Advances in Neurodevelopmental Disorders (2019) 3:246–258
https://doi.org/10.1007/s41252-019-0097-5

ORIGINAL PAPER

Self-Directed Video Prompting and Least-to-Most Prompting: Examining Ways of Increasing Vocational Skill Acquisition Among Students with Autism Spectrum Disorder and Intellectual Disability

Gulnoza Yakubova[1] · Louis Leibowitz[2] · Briella L. Baer[1] · Nada Halawani[3] · Lauren Lestremau[2]

Published online: 23 January 2019

Abstract

Objective The purpose of this study was to examine the effects of point-of-view video prompting (VP) as a self-prompting strategy with a least-to-most prompting (LMP) system on the rapidity of skill acquisition of two students with autism spectrum disorder (ASD) and two students with intellectual disability (ID) when working on school-based vocational tasks.

Methods We used multiple probes across students design of single-case experimental methodology to examine whether or not causal relation existed between the intervention and students' vocational skill acquisition and follow-up performance. Target tasks involved both process and basic functional mathematics steps that required students to pay attention to the process of task completion rather than the functional step itself.

Results All students showed immediate and considerable improvement in skill acquisition between baseline and intervention. Furthermore, all students completed the tasks with an average of over 90% accuracy once the LMP was removed. The four students in this study required two to six intervention trials to reach 100% accuracy without the use of LMP, with a mean of four trials. Tau-U effect size showed a strong effect of the intervention on skill acquisition and follow-up performance.

Conclusions VP and LMP as a combined intervention can be effective in teaching vocational tasks that involve process steps to students with both ASD and ID. VP can be a useful support for students with ASD and ID in school, community, and employment settings to decrease reliance on adult prompting and increase independence.

Keywords Autism spectrum disorder · Intellectual disability · Video prompting · System of least prompts · Vocational skills

While autism spectrum disorder (ASD) is primarily known for impacting a person's social-communication skills and repetitive behavior and restricted interests, ASD also impacts a person's functioning in many areas of life, e.g., adaptive behavior, independent living, academic learning, participation in leisure and recreation activities, community involvement, and employment (Hendricks 2010; Shattuck et al. 2012). The impact of ASD is extensive with caretakers assuming most of the responsibility when their family member with ASD graduates from high school and continues to live at home with no engagement in post-secondary education or employment training (Shattuck et al. 2012; Taylor and Seltzer 2011). Further, the cost of providing services for people with ASD is significant and impacts multiple sectors of society. An estimated amount of $11.5 billion–$60.9 billion are spent per year for children with ASD in the USA (Lavelle et al. 2014). These costs represent a variety of expenses such as medical care, special education, and parental wage and productivity loss due to the responsibilities of taking extra care of their child with ASD. Yet, when the investment is made in training people with ASD and other developmental disabilities for employment, both monetary and personal benefits outweigh the costs spent for the education and training of people with ASD (Cimera and Burgess 2011).

One challenge common to all people with ASD, both those who have a co-occurring condition of intellectual disability (ID) and those who do not have ID, is independence linked to adaptive behavior (Farley et al. 2009). Adaptive behavior includes a wide range of skills that enable a person to function independently across a variety of settings, e.g., functional,

✉ Gulnoza Yakubova
gulnoza@umd.edu

[1] Department of Counseling, Higher Education, and Special Education, University of Maryland, 3214 Benjamin Building, College Park, MD 20742, USA

[2] Ivymount School and Programs, Rockville, MD, USA

[3] University of Jeddah, Jeddah, Saudi Arabia

daily living, self-help, problem-solving, and work skills. In order to improve the learning outcomes of students with ASD, educational programming should include training in adaptive skills in addition to academic skills. Furthermore, the programming should be examined to identify the most effective interventions for students with ASD, who display diverse learning needs and characteristics (Alwell and Cobb 2009; Ninci et al. 2015).

In teaching students with ASD, technology-based interventions are frequently used to improve learning outcomes and skill acquisition in a variety of areas (Grynszpan et al. 2014). They have been used for several decades evolving in different formats and capabilities. These include the use of speech-generating devices, calculators, computer-assisted instruction, and various forms of assistive technology (Higgins and Boone 1996; Panyan 1984; Rayner et al. 2009). Technology has recently become an essential part of education for students with ASD (Odom et al. 2015) and plays an important role in the way students spend their free time. For instance, students with ASD engaged in technology-based activities more often than non-technology-based activities (4.5 h versus 2.8 h per day; Mazurek et al. 2012), in comparison to their typically developing siblings, who engaged in non-technology activities more than technology-based activities (5.7 h versus 3.1 h per day; Mazurek and Wenstrup 2013). Children with ASD spent 62% more time engaging in technology-based activities (watching television, playing video games) than in academic, physically active, or social activities without technology, whereas their typically developing siblings spent 87% more time engaging in non-technology activities than technology-based activities (Mazurek & Wenstrup, 2012).

Given that many students with ASD are familiar with technology from using it for personal interests and entertainment or in the classroom as a tool for communication, it is also being used as a way to teach functional and job-related skills. Some methods of teaching skills via technology include virtual reality (Walsh et al. 2017), audio coaching (Walsh et al. 2017), and video-based intervention (VBI), either through video modeling (VM) or through video prompting (VP; Burke et al. 2013; Domire and Wolfe 2014; Johnson et al. 2013; Walsh et al. 2017). With these interventions, instruction of how to complete a task is shown via tablet, iPhone/iPod touch, or laptop computer that either an educational aide or the student controls. There has been increasing evidence to support the use of technology-based instruction and intervention to teach skills to students with ASD and ID, as a whole (Walsh et al. 2017), and by specific platform types such as mobile technologies (Cumming and Rodríguez 2017) and tablets (Hong et al. 2016).

The design of these interventions can vary based on which platform is used, and how the instruction is given (e.g., first- or third-person perspective, text or voice-over narration, prompting steps or one continuous process). Although there is evidence for certain techniques over others, some aspects of these interventions seem to differ on an individual basis. This finding is not surprising given the heterogeneous nature of students with ASD, so professionals are encouraged to personalize materials and to try a variety of techniques with different students (Fletcher-Watson 2014). Despite individual differences, these technology-based interventions have repeatedly been shown to be effective in teaching a variety of skills to students with ASD, from daily living skills like washing dishes (Gardner and Wolfe 2015), to job-related skills such as completing shipments (Burke et al. 2013), or making recipes (Johnson et al. 2013).

One technology-based intervention that is effective, socially valid, and easy to develop and use is VBI. Video-based interventions have gained increasing amount of evidence in teaching students with ASD and include several types (video modeling, video self-modeling, point-of-view video modeling, and video prompting) that feature a video-recorded instruction presented to a student on a computer, laptop, tablet, or smartphone. Despite procedural variations between different VBIs (e.g., type of model, narration, perspective, and screen size), there is consistent evidence for the effectiveness of VBIs among students with ASD and other developmental disabilities (Bennett et al. 2017). One key strength to VBIs is their visual nature, which has been found to be more effective in terms of the rapidity of skill acquisition and prompt independence, than other types of visual interventions such as static picture prompting (Kellems et al. 2018; Van Laarhoven et al. 2010).

