USING VIDEO MODELING DELIVERED THROUGH IPODS TO TEACH VOCATIONAL TASKS TO YOUNG ADULTS WITH AUTISM SPECTRUM DISORDERS (ASD)

By

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Abstract

The purpose of this study was to evaluate the effectiveness of using video modeling delivered through a Portable media player (video iPod) as a means of teaching three job-related tasks to four young adults with autism spectrum disorders (ASD) in a community-based employment setting. The videos used in the study were enhanced by adding written instructions to a blank white screen prior to the step being modeled. Videos for two of the individuals were further enhanced with voiceovers of the written instructions. The effectiveness of the video modeling was evaluated using a multiple probe across tasks design. Results indicated that the introduction of the video iPod was associated with immediate and substantial gains in the percentage of steps the young adults were able to complete correctly. All of the participants demonstrated maintenance of the acquired tasks. In addition, all four of the young adults were able to use the video iPod independently to access and watch the videos. Social validity data indicated that using an iPod was a socially acceptable and appropriate way to deliver a video modeling intervention in some vocational settings.

CHAPTER ONE

Introduction

Bill, a high school senior who has difficulty with remembering and following directions, was going through job training. The instructor took Bill to the copy room, and taught him how to operate the copy machine. The instructor also provided Bill a set of directions with pictures and written instructions. Bill followed the directions well when the instructor showed him each step. The instructor, assuming that Bill learned all the steps, asked him to make copies of documents to be used for a meeting and left the copy room. When the instructor came back 10 minutes later, he found Bill standing in front of the copy machine staring at the copy of directions that the instructor had provided. Bill had not made any copies.

As humanity progresses, more and more people with disabilities are taking an active part in society. Specialized instruction designed to fit individual student learning characteristics has helped individuals with ASD learn the skills to work independently (Mechling & Ortega-Hurndon, 2007). Because of this, many individuals with disabilities, specifically those with Autism Spectrum Disorders (ASD), are joining the workforce and performing jobs that have previously been unavailable to them. (Brady & Rosenberg, 2002, Test, Grossi, & Keul, 1988). However, some individuals with ASD lack the ability to work independently and often require prompting and reminders of how to perform certain vocational-related tasks (Myles & Simpson, 2002). Therefore, a primary concern of practitioners is to teach these students how to be less dependant on adults (Hall, McClannahan & Krantz, 1995). For this reason, researchers have attempted to find the most effective and least obtrusive strageties to increase independence and decrease direct prompting in vocational settings (Van Laahoven, Johnson, Van Laahoven-Myers, Grider & Grider, 2009).

While there is a wide range of functional ability among young adults with ASD, a common denominator is that all of these young adults will face challenges in vocational settings (Myles & Simpson, 2002). Greenspan and Wieder (1999) have established that many young adults with ASD share challenges impacting vocational outcomes such as social-emotional reciprocity, communication, cognition, and sensory and motor development. Young adults with ASD may also exhibit overly restricted range of interests resulting in difficulty transitioning physical and cognitive attention from one activity or situation to another (Cohen & Volkmar, 1997).

Due to the complex nature of ASD and its increasing prevalence in our society, researchers from a variety of disciplines have been working to develop interventions specifically tailored to address the learning characteristics of this population. The result of this multi-disciplinary effort is a collection of strategies and interventions of varying degrees of efficacy (Simpson, 2005). Identifying effective interventions and strategies for this population continues to be a critical task for researchers and practitioners.

Video Modeling

One promising intervention is video modeling (VM) which incorporates visually-based learning to teach a variety of skills to young adults with ASD. Video modeling involves filming someone correctly performing the selected task. The video is then used to teach the individual with ASD how to perform the task (Cihak & Schrader, 2008, Van Laarhoven, et al., 2009). By modeling behaviors on videotape in a controlled, natural setting, the young adult learns to memorize, imitate, and generalize the behaviors. Research related to video modeling demonstrates this intervention to be an effective way to teach, modify or improve various behaviors.

Current interventions for teaching skills to individuals with ASD using video modeling may not take full advantage of current technology. In the past, bulky camcorders, VCRs, and televisions were needed to produce and playback videos. Now, digital media makes it possible for a novice to easily create and edit videos. Advances in technology now make it possible for videos to be viewed on a small portable media player, such as an iPod, in the setting in which the task or behavior is to be performed.

While research has shown that video modeling can be an effective method for teaching young adults with ASD various skills and behaviors there is still opportunity for improvement in how young adults engage the videos. One idea which has not been extensively researched, is the use of a portable video player, such as an iPod, as the method of delivery for the video modeling. Additionally, there is also a dearth of research related to the effectiveness of video modeling when used with young adults with ASD in vocational settings. This study seeks to determine if video modeling in a vocational setting is an effective way to improve learned tasks or to teaching unlearned tasks. This study also seeks to determine if using a portable media player, such as an iPod, as a means of delivery for video modeling is an effective means of delivery.

Purpose of the Study

The purpose of this study is to determine whether video modeling delivered through an iPod will increase the number of independent steps completed correctly when applied to learned and unlearned tasks being performed by individuals with ASD in a vocational setting. The study explored the feasibility of delivering the intervention through a portable handheld video player such as an iPod. Finally, the social validity of using an iPod in an employment setting to deliver the intervention was explored.

Research Questions

1. Will video modeling (independent variable), delivered through a portable video player, increase independent completion of vocationally tasks performed (dependant variable, operationally defined) by young adults with ASD?
2. What is the social validity of using an iPod as a delivery model for video modeling interventions?

CHAPTER TWO

Review of Literature

The chapter will review existing literature and research pertaining to characteristics of individuals with ASD, including a preference for visually-based learning. In addition, research related to video modeling (VM) as it applies individuals with ASD will be reviewed. This will include skills successfully taught using VM and VM procedures. Finally, factors related to the social validity of using video modeling with individuals with ASD will be presented.

Characteristics of Autism Spectrum Disorders

Autism spectrum disorders (ASD) is a complicated neurological developmental disability that usually appears early in life. ASD includes individuals with a diagnoses of ASD, autism, Asperger's syndrome and pervasive developmental disorder (PDD) that typically appear before a child is three years of age (CDC, 2009). There is no current medical test used to diagnose ASD. Usually a diagnosis is given after a comprehensive evaluation by a qualified professional. This assessment typically includes clinical observations, parent interviews, developmental histories; psychological testing, speech and language assessments and one or more of the autism diagnostic tests (CDC, 2009). Figures related to the prevalence of ASD over the past few years have been on the rise.

The number of students diagnosed with ASD aged 6-21 has increased significantly over the past few years from 54,064 in 1998 to 258,305 in 2007 (IDEA, 2007). While the number of students diagnosed with ASD has shown dramatic increases, it accounts for approximately 4% of all students who received special education services in 2007 (IDEA, 2007). According to the most recent figures from the Autism and Developmental Disabilities Monitoring Network (ADDM), an average of 1 in 110 children in the United States has been diagnosed with ASD

(CDC, 2009). Recent studies have estimated that the lifetime cost to care for an individual with an ASD is $3.2 million (Ganz, 2006).

Due to the sharp increase in the prevalence of individuals diagnosed with ASD, combined with both economic and societal costs the Centers for Disease Control now considers ASD an "urgent public health concern" (CDC, 2009, Public Health Actions section, ¶ 1). Because individuals with ASD possess a unique set of abilities, there is no single intervention found to be consistently effective (Higgins & Boone, 1996). Because of the complex nature of ASD, it is important that practitioners working with individuals with ASD are aware of research-based practices and align these practices with the specific needs of the student (Simpson, 2005).

