillet when timer rings, mix and pour into bowl

Blueberry Oatmeal
1 cup milk
1/2 cups Quaker Oats
1/3 cup Brown Sugar
Salt
Cinnamon
1/4 cup Blueberries
1. Heat milk in saucepan on stove for 3 minutes
2. Mix in Oats and one shake of salt into warm milk for 1 minute
3. Add in brown sugar and two shakes of cinnamon, mix for 30 seconds
4. Top oatmeal with blueberries in bowl

Pasta
1 cup Pasta
1/4 pasta sauce
1. Bring water in saucepan to boil
2. Add pasta to boiling water and stir
3. Cook pasta for 5 minutes
4. Strain cooked pasta and add sauce
5. Stir sauce into pasta

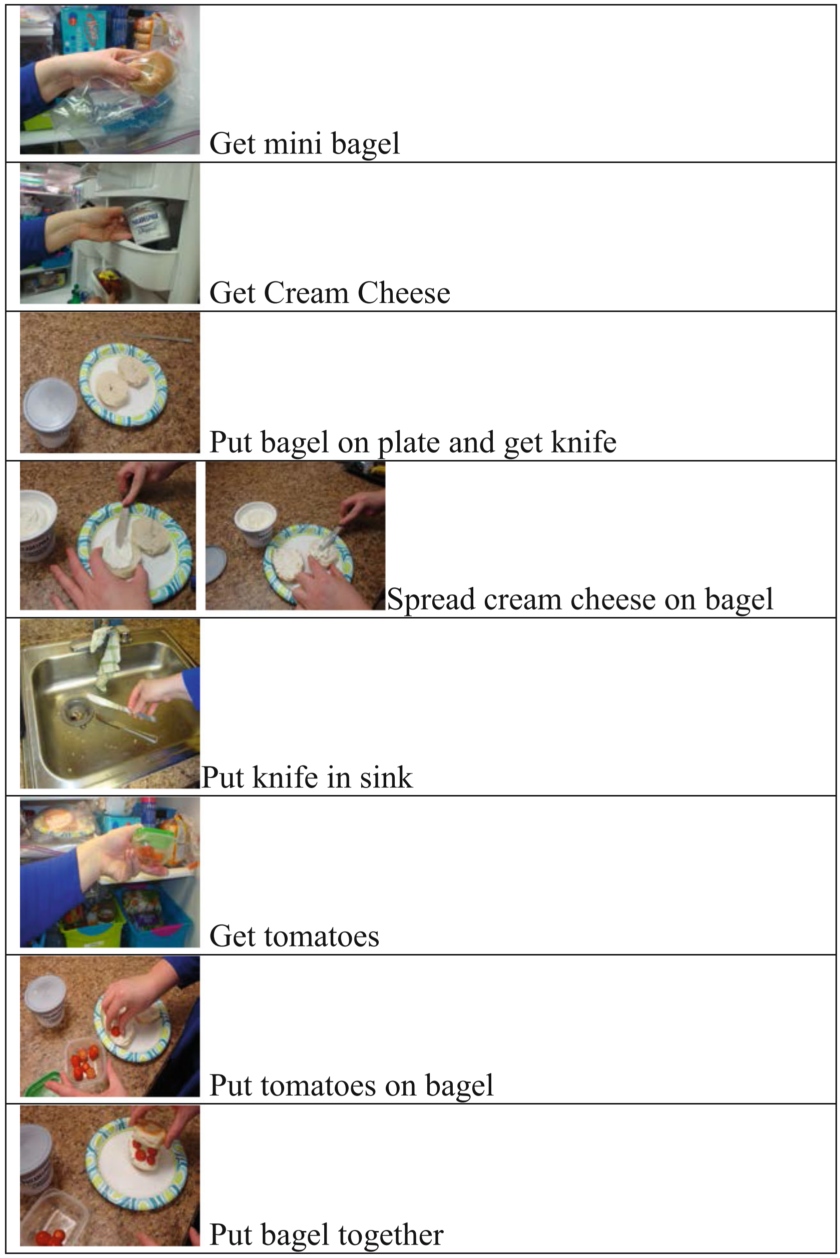
Waffles with Strawberries
2 Eggo Waffles
1 tbsp Syrup
Strawberries
1. Put waffles in toaster
2. Slice four strawberries and rinse
3. Put waffles on plate when cooked
4. Add strawberries
5. Add syrup
6. Cut waffles into bite size pieces

Fig. 1 Sample recipes for Brian (top row), Megan (middle row), and Chris (bottom row)

Baseline During baseline, participants were brought to the kitchen and were presented with the recipe for the target food. Participants were instructed by the experimenter that it was “Time to cook [target food].” No further prompts or directions were given.

VM VM sessions began by placing an iPad® in direct view of the participant with the Photos app opened. A screenshot of the video was shown on the iPad® screen, and the participant was provided an opportunity to press play. After viewing the

Fig. 2 Sample recipe for Amanda



video twice (e.g., Charlop & Milstein, 1989), the experimenter stated, "Time to cook [target food]," and the participant had the opportunity to prepare the recipe. When the participant did not press play within 10 s, the experimenter modeled pressing play on the iPad®, reset the video, and instructed the participant with "Now you try." At the end of the session, the participant was given the opportunity to consume the food prepared.