Video prompting (VP), a type of VBI, has been shown to be effective in teaching vocational and functional skills to adolescents and young adults with ASD and developmental disabilities (Alexander et al. 2013; Allen et al. 2010), although it has been most effective in skill acquisition when used with other interventions, e.g., self-management strategies, and error correction procedures (Cannella-Malone et al. 2012; Shrestha et al. 2013). VP is a video recording of a target task with explicit instruction, which is then presented to a student in small segments. Each step of the task analysis constitutes each VP clip, with a student watching each clip and then completing that step prior to watching the next instructional video clip. There is evidence to suggest that VP is a more effective strategy than other VBI strategies, such as video modeling (Domire and Wolfe 2014; Banda et al. 2011). Furthermore, when using VP as a self-instructional strategy to promote independence, video self-prompting was shown to be more effective for students with developmental disabilities than self-mediated video modeling, another type of self-instructing VBI (Shepley et al. 2018).

Research examining VP in teaching students with ASD and ID has typically focused on the acquisition of functional and vocational skills, such as daily living skills (Domire and Wolfe 2014), functional mathematics (Weng and Bouck 2014), cooking (Taber-Doughty et al. 2011), and job-related tasks (Allen et al. 2012). Research on the effects of VP has ranged from examining VP as a stand-alone strategy focusing on its salient features to examining VP as an intervention package. For example, one study examined VP with and without voice-over narration to teach clerical skills to adolescents with ASD (Bennett et al. 2013), and other studies have examined VP with error correction procedures to teach functional and vocational skills to students with ASD and ID (Cannella-Malone et al. 2012; Gardner and Wolfe 2015; Seaman-Tullis et al. 2018). These studies found that VP with error correction procedures resulted in faster skill acquisition and maintenance compared to when the intervention was used without error correction. Least-to-most prompting (LMP) and most-to-least prompting (MLP) strategies were common error correction procedures used in these studies to prevent future task completion errors. LMP is a prompting strategy that employs a hierarchy of prompts, beginning with the least amount of assistance required, such as a gestural prompt, to the most amount of assistance required, such as hand-over-hand guidance (Ault and Griffen 2013). LMP has been shown to be an effective prompting strategy, both individually and coupled with other strategies, for teaching skills to students with ASD and other developmental disabilities, such as self-prompted cooking (Mechling et al. 2008), tennis skills (Yanardag et al. 2011), and multi-symbol message production for communication (Finke et al. 2017). Most-to-least prompting is a similar strategy, but instead begins with the most assistance, moving to the least assistance. Although MLP can result in fewer errors due to the higher levels of guidance when the skill is first being acquired, it is also associated with slower skill acquisition than LMP (Libby et al. 2008). Regardless of which prompting strategy one uses, it is necessary to track student data to ensure that the prompting strategy of choice is effective for that student.

While studies that used VP alone produced varying results on both skill acquisition and the number of sessions needed to reach mastery, studies that used VP with error correction to teach vocational skills have an emerging evidence base in order to establish the external validity of VP for students with ASD and ID. Also, a moderate effect size has been observed for the effects of VP in teaching students with ASD and ID in meta-analytic research and systematic reviews (Aljehany and Bennett 2018; Domire and Wolfe 2014; Park et al. 2018). However, the need for more research on the effects of VP, particularly, using What Works Clearinghouse (WWC) Single-Case Research Design standards was noted to establish external validity of VP (Aljehany and Bennett 2018). Further, meta-analytic evidence on the effects of VP used to teach daily living skills found VP to be most effective when used with error correction procedures, especially, for secondary school students with ASD and a co-occurring diagnosis of ID. Studies that examined the effects of VP on teaching vocational skills were limited (Aljehany and Bennett 2018).

Thus, the purpose of this study was to examine the effects of point-of-view VP with LMP system on the rapidity of skill acquisition of two students with ASD and two students with ID when working on school-based vocational tasks with process and basic functional mathematics steps that required students to pay attention to the process of task completion rather than the functional step itself. Primary research questions were the following: (1) To what extent do students with ASD and ID improve skill acquisition when working on vocational tasks with process steps from baseline to intervention with the use of VP and LMP strategies? And (2) to what extent do students with ASD and ID continue to independently complete vocational tasks with VP alone following the intervention phase? The secondary question was the following: How many sessions of LMP during intervention do students require until they reach 100% accuracy in skill acquisition?

Method

Participants

Four students, two with ASD and two with ID, attending a secondary school in the Mid-Atlantic region participated in the study. Students participated in the study based on the following criteria: (a) received special education services under Individuals with Disabilities Education Improvement Act (IDEA, 2004); (b) had a primary diagnosis of ASD or ID; (c) received vocational skills instruction; (d) had no vision, hearing, or gross motor challenges that would impede a student's ability to access and learn from VP instruction per teacher reports; and (e) did not exhibit extreme behavioral challenges, such as severe physical aggression towards self or others, or non-compliance to watch the video clips or complete tasks per teacher reports. All students had an individualized education program (IEP) and received special education services under the eligibility category of ASD or ID. Students were in the program where the instruction focused on functional academic and vocational instruction with the goal transitioning to independent living and community-based employment. To participate in the study, the first author contacted the vocational program teachers at the school to identify students who might need additional support with vocational skill acquisition and meet the criteria for participation in the study. All students who participated enjoyed watching videos on YouTube or television for entertainment and used school iPads for instruction or entertainment during break time. However, they did not use VBI as part of the school instruction prior to and during participation in the study.

Ben, a 15-year-old male student of Caucasian ethnicity, had a primary diagnosis of ASD and secondary diagnosis of ID with a full-scale IQ score of 59 per latest psychological evaluation. He was in a classroom focusing on functional academic and vocational instruction. His reading was at a 2nd grade level and his mathematics skills were at a 1st grade level. His adaptive behavior was at a low range with a general adaptive composite standard score of 69 per Adaptive Behavior Assessment System, third edition (ABAS-3; Harrison and Oakland 2015). He was an energetic student who enjoyed school and focused on his work throughout the day.

Marcus, with a primary diagnosis of ASD and secondary diagnosis of ID, was a 17-year-old student of African American ethnicity. His most recent full-scale IQ was 46 per latest psychological evaluation, with his reading ability at a level of 1st grade and mathematics at kindergarten level. He had very low adaptive behavior with a general adaptive composite standard score of 45 per ABAS-3. He had minimal verbal ability and would communicate using short 1–2-word phrases. Marcus worked on developing his functional academic and vocational skills. Marcus was eager to learn throughout the school day and very attentive to instruction with visual materials.

