



**Usability of Video Prompting for Improving Employment Skills  
among Moderate and Moderate-Severe Older Adults with  
Intellectual Developmental Disabilities in Residential Facility  
Settings**

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THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE  
REQUIREMENTS FOR THE MASTER'S DEGREE, UNIVERSITY OF  
HAIFA



This work was supported by a grant from Shalem Fund for Development of Services for  
people with Intellectual Disabilities in the Local Councils in Israel

2022

2022 /890-626-2021 קון שלם/

## **Acknowledgments**

I would like to begin by expressing my deep and sincere gratitude to my great supervisor, Dr. Sarit Szpiro for her valuable dedication, knowledge and support during the entire process of this study.

I also want to express my special thanks to my beloved husband, my precious son Omar and family for their ultimate support, sacrifice, prayers and absolute patience during this challenging period of our lives. Without your encouragement and love, all of this would be impossible.

Lastly, I would like to acknowledge Keren Shalem Foundation for its support of this study and for the research grant assistance.

## **Table of contents**

	Page
Abstract.....	V
List of Tables.....	VII
List of Figures.....	VIII
Chapter 1: Review of Literature .....	1
1.1 Intellectual and Developmental Disability (IDD) .....	1
1.2 Employment and Intellectual Developmental Disability .....	3
1.3 Assistive Technology and Employment.....	4
1.4 Video Modeling and Video Prompting .....	5
Chapter 2: Objective and Rationale of this Present Study.....	10
2.1 Study Questions.....	11
2.2 Study Hypotheses.....	11
Chapter 3: Method.....	13
3.1 Ethics.....	13
3.2 Participants.....	13
3.3 Participant Characteristics.....	15
3.4 Study Design.....	17
3.5 Settings.....	18
3.6 Tasks.....	18
3.7 Materials.....	19
3.8 Dependent Variable.....	20

3.9 Data Collection and Observations.....	20
3.10 Procedure.....	21
3.11 Semi Structured Interviews with Staff Members.....	24
3.12 Social Validity.....	24
Chapter 4: Results.....	26
Chapter 5: Discussion.....	36
Chapter 6: References.....	42
Chapter 7: Appendices.....	52
7.1 Appendix 1- Observation Form of First Task.....	52
7.2 Appendix 2- Observation Form of Second Task.....	53
7.3 Appendix 3-Interview Questions for Staff Members.....	54
7.4 Appendix 4- Participant's Questionnaire.....	56
7.5 Appendix 5- Questionnaire and Interview for Staff Members.....	57
7.6 Appendix 6- Table 7: The Ratings of Two Staff Members on the Perception of Video Prompting Strategy.....	60

# **Usability of Video Prompting for Improving Employment Skills among Moderate and Moderate-Severe Older Adults with Intellectual Developmental Disabilities in Residential Facility Settings**

Tanweer Milhem-Midlej

## **ABSTRACT**

Employment is very important for people with intellectual and developmental disabilities (IDD); it enables daily routine, develops physical, cognitive, social skills, and strengthens their sense of independence. Although prior research has illustrated the benefits of short video clips in supporting daily tasks, these studies examined children and young adults (<30 years old) with mild to moderate IDD. In the current study, we have used a single-subject design with multiple baselines across participants to examine whether and how presenting video prompts can help six older adults (>50) with moderate and moderate-severe IDD to learn new tasks in an employment center. We compared participants' performance of a new task at **baseline** (i.e., without video prompts), **intervention** (i.e., with video prompts), and **follow-up** (i.e., without video prompts). Our results show that video prompting helped participants perform the task better, although some task steps required physical prompts for successful completion. Moreover, in the follow-up sessions (without video prompts), all participants performed better compared to the baseline. When comparing the follow-up (without video prompts) to the intervention, there was variability across participants - while three participants continued to perform tasks successfully without the video prompts, three showed reduced task performance. Post-intervention interviews confirmed the effectiveness of video prompts; staff

members described video prompts as highly successful in teaching all participants new work tasks and stated that video prompts would become a regular method at the employment center.

**Keywords** Video prompting, Residential facility, Older adults, Single subject design.  
Intellectual developmental disability.

## **Lists of Tables**

Table 1: Participants Information.	14
Table 2: Task Analysis for Preparing Bags for a Religious Holiday Bag.	19
Table 3: Task Analysis for Preparing Pencil Case.	19
Table 4: Means Percent and Standard Deviations of Task 1 Across Three Phases.	33
Table 5: Means Percent and Standard Deviations of Task 2 Across Three Phases.	33
Table 6: Results of Paired Sample t-test of the Mean Before and After Intervention.	34
Table 7: The Ratings of Two Staff Members on the Perception of Video Prompting Strategy.	60

## **List of Figures**

Figure 1: First Task Materials and Final Output.	23
Figure 2: Second Task Materials and Final Output.	23
Figures 3-8: Percentage of Steps Completed Correctly of the First Task.	31
Figures 9 -13: Percentage of Steps Completed Correctly of the Second Task.	32

# **Chapter 1**

## **Review of Literature**

### **1.1 Intellectual and Developmental Disability (IDD)**

Intellectual disability (intellectual developmental disorder) is a neurodevelopmental disorder characterized by deficits in general mental abilities (American Psychiatric Association, 2013). This disability originates before the age of 18 (American Association on Intellectual and Developmental Disabilities, 2010 (AAIDD)). AAIDD (2010) defined intellectual disability as: "significant limitations both in intellectual functioning and in adaptive behavior as expressed in conceptual, social, and practical adaptive skills."

**Components of the Definition;** (American Association on Intellectual and Developmental Disabilities, 2010; American Psychiatric Association, 2013; Israeli Ministry of Welfare and Social Affairs, 2017):

Disability in mental functioning/intelligence: intelligence refers to general mental ability, such as learning, abstract thinking, problem-solving, etc. One way to measure intellectual functioning is an IQ test. Two standard deviations below the population mean, and generally, IQ test score between 70 and 75 indicates a limitation in mental functioning. Also, it indicates a limitation in adaptive behavior that people learn and perform in their daily lives and include three types of skills: (a) Conceptual skills, e.g., language, concept of time, motivation, and acquisition of practical knowledge. (b) Social skills, e.g., empathy and social responsibility. (c) Practical skills, e.g., ADL, IADL, occupational skills.

AAIDD (2010) points out that factors such as cultural, linguistic, and interpersonal differences must be taken into account when defining and evaluating intellectual disability.

There are six sub-categories of severity levels of IDD as defined by the Israeli Ministry of Welfare and Social Affairs and Keren Shalem Foundation (2017). The main difference

between these categories is defined by the amount of support and help needed in participating in life domains. For example, individuals with moderate IDD need increased or constant support in at least half of the life domains, and in the other domains, they need increased support. That is, they need consistent guidance and instruction to perform the essential skills. While individuals with moderate-severe IDD need increased support in most of the daily domains, that is, direct assistance in performing all the skills, and in some, they need constant support, mainly in crises or new situations.

**Residential Care Facility:** In Israel, most individuals with IDD live in their homes with their own families, and the rest live in various settings outside their homes; residential care facilities and different community facilities (Neuman et al., 2014). In cases where residency in the community is not possible, the individual will be referred to a residential care facility (Israeli Ministry of Welfare and Social Affairs, n.d.). A Residential facility is a sheltered housing facility for individuals who need support and help performing daily activities, and it is deemed to be a lifetime home. Residential facilities include individuals who are generally between the ages of 21 and 90 and with all the severity levels, but most have moderate to profound levels of intellectual disability. Each residential care facility has an employment center at which the residents can work and earn money (Israeli Ministry of Welfare and Social Affairs, n.d.).

At the employment centers, the residents usually work 4-5 hours per day, five days a week, usually in simple and repetitive tasks, such as assembling or packing products. These tasks are generally broken down into smaller steps, and each resident is trained and assigned to perform one or two steps, for example, in packaging candles; one person is responsible for marking the correct location for threading the wicks, and another is assigned to thread the wicks, whereas the third person's job is to package the candles (that already have wicks done by someone else). The staff members are constantly required to assist residents in completing tasks by giving verbal and physical prompts and teaching new tasks to residents, which is experienced as very difficult for staff members and residents.

## **1.2 Employment and Intellectual Developmental Disability**

Employment is one of several essential factors that are considered critical to improve the quality of life among people with intellectual and developmental disabilities (Nota et al., 2010; Schalock et al., 2002 as cited in Morash-Macneil et al., 2018); it facilitates daily routine, develops physical and cognitive abilities, it can also strengthen the sense of independence and social skills (Stephens et al., 2005; Israeli Ministry of Welfare and Social Affairs, n.d.). However, the employment rate in the united states for individuals with IDD is 38.8%, which is about half of the employment rate of peers of similar age without disabilities (Morash-Macneil et al., 2018; Newman et al., 2011), and in Israel, the employment rate for people with IDD, in particular, is low (11.3%) (Alpasi-Henli, 2017). The lack and limitations in abilities and adaptive behavior skills needed to perform employment tasks contribute to the low employment rate among people with IDD (O'Rourke, 2011; Wagner et al., 2005).

Teaching methods for functional skills can include prompting strategies, e.g., modeling, verbal, visual, tactile, physical (in which the instructor provides gestural or hand-over-hand assistance), and task chaining, which is teaching each step of a task analysis (Cooper et al., 2007; Gilson et al., 2017), however, these procedures can take a lot of time, and when removed, performance can deteriorate. For example, Lancioni et al. (2001) used a self-operated verbal instruction system and showed that the three participants who performed well on the task with the verbal instruction did not manage to maintain this ability when the cassette was removed.

Acquisition and maintenance of employment among individuals with IDD are affected by skill limitations, e.g., conceptual understanding, time-management skills, organization skills, poor communication, and low motivation (Davies et al., 2002; J.-Y. Park & Park, 2019; Rose et al., 2005). These limitations can affect following the step-by-step instructions, completing tasks in the correct order, and moving from one task to the next independently (Mechling & Ortega-Hurndon, 2007).