When an error occurred, the experimenter gave the vocal direction "Wait" in a neutral tone, turned the participant away from the meal preparation task and view of materials, and completed the step of the task analysis that evoked an error. Once that step was completed, the experimenter repositioned the participant to continue the meal preparation task and gave the vocal direction "Keep cooking." Otherwise, no prompts or programmed consequences were provided. At the end of the session, the participant was given the opportunity to consume the food prepared.

VP VP sessions were conducted similarly to VM sessions; however, brief videos were presented that modeled individual links of the behavior chain. After viewing the brief video, the participant was given the opportunity to complete that step within 10 s. Subsequent steps must have been completed within 10 s of the conclusion of the video clip to be scored as correct. After completing that step, the participant would return to the iPad® and view the next video. This would continue until videos were viewed and subsequent steps in the task analysis were completed. If the participant did not independently return to the iPad® after completing a step, the experimenter escorted the participant to the iPad®, gave the vocal direction “Watch me,” swiped to the next video clip, swiped to the former video in view, and gave the vocal direction “Now you do it.” The same error correction procedure as in VM was used in VP. At the end of the session, the participant was given the opportunity to consume the food prepared.

Control condition During the control condition, sessions were implemented as during baseline. A recipe was presented on the counter, and participants were given the vocal direction “Time to cook [target food].” No videos, prompts, or programmed consequences were provided during control condition sessions.

Generalization probes Generalization probes were conducted pre- and postintervention to assess stimulus generalization of skills in an untrained location. Generalization probes were conducted in a kitchen not associated with training. During generalization probes, the participants were instructed with “Time to cook [target food].” Recipes were presented, although no videos were used.

Maintenance Maintenance data were collected 3 weeks postmastery. During maintenance probes, participants were escorted to the kitchen, presented with the necessary materials for the target cooking tasks (including a recipe), and were instructed with “Time to cook [target food].” After maintenance probes, the participant was provided an opportunity to consume the food prepared. During maintenance probes, there were no programmed consequences for performance.

Social validity Social validity was assessed across procedures, goals, and outcomes using a 5-point Likert-type scale—from *strongly agree* (1) to *strongly disagree* (5) with 3 being a neutral response—with teachers and graduate students enrolled in master’s or doctoral programs in applied behavior analysis. Video recordings from baseline and maintenance of a participant preparing a recipe were presented to respondents in random order across respondents who were not informed of the condition presented (i.e., baseline or maintenance). Surveys were submitted anonymously.

Interobserver agreement Interobserver agreement (IOA) was collected by a trained instructor on the components of meal preparation tasks completed correctly per participant per task. An agreement was defined as both observers scoring a step of the task analysis in the same way (i.e., as a correct response or as an incorrect response). Data were calculated using the formula of total agreements, divided by agreements plus disagreements, multiplied by 100.

Data were collected for 87%, 78%, 81%, and 74% of sessions for Brian, Megan, Chris, and Amanda, respectively. Mean IOA data equaled 100% for baseline, pregeneralization, and postgeneralization, for Brian, Megan, Chris, and Amanda. Across participants, mean IOA during VM ranged from 98% to 100%. During VP, IOA data ranged from 93% to 100%. During the control, mean IOA data ranged from 99% to 100% across participants. Mean IOA across participants during maintenance ranged from 97% to 100%.

Procedural integrity Procedural integrity data were collected by a second observer on the appropriate implementation of study procedures using condition-specific checklists from video-recorded sessions (e.g., Is the iPad® positioned on the counter? Is the correct color card out for the VBI method used in that session? Is the correct discriminative stimulus given? Is the participant given a choice of a preferred item or a meal at the end of the session?). All observers were trained using video recordings and written protocols. Training continued until a criterion of 100% for two consecutive sessions had been met.

Data were collected for 87%, 78%, 81%, and 74% of sessions for Brian, Megan, Chris, and Amanda, respectively. For Brian, Megan, and Chris, mean procedural integrity data were 100% for baseline, pre- and postgeneralization, VM, VP, and maintenance. Mean procedural integrity during control equaled 98% for Brian and Chris. For Amanda, mean procedural integrity data during VM equaled 99%, during VP equaled 95%, and during the control condition equaled 90%.

Results

Figure 3 shows the percentage of task components completed correctly and independently in the absence (probe data) of VBI across food items for Brian (top row), Megan (second row), Chris (third row), and Amanda (bottom row) across baseline and experimental conditions. Across participants, few to no task components were independently completed correctly during baseline. Once VM and VP were introduced, responding increased across participants, whereas performance during the control remained low. After VM was implemented for mac and cheese, Brian (top row) mastered the skill across 10 sessions during probe sessions ($M = 63\%$; range 0%–100%). After a 3-week follow-up, Brian performed 92% of task components of mac and cheese correctly. Preparing mac and cheese generalized to an untrained location; Brian completed 92% of task components correctly. After VP was implemented for making pasta, Brian mastered the skill across eight sessions in the absence of video intervention with a mean of 44% (range 0%–100%). After a 3-week follow-up, Brian independently