Kate, a 17-year-old female of Caucasian ethnicity, had a diagnosis of ID. Her full-scale IQ score was 51 per latest psychological evaluation. Her instruction focused on functional academic and vocational skills. She was at a kindergarten level in mathematics and a 1st–2nd grade level in reading. Similar to the other students, she had low adaptive behavior with a general adaptive composite standard score of 60, extremely low range, per ABAS-3. Kate was a friendly student and enjoyed activities throughout the day.

Samantha, a 16-year-old female of Caucasian ethnicity, had a diagnosis of ID and Prader Willi Syndrome. Her full-scale IQ was 41 per latest neuropsychological evaluation, with her reading at a 2nd grade level and mathematics at a 1st grade level. Samantha's general adaptive composite standard score was 75 per ABAS-3, which is at a low range of performance compared to her same-age peers. She had stronger social and interaction skills compared to other participants, however, struggled with functional academic, self-care, community-based, and daily living skills. She was friendly, social, and attentive to the tasks she would do. Samantha's instruction also focused on functional academic and vocational skills.

Procedure

Setting Students attended a private special education school for students with disabilities whose needs could not be met via traditional instruction in public schools. The school had several programs for students with ASD and other developmental disabilities from kindergarten to a post-school transition program. The four students were in a program designed for students with multiple learning needs who needed intensive instruction and received modified academic curriculum and vocational skills instruction. The study activities took place in the hallway during class time for three students who worked on cabinet inventorying task. One student worked in an ink inventorying room that was across from the vocational classroom.

Dependent Variable There were three dependent variables: one primary and two secondary. The primary dependent variable was defined as the percentage of steps completed correctly and independently without the use of LMP according to the task analysis (see Table 1 for task analysis steps and task subsection for description of task operational definition). Two secondary dependent variables included (a) the percentage of steps that required error correction using the LMP system, and (b) the number of sessions required to reach mastery criterion. The percentage of steps that required error correction was defined as the number of steps that required error correction during intervention using the LMP system divided by the total number of steps and then multiplied by 100%.

Independent Variable Video prompting and the LMP systems served as independent variables. VP in a point-of-view format featured an adult model completing each task step while narrating instruction. For instance, the video clip featured a model's hands completing the task, such as modeling the process of counting the number of black inks while saying "write down the number to the correct column" and showing where to write without actually writing. This was done to avoid a situation where a student might copy the number from the VP clip. We used an iPad 2 video camera to create the video clips. One video clip was made per task. Then, we imported each clip to the VideoTote application developed by the Prevent Group, LLC (version 0.8.4), and divided them into steps of task analysis to make it VP. Video recording of each task took approximately 10 min and editing it as VP on VideoTote took approximately 3–4 min per clip. During intervention, students accessed the VP clips through the VideoTote on an iPad, watched each step, and completed the step prior to watching the next step. The video clip accessed via VideoTote automatically paused following each step and students tapped "play" icon of the video clip to watch the following step. The duration of video clips was approximately 4 to 7 min.

The LMP system involved the following: (a) gestural, (b) verbal, (c) gestural plus verbal explanation, (d) modeling plus verbal explanation, and (e) physical assistance plus verbal explanation. When a student completed a task step incorrectly, the researcher provided error correction starting with gestural prompting and gradually increasing the prompting level if the student did not respond. The majority of errors were corrected with gestural or verbal prompting, while some errors required gestural plus verbal explanation and modeling plus verbal

Table 1 Task analysis steps of inventorying task (cabinet inventory/ink inventory)

Item	Task steps
1. Copy paper/128 A—black ink	1. Attends to and locates the item
	2. Counts and records on the checklist
2. Note pads/128 A—cyan ink	1. Attends to and locates the item
	2. Counts and records on the checklist
3. Velcro/128 A—yellow ink	1. Attends to and locates the item
	2. Counts and records on the checklist
4. Glue sticks/128 A—magenta ink	1. Attends to and locates the item
	2. Counts and records on the checklist
5. Sticky notes/131 A—black ink	1. Attends to and locates the item
	2. Counts and records on the checklist
6. Paper clips/131 A—cyan ink	1. Attends to and locates the item
	2. Counts and records on the checklist
7. Scotch tape/131 A—yellow ink	1. Attends to and locates the item
	2. Counts and records on the checklist
8. Staples/131 A—magenta ink	1. Attends to and locates the item
	2. Counts and records on the checklist
9. Dry erase markers/410 A—black ink	1. Attends to and locates the item
	2. Counts and records on the checklist
10. Paper towels/410 A—cyan ink	1. Attends to and locates the item
	2. Counts and records on the checklist
11. Clorox wipes/410 A—yellow ink	1. Attends to and locates the item
	2. Counts and records on the checklist
12. Trash bags/410 A—magenta ink	1. Attends to and locates the item
	2. Counts and records on the checklist
13. Gloves/26 A—black ink	1. Attends to and locates the item
	2. Counts and records on the checklist
14. White board spray/80 A—black ink	1. Attends to and locates the item
	2. Counts and records on the checklist

Step 2 in task analysis is a process step

explanation. Students did not require physical assistance plus verbal explanation for error correction.

Experimental Design A multiple-probe across students' design (Horner and Baer 1978) was used to identify the effects of the video prompting intervention on students' skill acquisition during vocational tasks. This design allowed researchers to determine the presence of a causal relation between the intervention and students' skill acquisition, and to replicate the effect across at least three students with a minimum of three attempts at three different points in time (Kratochwill et al. 2013).

Task The inventorying task was selected per teacher recommendation: (a) tasks were not addressed in students' vocational classroom instruction, and (b) tasks were functional and a part of the regular in-school job tasks. Ben, Marcus, and Kate worked on inventorying materials in the cabinet and Samantha worked on ink inventorying. Both tasks required the same skills and number of steps from the students. Task analysis steps appear in Table 1. Tasks included process steps, which were defined as tasks that required students to model the process of the step (e.g., counting the number of black inks and writing down the number to the correct column) and not the physical step (e.g., setting glass on the table). The number of each item in the inventorying task varied from session to session to prevent students from memorizing the numbers and to examine the extent to which students are modeling the process of the task completion.

The operational definition of the inventorying task was as follows: (a) attending, scanning, and locating—the students look at the inventory checklist at the item and scan for the item in the cabinet by orienting his/her eye gaze towards the item and pausing for 1 or 2 s before counting and writing the number on the inventory sheet, while standing within approximately 6 in. of proximity to the item; and (b) counting items correctly—could count by pointing with fingers or pen/pencil towards the item or without pointing towards the item; could count it out loud or silently; and could take out and return items if necessary while counting; and writes the correct amount the inventory checklist.

For the pre-baseline training, the task of photocopying was selected as it included process steps that required students to model the process and adjust the settings of the photocopying order. The order was different each time, e.g., 2 copies of a document in black and white and 1-sided option or 5 copies of a document in color with 2-sided option. Task analysis of photocopying steps and task analysis of operating a VP clip was used.

