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USING VIDEO PROMPTING TO TEACH SHOE TYING TO STUDENTS WITH AUTISM AND MODERATE TO SEVERE INTELLECTUAL DISABILITIES

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ABSTRACT: *A multiple baseline across two middle school students diagnosed with autism spectrum disorder (ASD) and moderate to severe intellectual disability was used to assess the effects of a video prompting intervention on shoe tying accuracy, maintenance, and generalization. The video, depicted a nine step shoe tying task analysis where the filmed sneaker was fitted with a black and red shoelace. The video was recorded from a first-person point of view, and incorporated a pause after each step, allowing the student to attempt the step immediately following viewing. Maintenance was assessed four weeks after intervention ended, and generalization was assessed during baseline and intervention in the gymnasium as part of the students' typical physical education class routine. Overall, video prompting was effective in teaching shoe tying to both students. Social validity data showed the parents of both students strongly supported the video prompting strategy, as well as approved of the outcomes.*

KEYWORDS: Video Modeling, Shoe Tying, Intellectual Disabilities, Autism Spectrum Disorder (ASD)

INTRODUCTION

Deficits in daily living skills have far reaching negative effects on people with autism spectrum disorder and other developmental and intellectual disabilities, regardless of age. Skill deficits in such functional living domains as housework, community employment, personal hygiene, and self-care/dressing impact the ability to meaningfully and actively participate with same age peers in both educational and community environments. If, as Sigafoos et al. (2005) suggest, the acquisition of daily, functional living skills represents one way to increase (a) inclusive participation, (b) quality of life, and (c) self-determination, then creating instructional opportunities for students with autism spectrum disorder and other developmental and intellectual disabilities that result in mastery of functional life skill is essential for personal independence across inclusive environments. More importantly, mastering and generalizing these skills as early as possible enhances meaningful inclusion in both school and community settings.

In a pair of literature reviews, Wolf and colleagues (Domire and Wolf, 2014; Gardner and Wolf, 2013) report there is a growing body of evidence showing video-based strategies (e.g., video modeling and video prompting), usually accompanied with some method of prompting and/or reinforcement, as an effective intervention for daily living skills for individuals with autism spectrum disorder and other developmental and intellectual disability. Video-based instructional strategies have several advantages over in vivo modeling or in vivo picture prompting when used as an intervention technique. Methodologically, video-based strategies allow for tighter control over the staff-delivery of antecedent instructional prompting. Videos can be produced, edited and re-edited until the final instructional model is precise and accurate,

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allowing for a fidelity of instruction delivered consistently and accurately within and across all training and maintenance sessions. Second, video-based strategies provide a model from the point of view (POV) of the participant, rather than the third-person perspective of in-vivo modeling. Creating an instructional model, as the participant views it may better direct the participant's attention to the critical, or relevant, stimuli of the task by narrowing the discrimination for the participant (Gardner and Wolfe, 2013), and minimizing stimulus over-selectivity (Charlop-Christy, Le, and Freeman, 2000). For example, in the current study the video was produced from the POV of the student, showing the two hands using an actual shoe performing the shoe-tying task, allowing each participant to view only those stimuli and behavior required to perform each step of shoe-tying as the student would practice. Presenting an antecedent stimulus array from the student POV may result in a simpler stimulus discrimination while viewing the video model. In vivo modeling would require the student to respond to a "mirror-image" of the required task, resulting in a more complex stimulus discrimination while viewing the in-vivo model. Lastly, video-based instruction, once produced, can be easily used independently by the student, eliminating the need for teacher-directed instruction, allowing teachers to serve as facilitators rather than primary instructor (Yakubova and Taber-Dougherty, 2102). This feature is especially beneficial once the discrete skill, or skill chain is mastered. Once mastered, the produced video can serve a self-management strategy, building task fluency, generalization across settings and responses, and maintenance over time. Efficiency of use is maximized when the videos are loaded to personal mobile devices such as cell phones or tablets.

In the field of autism and other developmental and intellectual disabilities, researchers have reported the effectiveness of video-based instruction across such functional life skills areas as employment (Allen, Burke, Howard, Wallace, and Bowen, 2012; Burke, Allen, Howard, Downey, Matz, and Bowen, 2013), purchasing/banking (Burton, Anderson, Prater, and Dyches, 2013; Cihak, Alberto, Taber-Doughty, and Gama, 2006), laundry (Van Laarhoven, Kraus, Karpman, Nizzi, and Valentino, 2010), and cooking/meal preparation (Johnson, Blood, Freeman, and Simmons, 2013; Mechling, Gast, and Seid, 2009; Payne, Cannella-Malone, Tullis, and Sabielny, 2012; Sigafoos et. al., 2005). In addition, video-based instructional strategies were shown to be more effective than in vivo static picture prompting (Mechling, et al., 2009; Van Laarhoven, et al., 2010) and in-vivo modeling (Charlop-Christy, et al., 2000).