Thus, people with IDD often require assistance, support, training, and prompts to enhance work skills (Sauer et al., 2010). While this ongoing assistance improves work performance, the continued dependency and reliance on others decreases an individual's self-esteem and quality of life (Morash-Macneil et al., 2018), and inhibits independence (Beyer & Perry, 2013; Morash-Macneil et al., 2018). Therefore, a critical step for promoting independence in the workplace for people with IDD is to move from human assistance to using aids (Beyer & Perry, 2013; Morash-Macneil et al., 2018). Many researchers have examined the effectiveness of various techniques, such as video, picture prompts, visual and auditory prompts, in acquiring and teaching new tasks to people with intellectual disabilities.

Picture prompts have been used extensively to teach individuals with intellectual disabilities task acquisition (Cihak et al., 2006; Wacker & Berg, 1983). Picture prompts are pictorial cues used as visual supports (for example, images and line drawings) for communication, prompting, and visual schedules (Cullen, 2013).

Auditory prompts have been found effective when teaching new tasks to people with IDD (e.g., Lancioni et al., 2001). Pictures paired with audio prompts were also found useful when teaching new tasks (e.g., Mechling & Gast, 1997).

While picture prompts are effective methods for acquiring work and functional tasks, pictures do not illustrate the steps required to accomplish a task, and video-based instructions have been found to be more efficient (Kellems & Morningstar, 2012 in Cullen, 2013).

### **1.3 Assistive Technology and Employment**

Assistive technology can replace human assistance to promote independence in the workplace and help individuals with IDD to perform their tasks independently (Chang et al., 2013; Cihak et al., 2008). Morash-Macneil et al. (2018) systematically reviewed ten studies to examine the effectiveness of AT use in improving work abilities among individuals with intellectual disabilities. The results demonstrated that the use of AT improved the work

performance of individuals with IDD with regard to productivity, time management, and task completion. The researchers also summarized the various types of AT used in the studies to improve work performance among individuals with IDD with various levels of severity (Morash-Macneil et al., 2018). These types include handheld computers to improve organizational skills (Cihak et al., 2008; Ferguson et al., 2005), wearable technology: e.g., smartwatch, which can improve time management skills and help in completing a task (Fichten et al., 2014; Green et al., 2011), portable electronic devices: e.g., iPad and iPhone, which can be used to provide a variety of prompts types (e.g., audio or video prompts) to help people with IDD perform a task independently rather than depending on others (Douglas & Uphold, 2014; Morash-Macneil et al., 2018).

#### **1.4 Video Modeling and Video Prompting**

Video modeling is a teaching method that involves filming someone other than the participant (usually someone without a disability) or the participant himself performing a target behavior or skill, then the entire video clip is shown to the individual (Alberto et al., 2005; Mechling & O'Brien, 2010), and immediately to one hour after the end of the video clip, the individual is required to perform/imitate what he watched in the video (Park et al., 2019).

Video prompting is a form of video modeling that shows the individual a video segment of one step of the task and then gives him an opportunity to perform this step that he watched immediately, and then proceed to the next video segment (Cannella-Malone et al., 2006; Mechling, 2005; Norman et al., 2001; Sigafoos et al., 2005). Video prompting segments are filmed with the participant (video self-prompting) or someone else performing the task (Mechling et al., 2014). The video segments could be filmed from the spectator's perspective (in which the participant sees a model perform the task) or from the performer's perspective/subjective viewpoint (in which the participant sees the clips from the perspective of the performer completing the task) (Graves et al., 2005; Sigafoos et al., 2005, 2007). The

video segments can be presented on a variety of devices, such as iPad (e.g., Cullen, 2013), TV with VCR (e.g., Norman et al., 2001), and iPod touch (e.g., Van Laarhoven et al., 2009), etc. The effectiveness of video prompting may be explained by the fact that the cognitive load is reduced by breaking down the task into smaller steps using video prompting, which presents the instruction in one step each time instead of presenting the whole video clip and then the participant is required to perform the step immediately (Park et al., 2019; Taber-Doughty et al., 2008; Weng et al., 2014). Therefore, the reduction of cognitive load can be beneficial for individuals with IDD who may experience difficulties in working memory and learning a new task (Park et al., 2019; Taber-Doughty et al., 2008; Weng et al., 2014).

Video prompting instructions are sometimes preferable to instructions delivered by another person because they can provide a degree of independence in performing a task, diminish learned helplessness, and facilitate learning a task (Cihak et al., 2007; Sigafoos et al., 2005; Van Laarhoven & Van Laarhoven-Myers, 2006 in Lund, 2013). The benefits of using video technology include: " (a) repeated observations of the same model, (b) reuse across a variety of instructors, (c) review at later dates for maintenance of skills, (d) transference of use to daily lives settings and environments" (Mechling, 2005, p. 25). Video modeling and video prompting are evidence-based practices for individuals with ID (Park et al., 2019).

Video prompting strategies can help acquire, maintain, and generalize a learned skill (Banda et al., 2011; Sigafoos et al., 2005). For example, Lo et al. (2014) used a video prompting to teach young participants (19-20 years old) with moderate intellectual disability how to play basketball, and showed that all the participants increased the number of steps performed correctly and maintained these skills even in follow up sessions when video prompts were not used. The effectiveness of video prompts has been demonstrated when videos were presented via stationary devices such as computers/laptops and VCR (e.g., Alberto et al., 2005; Cannella-Malone et al., 2011; Mechling et al., 2014) and via portable devices (e.g., Cihak et al., 2008;

Van Laarhoven et al., 2009; Walters et al., 2021). Notably, in some cases, video prompts alone are ineffective; some individuals require further support, such as error correction or physical prompts, in addition to video prompts (e.g., Cannella-Malone et al., 2013; Goodson et al., 2007).

Pertaining the acquisition of daily living-related activities, prior studies demonstrated the effectiveness of video-based instructions in children and young adults with IDD. Hetzroni & Banin (2017) demonstrated that video modeling, computer games, and group discussions improved social participation among the five participants (11-15 years old) with mild IDD. Ayres & Cihak (2010) investigated the effects of a computer-based video instruction program (CBVI) in teaching three 15-year-old participants with mild intellectual disability how to make a sandwich, use the microwave, and set the table. The results demonstrated that all participants increased the percentage of steps completed correctly when CBVI was introduced.

Researchers have also found that video prompting was more effective than video modeling in teaching participants daily living activities. Cannella-Malone et al. (2011) found that video prompting was more effective than video modeling in teaching seven children (11-13 years old) with severe ID to wash dishes and do laundry, and video prompts helped increase accuracy and independence among participants. Mechling et al. (2014) also found similar results after comparing the effects of video modeling, continuous video modeling, and video prompting on completing nine daily household tasks (e.g., cleaning the microwave and folding shirts) by three high school students with moderate ID, illustrating that in multi-steps tasks video prompting, was more effective than other procedures.

In terms of employment-related tasks, in community-based employment settings, the majority of studies that examined video prompting in children and young adults have shown very promising results. Van Laarhoven et al. (2007) found that video-based strategies via pocket PC (handheld) were useful in teaching two 18 years old participants with mild and moderate ID

three work tasks, such as portioning recipes, clocking in/out, and cleaning in community settings. The results indicated an increase in independent correct responses and a reduction in prompting. In another study done by Van Laarhoven et al. (2009), the results showed that video prompting presented via iPod device with video feedback (participant was instructed to watch the video segment again if he failed to perform the step, and then physical or model prompt was introduced if a second error occurred) was effective in completing three work tasks (cleaning bathroom, mopping the floor/emptying garbage and cleaning kennels in an animal shelter) for a 17-year-old participant with moderate IDD.

Cullen (2013) also examined the usefulness of self-directed video prompting an iPad device in increasing the independence of three participants (20-26 years old) with moderate IDD when performing three different employment tasks in different settings for each participant, such as cleaning/straighten shelves of boxes and bags, cleaning treadmill, and assembling dental tray for cleaning at an integrated employment setting located in a university. The results showed that all participants succeeded in acquiring the three tasks and demonstrated generalization. Moreover, all of them were able to operate and navigate the iPad independently.

Heider et al. (2019) examined the usefulness of self-directed video prompting in teaching two participants (18-22 years old) with moderate IDD three vocational tasks (nametag assembly, organizing coffee trays, and wrapping paper). Participants showed greater accuracy in executing all three tasks. However, seven weeks after the last intervention session (without the video prompts), both participants showed a drop in task accuracy. Similar results were demonstrated by Walters et al. (2021), who investigated the effective use of video prompting presented via a mobile app in teaching office tasks such as laminating a document, mailing an envelope, and preparing a folder to three young participants diagnosed with mild to moderate IDD. The results demonstrated that when the video prompting was introduced, all participants improved the independent and correct performance of tasks and were able to use the application independently.

Another study used three types of prompting, video, audio, and a combination of the two, to teach office tasks (copying, scanning, and faxing) to three young adults (21-22 years old) with moderate intellectual disability, Collins et al. (2014) found that the intervention was effective in enhancing the ability of the participants to perform the tasks independently and correctly. This improvement was similar across the three prompts. The researchers recommended systematically replicating their research in different settings and tasks and with different participants to strengthen the validity and generality of their findings. One study evaluated video prompting in teaching three adults (34-36 years old) with developmental disabilities to make popcorn using a microwave in the kitchen of the participants' vocational training program. Two of the three participants succeeded in acquiring the task when video prompting was introduced and even maintained task performance during follow-up sessions (without video prompts) two, six, and ten weeks following the removal of the video prompting (Sigafoos et al., 2005).

To sum, prior research has demonstrated the effectiveness of video prompting in young adults in daily living activities and employment-related tasks, but has not examined older adults with IDD.