Pre-baseline Training The purpose of conducting pre-baseline training was to teach students to independently operate the VP intervention to complete a vocational task that was not the target task for the study. At the beginning of pre-baseline training, baseline data on photocopying task were collected to ensure that students were unfamiliar with the task completion. Researchers used the model-lead-test procedure (Carnine et al. 1990) to train students on the use of VP to complete a pre-training task of photocopying and collected data on the percentage of steps for operating the VP clip. Data on students' completion of the photocopying task were also collected. The pre-baseline training phase continued until each student was able to use the VP independently to make a photocopy of papers with no prompts from the researcher. When students demonstrated they were able to use the VP and complete the pre-baseline training task independently with 100% accuracy, students started the baseline phase.

Baseline Each student completed the inventorying task for a minimum of five sessions and until stable response was achieved. Two sessions per week occurred, with two–three days of time difference between each session. Researchers provided students with all materials necessary to complete the task (inventorying sheet on a clipboard, pen/pencil), brought the student to the task setting, and asked the student to complete the inventorying task. No other verbal prompts, assistance, error correction, or performance feedback were provided. During baseline, participants could make an error on a step or skip a step and continue to the next step of the task per task analysis. The session was terminated if (a) the student did not respond for 30 s on any step, including the first step of the task, and/or (b) the student made a continuous error on any step for 30 s (for example, continuously retrieving items out of the cabinet and taking them elsewhere).

Intervention During each intervention session, with two sessions per week and two–three days of time difference between each session, researchers provided each student with all materials necessary to complete the task (inventorying sheet on a clipboard, pen/pencil), brought the student to the task setting, and asked the student to use the VP clip to complete the task. If the student made an error, the researchers used the LMP as an error correction. Data on the percentage of task steps completed independently and the steps completed with the LMP were noted separately. Additional data on the independent use of the VP on the iPad were collected. Criteria to move from intervention to VP-only phase were set at 100% independent task completion for one session and having at least five sessions of intervention.

VP-Only Phase The goal of this phase was to fade the error correction strategy and examine the use of VP as a stand-alone self-prompting support for students after students achieved 100% mastery on skill acquisition with the use of VP and LMP strategies. Two to three days, which is a regular time difference between each study session, upon completing the intervention phase, each student moved to the VP-only phase with two sessions per week. During this phase, students used VP to complete the inventorying task without LMP provided to them for three sessions. No assistance, prompting, or error correction was provided. Each session began with the researcher providing each student with all materials necessary to complete the task (inventorying sheet on a clipboard, pen/pencil), bringing the student to the task setting and giving the direction to start working on the task with the use of video prompting.

Measures

Data Collection Method For the primary dependent variable, event recording was used to determine the percentage of correct responses per task analysis of steps (Kennedy 2005). Each step was marked as independent correct or incorrect. Independent correct responding was defined as (a) initiating a task step within 5 s of researcher giving the direction to start working on the task (for the first step in task analysis) and correctly completing the step, (b) initiating the next step within 5 s of completing the prior step and correctly completing that step, and (c) initiating the task step within 5 s after watching a VP clip for that step and correctly completing that step without the LMP system. Incorrect responding was defined as (a) failure to initiate the step within 5 s for any of the points described in "independent correct responding" sections a–c, and (b) independent incorrect completion of the task step. Using event recording, two secondary dependent variables were recorded for the percentage of steps that required error correction using the LMP system and the number of sessions required to reach mastery criterion.

Procedural Reliability and Interobserver Agreement Procedural reliability was calculated by dividing the number of steps the researcher completed according to the procedural reliability checklist by the number of total steps of the procedural reliability checklist and multiplying it by 100% (Kennedy

2005). Procedural reliability data were collected during a minimum of 33% of each phase of the study: pre-baseline training, baseline, intervention, and VP-only phases. To ensure the reliability of the data collected, a second trained independent rater collected data on the primary dependent variable for at least 33% of each phase. Interobserver agreement (IOA) was calculated using interval agreement approach and by dividing the number of agreements by the number of agreements plus disagreements and then multiplying by 100% (Kennedy 2005).

Social Validity Upon conclusion of the study, students and a teacher answered social validity questions about their perceptions on the use of the intervention and skill acquisition. Questions asked of students required yes/no and short responses. Teacher questions required open-ended responses. Table 2 lists student and teacher social validity questions.

Data Analyses

We used visual analysis as the primary method of data analysis consistent with the single-case experimental design (SCED; Kratochwill et al. 2013). Visual analysis involved a four-step process described in Kratochwill et al. (2013) to determine the presence and magnitude of a causal relation between the VP and student performance. To supplement visual analysis, we conducted a nonparametric statistical analysis of effect size, Tau-U. Tau-U allowed us to determine the practical significance of the differences between comparative phases (baseline vs. intervention and baseline vs. follow-up). Tau-U provides a more complete measure of improvement between phases than several other effect sizes used in SCED (Parker et al. 2011). Tau-U scores range from 0 to 1.0, with 0–0.65 having weak effects, 0.66–0.92 having medium to high effects, and 0.93–1.0 having strong effects (Parker and Vannest 2009). We used an online effect size calculator for SCED data to get Tau-U scores (http://www.singlecaseresearch.org/calculators/tau-u; Vannest et al. 2016).

Results

Figure 1 illustrates the percentage of steps completed correctly and independently without using LMP. Based on visual analysis of data, functional relation exists between the VP and LMP as a combined intervention and students' skill acquisition. Further, the use of VP as a stand-alone self-prompting support for students upon reaching skill mastery criteria is illustrated in Fig. 1. Table 3 represents mean accuracy of task completion and standard deviation (SD) for each student per phase. Table 4 represents outcomes on two secondary dependent variables: (a) the percentage of steps that required error correction during intervention using the LMP system, and (b) the number of sessions required to reach mastery criterion.

Ben

At baseline, Ben completed the task with a mean response accuracy of 6.08% with a low and stable trend. Ben's mean response accuracy increased to 94.17% during the intervention phase, with a mean level change of 88.09%. Ben showed immediate improvement, with increasing, then stable trend during the intervention phase, with no overlapping data with baseline. During the VP-only phase, Ben performed the task with a mean response accuracy of 100%, demonstrating maintenance of the acquired skill. A Tau-U score of 1.0 was obtained between both baseline and intervention phases, and baseline and VP-only phases, indicating strong effectiveness of the intervention.

Marcus

Marcus had a mean response accuracy of 3.5% at baseline with low, stable trend. During the intervention phase, Marcus' mean response accuracy increased to 91.4%, with a mean level change of 87.9%. The intervention trend initially increased, and then became stable after a few trials, with no overlapping

Table 2 Social validity questions

Student questions	Teacher questions
1. Did you like video prompting? I did not like it It was okay I liked it I liked it a lot	1. What did you like about having your students use the video prompting strategy in completing vocational tasks?
2. What did you like about video prompting?	2. What did you not like about having your students use the video prompting strategy in completing vocational tasks?
3. What did you NOT like about video prompting?	3. How useful was the video prompting with error correction in helping your students improve vocational task performance?
4. Would you continue to use video prompting and why?	4. Would you continue to use the video prompting with or without error correction in the future? Why/why not?
5. Is there anything else you would like to tell us about your likes and dislikes in this project?	5. Is there anything else you would like to tell us about students' acquisition of skills in the project or use of the strategy?