Numerous researchers (e.g., Buggey, 2007; Charlop-Christy, et al., 2000; Cihak, Smith, Cornett, and Coleman, 2012; Leblanc, Coates, Daneshvar, Charlop-Christy, Morris, and Lancaster, 2003; Mechling, et al., 2009) suggest this increase in evidence may in part be due to the fact that video-based strategies provide minimal distractions during instructional session time, limiting the presentation of irrelevant or multiple stimulus features, while expecting minimal demand from students to socially interact with the video prompts.

Two of the most popular examples of video-based strategies include video-modeling (VM) and video-prompting (VP). Sigafoos et al. (2005), and others (e.g., Cihak, et al., 2006; Gardner and Wolf, 2013) differentiate video prompting from video modeling. Whereas video modeling, as defined, requires the participant to view the entire video of a model performing the sequence of steps required to complete the task before the participant has the opportunity to respond, video prompting shows each individual step of the task analysis, thus allowing the participant the opportunity to perform each step before moving onto view the next step in the task sequence (Sigafoos, et al., 2005) in a total task method. One benefit of a video prompting strategy, especially when the task requires a multiple step chain, is it allows the learner to view the

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discrete step, pause the video, attempt to complete the step, and then advance to the next video step. As a result of the step-pause-practice-next step strategy of video prompting, additional instructional prompts, and/or step-specific corrective feedback can easily be incorporated into the chain. In their review of 13 single case experimental research studies using video-based instruction for teaching daily living skills to individuals with autism spectrum disorder, Gardner and Wolf (2013) reported video prompting as being an effective intervention strategy, while video modeling as being a "somewhat effective" intervention strategy for increasing skill acquisition (p. 73). In addition, Gardner and Wolf (2013) noted in their review of research that all video prompting and video modeling strategies were accompanied by some form of additional antecedent prompting, resulting in a multi-component intervention package.

The purpose of this study was to examine the effects of video prompting to teach the dressing skill of shoe tying to two students with autism and moderate to severe intellectual disability. Specifically, we wanted to assess if video-prompting alone, without additional antecedent staff prompting, voice-over instruction, or corrective verbal feedback, would affect shoe tying accuracy, maintenance, and generalization. We also wanted to assess parental and student social validity, noting the acceptability of both the intervention and the outcomes.

METHOD

Participants and Setting

Two students, ages 13 and 14, participated in this study. Both students were diagnosed with autism spectrum disorder (ASD) and intellectual disability. Tony and Annie both participated in the Pennsylvania Alternate System of Assessment (PASA), a statewide tiered alternate assessment designed for students with the most significant cognitive disabilities. Each assessment has three tiers, A (least complex), B (intermediate), and C (most complex). Following completion, the PASA results were scored on a scale from lowest to highest: emerging, novice, proficient, and advanced. Tony was tested on a level A (least complex) and scored novice in both Reading and Math. Annie was tested on a level C (most complex) for Reading and scored advanced, and on a level B (intermediate) for Math and scored proficient. Both students attended an autism support classroom, housed in a general public middle school building. Both students received two, 30-minutes sessions of occupational therapy per month. They both wore shoes with laces to school each day, and their parents stated that they would like their child to learn to tie his/her own shoe in increase their independence. In addition to the parental concern, there was also the social integration issue of attending middle school unable to tie your shoes independently and/or asking adults for assistance to tie your shoes whenever they become untied.

Tony, a 14 year old boy, was diagnosed with autism spectrum disorder and severe intellectual disability. At the start of the study, he could not tie his shoes. Tony wore athletic sneakers to school each day, and when his shoes became loose or untied, he would locate an adult nearby and ask, "I need help, tie my shoe." Tony did not have prior exposure to video modeling to teach shoe tying. During the study, Tony had a medication change on session 21, when Abilify was added, while decreasing his Risperidone dosage. On session 48, he went back to his original medication including 3mg Risperidone (full dosage) and no Abilify. Tony was very good with technology. For example, he could navigate a computer and iPad with ease. He preferred to spend as much time as possible on these devices. He had limited vocal communication, which resulted in vocal outbursts and physical aggression at times. He benefited greatly from visual supports throughout his day. He spent about 60 minutes per day in general education including homeroom, special classes (gym and music), and lunch. The remainder of his day (5.75 hours) was spent in the Autism Support classroom where he received his academic classes.