## **Chapter 2**

### **Objective and Rationale of this Present Study**

Currently, the number of studies that examined the use of video prompting with regard to work skills among individuals with IDD is still relatively scanty and limited. Moreover, the majority of studies that investigated the effectiveness of using this strategy in improving employment abilities among individuals with IDD were done in employment settings in the free market in the community. Accordingly, the majority of these studies included participants with mild to moderate intellectual disability. In the systematic review by Morash-Macneil et al. (2018), the researchers recommended including people with lower functional abilities and severities in future studies. To date, the effectiveness of video prompts in employment for older adults with moderate and moderate-severe IDD has yet to be examined.

Moreover, still lacking in the field are studies examining video prompting use in employment centers in residential care facilities. In these work centers, the residents are employed in repetitive work tasks that suit their abilities and needs and are paid for their work based on the type and amount of work which needs to be done, and according to their personal productivity (Israeli Ministry of Welfare and Social Affairs, n.d.). Many residents need frequent assistance and constant prompting from a staff member in order to complete the steps of a work task and to learn a new one. The majority of residents are exposed to or use assistive technology and technology in general to a limited extent, which may affect the efficiency of video prompts as an assistive technology.

Importantly, the residents living in these residential facilities are characterized as an aging population, and they tend to be older. Older adults with IDD generally have " poor health, functional dependence, restricted activities, and limited participation" (Carmeli et al., 2016, p. 1465). Assistive technology can help these individuals develop independence and consequently allow caregivers to assist more easily and afford a learning opportunity (Carmeli et al., 2016).

However, prior work on video prompts and employment assistance has primarily focused on younger individuals, such as children and young adults (under 30 years old).

Finally, in the majority of studies that investigated the usefulness of video-based techniques in improving work skills among people with IDD, each participant was asked to complete several tasks according to the task analysis developed specifically for him at the workplace (e.g., Cullen, 2013; Goh, 2010; Van Laarhoven et al., 2007). In fact, only a few studies have developed the same task that could be used across several participants with IDD (e.g., Collins et al., 2014), and the findings were promising.

Thus, building upon prior results of studies, which demonstrated that video prompting alone was effective in teaching new tasks (e.g., O'Rourke, 2011; Sigafoos et al., 2005), the purpose of this study was to examine the effectiveness of video prompting strategy presented through an iPad device on the learning, acquiring two new work tasks, and completing all of the steps of the tasks (and accordingly improve employment skills) among six participants living in a residential facility diagnosed with moderate and moderate-severe IDD.

## **2.1 Study Questions**

1. Can video prompting presented alone via iPad affect the acquisition of new work tasks among older adults with moderate and moderate-severe IDD who live in a residential facility and thus enhance their employment skills?
2. Would physical prompts help if video prompting alone is not effective?
3. How would participants and staff members experience video prompting?

## **2.2 Study Hypotheses**

1. The use of video prompting alone when presented via iPad device will increase the percentage of steps completed correctly during the intervention and follow-up (without video prompts) phases compared to the baseline phase.

2. If video prompting alone is not effective, adding physical prompts will help the participants perform the steps correctly.
3. Participants will enjoy watching and performing the tasks with video prompting, leading to a sense of independence. Similarly, staff members will perceive video prompting as useful and thus help them dedicate time to other tasks and activities beyond providing direct instructions for each step of the task.

## **Chapter 3**

### **Method**

#### **3.1 Ethics**

The study was approved by the Ministry of Welfare and Social Affairs, the residential facility administration, and the University Ethics Committee.

#### **3.2 Participants**

The participants were recruited based on the following criteria:

- Age: 50 years and older.
- Diagnoses:
  - Moderate and moderate-severe intellectual and developmental disability, determined by clinical evaluations delivered by the diagnostic committee of the Israeli Ministry of Welfare and Social Affair, in accordance with the definitions of the American association on intellectual and developmental disabilities- 2010, DSM-IV (1994)/DSM-5 (2013), and informal observations. The diagnoses of each participant were obtained from the medical and social records of the facility.
  - Without visual or auditory impairments as determined by medical records of the facility.
  - Do not exhibit severe challenging behaviors, as determined by the psychologist's evaluations.
- Abilities:
  - Ability to understand simple commands and instructions (one to two stages)- as assessed by the researcher, by asking the participants to follow several verbal commands in a sequence, e.g., "raise your hand; take the keys in your hand, and put the keys on the ground...."

- Motor ability: Without motor difficulties in the upper limb and with a proper bilateral skill in order to exclude motor difficulties as a limiting factor that makes it difficult for participants to perform the work tasks.; no difficulties using both hands functionally, determined by the assessments of the physiotherapist and occupational therapist of the facility, which was obtained from the medical and social records of each participant.
- Graphomotor Skill: Ability to draw a line or circle and press the device buttons to obtain written agreement and operate the device.
- Expressing willingness and approval to participate in the study (verbally or by gestures determined in one-on-one sessions after explaining to the participants the purpose and the procedure of the study).
- Lack of exposure to video prompts: never used or was exposed to video prompting strategies before.

Seven older adults were identified as potential participants based on the criteria. The researcher contacted their guardians with the help of the facility's social worker, explained the objective, procedure, as well as expected duration of the study, and requested their approval. Following the approval of the guardians, the researcher explained the study to potential participants, and they provided verbal and written consent (by drawing a line or circle). One participant decided to drop out during the intervention and was excluded from the study, leading to a total of six participants (see **Table 1**).

**Table 1**

*Participants Information. Pseudonyms are used to ensure confidentiality and privacy of participants.*

Participants pseudo-name	Age	Gender	Diagnosis
Emily	67	Female	Moderate-severe IDD

Ria	59	Female	Moderate-severe IDD, Down syndrome.
Omer	52	Male	Moderate-severe IDD,
Shlomo	55	Male	Moderate IDD, Fragile X syndrome.
Yuval	67	Male	Moderate IDD, heart condition.
Rani	68	Male	Moderate IDD.

To ensure consent of participants during each session of the study, participants' behaviors/facial expressions/bodily gestures/emotional status/verbal expressions were closely observed. If there was a sign indicating refusal, tiredness, or discomfort to participate in the session or study, the session ended or was not initiated, and this was the case with one participant only, Ria.

### **3.3 Participant Characteristics**

All participants except two (Ria and Omer) were integrated into the employment center six days a week. Participants at the employment center experienced enthusiasm and joy when they were there. Participants were paid by the type and the amount of work that had to be done (e.g., for each package of candles, the residents received 0.13 USD). In addition, all participants had difficulties in their working memory (as determined by the evaluations of the psychologist's facility), which may limit their ability to learn new multi-steps tasks.

#### **Ria**

Ria was a 59-year-old female, diagnosed with moderate-severe intellectual and developmental disability and down syndrome. Ria had been living in the residential facility since she was nine. She had very limited communication skills and could use facial expressions and minimal gestures to express her basic needs. Ria understood simple commands and instructions that consisted of two stages. She had no difficulties using both hands functionally. Ria was never integrated into the employment center of the facility and had never been exposed to work- tasks before or used video prompting strategy for learning daily tasks or skills. Ria

was only independent in eating and drinking. She walked with supervision and needed moderate to total assistance in order to perform the basic daily activities.

### **Shlomo**

Shlomo was a 55-year-old male, diagnosed with moderate intellectual disability and fragile X syndrome. He had been living in the residential facility since he was seven. With a full range of motions in his upper and lower limbs, he used both hands functionally and used speech to communicate with others. He was integrated into the employment center six times a week and showed joy while performing work-related tasks. The tasks that were usually assigned to him consisted of transferring goods from one place to another or repetitively performing one single step of the task, such as putting a thread in a candle. Shlomo was independent in performing all basic daily activities except bathing and needed guidance to maintain his personal hygiene.

### **Yuval**

Yuval was a 67-year-old male, diagnosed with moderate intellectual disability and a heart condition. He had been living in the residential facility since he was 30. Yuval had a full range of motions in his upper and lower limbs and with normal fine and gross motor abilities. He expressed himself with limited words (yes, no, happy, eat...), and used gestures and facial expressions to communicate with others. Yuval was independent in performing all basic daily activities except bathing and maintaining personal hygiene. He was integrated into the employment center six times a week and showed interest and excitement while working. The tasks that he performed were characterized as repetitive ones and consisted of one or two steps.

### **Rani**

Rani was a 68-year-old male, diagnosed with moderate intellectual and developmental disability. He had been living in the residential facility since he was 18. Rani had normal motor abilities. He communicated with others using short sentences and was fully independent in

performing all basic daily activities except bathing. He was integrated into the employment center six days a week. The tasks that he performed were characterized as repetitive ones and consisted of two steps.

### **Omer**

Omer was a 52-year-old male, diagnosed with intellectual and developmental disability and challenging behavior. He had been living in the residential facility since he was 15. Omer had never been integrated into the employment center and had never worked or been exposed to video-based strategies. Omer had a full range of motions in his upper limbs. He was able to perform simple commands that consisted of one step. He was independent only in eating and needed close supervision in walking and total assistance in performing the rest of basic daily activities.

### **Emily**

Emily was a 63-year-old female, diagnosed with moderate-severe intellectual and developmental disability. Emily had been living in the residential facility since she was 12. Emily was able to perform simple commands that consisted of one stage. She used gestures, facial expressions, and limited words to communicate with others (e.g., no, yes, or thank you). She had a full range of motions in both hands. Emily was independent in eating and drinking, and she needed partial assistance in dressing and total assistance in bathing and maintaining hygiene. Emily was integrated into the employment center, and she performed only one step of a task repetitively.

### **3.4 Study Design**

A single-subject multiple-baseline design across subjects was used in this study so that the intervention could be applied sequentially to the same target tasks among different participants at different times (Hacker, 1980) and to examine the effectiveness of video prompting strategies on task learning and acquisition. This design was selected to provide multiple comparisons between baseline and intervention (Kazdin, 1982; Kratochwill & Levin,

1992). Single-subject research design is widely used in applied and clinical disciplines in special education and psychology (Kratochwill et al., 2010).