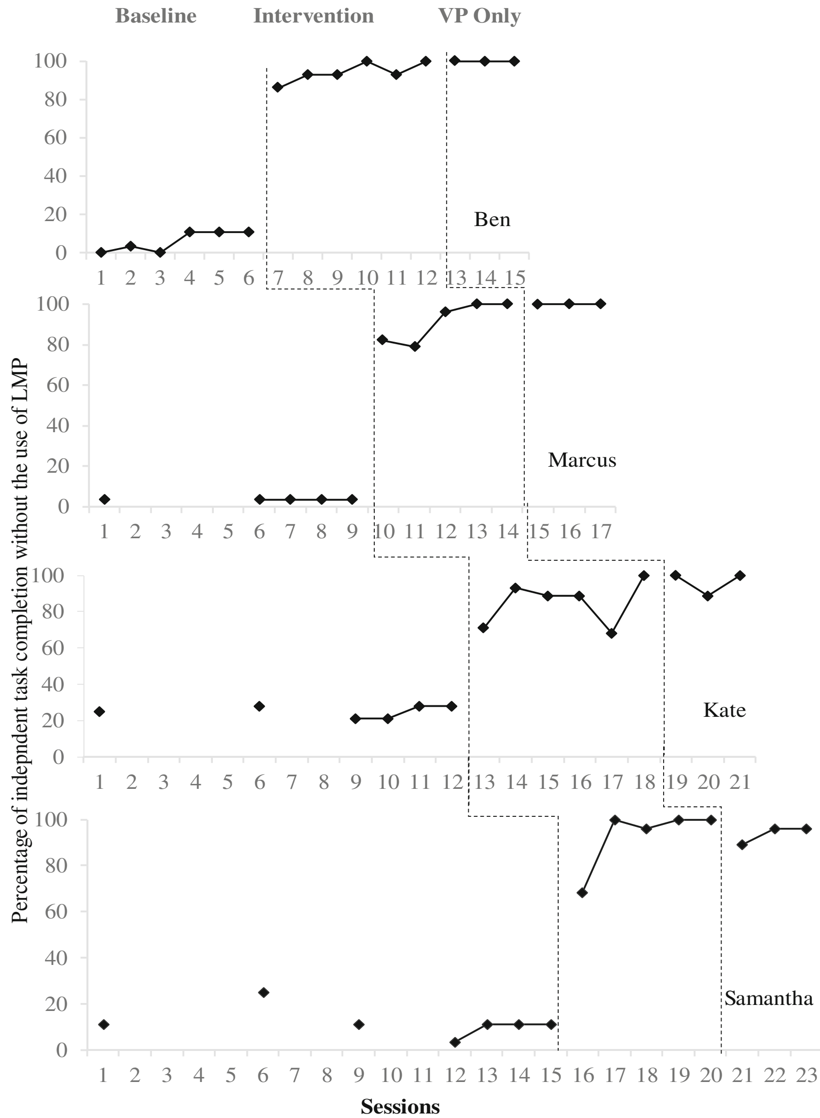

Fig. 1 Students' percentage of independent task completion without the use of LMP

data points with baseline. Ben completed the VP-only phase with a mean accuracy of 100%, also demonstrating maintenance of the acquired skill. Comparing baseline and intervention phases, a Tau-U score of 1.0 was obtained, suggesting strong effectiveness of the intervention. A Tau-U score of 1.0 was also obtained between the baseline and VP-only phases.

Table 3 Mean accuracy of independent task completion and standard deviation

Student	Baseline/SD	Intervention/SD	VP only/SD
Ben	6.08% (5.54)	94.17% (5.27)	100% (0)
Marcus	3.50% (0)	91.40% (10.14)	100% (0)
Kate	25.17% (4.04)	85.0% (12.70)	96.33% (6.35)
Samantha	11.93% (6.41)	92.80% (13.97)	93.67% (4.04)

Kate

Kate's baseline response accuracy had a mean of 25.17%, with a stable trend. Mean response accuracy increased to 85.0%, demonstrating a mean level change of 59.83% with no overlapping data points. Kate's intervention trend was more variable than that of the other students, initially showing a stable increase, then a sudden drop during one session, followed by improved response accuracy. Kate's sudden drop in task completion during one session could be explained per item error analysis and behavioral observation. Item by item error analysis revealed that the errors she made were counting errors when it involved more than 3–4 counts of an item. For instance, she would count an item as 10 when it was 11 or 12 or vice versa. Whereas per behavioral observation, the setting could have contributed to student's distractibility. During the VP-only phase, Kate had a mean response accuracy of

Table 4 (a) Mean proportion of steps that required error correction using LMP during the intervention sessions, (b) number of intervention sessions required for students to reach mastery (100% accuracy without LMP)

Student	Mean percentage of steps requiring LMP during intervention sessions (%)	Number of sessions until mastery
Ben	5.8	4
Marcus	8.6	4
Kate	15.0	6
Samantha	7.2	2

Table 5 Tau-U effect size trend comparisons for each participant, and the weighted average of all participant trend comparisons

Participant	Baseline-intervention			Intervention-VP only		
	Tau-U	*p* value	90% CI	Tau-U	*p* value	90% CI
Ben	1	0.0039	0.429–1	1	0.0201	0.292–1
Marcus	1	0.0090	0.370–1	1	0.0253	0.264–1
Kate	1	0.0039	0.429–1	1	0.0201	0.292–1
Samantha	1	0.0045	0.421–1	1	0.0167	0.313–1
	Tau-U		*p* value		90% CI	
Weighted average	1		> 0.0001		0.7695–1	

96.33%, indicating maintenance of the acquired skill. A Tau-U score of 1.0 was obtained between both baseline and intervention phases, and baseline and VP-only phases, indicating strong effectiveness of the intervention.

Samantha

Samantha had a mean baseline response accuracy of 11.93%, with a low, stable trend. Samantha's mean response accuracy increased to 92.80% during the intervention phase, with a mean level change of 80.87% and no overlapping data points. Samantha's intervention trend increased then stabilized over the course of the intervention phase. Samantha had a mean response accuracy of 93.67% during the VP-only phase, demonstrating maintenance of the acquired skill. Comparing baseline and intervention phases, a Tau-U score of 1.0 was obtained, suggesting strong effectiveness of the intervention. A Tau-U score of 1.0 was also obtained between the baseline and VP-only phases.

Effect Size

The Tau-U resulted in 1.0, showing a strong effect of the intervention between baseline and intervention phases and baseline and follow-up phases per student. This means that 100% of the data resulted in improvement with each comparative phase. See Table 5 for the effect size for each trend comparison across all participants and the weighted average.

