# USING VIDEO PROMPTED RECIPES TO IMPROVE CULINARY SKILLS FOR INDIVIDUALS WITH INTELLECTUAL DISABILITIES

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## ABSTRACT

Many individuals who have been diagnosed with intellectual disabilities (ID) often lack or are not taught independent living skills such as cooking. Because of inadequate preparation, young adults may then struggle with completing certain tasks, accomplishing personal goals, or integrating within their community. Previous research has suggested that the use of video prompting is an effective resource for teaching independent living skills (Taber-Doughty et al, 2011). A multiple-baseline design across participants was implemented to evaluate the effectiveness of video prompting to teach cooking skills to three adults with ID. A 21-step task analysis of cooking chocolate chip pancakes was developed and then used to create a picture recipe guide and video-prompting guide. During baseline, participants were unsuccessful when utilizing a picture recipe to make chocolate chip pancakes. During intervention participants used the *Task Analysis* app to cook chocolate pancakes through video prompting. All three participants were able to increase their ability to demonstrate the target skill; yet only one participant met mastery criterion. One participant was able to successfully generalize the skill to their home kitchen. Results indicate that video prompting may be an effective method to teach young adults with ID independent living skills such as cooking but prerequisite skills may be taught prior to video-prompting (e.g., how to measure ingredients, how to flip a pancake). Implications for future research and practice are discussed.



*Keywords: Video prompting, independent living skills, intellectual disability, cooking skills*

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## LIST OF ABBREVIATIONS

| | |
|---|---|
| ID | Intellectual Disabilities |
| AT | Assistive Technology |
| MSU | Michigan State University |
| IOA | Interobserver Agreement |
| PI | Procedural Integrity |

# INTRODUCTION

Independent living skills are defined as "skills necessary for management of one's personal self-care and daily independent living, including personal management skills needed to interact with others, daily living skills, financial management skills, and the self-management of health care and wellness needs" (Taconet et al., 2024, pg. 32). These life skills are necessary to live independently and to successfully navigate day to day life (Stierle et al., 2023). An individual's ability to engage in independent living skills is related to positive predictors for postschool employment opportunities and residential independence (Taconet et al., 2024).

Those diagnosed with intellectual disabilities (ID) experience a combination of intellectual and adaptive functioning deficits that can affect conceptual and practical domains. Such deficits can further impact the individual's memory, attention, focus, and ability to complete multi-step tasks, hindering their success in gaining independent living skills (Bridges et al., 2020). Individuals with ID are often not taught how to independently accomplish daily living skills (Wynkoop et al., 2018). In fact, one report indicated that only 25% of students with ID can perform daily life skills (e.g., making their own breakfast, doing laundry, traveling to places in the community) (IES, 2012). When individuals are not taught independent living skills, they become reliant on the help of family or supportive housing staff to complete or aid in daily living tasks, further reducing the individual's opportunity for community participation and independence (Bridges et al., 2020; Shipley et al., 2002). Providing direct instruction in independent living skills will increase opportunities for individuals with ID to live independently and contribute to their communities.

Prior research has identified several effective practices and instructional strategies to teach independent living skills to individuals with ID, including task analyses, prompting, and

assistive technology (AT) (Stierle et al., 2023). Task analyses are a common instructional tool that is used to teach individuals with and without disabilities a range of activities and skills by breaking down a task into smaller, more concise steps (Tan et al., 2016). Task analyses are an evidence-based practice that can be used in various settings and can be adapted to fit the individual's learning and support needs (Tan et al., 2016). While teaching the skill or activity using a task analysis, instructors will often use a series of prompting strategies to further support the individual's learning and acquisition of the skill. Prompting can also help the individuals to make fewer errors and allow the instructor to provide feedback for incorrect responses (Randall et al., 2019). There are several prompting methods that have been found to be effective such as physical, verbal, gestural, and visual prompts including video prompting (Randall et al., 2019).

Assistive technology includes any item, equipment, or system (whether commercially acquired, modified, or customized) that can be used to increase or maintain the functional abilities of a person with a disability (Lancioni et al., 2014). Video-based instruction is one effective form of assistive technology that can be used to teach independent living skills to individuals with ID. There are two types of video-based instruction: video modeling and video prompting. Video modeling is when a student watches a video of a person (model) performing a skill or activity in its entirety and then completes the same skill or activity using the same methods as the person in the video (Wynkoop et al., 2018). Alternatively, video prompting combines both task analysis and prompting to teach the activity or skill by allowing the individual to view short clips of videos that break down the skill or activity into steps. After viewing each step, the participant is asked to complete what was demonstrated in the video before watching the video of the next step in the sequence. Both video modeling and video

prompting are evidence-based practices that are effective methods to address skill deficits for individuals with ID (Bellini & Akullian, 2007).

Assistive technologies have been found to help motivate students with ID to learn and engage in productive behaviors such as independent living skills (Egarr & Storey, 2021). Another benefit of using assistive technology to help teach individuals with ID is that it decreases an individual's dependence on others when completing certain tasks (Randall et al., 2020). In addition to these positive findings supporting the use of assistive technology, other benefits include reduced cost, increased consistency when delivering instructional content, minimized social stigma, and an increase in skill generalization and maintenance (Randall et al., 2020; Wynkoop et al., 2018). Video modeling can also help students who are easily distracted by the environment to focus on the relevant stimuli (Wynkoop et al., 2018).

Recently, Stierle et al. (2023) conducted a study evaluating the effectiveness of using video prompting to teach cooking skills to students with ID. They used the newly developed *Task Analysis* app to teach different multiple step recipes to the participants. The *Task Analysis* app is a free application that can be downloaded on any iOS device through the App Store that practitioners can use to create and deliver video prompting (Stierle et al., 2023). Practitioners break down multi-step tasks into smaller steps (e.g., task analysis) and then create short video clips of each step to allow the individual to view and then perform each step of the task. Practitioners can customize and edit tasks and steps to best meet the individual's learning needs, such as adding additional textual and audio prompts. The app requires the individual to watch the video prompt in its entirety and then provides a textual prompt to ensure the individual has completed the step before allowing access to the next step. Some videos also include a caution

indicator to alert the individual that the step currently being completed uses critical safety measures (e.g., turning off the stove).