Annie, a 13 year old girl, was diagnosed with autism spectrum disorder and moderate intellectual disability. At the start of the study, she was unable to tie her shoes independently, and verbally say she did not know how to tie her shoe. When asked to try, she would use both hands to roll the laces into a ball. Annie did not have prior exposure to video modeling to teach shoe tying. She spent about 90 minutes per day in general education including homeroom, special classes (gym, music, computer, tech education, family & consumer science, and art), and lunch. The remainder of her day (5.25 hours) was spent in the Autism Support classroom where she received her academic classes.

In addition to the lead special education teacher (first author), the classroom contained a total of five students and two paraprofessionals. Typical classroom reinforcers used as part of the ongoing daily management plan were in place throughout the length of the study (baseline, intervention, and maintenance sessions). Typical classroom reinforcers included computer, puzzles, books, and walks around the school.

All baseline, intervention, and maintenance sessions were conducted in the autism support classroom. The classroom contains desks and tables for five students, and a smartboard in the front of the room. Generalization sessions were conducted in the gymnasium during a general physical education class. The gym class was an integrated small group, comprised of a total of six students; three special education students and three general education students.

Materials

Each student brought a pair of their own athletic shoes with laces to be used during all baseline and intervention sessions. Each sneaker was fitted with two different colored laces, ½ black and ½ red to serve as additional discrimination. The same untied sneaker was used for all baseline, intervention, and maintenance assessments.

Prior to intervention a video model was produced, showing an adult tying one white athletic sneaker with ½ black lace and ½ red lace, incorporating all nine steps of the task analysis (See Table 1 for complete task analysis). The video was shot from a first person POV, so that only the athletic sneaker and the adults' hands were present in the video. This POV represents the view the student would have when looking at the shoe on the table and on his/her foot. The video contained no voice-over verbal instructions, prompting, or feedback. After each step of the task analysis, the iPad mini screen went black for approximately three seconds, allowing the lead teacher to pause the video for the student to perform the task and/or any hand-over-hand error correction that may have been required. The video was a total of 73-seconds in duration. An iPad mini was used by the students to view the video during all intervention sessions.

During intervention sessions, an iPad mini, for viewing the video, was placed on the table prior to the student being seated. A video camera and stand, placed on blocks on a table about three feet was used to record initial intervention sessions for later scoring. Use of video during training sessions to record and then score later was necessary, allowing the classroom teacher opportunity to provide hand-over-hand error correction when trying.

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Dependent Measures

The primary dependent variable, recorded across all baseline, intervention, maintenance, and generalization assessment sessions was percentage of the nine step shoe tying task analysis steps completed accurately. Data were scored from videotapes, recording all baseline and intervention assessment sessions. Task analysis steps were scored accurate if the correct response was made within 5-seconds of the previous completed step. Task analysis steps were scored as errors if the incorrect response was made within 5-seconds of the previous completed step, or no response was observed by the student within 5-seconds of the last completed step.

Procedure

Baseline Assessment. During baseline assessment the students used their own sneaker fitted with a ½ red and ½ black lace. The student placed his/her shoe on a table, while seated at the table. During baseline assessment, the teacher delivered an initial verbal prompt "Tie your shoe." Baseline employed a total task format in which all steps were attempted each session. If the student correctly completed the step, the teacher said "good." If the student performed the step incorrectly, hand-over-hand, non-verbal error correction was used to complete that step, thus allowing the student to attempt the next step. If the student did not respond within 5 seconds of the initial verbal prompt for step one, or within 5 seconds of the last completed step, the teacher used hand-over-hand, non-verbal error correction to complete that step, thus allowing the student to attempt the next step. No vocal response was given to signal the step was performed incorrect or the step was not initiated. This continued until each step of the task analysis was complete.

Intervention. All intervention sessions occurred before lunch (completed before 11:40 am). The students practiced with the shoe tying video twice a day on an iPad mini, viewing it once in the morning following homeroom and again right before lunch.