Social Validity

All students liked using VP as an independent support by the end of the study. They particularly liked the visual aspect of it. Yet, as they used it more and got comfortable with the task completion, they liked to self-fade VP by either fast-forwarding the clips or by not watching them. Upon task mastery, some students liked to watch the clips as video modeling if they struggled to recall a certain step. The teacher liked the use of VP and LMP to ensure rapid skill acquisition for students, specifically, for tasks that involved process steps. The teacher expressed support for using VP for students to increase independence without constant reliance on adult prompting, and its potential use for more complex tasks as a self-prompting strategy that could be used on pocket-size devices.

Discussion

The aims of this study were to examine the extent to which the use of VP and LMP strategies could help with rapidity of vocational skill acquisition for students with ASD and ID, and to what extent these students could continue to independently complete these tasks with VP alone. Each of the four students showed immediate improvement in skill acquisition between baseline and intervention. Furthermore, each of these students continued to work on these vocational tasks with VP only, after the intervention phase, with two students reaching 100% accuracy, and all students reaching an average of over 90% accuracy once the LMP was removed. A secondary aim of this study was to determine how many sessions of LMP during intervention students needed to reach 100% accuracy in skill acquisition. The four students in this study required two to six intervention trials to reach 100% accuracy without the use of LMP, with a mean of four trials (meaning that students reached 100% accuracy on their fourth trial, on average). This adds to the increasing evidence base regarding the effectiveness of VP as an intervention in helping students with ASD and ID acquire vocational skills.

Findings from this study support the idea that VP and LMP as a combined intervention could be effective in teaching vocational tasks (Cannella-Malone et al. 2012; Gardner and Wolfe 2015; Seaman-Tullis et al. 2018). While the most recent meta-analysis (Aljehany and Bennett 2018) found VP as an effective strategy for teaching daily living skills, the need for further research on VP in teaching vocational skills was highlighted. The findings of our study contribute to this line of work to further examine the effects of VP for skill acquisition and its potential use as self-prompting support for completion of job-related tasks. Another contribution is the use of VP in teaching students to attend to and model the process of task completion (e.g., counting the number of items and recording on the inventory sheet) rather than model the task step itself (e.g., folding shirts). This embeds a basic, functional mathematics component.

The number of sessions required to achieve 100% mastery following the use of VP with LMP varied among students (two to six intervention sessions). On average, four intervention sessions were necessary for students to complete the tasks without LMP. For instance, the student would count an item as 14 when it was 15 or vice versa. The setting may have contributed to students' distractibility. In order to simulate more natural job settings, students watched the VP clips and completed inventorying tasks in an area where other students or staff would occasionally pass by, performing their regular routine tasks. Considering the attention challenges students with ASD and ID might experience both in the school setting and even more in community settings, future research could examine the use of VP in natural in-school job settings or community job sites.

While this intervention was effective for all students in the study, the two students with ASD (Ben and Marcus) were the only students who completed tasks with 100% accuracy across the three VP-only post-intervention trials. Although this may point to simply a small sample size, this also could be due to their primary diagnosis of ASD. VP interventions are especially effective for students with ASD because they help to focus attention on critical features of the task and minimize distraction and attention to unimportant details (Aljehany and Bennett 2018). Additionally, since these interventions are typically visual, they play to the strengths of students with ASD, who often excel at visual tasks (Domire and Wolfe 2014). Further, students self-operated the VP and watched each clip prior to completing the task step. Previous studies showed high levels of adult prompting to direct students to the VP clip (e.g., Kellems et al. 2016). This study conducted pre-training sessions until students were able to both complete a novel task (photocopying) with 100% accuracy and use VP independently to self-prompt.

The follow-up findings with the use of VP only showed that students used VP as an independent self-prompting support after initial skill acquisition with VP and LMP. Although maintenance and generalization of a skill is the ultimate goal, for those who struggle with maintenance once the technology platform has been removed, the ability to bring a portable device with the intervention materials to a variety of settings is a particular strength of this style of intervention (Bereznak et al. 2012). While this study examined the participants' use of VP as a self-prompting support upon initial skill acquisition and mastery, the maintenance of skill performance without any support in place is necessary to examine in future research. During this phase, students naturally faded the use of VP clips, and self-directed and fast-forwarded to specific steps of VP to remind themselves of the step as needed. For instance, Samantha did not use the VP during the follow-up phase and completed the task with high levels of accuracy. Ben watched it as a VM clip and completed the entire task with 100% accuracy rather than watching each step and then completing that step. Kate fast-forwarded the VP clip to specific steps when she needed a reminder. In contrast, Marcus watched each step of VP prior to completing that step. Systematic examination of skill maintenance in the absence of VP is necessary to ensure the extent to which students maintain skill performance.

Limitations and Future Directions

Limitations set the need for future research. While SCED allows for the demonstration of a causal relation with a single participant, best practices call for replication of effect with future studies to strengthen the generalizability of the findings. Future studies need to be conducted with additional students with different learning characteristics to expand the effects of VP as a self-prompting strategy. When interpreting findings, readers should note that tasks students completed with VP and LMP were unfamiliar tasks. Therefore, they made an immediate improvement in task performance following the use VP and LMP. Future research should consider using VP as a self-prompting support for tasks that students are familiar with but need extra support for skill acquisition and task completion independently.

Next, while not a limitation, self-prompting (VP) was examined in combination with adult prompting (LMP) for rapidity of initial skill acquisition. Thus, skill acquisition cannot be attributed to VP alone. Though once students acquire the skill, they can use VP as an independent support strategy. Examining rapidity of skill acquisition with the use VP and MLP could be of interest to future research. This could contribute to strategies that are most effective and efficient in teaching various vocational skills to students who need varying levels of support. Further research on using VP as a self-prompting strategy to students with ASD without ID could offer the application of VP for a broad range of students. While this study embedded basic, functional mathematics components into the vocational task, future research is necessary to examine the effects of VP in teaching vocational tasks that involve various mathematical functions (basic and complex). Synthesis on the use of VBI in teaching mathematics to students with ASD found only two studies (Kellems et al. 2016; Weng and Bouck 2014) that examined the use of VP in teaching vocational skills that embed basic mathematics skills (Hughes and Yakubova 2019). Given the nature of the intervention, VP can be particularly useful in teaching students with both ASD and ID tasks with complex functional and mathematical steps. This will allow students learn each step of the task and move on to the next step gradually.

Another limitation of the study that could be of interest to future research is the skill maintenance without the use of VP. Upon skill acquisition, do students continue to work on tasks with 100% accuracy without relying on VP as a self-prompting support? Or do some students use VP to compensate for memory challenges and help them work on tasks independently? Further, examining systematic generalization of VP use across natural settings with the same tasks is important to expand our knowledge on the effects and usability of VP. Though limitations exist, the findings of this study contribute to research and practice in determining evidence-based practices in supporting students' vocational skill acquisition and independent task completion. The findings extend efforts in using VP and LMP to teach various vocational tasks and embed basic, functional mathematics skills, while using VP as a self-prompting support strategy.