Stierle et al. (2023) examined three participants' abilities to cook using the *Task Analysis* app compared to a written recipe that was provided in baseline. Stierle et al. (2023) first trained participants on how to use the app and access its functions. They instructed participants on how to watch each video in order, how to re-watch a video, and how to exit the video step (Stierle et al., 2023). Once participants were able to master the functions of the app, participants were moved into the intervention phase to learn to cook vegetables, make macaroni and cheese, and cook an omelette.

Overall, Stierle et al. (2023) demonstrated that participants were able to learn cooking skills using the *Task Analysis* app. Once in the intervention phase, they found that participants were able to use the *Task Analysis* app to watch the video prompt, complete the step accurately, and then move onto the following step independently. Through the use of the app, participants increased their independence in completing the cooking recipes. The researchers also found that the video prompting increased participants' kitchen and cooking safety. It was reported that during baseline participants demonstrated numerous safety concerns while cooking the recipes. Once the video prompts were introduced, participants were able to follow along independently and complete the steps safely (Stierle et al., 2023).

**Current Study**

The present study was modeled after the Stierle et al. (2023) study to teach cooking skills to three young adults with Down syndrome. Extending the procedures from Stierle et al. (2023), the current study examined the effectiveness of video prompting through the *Task Analysis* app compared to the use of a picture recipe provided in baseline. The picture recipe serves as a

different learning method for teaching how to follow a recipe. The current study also examined whether the cooking skills learned in the intervention setting would generalize to the participant's home kitchens. The research questions asked were as follows:

1. Is video prompting an effective method for teaching cooking skills to individuals with ID?
2. Does the teaching method generalize to a home kitchen?

## METHOD

### Participants

Participants included three individuals with a medical diagnosis of Down syndrome. Participants reported having no prior knowledge of how to cook the selected recipe. Additional inclusion criteria included (a) the ability to operate a smartphone device, (b) ability to follow a picture recipe, and (c) required assistance in completing multi-step daily living tasks, as reported by a caregiver. Consent was obtained from all participant's parents/legal guardians, and assent was also obtained from the participants. All participants and their guardians acknowledged that the participants had no known food allergies or dietary restrictions.

Participant A was a 20-year-old White male. He was a student in a local transition program focusing on job skills training and independent living skills. He participated in numerous community activities such as a bowling league, a music group, and other groups geared toward the Down Syndrome community. Participant B was an 18-year-old White male. He recently graduated from high school and was attending a local transition program focusing on job skills training and independent living skills. He also participated in many local programs such as a bowling league and he had a very popular social media page where he posted the daily weather report. Participant C was a 28-year-old White male. He attended a day-program and participated in community activities such as bowling and Special Olympics. Participant C had higher support needs and required more assistance with certain academic tasks such as reading. Participant C's parents also reported that he used hearing aids due to a hearing impairment.

All three participants lived at home with their parents who also served as their legal guardians. Participant A and B were both proficient at using technology and had access to

personal technology devices (e.g., iPhone, iPad) at home. Participant C also had access to an iPad to use as an AAC device.

**Setting**

All baseline, app training, and intervention cooking sessions occurred at Michigan State University's (MSU) Venture Kitchen, located on MSU's campus in the Union. The Venture Kitchen is a fully licensed commercial size kitchen that includes a commercial size refrigerator, commercial size stove, commercial style sink, a microwave, and a prepping station (countertop). Generalization sessions were conducted in each participant's home kitchen.

**Materials**

Materials required for this study included an iPad, iPhone, printed picture recipes, cooking ingredients to make pancakes (pancake mix, chocolate chips, cooking spray, and water), and cooking tools (a frying pan, a kitchen timer, spatula, mixing bowl, a mixing spoon, a plate, and measuring cups). Other materials were available in the Venture Kitchen, including a stove and sink. Baseline session material included the picture recipe that displayed a picture of the cooking tools and ingredients required to make the recipe, as well as all the steps necessary to complete the recipe (see Appendix A). The recipe was broken down into 21 picture steps and had short written prompts explaining the step, while also showing a picture of the action needed to complete the step.

App training sessions included two crafts, making slime or making a sensory bottle. Materials included the iPad to display the *Task Analysis* app, materials to make slime (e.g., contact solution, craft glue, baking soda, and a bowl), and materials to make the sensory bottle (e.g., a glass bottle, assorted plastic beads, and uncooked rice, a plate, and liquid measuring cup). Intervention session materials included an iPad to display the *Task Analysis* app, ingredients to

make pancakes (pancake mix, chocolate chips, cooking spray, and water), cooking utensils (measuring cups, mixing bowl, spatula, mixing spoon, kitchen timer, and frying pan), and kitchen appliances such as a stove and a sink. The iPad was provided by the researcher with the *Task Analysis* app pre-downloaded onto the device. The researcher's iPhone was used to record all baseline, app training, intervention, and generalization sessions.

The video prompts were created by the researcher using all materials available at the MSU Venture Kitchen. The researcher then edited the videos using the media platform, TikTok. The researcher added a voice over describing each step and how the participants were expected to complete the step. For example, Step (2) required participants to measure one cup of pancake mix; the researcher added a voice prompt that said, "Measure one cup of pancake mix". The clips were then uploaded onto the *Task Analysis* app. The researcher added caution prompts and click prompts within the app.