There were three main conditions in the study; **baseline** (i.e., performing the task without video prompts), **intervention** (i.e., performing the task with video prompts), and **follow-up** (i.e., performing the task without video prompts). First, all three conditions were collected from task one (i.e., religious holiday bag), and then all three conditions were repeated with task two (i.e., preparing pencil case). The transition from baseline to intervention occurred after reaching a stable baseline, determined after two baseline sessions, and could last several sessions for different participants (see below; **Procedure**).

### **3.5 Settings**

We conducted the study at two different places. For Ria and Omer, the study took place in a quiet room at the pavilions- where they live because they were not integrated into the employment center, during hours that did not interfere with their therapy sessions or leisure activities. For the other participants, the study was conducted at the participant's usual workspace in the employment center, during work hours, where they were integrated and worked daily.

### **3.6 Tasks**

We selected two tasks for the study (see **Table 2**) based on the following considerations:

1. Unfamiliarity: New work tasks that the participants have never performed/taught before.
2. Just the right challenge: Sufficient level of complexity; not too difficult and not too easy to perform.

In order to select relevant tasks for this study, participants were observed while performing work tasks during their regular work day, and we interviewed four staff members.

Then, two tasks were selected: packaging a bag for a religious holiday gift (see **Figure 1**), which was broken into ten smaller steps (see **Appendix 1, and Table 2**) and preparing pencil

case (see **Figure 2**), which was also broken into ten smaller steps (see **Appendix 2, and Table 3**). The steps for each task were video recorded from a spectator's perspective so that participants see a model perform the task. The model was the work coach of the participants. The video clips included verbal instructions (i.e., the person performing the task would verbalize their actions). Each video clip was composed of three automatic repetitions of the step, and the duration was between 5-21 seconds. The second task (i.e., packaging a pencil case) was slightly more difficult than the first since it required fine motor skills.

**Table 2**

*Task Analysis for Preparing Bags for a Religious holiday.*

<b>Step</b>	<b>Time of the video clip</b>	<b>Description of the step</b>
<b>1</b>	11 seconds	Take a plastic bag and open it.
<b>2</b>	6 seconds	Take a carton.
<b>3</b>	7 seconds	Put the carton in the plastic bag.
<b>4</b>	6 seconds.	Take a Snack 1 bag.
<b>5</b>	12 seconds.	Place the Snack 1 in the plastic bag until the end.
<b>6</b>	6 seconds.	Take a Snack 2 bag.
<b>7</b>	12 seconds.	Insert the Snack 2 above the Snack 1 until the end.
<b>8</b>	6 seconds.	Take a lollipop.
<b>9</b>	18 seconds.	Put the lollipop on top of the Snack 2.

**Table 3**

*Task Analysis for Preparing Pencil Case*

<b>Step</b>	<b>Time of the video clip</b>	<b>Description of the step</b>
<b>1</b>	6 seconds.	Take a pencil case.
<b>2</b>	21 seconds	Open the zipper of the pencil case till the pencil case is fully opened.
<b>3</b>	5 seconds	Take a marker.
<b>4</b>	15 seconds.	Put the marker in the pencil case in the right space.
<b>5</b>	14 seconds.	Take a pencil and put it next to the marker.

<b>6</b>	5 seconds.	Take an eraser.	
<b>7</b>	15 seconds.	Insert the eraser inside the grid on the other side of the pencil case.	
<b>8</b>	20 seconds.	Take a glue and put it inside the grid.	
<b>9</b>	5 seconds.	Close the pencil case.	
<b>10.</b>	12 seconds.	Close the zipper of the pencil case.	<b>3.7</b>

## Materials

To display the video prompts, we used a 10<sup>th</sup>-generation iPad. The iPad was placed on the table using a case and a stand holder (see **Figures 1, 2**). The videos were recorded using a 13 pro max iPhone, and then the video clips were edited and transferred to the photo albums on the iPad. Observations during the sessions were video-recorded using iPhone 12 pro max and galaxy Z Flip 4 smartphone.

Observation forms for data collection included the participant's name, date, name of the task, a table that included each step in the task and a yes/no question to indicate if the participants completed the step correctly or incorrectly, as well as the number of errors (see **Appendices 1, 2**).

### 3.8 Dependent Variable

Percentage of steps completed correctly for each task was calculated by dividing the number of steps completed correctly in each session by the total number of steps in the task analysis multiplied by 100.

### 3.9 Data Collection and Observations

Two work coaches who work daily at the employment center of the facility were selected to be observers in the study and collect data using participant performance observation forms (see **3.4 Materials** above). In addition, a speech-language pathologist who was naïve to the purpose of the study was selected as the third observer, he filled out the observation forms while viewing the video recordings of the sessions.

These observers received detailed training from the researcher prior to the initial of the baseline phase on how to record correct/incorrect steps using the observation forms by observing and collecting data on two residents who were not part of the study. Observers were instructed not to assist participants beyond physical prompts or verbal encouragement to perform the steps. Other types of prompts, procedures, feedback, and instructions were not delivered.

### **3.10 Procedure**

*Training and familiarity with the iPad:* Each participant had a few sessions to learn how to operate the basic icons of the iPad skills and how to play/pause video clips. Two participants were able to learn how to use the basic icons on the iPad (press the play/pause button and proceed to the next video segment). While others found it too difficult to use those icons independently. This stage occurred before the baseline phase and lasted about a month with a frequency of three 15 minutes-sessions a week. In these sessions, participants also had to learn to perform an action they saw in a video displayed on the iPad, such as clapping hands, moving an item from one place to another, etc. All participants showed that they could perform the actions after watching the video clips.

*Study Conditions:* Both in the baseline and the intervention, sessions were conducted twice a day, two days a week, and each session lasted less than 10 minutes for each participant. The work coach placed the materials (required to perform the task) on a table in front of the participants within hand reach. If the participant did not complete the step, the observer completed it (without the participant seeing what he was doing) and recorded the step as incorrect. If the participant did not complete the remaining steps despite the verbal encouragement, they were all recorded as incorrect. In all conditions, each participant had up to one minute to start the step, and if they did not start performing the steps within this time, then the step was recorded as incorrectly completed. Prompts other than the video prompting were introduced in specific cases if the participant was physically unable to perform the steps by only watching the

video clips (that's happened only for Emily and Omer); physical prompts were given when the participant showed comprehension of what should be done but was unable to accomplish it because it required fine motor skills (e.g., after viewing the video clip of zipper opening, the participant tried over and over to open the zipper). When physical prompts were needed, the step was recorded as incorrect. These physical prompts were given in all three phases of the study (baseline, intervention, and follow-up).

*Baseline:* Baseline data, before the use of video prompting, was collected concurrently for all participants. The work instructor put the items required to perform the task on the table in front of the participant, while naming each item. Next, he only gave verbal instructions; showed an example of a bag that had already been prepared for the participant, and then took it away. The participant was asked to start performing the task on his own (e.g., "Make a Religious holiday bag bag"). The instructor did not correct participants or provide any feedback during this phase apart from verbal encouragement to continue performing the task when needed (e.g., carry on, keep going).

*Intervention:* The intervention began once a stable baseline was reached (determined after two sessions). In the intervention, the iPad was placed on the stand on the table where the participants usually sit and work (see **Figures 1 and 2**). The iPad was positioned so the participants could see it and did not prevent them from reaching out to grasp an item or a product. Observers provided assistance operating the iPad if needed). Once the intervention of the first task ended for each participant, the baseline of the second task began.

Each participant was verbally encouraged to play and pause the video clips by themselves. The work coach directed the participant to watch the videos and perform the action seen in the video. If the participant did not perform the step once again, the work coach would perform it on his behalf (coded as an error in the observation form), and the following video clip would be played.

**Figure 1**

*First Task Materials and Final Output*



**Figure 2**

*Second Task Materials and Final Output*



Because the two tasks varied in difficulty, the mastery criterion for task performance differed; in the first task, it was set to 100% correct steps during two consecutive sessions, whereas in the second task, it was set to 80% minimum, once that was achieved, participants proceeded to the follow-up sessions (without video prompts).

Once the first participant reached the criterion of 100% completed correctly in two sessions of the task (when the intervention ended), the second task immediately began (second baseline). And after one week of the intervention end, the follow-up began for this participant.

*Follow-up* (without video prompts): For each participant the follow-up sessions were conducted one, two, and three weeks after reaching the mastery criterion in the intervention phase of each task. At this phase, the participants were asked to complete the task on their own without the video prompting. Similar to baseline and intervention, in the follow-up condition (without video prompts), observers provided assistance only if the participant showed the same difficulties in performing specific steps and demonstrated comprehension of what needed to be done, but could not perform it motorically (thus, the observer completed it on behalf of the participants), the observers also encouraged the participant to perform the task.

*Data analysis:* The data was analyzed using a visual inspection of graphic displays of data and by comparing means within and between the three conditions of the study. The graphs assessed variability in task performance and trend line direction. The visual analysis evaluates "(a) trend-progress over time, (b) level, (c) stability of data" (Lane & Gast, 2013, p. 445).

### **3.11 Semi Structured Interviews with Staff Members**

Before the baseline began, four staff members working at the facility employment center were interviewed by the researcher (see **Appendix 3**) to select relevant tasks for the study and better understand the work essence and the challenges faced by staff and residents. In total, the researcher interviewed two female and two male employees between the ages of 40 to 55 years old. Two staff members were permanent employees at the employment center and were selected as the study observers. The other two staff members had irregular shifts. The interviews were conducted at the facility work center and consisted of open-ended questions about the employees themselves (e.g., How many people are you working with regularly? How many hours do you work at the facility per week?), the residents and difficulties (e.g., How do you

match between the work task and the residents? How often do the residents change their work task? Describe a difficulty encountered by a resident in his work?), and assistive technology in general (e.g., Does the employment center use any assistive technology to support the work of residents?)