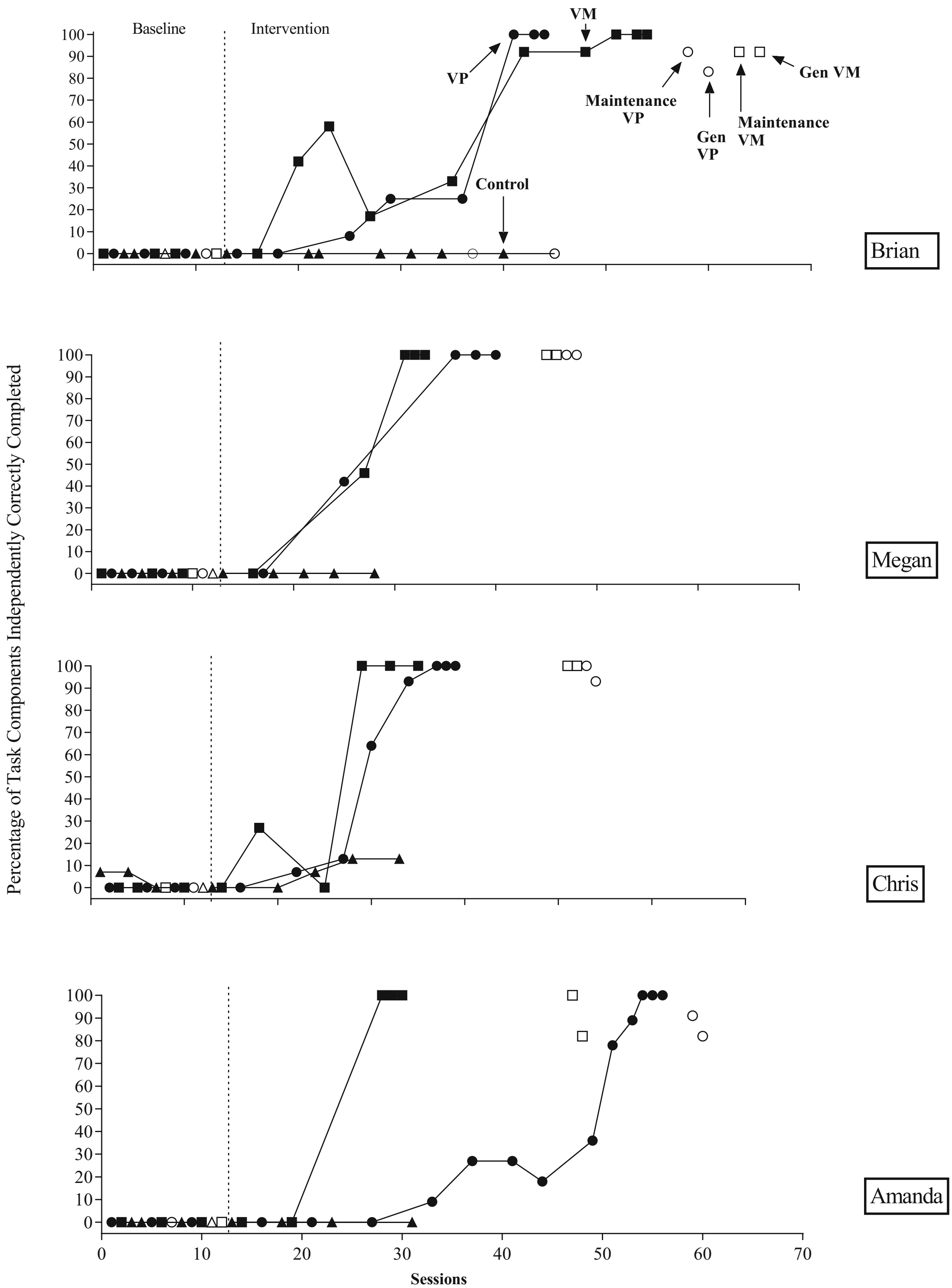


Fig. 3 Percentage of task components completed correctly and independently for Brian (top row), Meghan (second row), Chris (third row), and Amanda (bottom row). VP = video prompting; VM = video modeling; GP = generalization probe.

completed 92% of task components of making pasta correctly and displayed generalized responding in an untrained location by completing 83% of task components correctly.

As shown in the second row, after VM was implemented for the shrimp lettuce wrap, Megan showed rapid acquisition and mastered the skill across five sessions with a mean of 69%

(range 0%–100%). After a 3-week follow-up, Megan performed 100% of the task components for making a shrimp lettuce wrap correctly. She also performed 100% of the task components correctly for making a shrimp lettuce wrap in the untrained location, demonstrating generalized responding. After VP was implemented for making veggie stir-fry, Megan mastered the skill across five sessions during probe sessions (M = 68%; range 0%–100%). After a 3-week follow-up, Megan completed 100% of the task components correctly for making veggie stir-fry.

After VM was implemented for making waffles with strawberries (third row), Chris rapidly acquired and mastered the skill within six sessions during probe sessions (M = 55%; range 0%–100%). After mastery, he prepared waffles with strawberries 100% correctly and independently during a 3-week follow-up and in an untrained kitchen during a generalization probe. After VP was implemented for blueberry oatmeal, Chris mastered the skill across eight sessions (M = 60%; range 0%–100%). After a 3-week follow-up, Chris prepared blueberry oatmeal 100% correctly in both the trained and untrained kitchen locations.