**Independent Variable**

The independent variable was the use of video prompting through the *Task Analysis* app to determine whether it is a more effective prompting method for completing a recipe making chocolate chip pancakes compared to a picture recipe. The chocolate chip pancake recipe was chosen because it is a common recipe and has a limited number of steps. Participants are also able to use a pre-made pancake mix to eliminate unnecessary steps.

**Dependent Variable**

The dependent variable was the number of steps in the recipe that the participants accurately and independently completed from the task analysis (see Appendix B). The task analysis included twenty-one steps for completing the chocolate chip pancake recipe which were then grouped into 9 steps to present to participants on the picture recipe or through video

prompting. The recipe included four ingredients and eight kitchen tools. To determine the participant's accuracy, the written task analysis of the recipe was used to calculate the number of steps completed accurately and independently. Performance on each step was scored as (+) for an accurate and independent response, (-) as an incorrect response or no response, and (P) as prompted. The order in which the participant completed each step was not used to determine a correct or an incorrect response. For example, step (9) on the task analysis stated that the participant must turn off the stove and then put the pan in the sink; if the participant first put the pan in the sink and then turned off the stove, the researcher did not mark that as an incorrect response.

A correct response was recorded if the participant completed the step accurately and with 100% independence. For example, if the picture recipe or video prompt instructed the participant to add one cup of pancake mix to a bowl, a correct response was scored if the participant used a one-cup measuring cup, filled the whole measuring cup with pancake mix from the bag, and then dumped the mix into the bowl, without assistance from the researcher. An incorrect response was recorded if the participant did not complete the step as directed in the picture recipe or video model. An example of an incorrect response would be if the video prompt instructed the participant to add two-thirds cup of water to the bowl, and the participant measured one cup of water. A prompted response included a verbal prompt from the researcher to re-watch the video prompt, the researcher asking the participant whether a measuring cup was full, or asking the participant what the next step was. If after 30 seconds, there was no response, the step was marked incorrect, and the session was stopped by the researcher.

The percentage of correct steps was calculated by dividing the number of correct responses by the total number of steps in the task analysis and multiplying by 100. Mastery

criteria required that participants complete the recipe with 100% accuracy and independence across three consecutive intervention sessions.

**Data Collection**

After each cooking sessions, observers watched a recording of the session and used the task analysis created by the researcher (Appendix B) to score each step as (+), (-), or (P).

**Interobserver Agreement**

To ensure the reliability of data collection, interobserver agreement (IOA) data was collected and calculated during baseline and intervention sessions. A second observer was trained in the data collection procedures and how to accurately code data. Specifically, the researcher met with the second observer and independently modeled how to code one video session, going through each step on the task analysis and explaining the reasoning behind each scored response. Then the researcher and observer watched a second video session and recorded each response together. Finally, the researcher asked the observer to independently watch another video session and record their answers. Once they completed the independent recording, the second observer compared their scores to the researcher's scores for the video.

Once 100% agreement was reached, the second observer collected IOA data by watching 20% of the video-recorded baseline and intervention sessions. An agreement was defined by the number of matched responses collected by both the first and second observer. A disagreement was defined as the number of non-matching data collected during each session. IOA was calculated by taking the number of matched responses over the total number of possible responses and then dividing the number by 100. The overall IOA percentage for the data collected by the second observer was 100%; IOA was 100% across both baseline and

intervention sessions for Participant A, 100% across both baseline and intervention sessions for Participant B, and 100% across both baseline and intervention sessions for Participant C.

## Experimental Design

A multiple baseline design across participants was utilized to demonstrate the effectiveness of the video prompting intervention. By using a multiple baseline design, researchers are able to determine whether or not there are alternative explanations for behaviors that occur during each session. Each participant used one recipe across all sessions. When using a multiple baseline design across participants, the independent variable is introduced in sequential sessions among participants who have exhibited similar learning needs (Ledford & Gast, 2018). The target skill is measured across all phases. Once the skill is mastered in the intervention condition, the participant moves into the generalization phase.

## Procedures

### *Creation of Picture Recipes*

The chocolate chip pancake picture recipe was created using the *Accessible Chef*, a website that specializes in the creation of cooking recipes for individuals with ID (Moyer, https://accessiblechef.com/contact/). The website gives users three different styles of templates that can be customized to fit the steps of the recipe. Users can add steps, delete steps, upload pictures of ingredients and tools, or choose from stock images that are already on the website.

The researcher first created a task analysis of the recipe and then created the picture recipe using stock images that were available on the website, as well as images acquired from the internet. The final picture recipe that was used in the current study first displayed the ingredients and tools necessary to complete the recipe. Next, the picture recipe displayed images and text that corresponded with each step necessary to make chocolate chip pancakes. For example, the

first step, wash hands, displayed an image of hands under water and the text “wash hands”. The researcher also included a caution sign, indicating to participants that the step could be dangerous and required extra care such as moving the hot pan from the stove to the sink (see Appendix A).

***Creation of Video Prompts***

The video prompts were created prior to the start of the intervention phase. The video clips were filmed in the MSU Venture Kitchen using the same materials that were used in baseline and intervention. Each video clip mirrored the nine groups of steps depicted in the picture recipe, with audio describing the step. For example, Step (1) “wash hands” depicted a first-person point-of-view of the researcher washing their hands at the Venture Kitchen sink. First person point-of-view means that the video is filmed from the perspective of the researcher completing the step themselves as if they were the participant. The researcher also added the audio, “Step one: Wash hands”. The video clips were then uploaded to the *Task Analysis* app. The average length of the video clips was 30 seconds. Similar to the picture recipe, the researcher noted if a step was a caution step by adding a verbal prompt in the video and also a click prompt in the step itself.