During video prompting, the student used the same shoe that was used during baseline. During video prompting the teacher sat with the student at a table, and started the video on the iPad mini. Intervention employed a total task format in which all steps were attempted each session. Each step of the task analysis was separated by a 5 second pause in the video for the student to attempt the step just viewed. If the student performed the step correctly, the teacher said "good." If the student performed the step incorrectly, hand-over-hand, non-verbal error correction was used, thus allowing the student to attempt the next step. If the student did not respond within 5 seconds of the completion of the previous step, the teacher used hand-over-hand, non-verbal error correction, thus allowing the student to attempt the next step. No vocal response was given to signal the step was performed incorrect or the step was not initiated. After each step, the video resumed where left off, until all nine steps of the task analysis were viewed and completed. Students were trained on the same shoe (left or right) each session. When the session was over, the teacher thanked the student for participating, and turned off the iPad mini.

Because repeated errors were observed for both students at step seven and step three, a specific antecedent verbal prompt was added (a) at session 36 to step seven of the task analysis, and (b) at session 42 to step three of the task analysis. For the specific verbal prompt, the teacher read the step as written for the task analysis (See Table 1) after that step was observed on the video. These additional verbal prompts remained part of the intervention for the duration of the

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remaining intervention sessions. No additional reinforcement or antecedent prompting was provided during intervention sessions.

Assessment during Intervention. All assessments during the intervention phase occurred after lunch. Assessment during the intervention phase was identical to assessment during baseline. The students used his/her shoe on a table, while seated. The teacher delivered an initial verbal prompt "Tie your shoe." Assessment employed a total task format in which all steps were attempted each session. If the student correctly completed the step, the teacher said "good." If the student performed the step incorrectly, hand-over-hand, non-verbal error correction was used to complete that step, thus allowing the student to attempt the next step. If the student did not respond within 5 seconds of the initial verbal prompt for step one, or within 5 seconds of the last completed step, the teacher used hand-over-hand, non-verbal error correction to complete that step, thus allowing the student to attempt the next step. No vocal response was given to signal the step was performed incorrect or the step was not initiated. This continued until each step of the task analysis was complete.

Generalization and Maintenance. Both left and right shoe (without black and red colored laces) were assessed during generalization and maintenance sessions. All generalization probes were conducted in the school gymnasium, while maintenance probes were conducted in the classroom. Generalization was assessed once during the baseline phase, twice during the intervention phase. Maintenance was assessed at the end of the intervention phase. Each generalization and maintenance probe assessed the same nine step shoe tying task analysis assessed during baseline and intervention phases, with the lead teacher recording correct or incorrect responses to the first shoe to be tied. The teacher used the same verbal prompt to initiate each sessions, "tie your shoe." If the student correctly completed the step, then the teacher said "good." If the student performed the step incorrectly, hand-over-hand, non-verbal error correction was used to complete that step, thus allowing the student to attempt the next step. If the student did not respond within 5 seconds of the initial verbal prompt for step one, or within 5 seconds of the last completed step, the teacher used hand-over-hand, non-verbal error correction to complete that step, thus allowing the student to attempt the next step. No vocal response was given to signal the step was performed incorrect or the step was not initiated. This continued until each step of the task analysis was complete.

Experimental Design

A single-subject multiple baseline research design across two students was used to graph and visually analyze student assessment data. Intervention was introduced sequentially across the two students. Once baseline data from Tony showed stability, intervention was introduced to Tony. Once intervention data from Tony showed change from baseline data, intervention was introduced to Annie. The sequential introduction of intervention when using the multiple baseline design established control within and across students. A multiple baseline design establishes experimental control by noting (a) the change in the dependent measure as Tony and Annie move from baseline phase to intervention phase, and (b) the change in the dependent measure for Tony once the intervention phase is introduced, while responding remains unchanged across Annie continuing under the baseline phase (Barlow, Nock, & Hersen, 2009).

In addition to the multiple baseline, generalization probes were assessed in the school gymnasium, once during baseline, twice during intervention, and once during the maintenance phase of the study for both Tony and Annie.

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Interobserver Agreement and Procedural Integrity

Interobserver agreement data were scored by the lead classroom teacher and a second independent observer in the classroom (classroom teacher assistant). Agreement data on steps correct and errors were collected for 38% of baseline and intervention assessment sessions, with a mean agreement of 96.6% (range 78% - 100). A task analysis checklist was used to assess procedural integrity. The checklist included steps for session set up, initial verbal prompt, and error-correction, with a mean integrity of 98.5% (range 94% - 100%).