For Amanda (bottom row), after VM was implemented for making an English muffin with Nutella, Amanda showed rapid acquisition and mastered the skill across five sessions (M = 60%; range 0%–100%). After a 3-week follow-up, Amanda prepared an English muffin with Nutella 100% correctly. She completed 82% of components correctly in the untrained kitchen. After VP was implemented for making a NutriBullet fruit smoothie, Amanda mastered the skill in 13 sessions in the absence of video models (M = 45%; range 0%–100%). After a 3-week follow-up, Amanda performed 91% of task components correctly, as well as 82% of task components correctly in the untrained kitchen.

Figure 4 shows the percentage of on-task behavior scored for Brian (top row), Megan (second row), Chris (third row), and Amanda (bottom row) across baseline and experimental conditions. During baseline, Brian did not emit an on-task behavior across conditions. Once VBI was introduced, on-task behavior was variable during the control condition, although it was more stable during VP and VM. For Brian, VP resulted in the highest levels of on-task behavior. For Megan, on-task behavior occurred at a low to moderate level during baseline. Following VBI, on-task behavior increased across VP and VM and during the control, which resulted in the most on-task behavior. Moderate levels of on-task behavior were observed during baseline for Chris. Following the introduction during VBI, higher levels of on-task behavior were observed during both VM and VP. Amanda was not observed to engage in any on-task behavior during baseline. Following the introduction of VM and VP, on-task behavior increased during both conditions and remained low during the control.

Table 3 shows the number of errors across participants and interventions. Across participants, VM resulted in the fewest

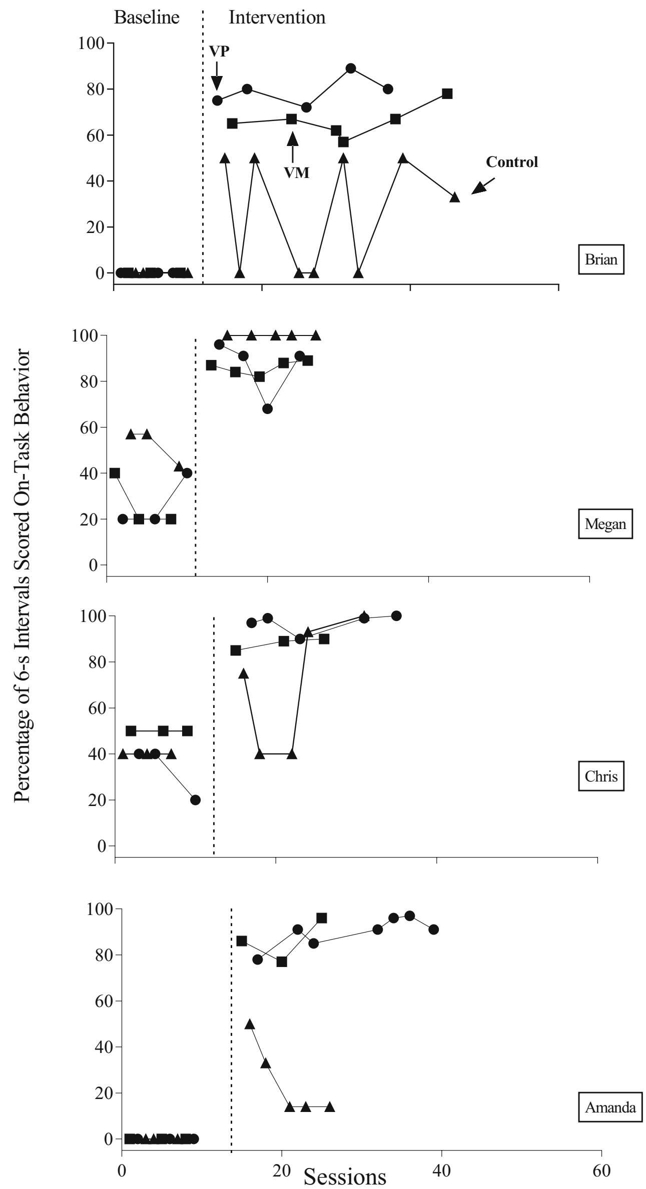


Fig. 4 Percentage of intervals scored as on task for Brian (top), Meghan (second row), Chris (third row), and Amanda (bottom row). VP = video prompting; VM = video modeling.

number of errors compared to VP. With VM, the number of errors ranged from 8 to 20, whereas during VP, errors ranged from 12 to 63.

Results of the social validity questionnaire are presented in Table 4. Respondents included 28 teachers and 12 graduate students in the field of applied behavior analysis. Respondents

Table 3 Number of errors

	Brian	Megan	Chris	Amanda	Mean
Video modeling	14	18	8	20	15
Video prompting	31	30	12	63	34

Table 4 Social validity questionnaire results

	Mean	Range
After watching Video 1, I feel the participant is proficient at completing the skill.	1.2	1–2
After watching Video 2, I feel that the participant is proficient at completing the skill.	4.3	1–5
The identified tasks are important ones for adolescents and young adults with autism to learn for independent living.	1.1	1–2
Creating the videos for both video modeling and video prompting requires preparation and preplanning (e.g., gathering materials, writing task analyses). Would you be willing to spend time to create videos for individual skills?	1.3	1–2
This process required the use of technology such as iPad® applications, iMovie, and a program to convert videos for the iPad® to create the videos. Would you feel technologically capable of performing these tasks to create videos to use for instruction?	1.6	1–3
Creating these videos required the use of at least two individuals because they were recorded from a point-of-view perspective. Would you be willing to expend the resources to create these videos with at least two members of your staff?	1.3	1–2
If you could purchase premade videos for cooking tasks, would you be willing to do so to teach skills to your students?	1.4	1–3

had at least a bachelor's degree in a related field and were unfamiliar with the participants. Data indicate that respondents were able to identify videos where skills were absent and present, reported that they were capable of using iPad® technology and computer applications to create videos, and reported a willingness to expend resources by using two or more members of staff to develop and create instructional materials.