***Pre-Baseline***

Prior to the start of baseline sessions, the researcher met with each participant and their parent at the Venture Kitchen to obtain consent and assent, and to provide a brief kitchen safety lesson. Participants were taught important safety skills needed to work in the kitchen. For example, they were taught to turn off the stove if they were leaving the kitchen space. Participants also watched a short YouTube video discussing other kitchen safety skills such as how to safely put out kitchen fires and how to handle hot kitchen tools. Following the kitchen

safety training, participants were asked a series of questions pertaining to their understanding of the concepts in the training (e.g., “What should you do when you are done using the stove?”) (see Appendix C). There were five multiple-choice questions, with three answer choices per question. Given his higher support needs, Participant C was provided a modified version of both the presentation and the safety assessment that included additional visual supports.

***Baseline***

All baseline sessions were conducted in the Venture Kitchen. Participants A and B began baseline on the same day. Participant C began baseline within two weeks of the first two participants. Baseline consisted of at least three sessions or until the participant displayed a stable pattern of performance and the previous participant had scored at least 50% across two consecutive session of app training. Participants completed all baseline sessions independently from other participants.

During baseline sessions, the researcher gave the participants the chocolate chip pancake picture recipe and the verbal prompt, “Please make chocolate chip pancakes using this picture recipe.” Participants were then required to begin each step of the recipe within a 30-second time period. If the participants completed a step correctly, they were given no feedback. If after the 30-seconds had elapsed and (a) the participant did not begin the next step, (b) attempted to complete the step but began the step incorrectly or only partially completed the step, or (c) skipped the step and moved onto the next step in the recipe, participants were marked as an incorrect response and the session was stopped without providing any additional feedback. The researcher ended the session by saying, “Thank you Participant A, you are all done.” Participants were asked if they would like the researcher to finish making the pancakes. If they answered “yes”, the researcher had the participant leave the room while they finished making the pancake.

The researcher used the task analysis to score the number of steps completed correctly or incorrectly by each participant. When Participant A reached a stable pattern of baseline performance, he proceeded into the App Training sessions while Participant B and C remained in baseline.

### *App Training Sessions*

Prior to the start of the intervention phase, participants were trained in how to access and use the *Task Analysis* app. In the training sessions, participants were asked to complete a craft instead of cooking a recipe. Participants had access to an iPad that displayed the *Task Analysis* app, which displayed video prompts of each step of the craft. All participants were shown how to initiate the step and start the video, exit the video, or how to re-watch the video.

The researcher then prompted the participants to complete the craft using the app by giving the verbal prompt, "I would like you to make this craft using the app." The slime craft consisted of four steps and four video prompts, and the sensory bottle task analysis listed nine steps and nine video prompts for participants to complete. The researcher used a task analysis to record the participant's responses (see Appendix D for the sensory bottle task analysis). A (+) response was recorded if the participant completed the step accurately and with 100% independence. An (-) response was recorded if the participant did not complete the step as directed in the video model. Participants were marked as (P) if the researcher provided the participant a verbal prompt such as, "You need to watch the whole video before starting the step." A step was marked as (N/A) if the participant did not complete a step that was not necessary to complete the overall craft. For example, the researcher broke down the creation of the sensory bottle into nine steps. Step (6) required that participant to pick two to three more beads and place them into the bottle. But if the participant had already placed all the beads in the

bottle during Step (4), it was not required for the participant to complete Step (6) to achieve the same end result. Participants were able to re-watch the video prompt as many times as needed. When a participant reached at least 50% accuracy during app training, the next participant was able to begin app training. Once the participant completed the craft with 100% independence across two consecutive training sessions, they were moved to intervention.

### *Intervention*

During intervention, participants used the *Task Analysis* app to cook chocolate chip pancakes. Because the participants had different learning needs, the researcher added visual supports throughout the kitchen to help with the skill acquisition. Participants are required to set the stove heat to low, so the researcher used a dry-erase marker to indicate on the stove where the "Low" heating setting was. The researcher also used the dry-erase marker to indicate where the two-thirds measurement was located on the liquid measuring cup.

Prior to the start of the intervention, the researcher reminded the participant how to initiate the step, move to the next step, and exit the video using the app. At the start of each trial, the researcher gave the verbal prompt, "Please use the app to make chocolate chip pancakes." The participant then watched the video depicting each step. Participant's performance was scored as (+), (-) or (P) using the task analysis. Steps that were marked as (P) were later scored as (-).

## Generalization

Generalization was conducted in the participant's home kitchen. The researcher went to the participant's home kitchen and asked them to complete the chocolate chip pancake recipe using the app but using their own kitchen utensils and appliances. The generalization phase was similar to the intervention phase in that the participant had access to an iPad with the *Task*

*Analysis* app, they were given the same verbal prompt to initiate the start of the session, they were given the same ingredients, and the liquid measuring cup contained the same visual support. The researcher was unable, however, to mark the low head setting on the stove. The researcher used the same task analysis to score the participant's accuracy and independence completing the recipe.

**Social Validity**

At the conclusion of the study, the researcher created a short, semi-structured interview with a series of questions for both the participants and their parents (Appendix F). Questions were created to determine whether the participants and parents thought the intervention was helpful and whether they enjoyed participating in the study. For example, parents were asked whether they felt their child had increased their cooking skills and if they would feel comfortable and confident if their child asked to cook at home. Participants were asked whether they enjoyed the experience and if they liked using the *Task Analysis* app to cook. Participant questions were created at a level of understanding for all participants (i.e., *yes, no,* or *I don't know*).

**Internal Validity Measures**

Checklists in the form of task analyses were created by the researcher to ensure procedural integrity (PI) of all baseline and intervention sessions (Appendix E). PI refers to the degree to which all experimental conditions were correctly implemented (Ledford & Gast, 2018). The checklist included items such as (a) all materials are available and displayed on the worktop, (b) participants watched each video modeled recipe for the entire duration, and (c) participants were given the verbal prompt to start cooking. PI was calculated for at least one-third of all baseline and intervention sessions by both the researcher and a trained graduate student via watching a video recording of the sessions. Following the completion of the PI checklist,

calculations were completed by dividing the number of correctly implemented steps by the total number of steps and multiplying by 100 to yield an overall percentage. Procedural fidelity was 100% across all observed sessions.