RESULTS

Acquisition

Following a stable baseline (X = 25.7%; range 22%-33%), intervention was introduced to Tony. Following baseline, Tony's data showed a slow, but steady upward trend. Tony's performance data plateaued at 78% (7 of 9 steps mastered) at sessions 33-35, with consistent and repeated errors on task analysis steps seven and three (See Table 1). An additional verbal prompt was added for step seven at session 36, and by session 48 Tony acquired the skill. An additional verbal prompt for step three was added at session 42, and by session 62 Tony had acquired the skill. After the addition of a verbal prompt for each step Tony achieved 100% independence on session 62, followed by two consecutive sessions at 100% independence on sessions 67 and 68.

Annie was introduced to intervention following a baseline (X = 18.7%; range 0%-33%) where the last 4 of the 5 baseline sessions stabilized at 22% (2/9). Similar to Tony's performance, following baseline, Annie's data showed a slow, but steady upward trend. Also similar to Tony, Annie's performance plateaued, but at 68% (6 of 9 steps mastered), with consistent and repeated errors on task analysis steps seven and three (See Table 1). The additional verbal prompt was added for step seven at session 36, and by session 55 Annie acquired the skill. The additional verbal prompt for step three was added at session 42, and by session 55 Annie had acquired the skill. After the addition of a verbal prompt for each step, Annie first reached 100% independent at session 55, concluding the intervention phase with 6 of the final 8 sessions at 100% independence.

A Tau-U effect size was used to support the visual analysis of graphically depicted data. Tau-U is a nonparametric effect size that accounts for both data overlap and data trend within and across experimental phases (Parker, Vannest, Davis, & Sauber, 2011). Tentative guidelines in interpreting Tau-U as small effect = 0 - .65; medium effect = .66 - .92; large effect = .92 - 1.0. Parker and Vannest (2009). The results of our Tau-U analysis confirmed the visual analysis. For Tony and Annie, calculated Tau-U yielded .97 (large effect) and .99 (large effect), respectively.

Generalization and Maintenance

During the baseline generalization probe, Tony completed 22% (2/9) of the steps independently. Two generalization probes were collected during intervention, showing Tony completing 78% (7/9) of the steps independently. Even though Tony did not reach 100% during generalization, anecdotally, he was observed tying his own shoe when needed throughout the school day. During the baseline generalization probe, Annie completed 11%

(1/9) of the steps independently. Two generalization probes were collected during intervention, showing Annie completed 78% (7/9) and 89% (8/9) of the steps independently. Maintenance data were collected four weeks after the final intervention session, and at that time, Tony and Annie each completed 89% (8/9) of the steps independently.

Social Validity

A social validation student survey was completed by both students (See Table 2). Questions were presented in a "yes/no" format including pictures and words to represent each choice. A smiley face and the word yes was one choice, and a frown face and the word no were the other choice. Tony answered "no" to the first two questions and "yes" to the last three questions. Annie answered "yes" to all five questions. Annie noted during the social validation survey that she can tie her shoe now, but it is still hard for her to do so. She also indicated that she would like to learn more things through video modeling.

Additionally, a social validation parent survey using a scale one to five was completed by both students' parents (See table 3). Tony's parents answered fives to all four questions, adding the comment, "He loves being able to independently tie his shoes." Anecdotally, Tony's family noted that he is tying his shoes independently at home, as well as tying the strings on his pants independently. He did not display this behavior prior to the start of this study. Annie's parents answered five to three of the four questions, posting a score of 4 for question #1.

Discussion

Our results extend the previous literature on the use of video-based strategies for student with autism and other developmental and intellectual disabilities in two ways. First, whereas the majority of previous video-based intervention research pair video-based instruction with additional intervention components, such as (a) video prompt with voice-over (Burke, et al., 2013; Johnson, et al., 2013; Mechling, et al., 2009; Sigafoos et al., 2005), (b) verbal prompts, tokens, and corrective feedback (Cihak, et al., 2006), (c) picture exchange communication system (PECS) (Cihak, et al., 2012), (d) verbal prompts (Charlop-Christy, et al., 2000), (e) video prompts and backwards chaining (Rayner, 2011), (f) reinforcement (LeBlanc, et al., 2003), or instructional cues and verbal praise (Van Laarhoven, et al., 2010), the purpose of our study was to evaluative video-prompting without additional staff-directed intervention components, on shoe tying accuracy, maintenance, and generalization. By minimizing added instructional prompts we (a) reduced the potential problem of prompt dependency, (b) reduced the instructional time required to fade any additional prompts, and (c) determine the efficacy of video-prompting as a viable stand-alone intervention, not as a single component of a multi-component intervention package. Results showed both students reached 100% independence on the 9-step shoe tying task analysis by the end of the classroom training sessions. Although no additional prompting was initially required, by session 36 we added s specific verbal prompt to step seven, followed by an additional verbal prompt added to step three at session 42. Even with the addition of verbal prompting for two task steps at sessions 36 and 42, the amount of additional prompting was minimal compared to recent research using video-prompting.