Discussion

We sought to replicate and extend findings of prior research on the comparative effectiveness of VM and VP (Cannella-Malone et al., 2006; Cannella-Malone et al., 2011). Specifically, we attempted to extend research by comparing the effectiveness of VM and VP on an iPad® to teach meal preparation tasks to adolescents with ASD by assessing efficiency across number of errors, the generalization of skills from trained to untrained environments, and the maintenance of skills across a 3-week follow-up. In addition, we assessed on-task behavior and evaluated the social significance of the procedures, goals, and outcomes.

We found VM to be the more effective intervention to teach meal preparation tasks to three participants, with the fourth acquiring the skill taught with VP more rapidly. For two of the four participants, VM resulted in fewer sessions to criterion. For one participant, there was no difference between VBI methods. For the final participant, VP was slightly more efficient with regard to sessions to mastery. Regarding errors, VP resulted in more errors across participants. It is unclear why more errors occurred during VP than during VM. Anecdotally, it may be that the window for error was more stringent during VP than during VM. A task analysis step could have been completed in any order and scored as correct. During VP, there was little room for deviating from the order of the task analysis. This is a limitation and may have inflated the number of errors emitted during VP. This may have contributed to the effectiveness of the intervention. Future research should continue to explore factors that impact errors emitted during VBI. In addition, the placement of the iPad® for VM and VP may have affected the number of errors across participants. During VM, the iPad® was placed on the table, and the participants were seated to view the video twice. During VP, the iPad® was placed on the counter with the participant standing in front of the iPad® to view the video prior to completing the step. During VP, anecdotally, some participants initially attempted to complete the step while the video was playing rather than viewing it entirely first. This may have prohibited participants from viewing the entire video and resulted in omitting behaviors of the step. It is possible that this difference impacted the number of errors during VP.

Moreover, we also found that for three of the four participants, on-task behavior improved over baseline and relative to the control with the introduction of VBI. Across on-task behavior, levels of on-task behavior were similar across both VM and VP. In addition, participants in the current study had a higher mean of on-task behavior during skills taught through VP, albeit marginal. The brevity of the duration of the videos used during VP, as compared to the duration of the videos used during VM, may have impacted on-task behavior. Variables impacting on-task behavior should be explored in future research. Although not directly recorded, it was anecdotally observed that participants were less on task during the second viewing of the video during VM. This clinical observation warrants research on the optimal number of viewings of a video that is required.

It was found that skills generalized to an untrained kitchen and maintained at near-criterion levels over a 3-week follow-up. All participants showed higher levels of performance during postgeneralization probes compared to pregeneralization probes in the untrained kitchen, indicating that responses generalized from trained to untrained locations. Although behaviors generalized to the untrained kitchen, both kitchens were equipped with similar cooking utensils. Although not specifically arranged, this may have promoted programming for common stimuli (Stokes & Baer, 1977) and may have meaningfully enhanced responding in the untrained location. It is unclear if participants would demonstrate skills in untrained locations with untrained food or kitchen utensils. In addition, videos were very specific to the targeted foods (e.g., a specific brand of blueberries, one specific measuring cup). Although the same brands of foods were used in the untrained kitchen location, videos depicting specific brand name foods could impact the generalization of skills to various settings (e.g., home, group home). After a 3-week follow-up, participants continued to display near-criterion levels of performance across meals and in the absence of VBI. Although we removed iPad® across both VM and VP during both generalization and maintenance, it may not be appropriate to eliminate the presence of the device. In fact, it may prove more beneficial to have the device present during meal preparation. In the future, researchers should explore conditions under which the iPad® should be accessible or not.

Last, teachers, therapists, and graduate students indicated that the skills taught were important for this population to learn, that the participants did not display the skills prior to instruction, and that a meaningful behavior change was observed after VBI. In addition, most teachers, therapists, and graduate students agreed that they would feel comfortable using these devices and the applications required to create videos. This indicates that VBI could be worth the time and resources required. Respondents also agreed that they would be interested in purchasing premade videos for meal preparation tasks if available. Despite the positive outcomes reported by respondents, we did not evaluate the social validity of the specific VBI procedures (i.e., VP or VM). It may be beneficial to assess whether respondents would rank procedural variations of VBI differently.

This study adds to the previous body of literature comparing VM to VP while evaluating efficiency measures across errors, assessing generalization in an untrained location (Allen, Wallace, Greene, et al., 2010; Charlop & Milstein, 1989; Haring et al., 1987; Shipley-Benamou et al., 2002), assessing the maintenance of skills over time (e.g., Allen, Wallace, Renes, et al., 2010; Sigafoos et al., 2007), and assessing on-task behavior of participants, which has been explored infrequently (e.g., Blum-Dimaya et al., 2010).