Some common difficulties encountered by individuals with ASD are impairments in the areas of attention, information processing, and memory (Quill, 1997). With regard to attention impairments, individuals with ASD demonstrate attention difficulties including shifting attention between visual and auditory stimuli, and attending to important informational cues. Strengths of individuals with ASD lie in their ability to be particularly focused in certain situations and their visual perception abilities (Quill, 1997). These strengths make individuals with ASD ideal candidates for learning using pictures and video that allows information to be processed by visually presenting tasks and directions.

Visually based learners. Research has shown that many individuals with ASD learn and retain information best when it is visually presented. Bryan & Gast, (2000) hypothesized the reason young adults with ASD responded to visual learning may be because they sometimes have difficulty comprehending and paying attention to auditory stimuli. Because of this preferred learning style, presenting information visually is recommended for individuals with ASD (Hodgdon, 1995).

Observational learning. The concept that humans can learn behaviors simply by watching others perform a behavior was first put forth by Albert Bandura over five decades ago. Bandura reported that students imitated aggressive behavior if it was modeled for them (Bandura, Ross & Ross, 1961). This groundbreaking study set the stage for Bandura's social learning theory which stated that humans can learn behaviors simply by watching others perform a behavior (Bandura, 1977, 1997).

Bandura (1982) studied children's ability to acquire a vast array of skills by observing others performing the skills. He also found that observers will imitate behaviors with or without the presence of a reinforcement, and will generalize the behavior to new settings. He argued that attention and motivation were essential to observational learning. Bandura also found that if one did not attend to the mode, they will not be able to imitate the behavior. According to Bandura, people were most likely to attend to a model that they perceived as competent, and who was similar to themselves in some way (e.g., physical characteristics, age, group affiliation, ethnicity).

Another aspect of Bandura's social learning theory was the idea of vicarious experiences. Here, students did not actually complete a task, but rather watched others successfully completing it. Bandura noted that the more characteristics the model and the student had in common, the more successful task completion. Using vicarious experiences as an intervention strategy opened the door for students to model desired behaviors (Bandura, 1982). Research building on Bandura's findings has reinforced that modeling is an effective method for teaching young adults with ASD (Charlop, Schreibman, & Tryon, 1983, Maheady, Mallette & Harper, 2006, Robertson & Weismer, 1997).

Visually based interventions. Several different visually-based interventions have been used to varying degrees of success with individuals with ASD. Some of these interventions include: (a) visual supports (Dettmer, Simpson, Myles & Ganz, 2000), (b) visual cues (Ganz, Bourgeois, Flores, & Campos 2008), (c) picture activity schedules (Bryan & Gast, 2000; Spriggs, Gast & Ayres, 2007), (d) video modeling, video self-modeling and computer-based video instruction (CBVI) (Ayres, Maguire & McClinton, 2009).

Dettmer and colleagues (2000) conducted a study using visual supports to facilitate the transition of two elementary-aged boys with autism. The study was based on research supporting the theory that individuals with autism are visual thinkers and respond better to visual stimuli as compared to auditory stimuli. A single-subject reversal design (ABAB) examined the effectiveness of using visual supports to decrease the amount of time the two children spent transitioning between activities. The visual supports were different for each child. With the first child a car schedule and a portable schedule were used. The car schedule was viewed by the child while in an automobile and consisted of a schedule of the day's events with each event being represented with a line drawing. The portable schedule was a small more portable version of the car schedule that was used throughout the day. The second child had three visual supports consisting of a visual schedule, a subschedule / finished box routine, and a Time Timer. The visual schedule used line drawings to show the days events whereas the subschedule/ finished box routine consisted of a 3 x 5 card that contained specific directions to complete a task. Once the task was completed, the child put the card into a box labeled "finished." The Time Timer was a timer that was used during specific activities and provided the allotted amount of time to complete each activity. The researchers found that using the visual supports decreased the amount of time lapse between receiving instructions to starting the next activity. The use of

visual supports also decreased the frequency of verbal and physical transition prompts for one of the students. Findings from this study support the use of visual instructions as an effective intervention for students with ASD.

Picture activity schedules have been described as flexible teaching tools used to address skill deficits in individuals with ASD (Bryan & Gast, 2000). Activity schedules support the individual to transition from one activity to another in sequence in order to complete an assigned task. Children with autism have been reported to have difficulty in making transitions between activities (Cohen & Volkmar, 1997). Picture activity schedules have been modified to accommodate other types of interventions, as demonstrated by Krantz and McClannahan, (1998) who taught communication skills using textual scripts embedded in picture activity schedules. After fading textual clues learned communication skills were generalized to other unscripted activities.

One method used to depict activities in an expected sequence is photo activity schedules. The photographs may depict an object related to the task or a person conducting the task. The student is then taught to refer to the photo activity schedule at the beginning and close of each activity as a means for determining what activity is to be done and when each activity is scheduled to take place (Massey & Wheeler, 2000). Photographs have also been used to teach children with low-functioning autism to complete daily living tasks, including getting dressed, doing the laundry, and setting the table (Pierce & Schreibman, 1994).

The use of photo activity schedules to increase lengthy response chains has been researched. In a study conducted by Macduff and colleagues (1993) photographic activity schedules depicting appropriate after-school activities were used by four boys with autism. The use of photographic activity schedules by the boys led to successful acquisition of lengthy

response chains and the ability to independently change activities. The researchers concluded that "photographic activity schedules, taught with graduated guidance, became functional discriminative stimuli that promoted sustained engagement after training ceased and fostered generalized responding to new activity sequences and novel leisure materials" (MacDuff, Krantz & McClannahan, 1993) pg 97.

One intervention that has been found to allow students with ASD to accomplish activities with a decreased level of adult supervision is picture activity schedules (MacDuff et al., 1993). MacDuff and colleagues found that photographic activity schedule use allowed students to move between activities without any prompting. In order for a student to maximize the benefit of using an activity schedule specific skills should be mastered. These skills include discriminating pictures from their backgrounds, matching identical objects, picture object correspondence skills, and tolerance for manual guidance (McClannahan & Krantz, 1999).

Some researchers have sought to take visual learning a step further by utilizing computer technology to support individuals with disabilities in vocational settings learn various tasks. Davies, Stock and Wehmeyer (2003) developed Pocket Compass which they describe as:

> A portable software system that utilizes intelligent audio and visual cues to help individuals with intellectual disabilities navigate through the cognitive process of making appropriate decisions when completing a vocational task. A total of 40 adults with intellectual disabilities participated in a beta test designed to evaluate the effectiveness of the prototype software system. The results demonstrated that the Pocket Compass approach can successfully be used by individuals with intellectual disabilities in a self-directed manner to increase independence and accuracy on vocational tasks (pg 182).

Pocket Compass is unique in that is uses visual cues to aid the task acquisition process. Pocket Compass is also interesting in the fact that it is a commercially available product that has been developed by a partnership between commercial and academic interests.

Advances in the technology simplifying the production of visually based interventions, such as video modeling, have been paralleled by technological advances in the types of devices providing visual stimuli. One example of such an advance in technology, is that it is now possible to load the videos onto a small device that can easily be carried around and used throughout the day, regardless of the setting. Students interact daily with sophisticated devices. These devices have the capability to deliver visually based instruction while integrating some unique interactive features. Students as young as five and six commonly use devices such as iPods, cell phones and computers. It is not a far stretch of the imagination for them to be able watch a video modeling video on one of these devices. These studies show that visually based interventions have been associated with positive outcomes when used by individuals ASD in a broad range of skills and behaviors.

Video Modeling

Video modeling is a form of observational learning based in Bandura's social learning theory that consists of the subject watching a video demonstration of someone performing the desired behavior, skill or task and then imitating that behavior (Sigafoos et al., 2007). In their meta-analysis of video modeling interventions for children and adolescents with ASD, Bellini and Akullian (2007) concluded that using videos to teach complex skills has been associated with positive outcomes. There are several aspects of video modeling that align with the learning characteristics of individuals with ASD.