**Data Analysis**

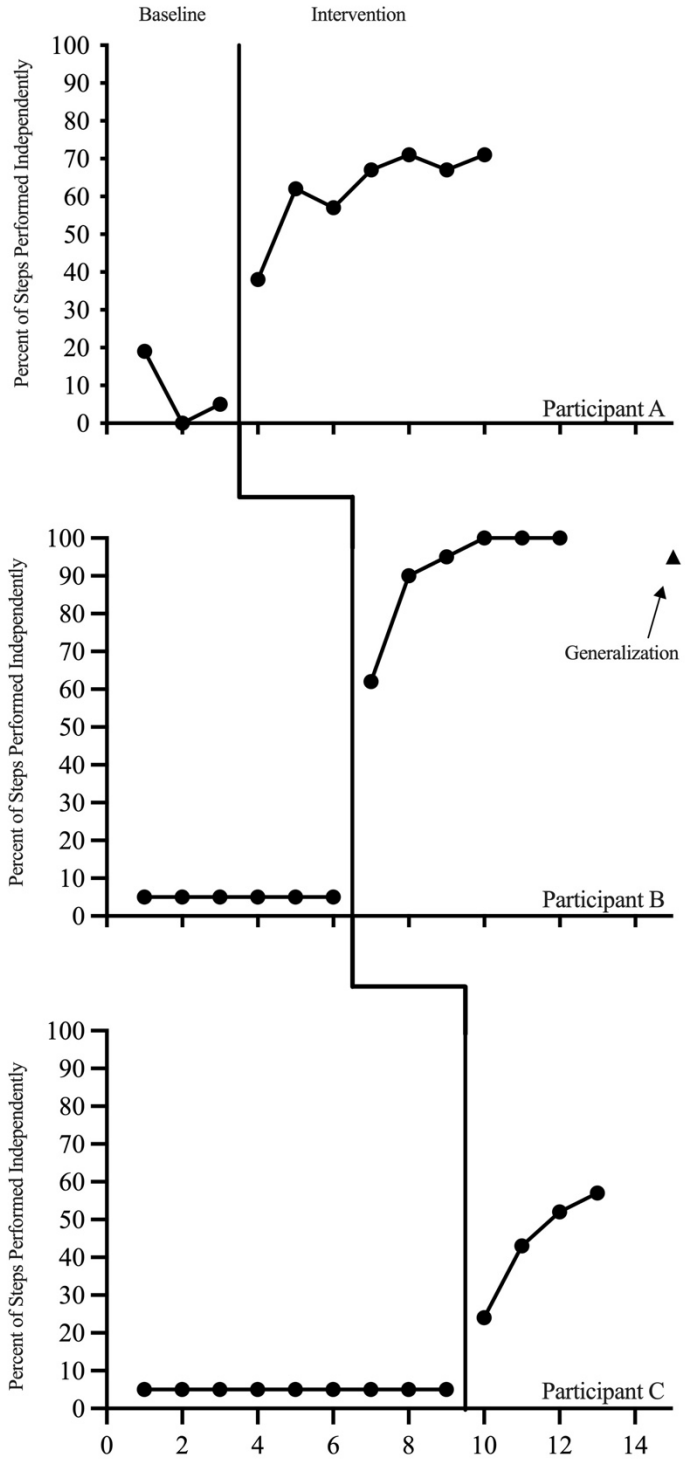
The researcher conducted a visual analysis of the graphed data to analyze a functional relation between the use of video prompting and the participants' acquisition of the target skills. Data were recorded and graphed after each session of the study throughout all conditions. The effect of the intervention was shown in the data by lower levels of correct responses within the baseline conditions and an increase in level following the introduction of the intervention.

## RESULTS

A multiple baseline design across participants was conducted and replicated across all three participants. When participants were introduced to the video prompting intervention, all participants increased in accuracy and independence of responding to the completion of the recipe. The percentage of correct responses across each participant across baseline and intervention can be found in Figure 1. Due to time constraints, only Participant B was able to complete a generalization session.

**Figure 1**

*Percent Correct Performance for Each Participant Across Baseline, Intervention, and Generalization*



**Baseline**

All three participants demonstrated a low level of independence and accuracy when asked to use the picture recipe to make chocolate chip pancakes. Participant A completed three baseline sessions, averaging 10% (range: 0%-19%) accuracy across sessions. Participant B completed six baseline sessions and scored 5% accuracy during all sessions. Participant C completed nine baseline sessions using the picture recipe, scoring 5% during all sessions.

**App Training**

All three participants learned how to independently use the app and reached mastery criteria during app training. Participant A completed five sessions of making the slime recipe, averaging 30% accuracy (range: 0%-50%). The recipe was then switched to making a sensory bottle. He immediately achieved 100% across two training sessions to meet mastery criterion using the app to make the sensory bottle. Participant B met mastery criteria of 100% independence and accuracy across two sessions when asked to complete the sensory bottle task (range: 100%). Participant C completed app training making a sensory bottle within three sessions, averaging 93% (range: 80%-100%).

**Intervention**

One participant met mastery criteria during intervention, whereas two of the participants demonstrated an increase in performance but did not meet mastery criteria by the end of the study. Participant A demonstrated an immediate increase in performance when intervention was introduced (increasing from 5% independence during his last baseline session to 38% during his first intervention session). He completed seven intervention sessions using the *Task Analysis* app and completed an average of 62% of steps independently across the seven sessions (range: 38%-

71%). Unfortunately, intervention sessions were terminated before Participant C could reach mastery.