Results of this study are in congruence with prior literature that has found VBI to be an effective strategy to teach daily living skills to individuals with ASD (e.g., Bereznak et al., 2012; Charlop & Milstein, 1989; Delano, 2007; Mechling, Gast, & Fields, 2008; Rayner, 2011; Sigafoos et al., 2005). We found VM to be the more effective and efficient intervention compared to VP based on the percentage of task components completed correctly for three of four participants and for all participants across the number of errors to criterion. This is not in agreement with previous literature comparing VM and VP (Cannella-Malone et al., 2006; Cannella-Malone et al., 2011), which found VP to be the more effective intervention across the percentage of task components completed correctly across participants.

Future research could address the limitations identified. Our participants learned across both VM and VP. It is possible that our participants' specific characteristics positively impacted our findings. Although our participants lacked a history of using VBI, our participants had a history of successfully preparing food and following schedules, which may have impacted our results. It is important to replicate these procedures with participants who do not have a history of these skills. In addition, future research should explore the efficacy and efficiency of VM, VP, and a non-VBI (e.g., textual activity schedules or in-vivo modeling). Future research should compare VBI outcomes across other tasks (e.g., vocational tasks, leisure tasks)—specifically, evaluating the efficacy and efficiency of VBI modalities using portable technology. Finally, it is important to evaluate the conditions under which different types of VBI are most efficacious and efficient. For example, it remains unknown whether the effectiveness and efficiency of VBI are sensitive to the duration of models, types of tasks, or complexity of tasks or whether outcomes are affected across discrete or continuous behaviors. It would behoove future researchers to explore questions related to better understanding the variables that may impact the efficacy and efficiency of VBI.

In addition, we assessed efficiency by recording errors to mastery. Future research should continue to explore optimal means to assess efficiency, such as duration in preparing instructional materials or duration to mastery. We attempted to control for task difficulty across the targeted recipes by equating the number of steps per task. Although it has been included in previous research (e.g., Cannella-Malone et al., 2006) as a method to control for difficulty, equating the number of steps per task does not account for the level of difficulty across steps. Future research should explore additional means to equate task difficulty across efficacy and efficiency skill-acquisition explorations.

Recent advances in technology have supported the use of iPods® and iPads® for individuals with disabilities in order to assist in independence (e.g., Bereznak et al., 2012; Johnson et al., 2013). This study used an iPad® to display videos to participants and provided the opportunity for participants to independently navigate the device. All participants easily acquired the ability to navigate through the VP clips and initiate the video during VM. This suggests the use of an iPad® is an effective medium to promote independence in meal preparation. In closing, VBI is an effective instructional approach for teaching a wide range of responses, especially for individuals with ASD and related disorders.

Author note Erika M. Thomas, Caldwell University; Ruth M. DeBar, Department of Applied Behavior Analysis, Caldwell University; Jason C. Vladescu, Caldwell University; Dawn Buffington Townsend, Institute for Educational Achievement.

This study is based on a thesis submitted by the first author, under the supervision of the second author, to the Department of Applied Behavior Analysis at Caldwell University for the master of arts in applied behavior analysis.

Funding No funding was received for this study.

Compliance with Ethical Standards

Conflict of Interest All authors declare that they have no conflicts of interest related to this pursuit.

Ethical Approval All procedures performed involving human participants were in accordance with ethical standards of the institutional research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

Informed Consent Informed consent was obtained from the parents of all individual participants included in the study.

References

Adamo, E. K., Wu, J., Wolery, M., Hemmeter, M. L., Ledford, J. R., & Barton, E. E. (2015). Using video modeling, prompting, and behavior-specific praise to increase moderate-to-vigorous physical activity for young children with Down syndrome. *Journal of Early Intervention, 37*(4), 270–285. https://doi.org/10.1177/1053815115620211.

Allen, K. D., Wallace, D. P., Greene, D. J., Bowen, S. L., & Burke, R. V. (2010a). Community-based vocational instruction using videotaped modeling for young adults with autism spectrum disorders performing in air-inflated mascots. *Focus on Autism and Other Developmental Disabilities, 25*, 186–192. https://doi.org/10.1177/1088357610377318.

Allen, K. D., Wallace, D. P., Renes, D., Bowen, S. L., & Burke, R. V. (2010b). Use of video modeling to teach vocational skills to adolescents and young adults with autism spectrum disorders. *Education and Treatment of Children, 33*, 339–349. https://doi.org/10.1353/etc.0.0101.

Ayres, K. M., Lowrey, K. A., Douglas, K. H., & Sievers, C. (2011). I can identify Saturn but I can't brush my teeth: What happens when the curricular focus for students with severe disabilities shifts? *Education and Training in Autism and Developmental Disabilities, 46*, 11–21. https://doi.org/10.1177/0885728809336656.

Bereznak, S., Ayres, K. M., Mechling, L. C., & Alexander, J. L. (2012). Video self-prompting and mobile technology to increase daily living and vocational independence for students with autism spectrum disorders. *Journal of Developmental and Physical Disabilities, 24*, 269–285. https://doi.org/10.1007/s10882-012-9270-8.