Bellini and Akullian (2007) hypothesized that the effectiveness of video modeling is related to the fact that many young adults with ASD are visual learners and that video taped instructions remove extraneous distractions that may inhibit learning. In addition, video modeling increases the attention of the individual by capitalizing on visual supports. These characteristics are especially relevant for individuals with ASD who rely heavily on visual information when learning (MacDuff, Krantz, & McClanahan, 1993).

There are several features of video modeling that add to its feasibility when used with individuals with ASD. Video modeling is an effective way to gain and hold the young adult's attention. Another key feature of video modeling is that it allows complete control over audio and visual stimuli that is presented to the individual (Dowrick, 1991). Charlop-Christy, Le, and Freeman (2000) found that video modeling resulted in quicker rates of skill acquisition and increased generalization as compared to live modeling. Video modeling also appears to be a more efficient method for teaching skills as it requires less time and training to implement (Graetz, Mastropiera & Scruggs, 2006). One reason video modeling is economically feasible is once the tape is created, the video can be used repeatedly and with high levels of fidelity that ensures that the lesson is delivered in a standardized manner (Ayres & Langone, 2005). A variety of social and communication, functional and vocational skills have effectively been taught to individuals with ASD utilizing video modeling.

Social and communication skills: Using video modeling. Researchers have used video modeling to teach individuals with ASD a variety of social and communication skills. In one early study, Charlop and Milstein (1989) used video modeling to teach conversational speech skills to three children with autism. All participants (ages 6 and 7 years old) were considered to be high-functioning, as demonstrated by the presence of some speech and social skills. A video

modeling intervention was implemented that depicted two adults engaged in a scripted conversation talking about toys. The children were shown the videos and after several viewings, the participants engaged in the scripted conversation with an adult. Results showed that all three participants acquired the scripted conversational speech skills immediately following exposure to the modeling procedure. Importantly, the participants' conversational skills generalized across new stimuli and persons over a 15-month period. Overall, this study demonstrated the effectiveness of using video models to teach conversational skills to children with autism.

Charlop-Christy and Daneshvar (2003) taught students with autism how to understand the different perspectives. This was accomplished by showing the students a video of an adult correctly performing a perspective taking task by having them assume the modeled role. One task used in the study was the tiger task which had the student wearing a tiger mask and assume the role of the tiger. The model verbalized the perspective taking strategy they used during the video. These researchers found "video modeling was a fast and effective tool for teaching perspective-taking tasks to children with autism" (p. 12).

Two studies performed by Nikoplous and Keenan (2003, 2004) examined the effects of video modeling on the social initiations and reciprocal play behaviors of children with ASD. Both studies used a peer without a disability as the model. All three students showed an increase in both initiation and reciprocal play behaviors. These behaviors were maintained at one and three month follow-ups. In the first study (2003) four of seven children showed increases in social initiations and play behaviors in. The researchers noted that the three children who did not show any gains did not know how to play with the toys featured on the videos. The second study (2004) was a replication of the first. The results showed that the video modeling intervention

improved social initiation and reciprocal play skills for all three of the children, and these effects were maintained at 1 and 3 month follow-up periods.

D'Ateno, Mangiapanello and Taylor (2003) taught preschoolers with ASD a series of complex play activities (e.g., having a tea party, shopping and baking) using video modeling. The video sequences incorporated both verbal and physical prompts. Their findings indicated that students acquired both the physical and verbal behaviors that were modeled in the video. The authors concluded that video modeling was a relatively efficient way to teach lengthy complex play sequences (D'Ateno, et al., 2003).

Video modeling was compared to in-vivo modeling by Charlop-Christy et al. (2000) to teach communication and functional skills to children with ASD. In this study, participants aged 5-11 years old watched adult models demonstrate various tasks such as, brushing teeth and washing face. The videos showed the models completing the tasks at a slower than normal pace. The results indicate that, video modeling led to faster skill acquisition and generalization than in-vivo modeling. The researchers noted that one reason video modeling may have been more effective was that it alleviated the anxiety of having to socially interact with someone that is often characteristic of children with ASD.

Cihak and colleagues (in press) conducted a study in which video iPods were used with students with ASD improve social behaviors while transitioning between activities and locations in the school. Using an ABAB design, the researchers found that when students watched the videos, their mean percentage of independent transitions increased from 7% to 77%. The percentage of independent transitions decreased to 36% when the iPod was withdrawn. When the iPod was reintroduced, the percentage of independent transitions went up to 86%. In addition, the four participating teachers all indicated the intervention was socially acceptable

(Cihak, Fahrenkroq, Ayres & Smith, in press). The findings from this study support the use of a video iPod as an effective means to deliver a video modeling intervention.

Functional skills: Using video modeling. In addition to social and communication skills, a wide variety of functional skills have also been successfully taught using video modeling. Norman, Collins and Schuster (2001) conducted a study using video modeling to teach self help skills (e.g., cleaning eye glasses, zipping up a jacket, putting on a wrist watch) to three elementary students with disabilities including one 12 year old with ASD. The researchers recorded the skills from the visual perspective of the person completing the task (first person). The videos also included verbal and graphic instructions at the beginning of each task sequence. The participants were shown the videos and then asked to perform the modeled behavior. Verbal praise and tokens were used as reinforces for successful task completion. Video modeling combined with reinforcement was demonstrated to be an effective way of teaching functional skills to individuals with ASD.

A similar study by Shipley-Benamou, Lutzker, and Taubman (2002) used video modeling to teach functional skills to 3 young adults with ASD: mailing a letter, setting a table, making orange juice and pet care. The videos were filmed from the first person perspective. The intervention was shown to be effective in increasing skill acquisition across all three participants. One thing to note from this study was that the videos started with a 5 second animation intended to increase the level of attention toward the video. Unlike the previous study by Norman et al., verbal praise was only provided to elevate the level of attention paid to the video. The skill acquisition was maintained at a one month follow-up.

Canella-Malone et al. (2006) taught daily living skills to six adults with developmental disabilities (five with ASD). The skills were taught with both video modeling and video

prompting in an effort to see which method was more effective. The daily living skills targeted were setting a table and putting away groceries. The video prompting strategy consisted of 10 separate clips each showing one step of the task analysis. The video modeling intervention was a single video showing all 10 steps from start to finish. Video prompting was shown to be more effective in promoting rapid task acquisition across both tasks as compared to video modeling. These results would indicate that for some students, shorter clips serving as a prompt is more effective than video modeling.

How to order and purchase food at restaurants has also been effectively taught using video modeling by Mechling and colleagues (2005). This study combined video modeling and a computer-based instructional program to teach purchasing skills to three adolescents with disabilities, including one with ASD. The videos consisted of an adult model ordering and purchasing items at three different restaurants. The young adults watched the videos on a computer using an interactive interface. As the young adult watched the video, the program would periodically pause and require them to answer a question asked by the store employee in the video such as "May I take your order." After the young adults reached a predetermined level of mastery, they went to the restaurants depicted in the videos to purchase an item. Results from the study indicated that video modeling in combination with computer generated practice was an effective way to teach and maintain purchasing skills in a community setting.

Vocational skills: Using video modeling. In addition to social-communication and functional skills, vocational skills have also been taught using video modeling. One study evaluated the effectiveness of using a video iPod as a prompting device to teach three job-related tasks to a young man with developmental disabilities in an employment setting (Van Laahoven et al., 2009). The intervention used a multiple probe across behaviors design. Results indicated that

the introduction of the video iPod was associated with immediate and substantial gains in independent and correct responding with an associated decrease in the level of prompting from a job coach. In addition, the participant learned to use the video iPod independently.