The second way in which our results extend the literature base was to target a specific dressing skill, using items during training and generalization sessions that are actually used in the real world. Very few video-modeling research focused on the functional life skill domain of dressing. For example, research studies reviewed by Gardner and Wolf (2013) and Domire and Wolf (2014) reported only one study explored the role of video-prompting on dressing skills,

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shoe tying. In that study, Rayner (2011) assessed the effects of video modeling on tying a shoelace knot, but required the addition of backwards chaining, live modelling, and verbal instruction following the video-prompting phase to secure mastery of the task for two of the three students. In addition, the Rayner (2011) study used a simulated mock-shoe for knot tying, requiring the actual shoe only during generalization.

If the criterion on ultimate functioning for student with autism and other developmental and intellectual disability is functional independence across inclusive settings, then as intervention techniques are designed and implemented we should be cautious as to (a) the amount and level of additional intervention components added to video-prompting (e.g. tokens, systems of least prompts, voice-over videos), and (b) the use of simulated instructional materials and environments

Limitation

Although both students reached 100% mastery during classroom intervention sessions, and although anecdotal reports from school personnel, students, and parents suggest Tony and Annie were tying their shoes independently outside of the classroom, maintenance and generalization checks did not report 100% mastery. Although maintenance data collected 4-weeks post video prompting showed marked improvement above baseline data, neither student remained at 100% independent (Tony and Annie both completed 8 of 9 steps correct during maintenance check). Generalization data collected during scheduled gym time also showed marked improvement from baseline generalization, but neither student remained at 100% independent. Although eight of nine steps performed independently is a vast improvement post baseline, for many daily life skills 100% is the only functional criteria. For example, incorrectly completing step seven on the task analysis in Table 1, still results in an untied shoe. As educators we have to be certain to not only report session data accuracy, but also report accuracy levels within the criteria of ultimate functioning. One solution to this issue would have been to transfer the video prompting task analysis to a smaller mobile device, allowing both Tony and Annie to continue to access the video throughout the school day. Such mobile devices are commonly used by students in middle and high school setting, so viewing the video on such a device in an inclusive setting would have been generally acceptable. Unfortunately, our students did not have access to such devices at the time of the study.

A second limitation was only two students participated in the study. A multiple baseline across two baseline is less adequate in demonstrating a functional relation between intervention and behavior change than a multiple baseline across 3 students because it shows one less AB comparison. Initially, a third student participated in this study, but dropped out of the study before completion.

In light of the limitations, both students mastered shoe tying at 100% independent by the end of the training sessions. In addition, parents of both students strongly (a) supported the video prompting strategy, as well as (b) approved of the outcomes as reported in the social validity survey completed at the end of the study.

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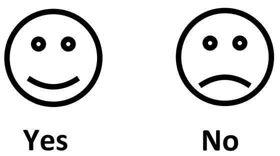
APPENDIX

Table 1. Nine-Step Task Analysis for Shoe Tying

	Task Analysis: Shoe Tying
1	Pick up both laces
2	Crosses the laces
3	Put the red lace through the middle
4	Pull both laces tight
5	Make a loop with the red lace
6	Put the black lace around the red lace
7	Put the black lace through the hole
8	Hold both loops
9	Pull down to make a bow

Table 2. Social Validation Student Survey



1. I liked learning to tie my shoe by watching the video
2. The video made shoe tying easy for me
3. Shoe tying is still hard for me
4. I can tie my shoe now
5. I want to learn more things by watching videos

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Table 3. Social Validation Parent Survey

1 = Disagree	**2** = Somewhat Disagree	**3** = Neutral	**4** = Somewhat Agree	**5** = Agree

1. My child can now tie his/her shoe at home

   1 ***2*** ***3*** ***4*** ***5***

2. I am pleased with the improvement of my child's shoe tying skills

   1 ***2*** ***3*** ***4*** ***5***

3. The study targeted an important skill

   1 ***2*** ***3*** ***4*** ***5***

4. I would like to try video modeling to teach my child other skills

   1 ***2*** ***3*** ***4*** ***5***

Figure Caption

Figure 1 shows the percentage of shoe tying steps completed independently across two students; Tony and Annie.

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