Author Contributions GY designed and implemented the study, assisted with the data analyses, and wrote the paper. LL collaborated with the design and implementation of the study. BLB collaborated with the data analyses and writing of the paper. NH collaborated with the implementation of the study. LL collaborated with the implementation of the study.

Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflict of interest.

Ethics Statement All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional review board of the University of Maryland, College Park, and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

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

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

References

Alexander, J. L., Ayres, K. M., Smith, K. A., Shepley, S. B., & Mataras, T. K. (2013). Using video modeling on an iPad to teach generalized matching on a sorting mail task to adolescents with autism. *Research in Autism Spectrum Disorders, 7*, 1346–1357. https://doi.org/10.1016/j.rasd.2013.07.021.

Aljehany, M. S., & Bennett, K. D. (2018). Meta-analysis of video prompting to teach daily living skills to individuals with autism spectrum disorder. *Journal of Special Education Technology.* https://doi.org/10.1177/0162643418780495.

Allen, K. D., Wallace, D. P., Renes, D., Bowen, S. L., & Burke, R. V. (2010). 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.

Allen, K. D., Burke, R. V., Howard, M. R., Wallace, D. P., & Bowen, S. L. (2012). Use of audio cuing to expand employment opportunities for adolescents with autism spectrum disorders and intellectual disabilities. *Journal of Autism and Developmental Disorders, 42*, 2410–2419. https://doi.org/10.1007/s10803-012-1519-7.

Alwell, M., & Cobb, B. (2009). Functional life skills curricular interventions for youth with disabilities. *Career Development for Exceptional Individuals, 32*, 82–93. https://doi.org/10.1177/0885728809336656.

Ault, M. J., & Griffen, A. K. (2013). Teaching with the system of least prompts. *Teaching Exceptional Children, 45*, 46–53. https://doi.org/10.1177/004005991304500305.

Banda, D., Dogoe, M., & Matuszny, R. (2011). Review of video prompting studies with persons with developmental disabilities. *Education and Training in Autism and Developmental Disabilities, 46*, 514–527.

Bennett, K. D., Ramasamy, R., & Honsberger, T. (2013). The effects of covert audio coaching on teaching clerical skills to adolescents with autism spectrum disorder. *Journal of Autism and Developmental Disorders, 43*, 585–593. https://doi.org/10.1007/s10803-012-1597-6.

Bennett, K. D., Aljehany, M. S., & Altaf, E. M. (2017). Systematic review of video-based instruction component and parametric analyses. *Journal of Special Education Technology, 32*(2), 80–90. https://doi.org/10.1177/0162643417690255.

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.

Burke, R. V., Allen, K. D., Howard, M. R., Downey, D., Matz, M. G., & Bowen, S. L. (2013). Tablet-based video modeling and prompting in the workplace for individuals with autism. *Journal of Vocational Rehabilitation, 38*, 1–14. https://doi.org/10.3233/JVR-120616.

Cannella-Malone, H. I., Wheaton, J. E., Wu, P., Tullis, C. A., & Park, J. H. (2012). Comparing the effects of video prompting with and without error correction on skill acquisition for students with intellectual disability. *Education and Training in Autism and Developmental Disabilities, 47*, 332–344.

Carnine, D., Silbert, J., & Kameenui, E. J. (1990). *Direct instruction* (2nd ed.). New York: Macmillan.

Cimera, R., & Burgess, S. (2011). Do adults with autism benefit monetarily from working in their communities? *Journal of Vocational Rehabilitation, 34*, 173–180. https://doi.org/10.3233/JVR-2011-0545.

Cumming, T. M., & Rodríguez, C. D. (2017). A meta-analysis of mobile technology supporting individuals with disabilities. *The Journal of Special Education, 51*, 164–176. https://doi.org/10.1177/0022466917713983.

Domire, S. C., & Wolfe, P. (2014). Effects of video prompting techniques on teaching daily living skills to children with autism spectrum disorders: a review. *Research and Practice for Persons with Severe Disabilities, 39*, 211–226. https://doi.org/10.1177/1540796914555578.

Farley, M. A., McMahon, W. M., Fombonne, E., Jenson, W. R., Miller, J., Gardner, M., Block, H., Pingree, C. B., Ritvo, E. R., Ritvo, R. A., & Coon, H. (2009). Twenty-year outcome for individuals with autism and average or near-average cognitive abilities. *Autism Research, 2*, 109–118. https://doi.org/10.1002/aur.69.

Finke, E. H., Davis, J. M., Benedict, M., Goga, L., Kelly, J., Palumbo, L., Peart, T., & Waters, S. (2017). Effects of a least-to-most prompting procedure on multisymbol message production in children with autism spectrum disorder who use augmentative and alternative communication. *American Journal of Speech-Language Pathology, 26*, 81–98. https://doi.org/10.1044/2016_ajslp-14-0187.

Fletcher-Watson, S. (2014). A targeted review of computer-assisted learning for people with autism spectrum disorder: toward a consistent methodology. *Review of Research in Autism and Developmental Disorders, 1*, 87–101. https://doi.org/10.1007/s40489-013-0003-4.

Gardner, S. J., & Wolfe, P. S. (2015). Teaching students with developmental disabilities daily living skills using point-of-view modeling plus video prompting with error correction. *Focus on Autism and Other Developmental Disabilities, 30*, 195–207. https://doi.org/10.1177/1088357614547810.

Grynszpan, O., Weiss, P. L., Perez-Diaz, F., & Gal, E. (2014). Innovative technology- based interventions for autism spectrum disorders: a meta-analysis. *Autism, 18*, 346–361. https://doi.org/10.1177/1362361313476767.

Harrison, P. L., & Oakland, T. (2015). *Adaptive behavior assessment system (3rd ed.)*. Torrance: Western Psychological Services.

Hendricks, D. (2010). Employment and adults with autism spectrum disorders: challenges and strategies for success. *Journal of Vocational Rehabilitation, 32*, 125–134. https://doi.org/10.3233/JVR-2010-0502.

Higgins, K., & Boone, R. (1996). Creating individualized computer-assisted instruction for students with autism using multimedia authoring software. *Focus on Autism and Other Developmental Disabilities, 11*, 69–78. https://doi.org/10.1177/108835769601100202.

Hong, E. R., Ganz, J. B., Mason, R., Morin, K., Davis, J. L., Ninci, J., Neely, L. C., Boles, M. B., & Gilliland, W. D. (2016). The effects of video modeling in teaching functional living skills to persons with ASD: a meta-analysis of single-case studies. *Research in Developmental Disabilities, 57*, 158–169. https://doi.org/10.1016/j.ridd.2016.07.001.

Horner, R. D., & Baer, D. M. (1978). Multiple-probe technique: a variation of the multiple baseline. *Journal of Applied Behavior Analysis, 11*, 189–196. https://doi.org/10.1901/jaba.1978.11-189.