In another study, Taber-Doughty and colleagues (2008) used a video iPod to teach three young adults with moderate intellectual disabilities to either locate call numbers for specific books using a library computer or to locate books or DVDs at a library. The study also investigated if the timing in which a video modeling intervention is presented has an impact on task acquisition. The students alternated between watching the videos one hour prior to visiting the library or watching the videos while at the library performing the task. The study also found that the majority of the participants preferred to watch the videos in the library as they were performing the task. The results indicated that both methods were effective in increasing task completion, but the a participant's preferred method was more effective. (Taber-Doughty, Patton, & Brennan, 2008).

Another study used video modeling to teach pre-vocational and vocational tasks (e.g., preparing a package, preparing a first aid kit, making copies and sending a fax) to four adolescents' with ASD (Cihak & Schrader, 2008). The tasks were selected because of similarities in the number of steps to completion and complexity of the task. The individuals were shown videos of either themselves or an unfamiliar adult completing the task. The videos were delivered through a laptop computer that was placed on a table in the same setting shown in the video. The findings from the study supported earlier findings of increased positive outcomes associated with using video modeling.

Video modeling procedures. Regardless of the behavior or skill being taught, established procedures should be followed when using video modeling with young adults with ASD.

Procedures can be used for creating videos in various settings but may need to be adapted to meet the needs of the individual. Deciding which procedures to use will depend on the behavior or skill being taught, taking in account circumstances in each situation. Sigafoos et al. (2007) has established ten steps to follow when using video modeling with individuals with ASD. These steps are meant to be completed in a systematically and logical sequence to maximize the effectiveness of video modeling.

1. *Selecting a Target Behavior.* The first step is to select a specific skill or behavior to address. This selected behavior or skill becomes the target behavior. The skill or behavior selected can either be new or one that needs improvement. It is important that the target behavior can be clearly defined so that accurate data can be collected throughout the intervention process to monitor its effectiveness (pg 9).

2. *Getting the Right Equipment.* Two pieces of equipment needed when implementing a video modeling intervention: (a) video recorder, (b) something to display the video. With the rapid advances in technology smaller digital cameras are now being used which allows the digital video to be edited on a computer. Videos can be shown in a variety of ways that range from a traditional television to loading the videos on a small portable video player (pg. 11).

3. *Writing a Script or Developing a Task Analysis.* Just as with making a movie, it helps to have a plan before filming the model performing the target behavior. Creating a script or task analysis of the skill helps instruct the model during the recording. A task analysis is helpful for breaking down a complex skill into a sequence of several behaviors (pg. 11).

4. *Obtaining Baseline Data.* In order to document if the individuals performance improves with video modeling, baseline data must be collected. Collecting baseline data helps to

identify skills already displayed. This information can be used to determine what steps to include in the video (pg. 13).

5. Making the Instructional Video. Prior to making the video four decisions need to be made: (a) which aspects of the script or steps in the task analysis are to be filmed? (b) who will serve as the model in the video? (c) from which perspective will the video be filmed? (d) should you include voice-over instructions? Baseline data should be used when deciding which parts to film. Selecting who will act as the model as this can have an impact on the overall effectiveness of the intervention. Issues related to the types of models are addressed in a more comprehensive manner later in the review of literature. Two options as to the perspective of the video have been shown to be effective. Deciding whether to use the participants or spectators perspective should take into account the intended use of the video. Adding verbal instructions to the videos can help reinforce the visual information being presented. Verbal instructions can be used to provide additional information about the task that may not easily be conveyed in a video (pg. 14).

6. *Arranging the Teaching Environment.* When possible the video should be viewed in the setting the target behavior is to occur. A schedule should be established when the video is shown which is as close to the time the behavior would naturally occur. A specific physical location where the video will be viewed should be established. This location should be similar if not identical to the setting where the target behavior occurs. Finally, make sure the materials used in the video are the same materials the individual will be using (pg. 18).

7. *Presenting Video Models*. While some individuals with ASD will easily be able to attend to and watch the video, others may need additional assistance: (a) Make sure the video monitor is near the learner and that he has a clear and unobstructed view. (b) Remove distractions from the surrounding environment. (c) Immediately prior to playing the video, gain

the learner's attention. (d) Praise the learner for remaining oriented to the video screen as the videotape is playing. (e) if the learner looks away, remind him to keep watching. If necessary, gently orient him toward the video. This may require lightly turning his head to face the video monitor. (f) While the videotape is running, use your finger to point out relevant content and verbally describe the relevant behavior (pg. 19).

8. *Monitoring Progress.* Performance data with use of the video modeling can be compared to baseline data to determine what effect video modeling has had on the target behavior. After the intervention has been introduced, data should be collected during each session (pg. 20).

9. *Troubleshooting.* Some individuals will show significant improvements after one session, while others may take longer to show improvement. If progress has not been made after approximately five sessions it may be due to one of several factors that may be impeding: (a) lack of reinforcement, (b) poor video content, or (c) lack of prerequisites. Once the problem has been identified, the video modeling procedure should be modified accordingly (pg. 22).

10. *Fading the Video and Prompting.* It may be necessary to use a fading procedure to reduce reliance on the videos. This is typically done by gradually withdrawing the video model. One procedure is to progressively use less of the video during each session by starting the video at a later point each time. Error correction occurs when only the relevant parts of the video in which the individual is making mistakes are shown. Scene fading involves slowly deleting parts of the video as the skills are mastered.

Types of Video Models

When using video modeling, the type of model can impact the effectiveness of the intervention. Generally, individually-tailored models appear to work best (Buggey, 2007). It has

been reported that video modeling is more effective if the individual is familiar with and able to relate to the model (Buggey, 2007). Researchers have also discovered that models that closely resemble the individual in appearance (e.g., size, hair color, ethnicity), and who have an equal or higher perceived social status tend to be more effective in improving targeted skills (Lantz, 2005).

Studies have compared video modeling (someone else acts as model) to video *self*-modeling (individual acts as the model). In one study, Sherer and colleagues (2001) compared "self" versus "other" video models to teach five children to answer verbal questions. Findings indicated that there was no difference in the rate of task acquisition between the two interventions. In a meta-analysis of video modeling and self modeling, Bellini and Akullian (2007) concluded that there were "no statistically significant differences in the intervention, maintenance, and generalization effects between video modeling and video self-modeling"(p. 270).

Cihak and Schrader (2008) evaluated if the type of video model mattered when teaching adolescents with ASD vocational tasks. These researchers found that both video modeling and self-modeling were effective at teaching vocational skill. two of the four participants in the study acquired skills more efficiently during video self-modeling instruction. One participant performed more effectively with self-modeling, and one of the participants showed no difference in task acquisition between video and video self-modeling. These studies support the findings of Sherer et al. (2001) that demonstrated no functional difference between using one's self as compared to someone else to teach individuals with ASD new or emerging behaviors.

Technology and video modeling. Buggey (2007) concluded that advances in technology have progressed so that equipment needed to produce video modeling videos is now available to

most educators. Video production no longer requires professionals. As technology continues to drop in price it will become even more available to educators and parents. The combination of these factors make the production of high quality video modeling videos a possibility for those who possess an understanding of computers and technology.

In addition, technology now exists that allows students to watch videos on small portable devices. The most common and popular of these devices is the video iPod. Traditionally, iPods have been utilized only as an audio device and recent technological advances have turned the iPods into small handheld computers capable of displaying videos, playing games and storing files. Today most iPods come with the capability of playing video files. Providing students with access to video modeling videos on a handheld device that allows them to watch the video without imposing on others has the potential to significantly increase effectiveness.