### **3.12 Social Validity**

After completing the study, the researcher delivered the social validity questionnaires to staff members and participants.

*Staff members:* The interviews and questionnaire (see **Appendix 5**) aimed at evaluating the perception, acceptability, degree of satisfaction, results of the video prompting strategy, and staff recommendations for future use of the video prompting with individuals with IDD. Two staff members who were also the observers of the study were interviewed and filled out the questionnaire on their own; a 47-year-old woman who was the work coordinator of the employment center and was responsible for all 26 residents working at the employment center, and a 55-year-old man who was a coach, and worked with nine residents. The interviews included rating 10 questions and eight open-ended questions.

*Participants:* The participants' questionnaire (see **Appendix 4**) included five yes/no simple questions (The researcher read the question and then asked the participant to draw a circle or a line beneath the smiles representing his response.).

## **Chapter 4**

### **Results**

#### **Inter-Observer Agreement**

Agreement was defined as the number of times in which the observers recorded in the same way (Cooper et al., 1987). Inter-observer agreement was calculated by dividing the number of the agreements by the total number of agreements plus the disagreements (across steps) and then multiplying it by 100. The *Inter-observer agreement* was calculated on a sample data collected during two sessions of each condition and each participant, and was 100% for sample data.

#### **Participant Results**

The results show that during baseline, the performance of the participants was inconsistent. In addition, the average percentage of steps completed correctly was relatively low in comparison with intervention and follow-up (without video prompts) (see **Tables 4 and 5**; Task 1: **Figures 3-8**; Task 2: **Figures 9-13**)

Moreover, the results revealed a significant improvement in both tasks' performance following the intervention when video prompting was introduced (see **Table 6**). Alongside an improvement for all participants in follow-up versus baseline.

Maintenance of task performance varied among participants in follow-up sessions (i.e., without the video prompts intervention), three participants were able to maintain their high level of performance, and three showed reduced performance two and three weeks after the completion of the intervention. Nevertheless, their performance was still better in the follow-up (without video prompts) than during the baseline.

A paired sample t-test of the mean before and after intervention (i.e., baseline vs. follow-up) (see **Table 6**) demonstrated a significant improvement in performance after the intervention for both tasks.

## **Yuval**

Yuval participated in fewer sessions compared to the other participants. He started the intervention phase after three baseline sessions in the first task and four sessions in the second, which were enough to reach a stable baseline. He participated in four intervention sessions in both tasks, which were very effective in the acquisition of tasks and in teaching him how to complete each step. He only needed assistance switching to the next video clip and did not need other verbal or physical prompts. Yuval was sometimes able to play the clips independently. The results show an immediate and rapid increase in the level of performance once the intervention phase started. In the intervention phase, Yuval reached a level of 100% of steps completed correctly in the four sessions, and it was stabilized at this level. In follow-up sessions (without video prompts), he was first requested to watch the videos in order to perform the task, but he was asked to perform it on his own. Nevertheless, in follow-up sessions, without the video prompts intervention, he continued at a performance level of 100%. Thus, while in baseline, Yuval was unable to complete the tasks above 55.55% to 70%, and after the intervention, he succeeded in acquiring both tasks, and he was able to perform them independently without errors and without video prompts.

## **Rani**

Baseline performance ranged from 50% to 70% in both tasks across three to four sessions. The intervention consisted of five sessions in the first task and six sessions in the second. Rani was able to use the iPad on his own (to click on the videos and move on to the following video clip), but sometimes he needed verbal reminders and prompts to move to the next video clip. In the first task, the percentage of steps completed correctly increased immediately when the intervention phase began (from 55.55% to 88.88%). In contrast, when the intervention began in the second task, performance was around 70% but kept improving until it reached 100% in the fifth and sixth sessions. During the intervention sessions, there was

a decrease in video prompting; Rani succeeded in performing some of the steps without watching the video clips. In all follow-up sessions (without video prompts), Rani was able to maintain 100% of the steps completed correctly in the first task. However, in the second task, there was a slight decrease in the third follow-up session, to a 90% percentage of steps completed correctly (one error).

### **Shlomo**

Shlomo participated in four baseline sessions in the first task (performance ranged from 33.33% to 55.55%) and three in the second task (performance was stable at 50%; no change in trend or level). Four intervention sessions were effective in acquiring the work tasks, which was also demonstrated in the reduction of video prompts; thus, he was able to perform the steps without watching some of the video clips. An immediate increase in level occurred in the first task after the intervention began, from 44.44% in baseline to 89% in intervention, and in the second task, from 50% in baseline to 80% in intervention. The performance in the intervention phase ranged from 89% to 100% in the first task and from 80% to 100% in the second. However, the mean percentage of the follow-up sessions (without video prompts) in the first task decreased compared to the mean of the intervention (93% compared to 97%). In the second task, Shlomo maintained 100% performance in the three follow-up sessions (without video prompts).

### **Emily**

Emily started the intervention phase after participating in six baseline sessions in both tasks (performance ranged from 11.11% to 33.33% in the first task and from 0 to 20% in the second task). Her performance increased immediately when the intervention phase began in the first task (from 33.33% to 67%). In the first sessions of the intervention phase, her performance levels were not steady and varied, especially in the second task. She needed constant reminders and verbal instructions (e.g., continue, please, look at the video clip) to watch the videos to

perform steps after watching the video clips. In the second task, along with the video, she needed physical prompts (physical guidance/ hand-over-hand assistance) to open and close the pencil case zipper. That explains why only 80% of the steps were completed correctly in the second task. Emily received ten intervention sessions in both tasks. The results indicate an increase in the average of the intervention phase compared to the baseline. However, in the first session of the intervention phase of the second task, the percentage decreased (from 20% in baseline to 0% in intervention), and then, the trend and levels increased and reached 80% in the last two follow-up sessions (without video prompts). Emily needed more encouragement than the other participants in order to look at the videos. In the first sessions of intervention, she avoided looking at the iPad, especially in the second task and kept laughing. In follow-up (without video prompts), results show a decrease in the percentage of steps completed correctly in the second and third sessions; however, the average percentage of steps performed correctly in follow-up was higher than the baseline sessions (see **Table 4**), demonstrating improved performance and acquiring of the tasks.

### Ria

Ria participated in six baseline sessions in which she maintained a stable baseline with an average of 22.22% (range from 11.11% to 33.33%). She participated in 10 intervention sessions with an average of 69% (range from 44.44% to 88.88%). The results demonstrated an increase in level and trend once the intervention started (from 33.33% in baseline to 44.44% in intervention). She reached 88.88% of steps completed correctly in the last three sessions of intervention (8 of 9 steps completed correctly), the main error repeated was putting one item in the opposite direction. The video prompting alone was not helpful for Ria to learn how to distinguish between the directions. In follow-up sessions (without video prompts), there was a decrease in trend; thus, the percentage decreased two weeks after the intervention's end. Ria did

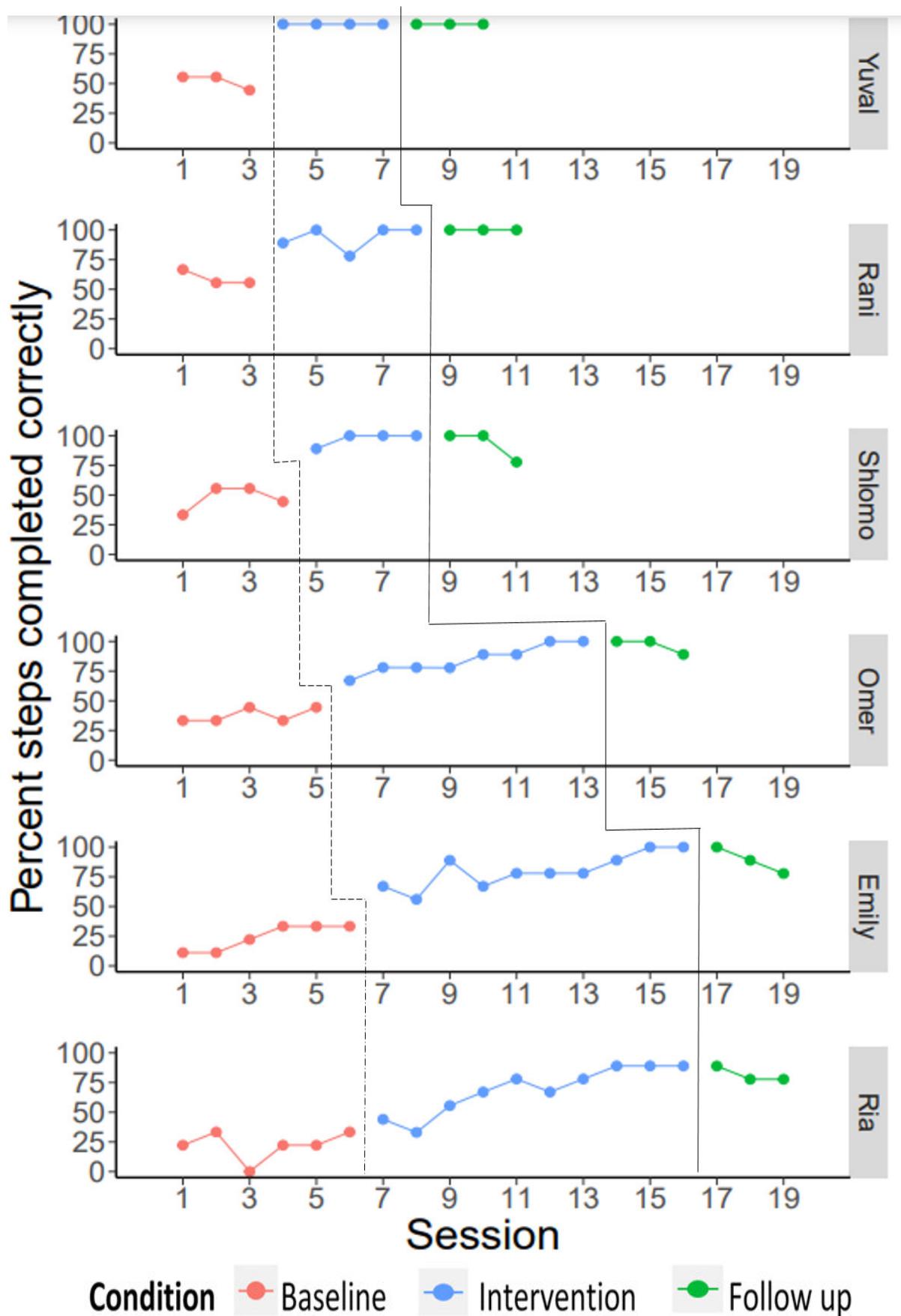
not perform the second task, and intervention sessions of the first task were limited to ten due to changes in her state of alertness and signs of tiredness.