Blum-Dimaya, A., Reeve, S. A., Reeve, K. F., & Hoch, H. (2010). Teaching children with autism to play a video game using activity schedules and game-embedded simultaneous video modeling. *Education and Treatment of Children, 33*, 351–370. https://doi.org/10.1353/etc.0.0103.

Cannella-Malone, H. I., Brooks, D. G., & Tullis, C. A. (2013). Using self-directed video prompting to teach students with intellectual disabilities. *Journal of Behavioral Education, 22*, 169–189. https://doi.org/10.1007/s10864-013-9175-3.

Cannella-Malone, H. I., Fleming, C., Chung, Y.-C., Wheeler, G. M., Basbagill, A. R., & Singh, A. H. (2011). Teaching daily living skills to seven individuals with severe intellectual disabilities: A comparison of video prompting to video modeling. *Journal of Positive Behavior Interventions, 13*(6), 44–53.

Cannella-Malone, H., Sigafoos, J., O'Reilly, M., de la Cruz, B., Edrisinha, C., & Lancioni, G. E. (2006). Comparing video prompting to video modeling for teaching daily living skills to six adults with developmental disabilities. *Education and Training in Developmental Disabilities, 41*(6), 344–356.

Charlop, M. H., Lang, R., & Rispoli, M. (2018). Lights, camera, action! Teaching play and social skills to children with autism spectrum disorder through video modeling. In *Play and social skills for children with autism spectrum disorder* (pp. 71–94). Cham, Switzerland: Springer.

Charlop, M. H., & Milstein, J. P. (1989). Teaching autistic children conversational speech using video modeling. *Journal of Applied Behavior Analysis, 22*(3), 275–285.

Charlop-Christy, M. H., Le, L., & Freeman, K. A. (2000). A comparison of video modeling with in vivo modeling for teaching children with autism. *Journal of Autism and Developmental Disabilities, 30*, 537–552. https://doi.org/10.1023/A:1005635326276.

Cihak, D., Fahrenkrog, C., Ayres, K. M., & Smith, C. (2010). The use of video modeling via a video iPod and a system of least prompts to improve transitional behaviors for students with autism spectrum disorders in the general education classroom. *Journal of Positive Behavior Interventions, 12*, 103–115. https://doi.org/10.1177/1098300709332346.

Delano, M. E. (2007). Video modeling interventions for individuals with autism. *Remedial and Special Education, 28*, 33–42. https://doi.org/10.1177/07419325070280010401.

DeLeon, I. G., & Iwata, B. A. (1996). Evaluation of a multiple-stimulus presentation format for assessing reinforcer preferences. *Journal of Applied Behavior Analysis, 29*, 519–533. https://doi.org/10.1901/jaba.1996.29-519.

DeQuinzio, J. A., Buffington Townsend, D., Sturmey, P., & Poulson, C. L. (2007). Generalized imitation of facial models by children with autism. *Journal of Applied Behavior Analysis, 40*, 755–759. https://doi.org/10.1901/jaba.2007.755-759.

Drysdale, B., Lee, C. Y. Q., Anderson, A., & Moore, D. W. (2014). Using video modeling incorporating animation to teach toileting to two children with autism spectrum disorder. *Journal of Developmental and Physical Disabilities, 27*, 149–165. https://doi.org/10.1007/s10882-014-9405-1.

Dunn, D. M., & Dunn, L. M. (2007). *Peabody Picture Vocabulary Test (4th ed.) [Manual]*. Minneapolis, MN: NCS Pearson.

Egel, A. L., Richman, G. S., & Koegel, R. L. (1981). Normal peer models and autistic children's learning. *Journal of Applied Behavior Analysis, 14*, 3–12. https://doi.org/10.1901/jaba.1981.14-3.

Fisher, W. W., Piazza, C. C., Bowman, L. G., & Amari, A. (1996). Integrating caregiver report with a systematic choice assessment. *American Journal on Mental Retardation, 25*(2), 15–25.

Fisher, W. W., Piazza, C. C., Bowman, L. G., Hagopian, L. P., Owens, J. C., & Slevin, I. (1992). A comparison of two approaches for identifying reinforcers for persons with severe and profound disabilities. *Journal of Applied Behavior Analysis, 25*, 491–498. https://doi.org/10.1901/jaba.1992.25-491.

Hammond, D. L., Whatley, A. D., Ayres, K. M., & Gast, D. L. (2010). Effectiveness of video modeling to teach iPod use to students with moderate intellectual disabilities. *Education and Training in Autism and Developmental Disabilities, 45*(4), 525–538.

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

Behavior Analysis, 20, 89–96. https://doi.org/10.1901/jaba.1987.20-89.

Harrison, P. L., & Oakland, T. (2003). *Adaptive behavior assessment system* (2nd ed.). San Antonio, TX: The Psychological Corporation.

Hart, J. E., & Whalon, K. J. (2012). Using video self-modeling via iPad®s to increase academic responding of an adolescent with autism spectrum disorder and intellectual disability. *Education and Training in Autism and Developmental Disabilities, 47*(4), 438–446.

Hayes, G. R., Custodio, V. E., Haimson, O. L., Nguyen, K., Ringland, K. E., Uglado, R. R., et al. (2015). Mobile video modeling for employment interviews for individuals with autism. *Journal of Vocational Rehabilitation, 23*, 275–287. https://doi.org/10.3233/JVR-150775.