Social validity. Social validly seeks to establish how important and socially acceptable the intervention is from the eyes of the consumer (Schwartz & Baer, 1991). This is an important factor to keep in mind when designing and implementing a new intervention. The issue of social validity is of particular concern when designing an intervention that will be used in a vocational setting. In a meta-analysis of video modeling interventions for individuals with ASD, Bellini and Akullian (2007) explained that because of perceived difficulties with filming, editing and implementing video modeling interventions, determining the social validity is especially important.

Van Laarhoven et al. (2009) examined the social validity of using a video iPod to teach job-related skills. To determine the social validity at the conclusion of the study of the intervention the researchers conducted informal interviews with the participant, parent, and employer. Interview questions included if the participant liked using the iPod, if he thought it

helped him at work and if he would use the iPod in the future. These researchers found the participant enjoyed using the iPod and that it assisted him to be independent at work. Both the employer and the parents were satisfied with the positive results that came from using the iPod. The employer noted he would use it with other employees if necessary. These findings supported the social acceptability of using video modeling and an iPod with young adults with ASD

In a study of video modeling using iPods to improve the transition behaviors of students with ASD, Cihak and colleagues (in press) also examined social validity. The *Intervention Rating Profile 15* (IRP-15) consisted of 15 questions completed by the teachers. Results from the IRP-15 showed that all of the teachers agreed that using an iPod to help improve transitional behaviors was acceptable and something they would use in the future. The teachers also indicated they would recommend this approach to other teachers. They also liked the portability of the handheld device. The students responded that they liked the intervention, and in particular they enjoyed watching the videos. Some students also noted that they liked watching the videos because it kept them out of trouble.

Another related study examined the social validity of using a video iPod to teach library-related tasks (Taber-Doughty et al, 2008). The researchers used informal interviews with each participant before baseline, after the intervention and at the end of the study. Responses from the interviews after baseline indicated that the participants thought using the iPod was “cool” and that it was “easy to use.” During the intervention, one participant stated he found it hard to use the iPod at the same time he was supposed to be completing a task. At the completion of the study, the participants reiterated the coolness as well as that they felt the iPod helped them to learn.

These studies have helped to establish the social validity of using an iPod as a means of delivering video-based instruction. One interesting point to note is that in each study, the participants expressed they liked using the iPod to watch the videos. In the study that took place in a vocational setting, the employer indicated they found using an iPod a socially acceptable practice.

Pilot Study

A pilot study was completed by the researcher that evaluated the effectiveness of using video modeling delivered through an iPod to teach a young adult with ASD vocationally-related tasks in a competitive employment setting. The participant in the pilot study was 19 years old and had a diagnosis of ASD. The study took place in a local retail setting where the participant was employed. Three vocational tasks were selected for the study with input from the participant, employer and job coach. Tasks were selected in which the participant was either incorrectly performing (i.e., restocking soda, restocking laundry detergent); and the third task was a new skill: making iced tea in the break room. Results from the study showed dramatic improvements in the percentage of steps correctly completed after the introduction of the iPod video modeling intervention for all three tasks. The social validity indicated that the iPod was an effective and practical way of delivering the video modeling according to the participant, employer, and job coach. The pilot study helped to determine that the iPod was the best portable video player to use to deliver the intervention.

Summary

The available research has suggested that video modeling is an effective and efficient method for teaching children with disabilities including those with ASD, a variety of skills such as social/communication, functional and vocational. Video modeling appeared to be an effective

intervention when used with individuals with ASD, and has been shown to assist in the acquisition of target skills that are maintained over time and transferred across settings (Bellini & Akullian, 2007). The effectiveness of video modeling has been demonstrated across a wide variety of skills. However more research is needed to determine if this intervention combined with the latest technology is effective in teaching job-related skills in vocational settings.

Research related to young adults with ASD has established the need for interventions that increase functional, behavioral, academic, and independent living skills needed to be independent (Bellini & Akullian, 2007). It is important to keep in mind that the approach to the intervention must consider each child's developmental level, his or her profile of learning strengths and weaknesses, family priorities, and the fit of the intervention approach with the culture and lifestyle of a family (Prizant & Rubin, 1999; Lewis, 1998).

Using a small portable video player (iPod) to deliver video modeling interventions allows the young adult to watch the videos without interfering with others. The small portable video player offers the young adult control of the video model by allowing them to watch and rewind the video in the natural setting. Today over of half of teens (54%) now own a portable media player (Ipsos, 2006). With so many now using small portable media players, a young adult watching a video is a socially acceptable practice among their peers and the general public. Finally, given recent policy-related debates regarding the identification and use of effective, yet cost-efficient strategies for children with ASD (Simpson, 2003), video modeling holds promise.

Purpose of the Study

The purpose of this study is to determine whether video modeling delivered through an iPod will increase the number of independent steps completed correctly when applied to learned and unlearned tasks being performed by individuals with ASD in a vocational setting. The study

will also explore the feasibility of delivering the intervention through a portable handheld video player such as an iPod. Finally, the social validity of using an iPod in an employment setting to deliver the intervention will be explored.

Research Questions

1. Will video modeling (independent variable), delivered through a portable video player, increase independent completion of vocationally tasks performed (dependant variable, operationally defined) by young adults with ASD?
2. What is the social validity of using an iPod as a delivery model for video modeling interventions?

CHAPTER THREE

Methods

Participants

Approval was obtained from the University of Kansas Human Subjects Committee-Lawrence (HSCL). Special consideration was made due to the fact the participants have disabilities and are a protected population. Four participants ranging in age from 16-22 were recruited from a school district's vocational job placement program as well as from among community supported employment settings. The young adults participating in the study met the established criteria of: (a) a current diagnosis of autism, Asperger Syndrome (AS), or Pervasive Developmental Disorder-Not Otherwise Specified (PDD-NOS) according to the *Diagnostic and Statistical Manual for Mental Disorders—Fourth Edition—Text Revision* (DSM-IV-TR; American Psychiatric Association, 2000); (b) current levels of cognitive functioning in the average to below-average range on a published standardized measure (e.g., Stanford-Binet Intelligence Scales); and (c) currently employed and working in a vocational setting.

Participants were recruited through school and employment agencies serving this population. The agency staff selected young adults who met the criteria established (age range and identification of the disability). These participants and their parents, if applicable, (i.e. the participant is a minor or an adult requiring a legal guardian) were given an informational flyer (see Appendix A). The agency staff then gave the assent and consent forms to families and young adults without guardians (see Appendix B,C). An assent to participate described the terms of participation was presented to each young adult in order aid the participant's understanding of the study (see Appendix D). Once the school or agency staff had obtained consent from participants (and such participant's legal guardians) the researcher then met with the young adult

to determine if they met the criteria for inclusion in the study and to confirm their interest in participating.

Participants who met the criteria for inclusion were screened by the researcher to determine if they were good candidates for the study. The researcher met informally with the young adult, parent, employer and job coach regarding their responsibilities and regular work duties. The researcher also observed the young adult at work to determine if the young adults were good candidates for the study. This informal observation served as a starting point for determining the vocational tasks that were targeted for improvement or acquisition.

Sam. Sam, was a 20-year-old Caucasian male with a diagnosis of Asperger Syndrome, major depressive disorder and attention deficit hyperactivity disorder. During the study, Sam was in a new job placement at a local bowling alley. Sam's job duties consisted of basic janitorial work. He was responsible for cleaning the bathrooms, vacuuming, changing the garbage and cleaning outside of the bowling alley.