Participant B displayed an immediate increase in accurate responding, increasing from 5% independence during his last baseline session to 62% during his first intervention session. He demonstrated an upward trend throughout the intervention phase and met mastery criteria within six intervention sessions (range: 62%-100%). Participant C demonstrated an immediate increase in independent performance (increasing from 5% independence during his last baseline session to 24% during his first intervention session) and upward trend throughout intervention. Across the four intervention sessions, he averaged 44% accuracy (range: 24%-57%). Unfortunately, intervention sessions were terminated before Participant C could reach mastery.

**Generalization**

Generalization was assessed in Participant B's home where he completed the recipe using the *Task Analysis* app with 95% accuracy.

**Social Validity**

Overall, parents reported that they felt their child had increased their cooking skills and would feel comfortable if their child wanted to cook at home under their supervision. Participant C's parents also stated that prior to the start of this study, Participant C did not like to eat chocolate chip pancakes and would only eat plain pancakes from a local restaurant. After starting the intervention condition, Participant C began eating the chocolate chip pancakes made by either the researcher or himself. Participants also showed an increase in confidence throughout the study. For example, when participants correctly flipped the pancake or independently moved to the next video prompt, they often gave themselves fist bumps or visibly smiled and sometimes gave self-praise. Participant C also reported that they would like to cook more at home

## DISCUSSION

Assistive technology is an evidence-based practice that may be an effective way to teach various independent skills to individuals with ID. The current study was modeled from Stierle et al. (2023) to further evaluate the effectiveness of video prompting to teach cooking skills to young adults with ID and to assess whether the cooking skills would generalize to the participants' home kitchens. Findings indicate that video prompting increased independence when cooking and following a recipe, but participants may have required additional training on prerequisite skills prior to video prompting. All three participants showed an increasing trend in correct responding after the introduction of the *Task Analysis* app in the intervention condition and one participant was able to reach independence. These findings replicate and support previous research by Stierle and colleagues (2023).

Extending the methods from Stierle et al. (2023), the current study used picture recipes during baseline rather than written recipes. This change was made to address potential reading deficits and to first determine whether participants would be able to follow a recipe using a picture recipe. Findings indicate that, similar to written recipes, picture recipes were not an effective tool for participants to learn to cook pancakes. One potential struggle with the picture recipe was that participants did not independently initiate moving on to the next step after completing a step. These findings are similar to those reported by Mechling & Stephens (2018), who compared static picture cookbooks to teach cooking skills to video prompting and found that videos were more effective to prompt completion of a task compared to picture prompts. Using a picture recipe may require additional prompting such as physical or gestural prompting to encourage participants to move to the next step (Mechling & Stephens, 2018), which was often observed for the participants in the current study.

Following baseline, participants in the current study were able to learn to independently use the *Task Analysis* app to follow instructions. Extending the Stierle et al. (2023) study, the current study trained participants on the app by asking them to complete a craft rather than the recipe. Participants were able to demonstrate independence and accuracy using the app by completing the craft with 100% independence across two consecutive sessions. They were then able to generalize that training to independently use the app to complete the cooking task. Future studies should examine additional independent living skills or tasks that can be taught using the *Task Analysis* app.

Despite these positive results during app training, there were important considerations to address in future research. Participant A struggled with completing the initial craft of making slime during app training. Although he was able to demonstrate acquisition and use of the app's functions, such as exiting the video or moving on to the next step independently, he struggled with completing the physical steps of the task analysis. For example, Step (1) of the slime task required that the participant squeeze an entire bottle of glue into a bowl. The squeezing of the plastic bottle is a fine motor skill with which the participant struggled, and he only squeezed a small amount of glue out of the bottle. Because of this, the participant was not able to meet mastery criteria during the training sessions. It was determined that the lack of mastery was not because he did not know how to use the app, but rather because the slime making recipe included fine motor skills that were difficult for the participant to accurately complete the task. After five app training sessions of making slime, the researcher created a different task, making a sensory bottle, for the participant to complete to demonstrate his independence using the app. This change in task led to immediate mastery of the app training.

All three participants displayed an immediate increase in independent responding and an increasing trend during the intervention phase using the *Task Analysis* app. These findings replicate the previous results reported by Stierle and colleagues (2023). Although participants were able to acquire some steps of cooking through video prompting, however, two of the three participants were not able to progress to reach mastery criterion. These findings are different from previous studies that used video prompting to teach cooking skills (Stierle et al., 2023). One potential reason for this difference could be that two of the participants did not have some of the potential prerequisite cooking skills required, such as measuring and flipping. For example, participants struggled with knowing how to correctly measure certain ingredients such as the pancake mix or the water. Step (3) instructed participants to measure one cup of pancake mix, and participants sometimes filled the one-cup measuring cup only half-way or less. When asked to measure one cup of pancake mix, Participant C attempted to pour the mix into the measuring cup instead of dipping the measuring cup into the bag of mix, resulting in spilling the mix. The researcher used physical prompts to help the participant learn this skill, after which he was able to independently complete this step in the following intervention sessions. It is possible that pre-training to teach the participants how to accurately complete some of these skills could have expedited their ability to complete the recipe independently while using the *Task Analysis* app.

Another potential reason for why Participants A and C were not able to reach mastery is because of the strict scoring criteria that required the participants to complete each step exactly as instructed. For example, when he was instructed to measure one-half cup of chocolate chips, Participant A often attempted or continued to add more chocolate chips. Because he added extra chocolate chips, Participant A was marked as incorrect for this step. It could be argued, however, that Participant A should get to choose the amount of chocolate chips he wants in his pancake

and should not be scored as incorrect for adding more. In fact, allowing the participants to make certain adjustments to the recipes allows for more autonomy and supports their ability to make their own choices (Bannerman et al., 1990). Future research should consider how individuals with ID can be taught to independently follow recipes while also allowing them the autonomy to cook their food they way they desire.