Hughes, E. M., & Yakubova, G. (2019). Addressing the mathematics gap for students with ASD: An evidence-based systematic review of video-based mathematics interventions. *Review Journal of Autism and Developmental Disorders.* (in press)

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), 147–158. https://doi.org/10.1177/1088357613476344.

Kellems, R. O., Frandsen, K., Hansen, B., Gabrilsen, T., Clarke, B., Simons, K., & Clements, K. (2016). Teaching multi-step math skills to adults with disabilities via video prompting. *Research in Developmental Disabilities, 58*, 31–44. https://doi.org/10.1016/j.ridd.2016.08.013.

Kellems, R. O., Frandsen, K., Cardon, T. A., Knight, K., & Andersen, M. (2018). Effectiveness of static pictures vs. video prompting for teaching functional life skills to students with autism spectrum disorders. *Preventing School Failure: Alternative Education for Children and Youth, 62*, 129–139. https://doi.org/10.1080/1045988x.2017.1393790.

Kennedy, C. H. (2005). *Single-case designs for educational research*. Boston: Allyn & Bacon.

Kratochwill, T., Hitchcock, J., Horner, R., Levin, J., Odom, S., Rindskopf, D., & Shadish, W. (2013). Single-case intervention research design standards. *Remedial & Special Education, 34*, 26–38. https://doi.org/10.1177/0741932512452794.

Lavelle, T. A., Weistein, M. C., Newhouse, J. P., Munir, K., Kuhlthau, K. A., & Prosser, L. A. (2014). Economic burden of childhood autism spectrum disorders. *Pediatrics, 133*, e520–e529. https://doi.org/10.1542/peds.2013-0763.

Libby, M. E., Weiss, J. S., Bancroft, S., & Ahearn, W. H. (2008). A comparison of most-to-least and least-to-most prompting on the acquisition of solitary play skills. *Behavior Analysis in Practice, 1*, 37–43. https://doi.org/10.1007/bf03391719.

Mazurek, M. O., & Wenstrup, C. (2013). Television, video game and social media use among children with ASD and typically developing siblings. *Journal of Autism and Developmental Disorders, 43*, 1258–1271. https://doi.org/10.1007/s10803-012-1659-9.

Mazurek, M. O., Shattuck, P. T., Wagner, M., & Cooper, B. P. (2012). Prevalence and correlates of screen-based media use among youths with autism spectrum disorders. *Journal of Autism and Developmental Disorders, 42*, 1757–1767. https://doi.org/10.1007/s10803-011-1413-8.

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*, 179–190. https://doi.org/10.1177/0022466907313348.

Ninci, J., Neely, L. C., Hong, E. R., Boles, M. B., Gilliland, W. D., Ganz, J. B., Davis, J. L., & Vannest, K. J. (2015). Meta-analysis of single-case research on teaching functional living skills to individuals with ASD. *Review Journal of Autism and Developmental Disorders, 2*, 184–198. https://doi.org/10.1007/s40489-014-0046-1.

Odom, S. L., Thompson, J. L., Hedges, S., Boyd, B. A., Dykstra, J. R., Duda, M. A., Szidon, K. L., Smith, L. E., & Bord, A. (2015). Technology-aided interventions and instruction for adolescents with autism spectrum disorder. *Journal of Autism and Developmental Disorders, 45*, 3805–3819. https://doi.org/10.1007/s10803-014-2320-6.

Panyan, M. V. (1984). Computer technology for autistic students. *Journal of Autism and Developmental Disorders, 14*, 375–382. https://doi.org/10.1007/bf02409828.

Park, J., Bouck, E., & Duenas, A. (2018). The effect of video modeling and video prompting interventions on individuals with intellectual disability. *Journal of Special Education Technology.* https://doi.org/10.1177/0162643418780464.

Parker, R. I., & Vannest, K. (2009). An improved effect size for single-case research: nonoverlap of all pairs. *Behavior Therapy, 40*, 357–367. https://doi.org/10.1016/j.beth.2008.10.006.

Parker, R. I., Vannest, K. J., Davis, J. L., & Sauber, S. B. (2011). Combining nonoverlap and trend for single-case research: Tau-U. *Behavior Therapy, 42*, 284–299. https://doi.org/10.1016/j.beth.2010.08.006.

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.

Seaman-Tullis, R. L., Cannella-Malone, H. I., & Brock, M. E. (2018). Training a paraprofessional to implement video prompting with error correction to teach a vocational skill. *Focus on Autism and Other Developmental Disabilities.* https://doi.org/10.1177/1088357618794914.

Shattuck, P. T., Narendorf, S. C., Cooper, B., Sterzing, P. R., Wagner, M., & Taylor, J. L. (2012). Postsecondary education and employment among youth with an autism spectrum disorder. *Pediatrics, 129*, 1042–1049. https://doi.org/10.1542/peds.2011-2864.

Shepley, S. B., Ayres, K. M., Cagliani, R., & Whiteside, E. (2018). Effects of self-mediated video modeling compared to video self-prompting for adolescents with intellectual disability. *Education and Training in Autism and Developmental Disabilities, 53*, 264–275.

Shrestha, A., Anderson, A., & Moore, D. W. (2013). Using point-of-view video modeling and forward chaining to teach a functional self-help skill to a child with autism. *Journal of Behavioral Education, 22*, 157–167. https://doi.org/10.1007/s10864-012-9165-x.

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*, 499–513.

Taylor, J. L., & Seltzer, M. M. (2011). Employment and post-secondary educational activities for young adults with autism spectrum disorders during the transition to adulthood. *Journal of Autism and Developmental Disorders, 41*, 566–574. https://doi.org/10.1007/s10803-010-1070-3.

Van Laarhoven, T., Kraus, E., Karpman, K., Nizzi, R., & Valentino, J. (2010). A comparison of picture and video prompts to teach daily living skills to individuals with autism. *Focus on Autism and Other Developmental Disabilities, 25*, 195–208. https://doi.org/10.1177/1088357610380412.

Vannest, K.J., Parker, R.I., Gonen, O., & Adiguzel, T. (2016). Single case research: Web-based calculators for SCR analysis. (version 2.0) [Web-based application]. College Station, TX: Texas A&M University. Available from singlecaseresearch.org

Walsh, E., Holloway, J., McCoy, A., & Lydon, H. (2017). Technology-aided interventions for employment skills in adults with autism spectrum disorder: a systematic review. *Review Journal of Autism and Developmental Disorders, 4*, 12–25. https://doi.org/10.1007/s40489-016-0093-x.

Weng, P., & Bouck, E. C. (2014). Using video prompting via iPads to teach price comparison to adolescents with autism. *Research in Autism Spectrum Disorders, 8*, 1404–1415. https://doi.org/10.1016/j.rasd.2014.06.014.

Yanardag, M., Birkan, B., Yilmaz, I., Konukman, F., Agbuga, B., & Lieberman, L. (2011). The effects of least to most prompting procedure on teaching basic tennis skills for children with autism. *Kinesiology, 43*, 44–55.