According to the Weschler Adult Intelligence Scale – Third Edition (WAIS III), Sam had a full IQ of 97, which fell in the average range, as well as a verbal IQ of 105 (average) a performance IQ of 81 (low average) while his processing speed was 73 and placed him in the 4th percentile (low). Sam performed academically on a 7th to 12th grade level across a range of core subjects, with his highest scores in vocabulary. His strengths included letter word identification, mathematical number operations and computer skills (such as navigating the internet). Sam's greatest challenges were in the areas of memory, social skills, organization, focusing and sustaining attention. Sam struggled with directions that involved transitioning to a new activity, performing a new task or a task with a perceived high level of difficulty, or engaging in an activity while emotionally upset. Sam also had issues with his anger and his family had been

counseled not to argue with him when he is upset or stuck on a task. Sam saw several mental health professionals during his adolescence for his adjustment issues, depression, and anger management.

Sam's parents indicated that he has a limited attention span, seemed to lack self control, seems impulsive, overacted when confronted with a problem, required a lot of parental attention, and had difficulties calming down. He also had several fears including excessive concerns about his mom dying and worries about being homeless. Sam was comfortable being alone or with children much younger than he was and had problems making friends.

Alex. Alex was a 22-year-old Caucasian male with a primary diagnosis of autism. Alex received special education services until he turned 21 years old, at which point he was no longer eligible for services. During the study, Alex was learning new skills needed to work for a vending machine service. The skills Alex was learning were filling out the order book. Which consisted of a three ring binder with separate pages for each shelf of the machine. Each page had a picture of the item and a place directly below the item where a Velcro number was placed indicating how many of that item was needed to fill the machine. Alex was responsible for counting how many of each item was needed to fill the machine and place the correct number below the item in the book. Alex was also responsible for taking inventory, which consisted of counting out loud how many of each item was in the vending machine. Another co-worker would record how many of each item there was as Alex counted out loud into an inventory book. The final task for Alex was fulfilling orders which consisted of Alex using the order book to put together a box filled with the items needed to refill the vending machine that were identified during the first task.

Alex's WASI (Wechsler Abbreviated scale of intelligence) verbal score was 55 (significantly below average) his performance score was 96 (average range). Due to the significant differences between his verbal and performance scores, no full score was reported. Alex's teachers reported that he read at the 2nd grade level but was frequently unable to answer basic questions pertaining to the passages read.

A lack of emotional understanding gave Alex limited responses to varied situations in his life which had led to aggressive behavior. This aggressive behavior appeared to be the result of social frustrations which occurred when he is unable to interact with a preferred person, usually a girl. He tended to have fewer outbursts when he is in a controlled environment and followed a schedule.

Tommy. Tommy was a 22-year-old Caucasian male with a primary diagnosis of Asperger Syndrome. Tommy received special education services from the school district until age 21. Tommy's parents indicated that he had been in special education for his entire schooling. During the study, Tommy was employed at a local community center where he performed various jobs including janitorial duties. Tommy started working at the community center a couple years earlier in a temporary position that has since turned into a permanent position. Tommy's work responsibilities consisted of cleaning the staff bathroom, changing the garbage in the office and breaking down cardboard boxes for recycling.

Tommy's WISC (Wechsler Intelligence Scale for Children) verbal score was 94 (average range), his performance score was 98 (average range), his freedom from distraction score was 69 placing him in the 2nd percentile (significant deficit), his processing speed of 80 was in the 9th percentile (low average), and his full scale score was 95 (average range).

Tommy's last IEP listed his primary diagnosis of Asperger Syndrome and noted that this had a significant impact on his social skills. It was observed that in the educational environment he was not very enthusiastic about working with peers and often avoided interactions with adults. Tommy also needed prompting in order to finish his work. His teacher also noted that Tommy frequently needed to be encouraged to participate and pay attention to class activities that he did not find interesting.

Tommy's parents and teachers noted that he tried very hard, was eager to please, friendly and polite with adults and animals. It was also noted that Tommy was very rigid in what he wanted to work on and how he wanted to do it. There have been instances where Tommy had become very resistive to working on assignments and jobs he was not interested in. This resistance could be avoided if he was given choices.

Kyle. Kyle was a 22-year-old Caucasian male with diagnoses of Autism, Disruptive Behavior Disorder not other wise specified, and Moderate Mental Retardation. Kyle had been receiving special education services since he was in preschool. During the study, Kyle was participating in a functional curriculum with a supervised paid work experience as part of his day, and has a modified curriculum in his general education classes. The study took place at his supervised paid work experience, which was a museum. Kyle's work responsibilities consisted of basic janitorial duties. He was responsible for cleaning the bathrooms, polishing wood wall panels and cleaning the glass on display cases.

Kyle was diagnosed with Autism at the age of 11. Prior to that time, he had been diagnosed with Landau-Kleffner syndrome. On the Standford Binet Intelligence Scale, 4th edition, Kyle received a composite score of 38 which placed him below the 1st percentile when compared to his peers. Kyle received a total performance score of 55% on the Enderle-Severson

Transition Rating Scale (ESTR III) completed by his job coach and the transition counselor. According to the ratings given to Kyle on the ESTR III, he understood the importance of regular attendance and timeliness. He had great attendance and comes to work clean and appropriately dressed. Kyle respected his work supervisors and responded appropriately to their suggestions and requests. He struggled to motivate himself without staff support, initiate work tasks and understand time restraints as they applied to his work responsibilities.

In the area of communication, Kyle's receptive language skills were much more functional than his expressive skills. He struggled to maintain a conversation, however he was able to participate in brief exchanges and provided requested information.

Identified Target Tasks

The target tasks identified for each young adult were identified through a collaborative process involving the young adult, parents, teachers, job coach and employer. After obtaining consent during the informal discussions that took place as part of the screening process those involved with or knowledgeable about the participants work situation including the participants themselves helped identify vocationally related areas that could be targeted for improvement. In addition these meetings identified new tasks that the young adult needed to learn during the study.

Three tasks were identified for each participant and detailed information about each task was collected. This occurred by observing the young adult engaging in the targeted tasks. Informal observations were used to determine if the targeted tasks were appropriate for the study. The information was then used to determine essential features of the tasks to include in the videos, as well as which steps the young adult was currently able to correctly complete.

Table 1: *Identified Target Tasks for Each Participant*

Participant	Task 1	Task 2	Task 3
Sam	Cleaning the bathroom	Vacuuming	Cleaning outside bowling alley
Alex	Filling out order book	Taking inventory	Fulfilling order
Tommy	Cleaning the bathroom	Changing garbage	Recycling cardboard
Kyle	Cleaning the bathroom	Cleaning the glass on a display case	Polishing wood wall panels

Settings

Participant observations were conducted with the consent of the employer at each young adult's place of employment during regularly scheduled work hours. The location of each observation varied and was dictated by where the targeted task was performed. The videos used in the intervention were filmed in the same locations, utilizing the same materials the participants were expected to use to complete the task.

Sam worked at a local bowling alley two hours a day, three days a week. Sam had been placed at the bowling alley by a local service provider. The goal of Sam's employment was to learn the responsibilities from the current employee who would soon be quitting. The first 80 hours of Sam's employment would be considered on the-job training and he would be paid by the adult agency. The first day of the study was the first day of Sam's job tryout. Sam worked from 9-11am Monday, Wednesday, and Thursday. During this time the bowling alley was open but was virtually empty except for employees. Sam engaged in the selected work-related tasks for cleaning the public restrooms which were located in the front of the alley, cleaning outside

the bowling occurred along the sidewalk in front of the alley and the vacuuming took place in the main part of the alley.

Alex's selected tasks took place in two different locations. The filling out the order book and taking inventory tasks took place in the public lounge area of the local airport. Due to the small size of the airport there was rarely anyone at the airport during any of the sessions. The fulfilling orders task took place in the kitchen at the home of the owner of the vending machine business. The observations took place one a week in the afternoon.

Tommy's employment was located within a local community center. The center included a daycare facility, food pantry, and staff offices. The targeted tasks took place throughout the building including the staff bathroom, food pantry and staff offices. The observations all took place in the afternoon during regular operating hours.