Finally, the currently study required the participants to meet a mastery criterion of 100% independence. This criterion was set because the researcher determined that all steps must be complete to accurately and safety cook chocolate chip pancakes. Upon observation, however, it appears that certain steps of the task analysis may not have been critical (e.g., placing the pan in the sink at the end) to the completion of cooking pancakes. As mentioned, other steps could have had looser criteria to be scored as correct (e.g., adding more chocolate chips than the recipe calls for). If there was more flexibility in scoring, it is possible that the participants would have reached mastery. Even if they did not meet mastery, however, visual analysis of the data is clear that all three participants demonstrated an increase in the target skill and achieved more independence in cooking chocolate chip pancakes than they could at the beginning of the study. Thus, they learned valuable skills and steps toward independence that should not be dismissed. Future research should continue to explore how the *Task Analysis* app and video prompting can promote more opportunities for independence.

**Limitations and Future Research**

While the study was able to demonstrate positive results, there are still limitations that should be considered for future research. First, due to time constraints, the study was terminated before two participants could complete intervention and only one participant was able to reach the generalization condition of the study. Second, participants were only required to make one

recipe, thus limiting the generalizability of the app's potential to teach other recipes. Third, due to the nature of the recipe that was chosen, it was difficult to further simplify steps to fit the individual needs of each participant. For example, Participant C took longer to process what was being asked in each step. Therefore, the researcher had to prompt the participant to rewatch the videos to ensure that the participant was completing each sub-step in a timely manner. Further, one step asks the participant to flip the pancake and the next step requires that the participant set a timer. If the participant was completing this task independently, it would be expected that the participant completed these steps in a timely manner to ensure kitchen safety by not burning the product, or possibly starting a kitchen fire.

Finally, future studies should consider the functionality of the *Task Analysis* app. Though it is basic in its initial look, when participants were using the app, the researcher noticed that some functions of the app made it difficult for participants to know what step they were on. When the researcher was creating and uploading the videos onto the app, they added a textual prompt to each step, indicating the step number and a brief description of the step. When the participants were using the app, however, these prompts were not displayed. Participants were then unable to find the next step or go back to a previous step. Creators of the app should also consider making a library of tasks that can be available to users. After the completion of the generalization condition, Participant B wanted to download the app onto their own electronic device. The researcher did have to tell Participant B's parents that if they wanted to teach other skills, they would have to create their own videos and their own voiceovers. For adults who may not have knowledge of technology or even a basic understanding, this could be difficult and could cause users to not use the app and forego teaching a skill altogether.

Despite these limitations, participants demonstrated improvement in their cooking skills and increased their independence. Independent living skills are not only important, but necessary to live independently and successfully (Stierle et al., 2023). Further research should continue to explore how video prompting can be used to teach independent living skills to individuals with ID.

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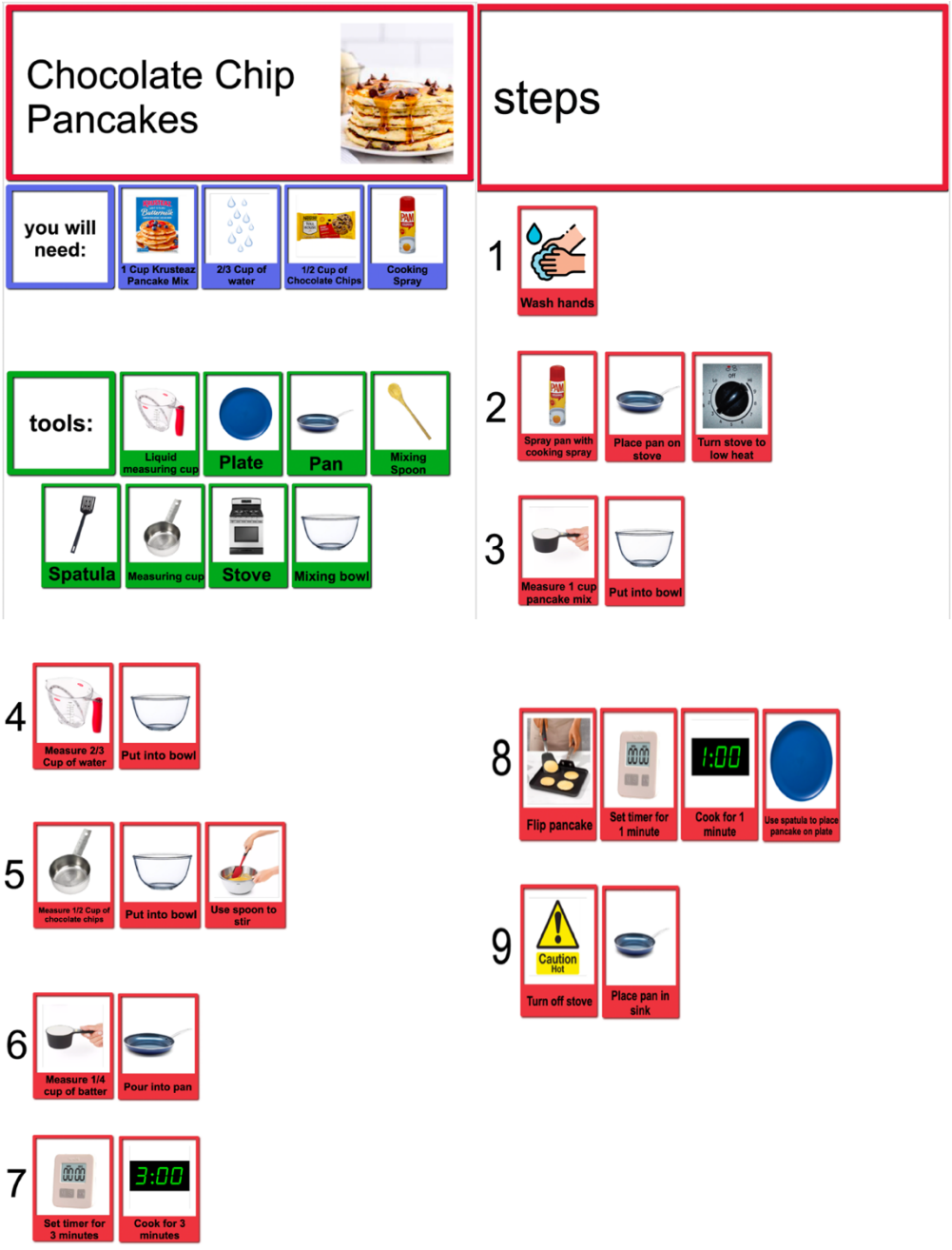
## APPENDIX A: PICTURE RECIPE