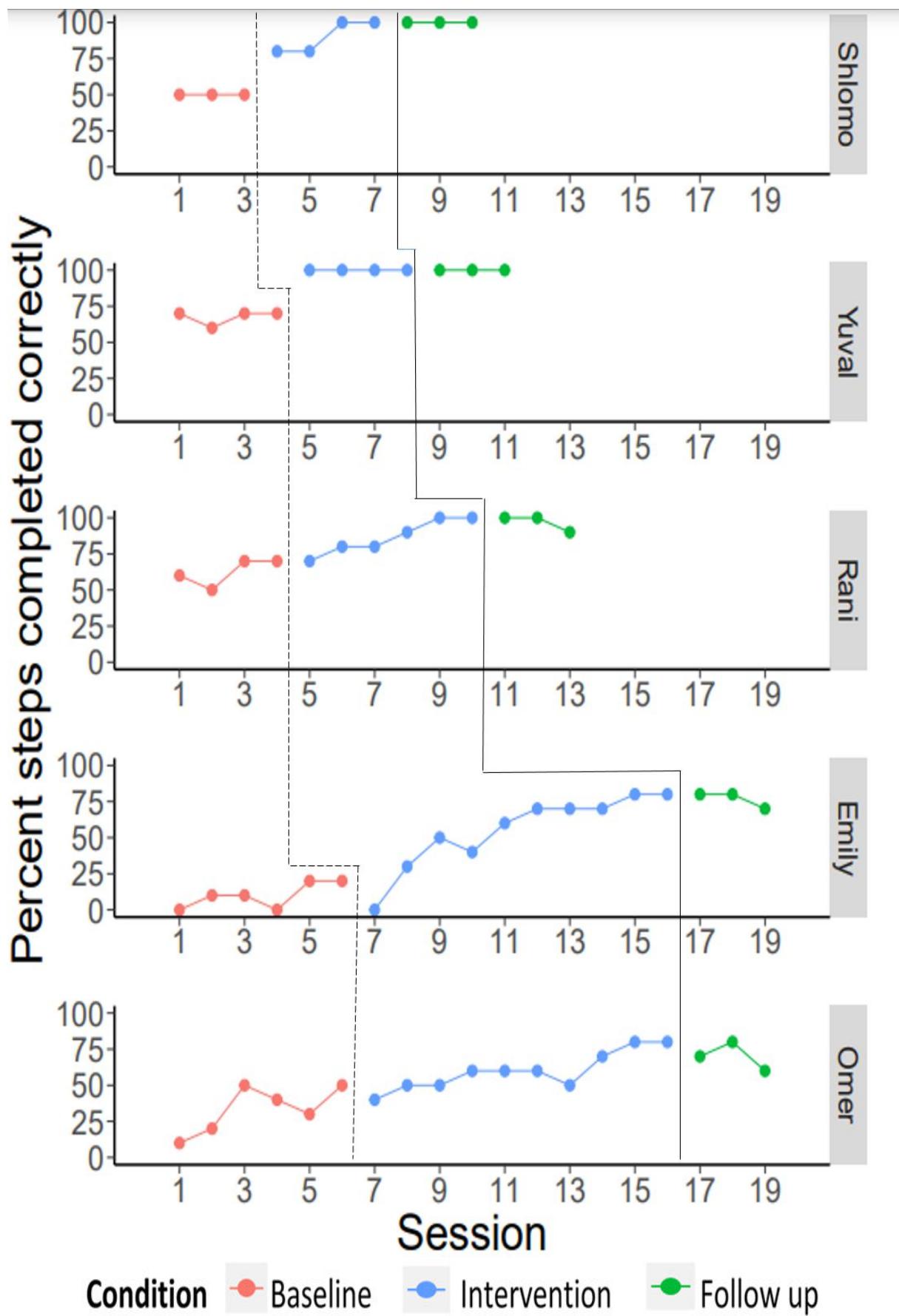
### **Omer**

Omer participated in five sessions in baseline in the first task, with an average of 37.77% (range from 33.33% to 44.44%) and six sessions in the second task, with an average of 33.33% (range from 10% to 50%). The results indicate a stable and immediate increase in average, level, and trend in the first task when the intervention began (level- from 44.44% to 67%); the average increased to 85%. Omer completed 100% of the steps correctly and maintained this achievement during the first two follow-up sessions (without video prompts), but a decrease occurred in the third session (90%, one error). In the second task, Omer also needed physical prompts to open and close the pencil case zipper and could not succeed in learning how to perform these steps independently. He could not learn how to perform these steps only by watching the videos. The change in level and trend did not occur immediately; rather, a decline occurred from 50% to 40%. Omer was distracted at the beginning of the second task intervention and kept asking for snacks. The average of the intervention phase increased to 60% compared to the baseline. Omer completed 80% of the steps correctly but failed to maintain this percentage in the third follow-up session. When the follow-up (without video prompts) session began, the trend and level descended to 70% but increased in the second session to 80%.

**Figures 3-8**

*Percentage of Steps Completed Correctly of First Task.*



**Figures 9-13***Percentage of Steps Completed Correctly of Second Task*

**Table 4**

*Means Percent and Standard Deviations of Task 1 across Three Phases.*

<b>Participant</b>		<b>Baseline</b>	<b>Intervention</b>	<b>Follow-up</b>
Yuval	Mean	51.85%	100%	100%
	SD	6.414	0	0
Rani	Mean	59.25%	93%	100%
	SD	6.414	9.942	0
Shlomo	Mean	47.22%	97%	93%
	SD	10.637	5.56	12.834
Emily	Mean	24.07%	80%	89%
	SD	10.923	14.63	11.115
Ria	Mean	22.22%	69%	81%
	SD	12.1704	19.455	6.4143
Omer	Mean	37.77%	85%	96%
	SD	6.085	11.78764	6.4201

**Table 5**

*Means Percent and Standard Deviations of Task 2 Across Three Phases.*

<b>Participant</b>		<b>Baseline</b>	<b>Intervention</b>	<b>Follow-up</b>
Yuval	Mean	67.50%	100%	100%
	SD	5	0	0
Rani	Mean	62.50%	87%	97%
	SD	9.5742	12.1106	5.7735
Shlomo	Mean	50%	90%	100%
	SD	0	11.54701	0
Emily	Mean	10%	55%	77%

	SD	8.9442	25.4951	5.7735
Omer	Mean	33.33%	60%	70%
	SD	16.3299	13.3333	10

**Table 6**

*The Results of Paired Sample t-test of the Mean Before the Intervention (i.e., baseline) and After Intervention (i.e., follow-up- without video prompts) of all participants.*

	Task 1	Task 2
Mean at baseline	39.86%	44.66%
Mean at follow-up	93.166%	88.8%
t test	14.587, p<0.001	6.805, p<0.005

### Social Validity: Participants

The participant questionnaire consisted of five Yes/No simple questions (smiles that were used by Gat et al., 2015). Only three participants were able to answer or draw a line around the responses. All three indicated that they enjoyed watching the videos and felt it was not hard to watch the videos and perform the steps. They also indicated a feeling of capability to perform tasks independently and that the videos helped them learn the tasks.

### Semi-Structured Interviews: Staff Members

The four staff members described they experienced a heavy workload, which caused difficulties in teaching residents new tasks. They also reported that the main challenge in receiving new work tasks that the residents were unfamiliar with; lack of time to break every task into smaller steps and in dedicating time to teach every step, "The biggest problem we face is actually the lack of staff members; more work coaches are needed. We have to teach the residents each step in the new task. Because of the variety of work tasks we receive, sometimes

it's not feasible to teach each step." (Permeant employee 1). In addition, staff members said that the residents were not exposed to aids or technology at the employment center.

### **Social Validity: Staff Members**

The two staff members indicated that video prompting helped participants and was highly effective in teaching all participants new work tasks (see **Appendix 6**). They liked the use of video prompting at the employment center and reported that the participant also had fun watching the videos. Moreover, they stated that they see this strategy becoming a standard method of teaching all residents of the employment center new tasks, thus helping them reduce workload. They did not perceive that the iPad and stand interrupted other residents while performing their work.

Although participants were not independent in using the iPad and clicking on the video clips, staff did not feel it was hard for them to stand aside and click on the video clips. One staff member stated that she would not change anything about the study's strategy, while the other indicated that when filming the video clips, the participants themselves should be the models. They both thought that the video prompts drove participants' success in performing the tasks and increased their satisfaction. They also believe that this method can be appropriate for all residents except residents with high functioning. One permeant staff member indicated that she initially doubted the efficiency of the video prompting and was very surprised by the abilities of the participants to better understand the work tasks, and to improve their performance by watching videos, especially those who had never worked at the employment center before, "To be honest, I really thought this strategy would be a waste of time and could not believe it will help our residents learn the new tasks, especially those who are considered low functioning, but I was very surprised and happy to see the residents learn the task in a relatively short period of time. I loved how the videos motivated them. ".