Kyle's work setting was the county historical society's museum. All of the targeted tasks were performed in the public areas of the museum. The bathroom cleaning took place in the men's bathroom on the first floor. The cleaning display case task took place at a large display case on the first floor. The polishing wood panels task took place in a meeting room on the first floor. The observations occurred during the morning when the museum was closed to the public but occasionally open to groups of elementary students.

Research Design

The study was conducted following the framework established by Sigafoos et al. (2007) utilizing a multiple probe across behaviors design with four participants. One powerful aspect of single subject design is its ability to demonstrate that change occurs when, and only when the intervention is directed at the behavior (Barlow, Nock, & Hersen, 2009). A multiple-probe

design was selected to prevent any increase in the independent variable due to reactivity to the assessment and not the intervention (Barlow et al., 2009).

A single subject design allowed the intervention to be implemented on a single behavior, while baseline measures are being collected on the 2 other targeted tasks. When the young adult reached the criterion level on the first targeted behavior, the intervention was then introduced to the second target behavior and then the third. Single subject design is able to evaluate the effectiveness of an intervention used to increase targeted behaviors, which increases the validity of the findings (Kazdin. 1982).

The multiple-probe design was selected for its ability to provide the opportunity for the researcher to demonstrate a functional relationship between the introduction of video modeling and increases in the percentage of steps completed correctly (Horner & Baer, 1978). The steps in the development and delivery of the video modeling intervention included:

1. Determine the targeted tasks. The researcher worked in collaboration with the young adult, teacher, parent and job coach to determine vocational tasks that would be beneficial for the young adult to improve or acquire.
2. Complete a task analysis. Once the targeted tasks were selected, the researcher filmed a co-worker performing the task. The researcher then performed a task analysis using this video. This task analysis was used to determine the number of correct steps the participant completed each time they are observed performing the targeted skill. This video allowed the task to be viewed at a later time by other researchers to establish inter-rater reliability.
3. Establish baseline. After the task analysis was conducted baseline data was collected.
4. Making the instructional videos. The video was divided into steps according to the

task analysis. Each step or group of steps was introduced with a 5 second written description of the step consisting of black text on a white background. A voice-over of the written instructions was added to Alex's and Kyle's videos at the request of their job coaches due to their reading level. The written explanation was followed by the model giving a verbal description of the step as they completed it.

5. Transfer the video files to iPod. The videos were edited on a Mac computer using iMovie and then transferred to the iPod. Before the videos were loaded onto the iPod "museum mode" was enabled which restricted the participants access to extraneous features of the iPod such as games and music.

6. Pre-training. Participants completed a pre-training session where they learned to use the iPod. Instructions on how to access and view the videos was provided. After the pre-training session the researcher asked each participant to access an unrelated video on the iPod to confirm that each participant was able to independently follow the simple on-screen instructions. The pre-training consisted of the researcher modeling how to access the intervention videos and use the video iPod. The videos used in the pre-training were unrelated to the target tasks and did not share any common skills being taught.

8. Presenting the videos. Once a stable baseline of three consecutive data points was established for the first identified task, the intervention was introduced to the first task. Baseline probes were conducted on tasks 2 and 3 after the participant demonstrated acquisition of the first task as determined by three consecutive stable data points above 80%. Once the participant demonstrated acquisition of the targeted skill and after baseline probes were conducted the intervention was introduced to the second task and the same procedure was used for the third task.

9. Delivery of the intervention. The young adult used the iPod to independently view the videos for each task. The researcher video recorded some of the observations in order to establish inter-rater reliability. Participants were not allowed to use the iPods or watch the videos at any time other than the time established for intervention training.

Dependent Measure

The dependent measure was the percentage of independent steps completed correctly. The observational data collection checklist was used to document if each step of the task was completed independently or not on a session-by-session basis.

Instruments. Two measures were used to collect dependent variable data. The first was an observational data checklist. This form documented and charted the percentage of steps in the targeted task(s) that the participant correctly completed (see Appendix E). The checklist included a list of the steps in the task with a column to indicate if the step was completed. The researcher entered a 1 if the step was completed, or a 0 if the step was not completed correctly. The checklist was developed and used by the researcher during the pilot study.

The second measure was an informal interview guide. The interview guide was designed to measure the social validity of the research with the participant, employer and job coach. The interviews were video taped and transcribed. The interview was semi-structured and used an open-ended approach with an interview guide. Using semi-structured interviews allowed the exploration of the social validity of the intervention. This approach aligned the purpose of the study as it did not seek to establish a cause/effect relationship (Merriam, 2002). One version of the interview was given to the participants and another version of the interview was given to the job coach and employer (see Appendix F).

Materials

Videos. Three videos were produced for each participant, one for each of the selected targeted tasks. Each video was designed and produced according to Sigafoos and colleagues (2007) using the equipment described below. Each video was individualized according to each participants needs and their targeted tasks. Participants only had access to and viewed videos for their selected tasks.

The videos were captured using a Cannon digital camcorder and edited using iMovie 7.1.4. Each video was divided up into small clips, one for each of the identified steps in the task analysis which was conducted before baseline observations occured. Each step or series of steps was introduced with a 5-second written description consisting of black text on a white background. Written descriptions of the steps were at a 6th grade reading level according to the Flesch Reading Ease Scale (Flesch, 1974). The written explanation was followed by the model giving a verbal description of the step as they complete it. The videos for Kyle and Alex included a voiceover of the written instructions at the request of their job coaches due to their reading ability.

Video models. Videos were produced using a model the participant could relate to correctly completing the target tasks. The models were deliberately selected to be someone who the participant was familiar with and could relate to in some way. Models similar to the participants were used to increase the effectiveness of the intervention. In each of the videotapes, models depicted the selected targeted behavior in the setting where the task would normally be completed in a way that was as natural as possible, avoiding a slow or exaggerated pace. When appropriate, the models provided verbal explanations of the step as they completed it.

Device. The completed videos were loaded onto a 30gb fifth generation video iPod using iTunes 9.1. The iPods used were 4.1 inches tall and 2.4 inches wide and .5 inches thick and

weighed 4.8 ounces. Each participant was given a set of headphones to use with the iPod. Participants were allowed to select the type of headphones they preferred. Two of the participants used ear buds which go directly into the ears while the other two used headphones that covered the ear. The iPods used by Sam and Kyle were inside a Speck ToughSkin case that could be attached to a belt (Sam) or worn around the neck (Kyle). Alex and Tommy's iPods were protected by a hard clear plastic case with a stand in the back that allowed the iPod to stand on its own.

The iPods were used in "museum mode" which allowed the researcher to prevent the participants from accessing anything other than the intervention videos. Within museum mode, the notes feature on the iPod was used. The notes feature allowed the researcher to create web type pages containing text that linked to the corresponding videos on the iPod. Utilizing these web type pages greatly simplified the process participants went though to access the videos on the iPod. When the participant turned on the iPod they saw a screen with a list of the available target tasks. This list was updated as the second and third intervention videos were added. This page was fully customizable and allowed the researcher to include instructions on how to access the videos along with the title of each video clip. An example of instructions with the title would be "push the center button to watch how to clean the bathroom." Clicking the center button started the corresponding video.

A pair of headphones and the iPod loaded with the intervention videos was given to the participant immediately prior to each intervention session. During all baseline, intervention, and maintenance sessions, participants were provided with the materials necessary to complete the identified target task. The materials used by the models in the videos were the same as the materials the young adults were expected to use to complete the task. Due to the individualized

nature of the targeted tasks, the materials needed to complete each of the targeted tasked varied for each participant (see appendix G).