Johnson, J. W., Blood, E., Freeman, A., & Simmons, K. (2013). Evaluating the effectiveness of teacher-implemented video prompting on an iPod touch to teach food-preparation skills to high school students with autism spectrum disorders. *Focus on Autism and Other Developmental Disabilities, 28*, 147–158. https://doi.org/10.1177/1088357613476344.

Jowett, E. L., Moore, D. W., & Anderson, A. (2012). Using an iPad®-based video modelling package to teach numeracy skills to a child with an autism spectrum disorder. *Developmental Neurorehabilitation, 15*(4), 304–312. https://doi.org/10.3109/17518423.2012.682168.

LeBlanc, L. A., Coates, A. M., Daneshvar, S., Christy-Charlop, M. H., Morris, C., & Lancaster, B. M. (2003). Using video modeling and reinforcement to teach perspective taking skills to children with autism. *Journal of Applied Behavior Analysis, 36*, 253–257. https://doi.org/10.1901/jaba.2003.36-253.

Macpherson, K., Charlop, M. H., & Miltenberger, C. A. (2015). Using portable video modeling technology to increase the compliment behaviors of children with autism during athletic group play. *Journal of Autism and Developmental Disorders, 45*, 3836–3845. https://doi.org/10.1007/s10803-014-2072-3.

Mechling, L. C., Gast, D. L., & Fields, E. A. (2008). Evaluation of a portable DVD player and system of least prompts to self-prompt cooking task completion by young adults with moderate intellectual disabilities. *The Journal of Special Education, 42*(3), 178–190.

Mechling, L. C., Gast, D. L., & Seid, N. H. (2009). Using a personal digital assistant to increase independent task completion by students with autism spectrum disorders. *Journal of Autism and Developmental Disorders, 39*, 1420–1434. https://doi.org/10.1007/s10803-009-0761-0.

Mechling, L. C., & Savidge, E. J. (2011). Using a personal digital assistant to increase completion of novel tasks and independent transitioning by students with autism spectrum disorders. *Journal of Autism and Developmental Disorders, 41*, 687–704. https://doi.org/10.1007/s10803-010-1088-6.

Partington, J. W., & Mueller, M. M. (2013). *The Assessment of Functional Living Skills: Home Skills Assessment Protocol.* Marietta, GA: Stimulus Publications.

Payne, D., Cannella-Malone, H. I., Tullis, C. A., & Sabielny, L. M. (2012). The effects of self-directed video prompting with students with intellectual and developmental disabilities. *Journal of Developmental and Physical Disabilities, 24*, 617–634. https://doi.org/10.1007/s10882-012-9293-1.

Rayner, C. (2011). Teaching students with autism to tie a shoelace knot using video prompting and backward chaining. *Developmental Neurorehabilitation, 14*, 339–347. https://doi.org/10.3109/17518423.2011.606508.

Rayner, C., Denholm, C., & Sigafoos, J. (2009). Video-based intervention for individuals with autism: Key questions that remain unanswered. *Research in Autism Spectrum Disorders, 3*, 291–303. https://doi.org/10.1016/j.rasd.2008.09.001.

Shipley-Benamou, R., Lutzker, J. R., & Taubman, M. (2002). Teaching daily livings skills to children with autism through instructional video modeling. *Journal of Positive Behavior Interventions, 4*(3), 165–175.

Sigafoos, J., O'Reilly, M., Cannella, H., Edrisinha, C., de la Cruz, B., Upadhyaya, M., et al. (2007). Evaluation of a video prompting and fading procedure for teaching dish washing skills to adults with developmental disabilities. *Journal of Behavioral Education, 16*, 93–109. https://doi.org/10.1007/s10864-006-9004-z.

Sigafoos, J., O'Reilly, M., Cannella, H., Upadhyaya, M., Erdrisinha, C., Lancioni, G. E., et al. (2005). Computer-presented video prompting for teaching microwave oven use to three adults with developmental disabilities. *Journal of Behavioral Education, 14*, 189–201. https://doi.org/10.1007/s10864-005-6297-2.

Sindelar, P. T., Rosenberg, M. S., & Wilson, R. J. (1985). An adapted alternating treatments design for instructional research. *Education and Treatment of Children, 8*(1), 67–76.

Stokes, T. F., & Baer, D. M. (1977). An implicit technology of generalization. *Journal of Applied Behavior Analysis, 10*, 349–367. https://doi.org/10.1901/jaba.1977.10-349.

Taber-Doughty, T., Bouck, E. C., Tom, K., Jasper, A. D., Flanagan, S. M., & Bassette, L. (2011). Video modeling and prompting: A comparison of two strategies for teaching cooking skills to students with mild intellectual disabilities. *Education and Training in Autism and Developmental Disabilities, 46*(4), 499–513.

Van Laarhoven, T., Johnson, J. W., Van Laarhoven-Myers, T., Grider, K. L., & Grider, K. M. (2009). The effectiveness of using a video iPod as a prompting device in employment settings. *Journal of Behavioral Education, 18*, 119–141. https://doi.org/10.1007/s10864-009-9077-6.

Werts, M. G., Caldwell, N. K., & Wolery, M. (1996). Peer modeling of response chains: Observational learning by students with disabilities. *Journal of Applied Behavior Analysis, 29*, 53–66. https://doi.org/10.1901/jaba.1996.29-53.