# **Chapter 5**

## **Discussion**

**Evaluation of Results:** in this chapter, we will discuss the results of this study and relate them to the hypotheses, previous studies, recommendations for future research, and limitations.

Our study was the first to examine the effective use of video prompting strategy via iPad device across six older participants (above 50 years old) with moderate and moderate-severe intellectual and developmental disabilities who live in a residential facility. Prior studies have focused on young and adults with IDD when investigating the use of video prompting in teaching new work tasks in community-based settings, most likely because younger individuals are probably easier to teach than older adults. In addition, older adults with IDD are more likely to have "poor health, functional dependence, restricted activities, and limited participation" (Carmeli et al., 2016), which can affect their learning ability and explains why older adults have never participated in prior studies.

### **Hypothesis 1**

*The use of video prompting alone when presented via iPad device will increase the percentage of steps completed correctly during the intervention and follow-up (without video prompts) phases compared to the baseline phase.*

Our current study demonstrated that video prompting is effective in teaching older adults new work tasks and offers promising directions for new research. In the baseline phases, the performance of all participants was relatively low in both tasks. During the intervention phases, when video prompting was introduced, their performance improved immediately during the first task. Although the performance of two participants (Emily and Omer) in the second task dropped when the video prompting was introduced in the first intervention session (possibly because both participants were distracted during these sessions and avoided looking

at the videos), yet their performance increased in the following sessions. Follow-up sessions (without video prompts) revealed variability among participants; One participant was able to maintain performance during all three sessions for both tasks, and two participants successfully maintained their performance in one task, and in the other, only one error occurred. In sum, all participants' performances improved significantly compared to the baseline sessions in both tasks. Thus, hypothesis number one was confirmed.

Most researchers (e.g., Collins et al., 2014; Cullen, 2013) used video promoting in combination with other strategies, such as error correction, most-to least prompt to teach new work tasks to the participants. Here, we examined the use of video prompting alone and showed that video prompting is highly effective teaching method across all participants, even without additional strategies.

Our results are consistent with prior work of O'Rourke (2011) and Sigafoos et al. (2005), who demonstrated that video prompting alone was effective in teaching new tasks to individuals with IDD, and we extend prior research by revealing that this method is also highly effective for older adults (over 50 years old).

## **Hypothesis 2**

*If video prompting alone is not effective, adding physical prompts will help the participants perform the steps correctly.*

We tried to compare the two tasks in terms of cognitive and motor difficulties and also to keep the tasks ecological (tasks that could be used in the employment center). However, when the study started, we discovered that there were differences between the two tasks; the second task was a little more difficult and different from the first (motorically and cognitively), because it required the insertion of some items in the left side of the pencil case, and the rest in the right side (the first task requested putting all of the items in the same direction), also, it required opening and closing a zipper, which was not evaluated prior the start of the study

phases; if each participant could perform this specific action because none of the participants showed any fine motor difficulties. Shlomo, Yuval and Rani showed no differences as they learned to complete both tasks; however, Omer and Emily have shown difficulties in performing specific steps on their own (opening and closing the zipper) in all the phases of the study, despite the fact that physical prompts were also introduced, thus the observer opened and closed the zippers for them. Given that these two participants were diagnosed with moderate-severe IDD and demonstrated lower functioning than the other participants, these steps could have been too difficult for them to complete. Thus, the second hypothesis was not confirmed; the two participants failed to acquire these two steps. The difference between the tasks enabled us to see the limits of the video segments; for more difficult tasks and with lower functioning participants, video prompting may not help in learning the steps.

### **Hypothesis 3**

*Participants will enjoy watching and performing the tasks with video prompting, leading to a sense of independence. Similarly, staff members will perceive video prompting as useful and thus help them dedicate time to other tasks and activities beyond providing direct instructions for each step of the task.*

This hypothesis was confirmed; participants stated that they enjoyed watching and performing the tasks, and the staff also found it helpful in reducing workload and teaching residents new tasks in a short period of time, rather than teaching only one or two steps of a new task.

### **Participants with Moderate-Severe IDD**

Two of the participants of the study (Omer and Ria) had never been integrated or exposed to employment tasks and did not work at the work center due to low functioning and challenging behavior. Thus, the learning of the two tasks occurred in their living settings. The results are especially promising given that these two participants (Omer and Ria) demonstrated

an ability to learn when video prompting was introduced; Omer was able to learn to perform both tasks independently, with higher performance in the first task. Ria participated only in one task, but she was able to show a high level of performance with only one error, which was repeated across sessions (putting an item upside down). These results are very encouraging and may provide employment opportunities for older adults considered lower functioning and unsuitable to be integrated into employment centers, especially those living in residential facilities. However, we believe that the learning of the work task would have been more effective if it occurred in the work center itself, because it would give the participants more motivation, sense of capability and social belonging.

Why did the video prompts help participants? Given that people with intellectual disabilities in general and our participants in specific exhibit working memory and attention impairments (e.g., Costanzo et al., 2013; Danielsson et al., 2010), the video prompting (the video clips were short and clear) allowed and enabled the participants to learn the task by watching a single step at a time and then perform what they had watched immediately, thereby reducing the demands from them (Park et al., 2019; Taber-Doughty et al., 2008; Weng et al., 2014). In the follow-up (without the use of the video prompts), some of the participants managed to maintain their level of task performance the same as the intervention (when they watched the video segments). Although some participants, reduced their level of performance in the follow-up (without video prompts) as compared to the intervention, this can be expected due the fact that during the follow-up no assistive technologies were used, and without on-going support participants may experience difficulties in working memory and lapses of attention, similar performance is experienced with tasks they perform on a daily basis in the work center. Yet, overall the level of performance across participants was very high and at most two steps were completed incorrectly for each task in the follow-up. For these participants, the video prompting may be needed not just for learning the task but also for performing tasks with 100% accuracy independently.

## **Future Research**

We hope that this study will facilitate future research with this particular population and should include more individuals with lower functioning, those who have never been exposed to work tasks in order to provide employment opportunities. Furthermore, future studies may consider allocating a greater period of time than the period used in this study to teach participants how to operate the device on their own and take into consideration examining and addressing the main difficulties that inhibit the independent use of the iPad, which may give participants a sense of independence and strengthen it. We also hope that our study will shed light on the employment centers in residential facilities and encourage researchers to continue examining video-based instructions with more participants and various work tasks. Regarding the creation of video segments, future studies may consider building a design that refers to adjustments that meet the precise needs of this specific population. Future studies may also examine or compare other procedures delivered with video prompting (besides physical prompts) to teach older participants steps that are considered difficult and complex to learn through watching videos only and can

## **Limitations**

Despite the promising results of this study, several limitations should be mentioned. First, the limitation of criterion; creating a study structure with six participants rather than dividing it into two replication units, which would have increased the number of comparisons and the strength of the study.

Another limitation was that participants were expected to use the iPad on their own and rely less on staff members. However, only two participants were able to play the video clip and move on to the next one, but they needed constant verbal instructions to move to the next video clip. This suggests that future work should consider developing proprietary applications that are tuned to the motor and touch gesture characteristics of people with moderate-severe IDD. We also should note that we have not assessed the ability of participants to perform certain

specific steps that may be considered difficult to perform before the start of the study (i.e opening and closing the zipper of the pencil case in the second task) due to the fact that we relied on the evaluations of the physiotherapist and occupational therapist of the facility regarding the motor skills of the participant, which showed that none of the participants demonstrated difficulties or limitations in these skills. The inability to perform these actions may be also a result of a lack of experience. If we had evaluated the participants' ability to complete these steps before the start of the study, and dedicated a period of time teaching them how to perform these steps, in particular, Omer and Emily; who could not complete these steps on their own, they may have demonstrated better results.

Another limitation was the need to use motor prompts for the second task with two participants. This was not expected (tasks were selected to match in overall difficulty), but we chose to provide these prompts to allow participants to participate in the second task. Future studies should consider selecting tasks better suited to the motor skills of participants to allow independent performance of all steps.

## **Chapter 6**

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## Chapter 7

### Appendices

#### 7.1 Appendix 1

##### Observation Form (Intervention)

Participant: \_\_\_\_\_

Date: \_\_\_\_\_

##### Task: Preparing bags for Religious holiday bag.

Step	Was the step completed correctly?	Did a mistake occur?	Did help was needed using the device?
1. Take a plastic bag and open it.	Yes/no	Yes/no	Yes/no
2. Take a carton.	Yes/no	Yes/no	Yes/no
3. Put the carton in the plastic bag.	Yes/no	Yes/no	Yes/no
4. Take a Snack 1 bag.	Yes/no	Yes/no	Yes/no
5. Place the Snack 1 in the plastic bag until the end.	Yes/no	Yes/no	Yes/no
6. Take a Snack 2 bag.	Yes/no	Yes/no	Yes/no
7. Insert the Snack 2 above the Snack 1 until the end.	Yes/no	Yes/no	Yes/no
8. Take a lollipop.	Yes/no	Yes/no	Yes/no
9. Put the lollipop on top of the Snack 2.	Yes/no	Yes/no	Yes/no

- Was the task completed correctly? Yes/No.
- Total number of errors: \_\_\_\_\_.
- Total number of steps completed correctly: \_\_\_\_\_

## 7.2 Appendix 2

### Observation Form (Intervention)

Participant: \_\_\_\_\_

Date: \_\_\_\_\_

#### **Task: Pencil case.**

Step	Was the step completed correctly?	Did a mistake occur?	Did help was needed using the device?
1. Take a pencil case.	Yes/no	Yes/no	Yes/no
2. Open the zipper of the pencil case till the pencil case is fully opened.	Yes/no	Yes/no	Yes/no
3. Take a marker.	Yes/no	Yes/no	Yes/no
4. Put the marker in the pencil case in the right space.	Yes/no	Yes/no	Yes/no
5. Take a pencil and put it next to the marker.	Yes/no	Yes/no	Yes/no
6. Take an eraser.	Yes/no	Yes/no	Yes/no
7. Insert the eraser inside the grid on the other side of the pencil case.	Yes/no	Yes/no	Yes/no
8. Take a glue and put it inside the grid.	Yes/no	Yes/no	Yes/no
9. Close the pencil case.	Yes/no	Yes/no	Yes/no
10. Close the zipper of the pencil case.	Yes/no	Yes/no	Yes/no

- Was the task completed correctly? Yes/No.
- Total number of errors: \_\_\_\_\_.
- Total number of steps completed correctly: \_\_\_\_\_

## **7.3 Appendix 3**

### **Interview Questions for Staff Members**

Hello, we appreciate your willingness to participate in the interview. Your answers will help us target our research area and choose relevant tasks so that we can help people with intellectual and developmental disabilities improve their work skills.