**Figure 2**

*Picture recipe provided to participants in baseline*



## APPENDIX B: TASK ANALYSIS

| **Chocolate Chip Pancakes Task Analysis** | | | | | |
|---|---|---|---|---|---|
| **Rating Scale:** | + = implemented step correctly and independently<br>- = did not implement or was implemented incorrectly<br>P = prompted | | | | |
| **Steps:** | | | | | |
| **Date:** | | | | | |
| **1.)** Wash hands | | | | | |
| **2.)** Spray pan with cooking spray | | | | | |
| **2A.)** Place pan on stove | | | | | |
| **2B.)** Turn stove to low heat | | | | | |
| **3.)** Measure 1 cup of pancake mix | | | | | |
| **3A.)** Put into bowl | | | | | |
| **4.)** Measure 2/3 Cup of water | | | | | |
| **4A.)** Put into bowl | | | | | |
| **5.)** Measure ½ Cup of chocolate chips | | | | | |
| **5A.)** Put into bowl | | | | | |
| **5B.)** Stir together with spoon | | | | | |
| **6.)** Measure ¼ Cup of batter | | | | | |
| **6A.)** Pour into pan | | | | | |
| **7.)** Set timer for 3 minutes | | | | | |
| **7A.)** Cook for 3 minutes | | | | | |
| **8.)** Flip pancake | | | | | |
| **8A.)** Set timer for 1 minutes | | | | | |
| **8B.)** Cook for 1 minute | | | | | |
| **8C.)** Place pancake on plate | | | | | |
| **9A.)** Turn off stove | | | | | |
| **9B.)** Place pan in sink | | | | | |
| **Score:** | | | | | |

## APPENDIX C: KITCHEN SAFETY ASSESSMENT

### Kitchen Safety Post-Training Assessment

Name: _____ Score: _____

1. What should you do before you start cooking?
    a. Clean your room
    b. Wash your hands
    c. Text your best friend

2. What should you use when you take a hot pan off the stove?
    a. Paper towel
    b. Use your bare hands
    c. Oven mitts

3. What should you do when you are done using the stove?
    a. Turn it off
    b. Leave it on
    c. Wait to turn it off until after you watch your favorite show

4. How long do you need to wash your hands for?
    a. 3 hours
    b. 20 seconds
    c. Splash water on them

5. When you are cooking, you should be:
    a. Aware
    b. Careful
    c. Both aware and careful

## APPENDIX D: APP TRAINING TASK ANALYSIS

| **Sensory Bottle Task Analysis** | | | | | | |
|---|---|---|---|---|---|---|
| **Rating Scale** | + = implemented correctly<br>- = did not implement or was implemented incorrectly<br>P = prompted<br>N/A = non-applicable | | | | | |
| **Steps:** | | | | | | |
| **Date:** | | | | | | |
| **1.)** Pick out beads and place on plate | | | | | | |
| **2.)** Add bag of rice to measuring cup | | | | | | |
| **3.)** Pour small amount of rice into the glass container | | | | | | |
| **4.)** Place 2-3 beads into glass container | | | | | | |
| **5.)** Pour small amount of rice into the container | | | | | | |
| **6.)** Pick 2-3 more beads and place in container | | | | | | |
| **7.)** Pour small amount of rice into container | | | | | | |
| **8.)** Add the last beads to container | | | | | | |
| **9.)** Screw on the cap of the container | | | | | | |
| **Score** | | | | | | |

## APPENDIX E: PROCEDURAL FIDELITY CHECKLIST

| Procedural Steps | Yes | No |
|---|---|---|
| **1.)** Instructor has given participant all necessary materials to complete the recipe(s) (i.e., mixing bowls, measuring cups, ingredients, etc.) | | |
| **2.)** Instructor has given participants access to a picture modeled recipe | | |
| **3.)** Instructor will give a verbal prompt which will indicate the start of the session, "Please use ____ to make chocolate chip pancakes" | | |
| **4.)** Instructor will stop baseline session after 30 seconds if participant gives no response or an incorrect response | | |
| **5.)** Instructor did not give any feedback or prompt(s) to participants regarding their accuracy on the completion of the recipe | | |
| **6.)** Instructor video-recorded all sessions on an electronic device | | |
| **# of steps correct out of 6:** | | |
| **% correct:** | | |

## APPENDIX F: SOCIAL VALIDITY QUESTIONS

Social Validity Questions for Parents:

1. Do you feel your child has increased their cooking skills through this study?
2. Has your child asked to cook at home after being a part of this study?
3. Would you feel comfortable if your child wanted to cook at home?
4. What did you think of the *Task Analysis* app? Would this be something you would use at home?
5. Would you tell other parents about the app?
6. What do you think I could have done differently in this study?

Social Validity Questions for Participants:

1. Did you like cooking the pancakes?
2. Did you like using the app?
3. Would you want to use the app at home?
4. Would you tell your friends about the app?
5. Do you want to cook more at home?
6. Would you feel safe cooking at home?