Full name: \_\_\_\_\_

Position in the facility: \_\_\_\_\_

The interview will take approximately a half hour and includes the following parts:

- a. Questions about you. Personal demographic data - age, gender, education, and work history.
- b. Questions about the residents, difficulties, and assistive technology in general.

#### **Part a.**

1. How long have you been working at the facility?
2. How many hours do you work at the facility per week?
3. How many people are you working with on a regular basis? How familiar are you with the residents? What is their degree of severity level?
4. Please describe the difficulties/barriers or burden you encounter in your work at the employment center.

#### **Part b.**

5. How many residents work in the employment center? What are their levels of intellectual and developmental disabilities?
6. Please describe the current kinds of employment activities that residents are engaged in.
7. How do you match between the work task and the residents? Who does that? Do the residents change their work task? And how often?

8. How much assistance do residents require? Partially, often, all the time? Please describe what kind of assistance.
9. Think back to the last two times this week in your job in the employment center and briefly describe a difficulty encountered by a resident in his or her work?
10. In your opinion, what can help or support the difficulties experienced by residents in ways that you do not have? Please be more specific.
11. What do you think will help enhance the work skills of residents?
12. What assistive technologies do residents use? Can you describe the use of assistive technology? Does the employment center use any sort of assistive technology to support the work of residents?
13. In your opinion, what kind of technology can help residents perform their work?
14. In our research, we will break down the task into steps and record the performance of each step by video so that the resident can watch each step via iPad and perform it immediately after viewing it. How and in what ways do you think that can help residents? What is problematic with this kind of technology?
15. What do you suggest to measure in employment? (Completion of work, accuracy, self-confidence...).
16. How do you suggest we train residents to use that kind of technology?
17. With which residents do you think this can assist, and in what type of work? In which cases will it not help?
18. What experience do residents have with video? Did they experience it?
19. Do residents have and use smartphones?

Thank you very much for your time. Would you like to add/comment something that you think is important? Do you have any questions for me?

Do not hesitate to contact me by email if you remember something you want to mention.

## 7.4 Appendix 4

### Participant's Questionnaire (Based on Gat et al., 2015)

#### Social Validity Questionnaire

Participant's name: \_\_\_\_\_

Date: \_\_\_\_\_

Draw a line or a circle on the smiley that indicates your answer.

Question	No (1)	Yes (2)
1. Did you have fun watching the videos?		
2. Did the videos help you learn the new work task?		
3. Do you want to keep learning new tasks by watching videos?		
4. Was it difficult for you to view the video and then do the work?		
5. Do you feel more independent (can do things alone) after watching the videos?		

## 7.5 Appendix 5

### Questionnaire and Interview for Staff Members

Name: \_\_\_\_\_

Date: \_\_\_\_\_

	<b>Not at all</b>	<b>Very little</b>	<b>Moderately</b>	<b>Very much</b>
1. To what extent do you think it was helpful to use videos to learn new tasks? Express.	1	2	3	4
2. How much do you think the participants liked to watch the videos?	1	2	3	4
3. To what extent you think there are negative effects/consequences of watching the videos? What are they?	1	2	3	4
4. As an instructor, to what extent did you enjoy the video instruction method? Why?	1	2	3	4
5. How much relieved were you with the burden of teaching new tasks using the standard method compared to videos? Describe and explain.	1	2	3	4
6. To what extent do you think the device interfered with other residents as they were doing their work tasks?	1	2	3	4
7. To what extent do you see this becoming a regular teaching method for	1	2	3	4

all residents of the employment center? Why?				
8. How comfortable would you say it was to integrate the use of the device (iPad and stand) into the participants' workspace?	1	2	3	4
9. We expected that participants would be able to use the iPad independently. To what extent do you think it is still helpful to stand near them and play the video clips? Describe and explain.	1	2	3	4
10. To what extent are you willing in the future to teach residents new work tasks with video strategies?	1	2	3	4

### **Open questions:**

1. What improvements would you make in learning via video method?
  
  
  
2. What would you change in videos themselves?
  
  
  
3. In your opinion, how did the level of intellectual disability of the participants in our study affect the use of videos or the iPad?
  
  
  
4. What was particularly difficult/easy within this population? In your opinion, how is it possible to identify individuals for whom this method is appropriate?
  
  
  
5. Do you have an idea for future use of the videos in this or other residential facilities?

6. Which residents do you think this method is not suitable for?

7. What did you expect prior to the beginning of the study? And what actually happened?

## **7.6 Appendix 6**

**Table 7**

The ratings of two staff members on the perception of video prompting strategy.

Question	Rating 1 -Not at all, 2- very little, 3- moderately, 4- very much)
To what extent do you think it was helpful to use videos to learn new tasks?	4 4
How much do you think the participants liked to watch the videos?	4 4
To what extent you think there are negative effects/consequences of watching the videos?	1 1
As an instructor, to what extent did you enjoy the video instruction method?	4 4
How much relieved were you with the burden of teaching new tasks using the standard method compared to videos?	4 4
To what extent do you think the device interfered with other residents as they were doing their work tasks?	1 1
To what extent do you see this becoming a regular teaching method for all residents of the employment center? Why?	4 4
How comfortable would you say it was to integrate the use of the device (iPad and stand) into the participants' workspace?	4 4
We expected that participants would be able to use the iPad independently. To what extent do you think it is still helpful to stand near them and play the video clips? Describe and explain.	4 3
To what extent are you willing in the future to teach residents new work tasks with video strategies?	4 4

**מוגבלות שכילת התפתחותית ברמה ביןנית ובינונית-נמוכה שగרים במעטן שימוש בהנחיות ווידאו לשיפור יכולות תעסוקה בקרב מוגרים עם**

## **פְּנִימִיָּה**

תנוויר מלחם-מדלי

תקציר

תעסוקה מהוועה אחת מכמה גורמים מהותיים וקריטיים לשיפור איכות חייהם של אנשים עם מוגבלות שכליית התפתחותית. עובודה מאפשרת שגרת חיים, מפתחת יכולות פיזיות, קוגניטיביות ומילומניות חברתיות, ומחזקת את תחושת העצמאות.

מחקריהם קודמים המוכיחו את יתרונות השימוש בקטעי וידאו קצרים ביצוע מטלות כמו קניות ופעילות יומיומיות. עם זאת, רוב החוקרים הללו התמקדו בילדים ובכעירים עם מוגבלות שכלית (מתוך 30 שנים), קלה עד בינוני הגרים בקהילה, ולא היה ברור אם הנחיות המבוססות על סרטונים יכולות לעוזר למבוגרים (מעל גיל 50) עם מוגבלות שכלית התפתחותית ברמה בינונית ובינונית נמוכה הגרים במערכות פנימייה ללמידה מטלות עבודה חדשות. מריאינות שבוצעו עם אנשי צוות בمعון במרכזי הארץ עולה כי העובדים חוות עומס רב בעבודתם, דבר המתבטא בקשישים ובהקשת זמן רב בלימוד מטלות חדשות לדיירים ורוב הדиירים הגרים בمعון מוקצים לבצע רק שלב אחד או שניים ממשימות המורכבות מרצף של שלבים והם תלויים במידה רבה בצוות ביצוע המשימות האלו.

במחקר הנוכחי, השתמשנו במחקר יחידני (single subject design) מסוג multiple baseline study שמאפשר בודק את האפקטיביות של הנקודות וידעו כשהן מוצגות באמצעות איפד ברכישת מידע חדש בקרוב שבה משותפים שמאובחנים עם מגבלות שכלית התפתחותית ברמה בינונית ובינונית נמוכה וגרים במעטון פנימיה. התוצאות הראו ששתי המשימות בוצעו באופן טוב יותר כאשר הונגו הנקודות הידועה באמצעות האיפד. כך שהממצאים והרמות הוגדלו עם תחילת שלב ההתערבות. עם זאת, הנקיות וידעו בלבד לא אסטרטגיות הוראה אחירות לא הייתה עיליה כפי שהושער במחקר בעת לימוד שני משותפים איך לבצע שלבים מסוימים באחת מהמשימות. תוצאות שלב המעקב הראו שונות בין המשותפים, כך שלושה משתתפים הצליחו לשמור על ביצועיהם והשאר הרואו ביצועים מופחתים במהלך השבוע השני והשלישי למשך לאחר השלמת שלב ההתערבות. ראיונות לאחר סיום שלב ההתערבות עם אנשי צוות העלו כי לדעתם הנקודות הידועה היו יעילות מאוד בלימוד כל המשתתפים משימות עבודה חדשה ושיערו כי אסטרטגיה זו תהפוך לשיטה קבועה בעת לימוד חדשות לדיררים.

**שימוש בהנחיות ווידאו לשיפור יכולות תעסוקה בקרב מבוגרים עם  
מוגבלות שכלית התפתחותית ברמה בינונית ובינונית-نمוכה שגורים בمعון**

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מחקר זה נערך בסיווע מענק מחקר מקרן שלם הקרן לפיתוח שירותים לאדם עם  
מוגבלות שכלית התפתחותית ברשותות המקומיות

2022

קרן שלם / 2021-2022