Procedural Reliability

Fidelity of the intervention was assessed using a treatment fidelity checklist developed by Lacava (2008) (see Appendix H). To ensure the fidelity of the intervention baseline, intervention and probe sessions were conducted in person by the researcher. The researcher used the checklist to maintain procedural fidelity. The checklist documents that established video modeling procedures were followed throughout the study.

Data Analysis

Data was analyzed through a visual inspection. A visual inspection was used to reach a judgment about the reliability or consistency of the interventions effects by visually examining the graphed data according to changes in the percentage of steps completed correctly (Kazdin, 1982). Criterion for task acquisition was demonstrated it participants completed above 80% of the steps correctly for 3 consecutive data points. Charts documenting task performance were created for each participant using Microsoft Excel. The percentage of steps completed correctly during baseline phase was compared to data points from intervention and maintenance phases.

Inter-observer agreement. Inter-observer agreement was collected on 30% of the baseline and intervention observations for each participant (Barlow, et al., 2009). The point-by-point agreement ratio (the number of agreements divided by number of agreements plus disagreements and multiplied by 100) was used to calculate inter-observer agreement (Kazdin, 1982). The inter-observer agreement was calculated by having a second observer with a background in special education analyze and score the videos using the data collection sheet.

Inter-observer checks occurred during 30% of the baseline condition, 25% of the intervention condition, and 20% of the probe observations.

Observations were considered reliable if at least 80% inter-observer agreement was achieved for each observation. Inter-observer agreement was consistently above 90% for all participants. Agreement ranged from 93% to 100% for Sam (M = 96%), 97% to 100% for Alex (M = 99%), 91% to 100% for Tommy (M = 96%), and 94% to 100% for Kyle(M = 99%).

Social validity. The interviews were transcribed and then reviewed by the participants to make sure they were accurate. Data was coded and analyzed following procedures set forth by Coffey and Atkinson (1996). These procedures consisted of simplifying the data, establishing a coding framework, coding the data and identifying common themes.

The data was first coded to break-up and simplify the data. The researcher began the coding process by reading through each of the transcripts to familiarize himself with the data. Using the interview questions as well as the initial review of the transcript a general framework was established to code and further categorize the data. Words and phrases that were common to multiple interviews were used to identify themes that were mentioned by more than one of the participants, employers or job coaches. An example of this is that the phrase “coolness” came up in two of the interviews. From this common phrase the researcher established a common theme.

Once the general coding framework was established, the researcher hand coded each transcript. The researcher used the method from Coffey (1996) that incorporated brackets in the margins of the transcript to break the data up into smaller segments of text. The brackets in the margins identifying common themes made it possible to identify broad themes in addition to the smaller categories that are components of the larger themes. As the data was coded, several general themes emerged which were then further broken down. The smaller categories that

made up each of the general themes were reviewed and categories that were common to multiple participants were identified.

CHAPTER FOUR

Results

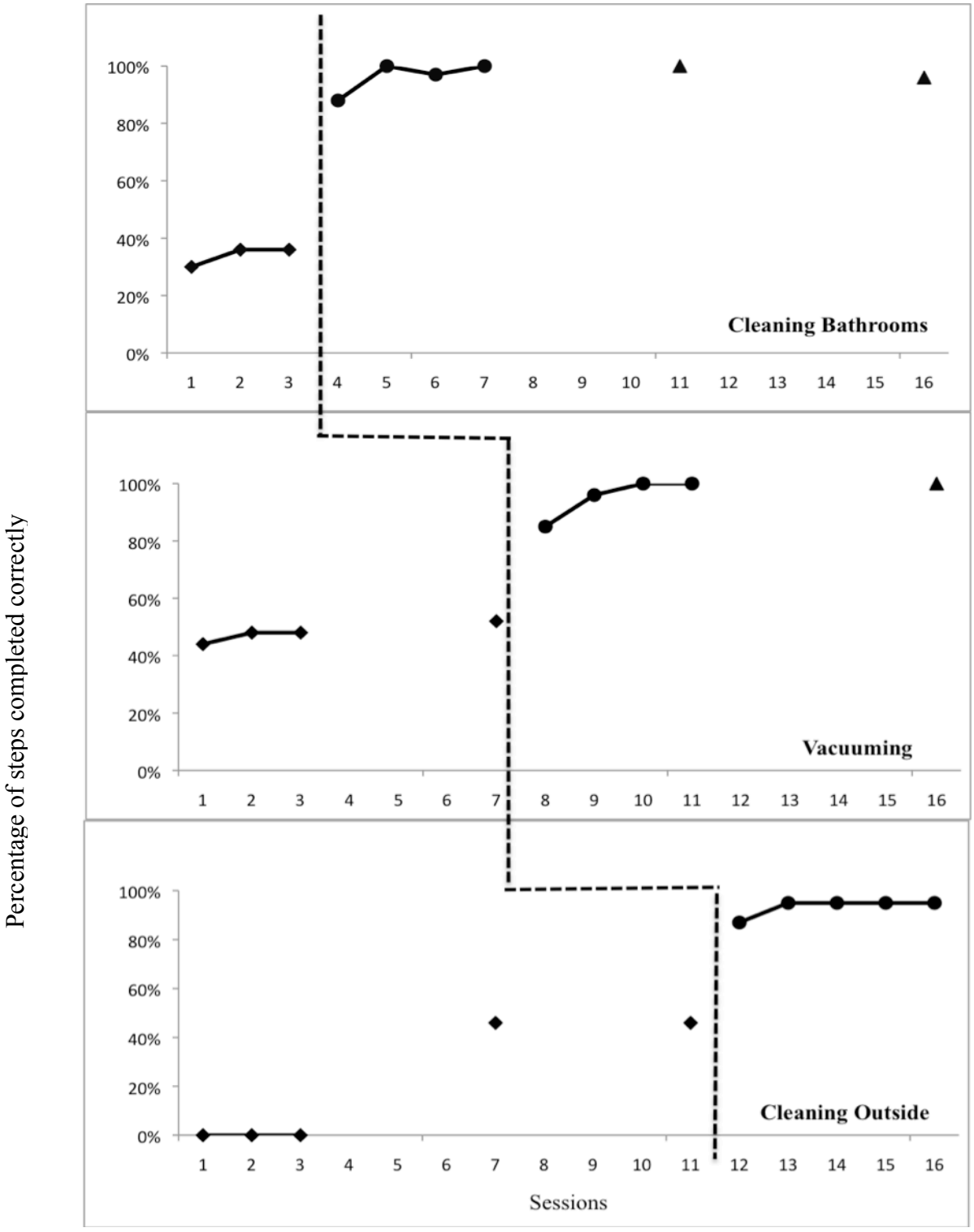
This chapter presents the data relative to the research questions. For the first research question, percentage of steps independently completed, a visual analysis of observational data is presented including comparing the means for each phase. Qualitative descriptive data results are presented for the question focused on social validity of the intervention. A summary of the findings is included at the end.

The first research question *Will video modeling (independent variable), delivered through a portable video player, increase independent completion of new vocationally-related tasks or tasks currently being performed (dependant variable, operationally defined) by young adults with ASD?* Results were examined through visual analysis of data recorded using the observational data collection sheet. Results for each participant will be presented individually.

Sam

The selected target vocational tasks for Sam were cleaning the bathroom, vacuuming and cleaning outside. Cleaning the bathroom and vacuuming tasks had been performed by Sam in other settings and were therefore not new to him. However he was not performing these tasks independently. Cleaning outside was a new task. During baseline data collection, Sam was able to correctly complete approximately 40% of the bathroom cleaning steps (See Figure 1). During the iPod intervention, Sam viewed his co-worker cleaning the bathrooms correctly. When the iPod intervention was introduced the percentage of steps Sam completed correctly increased from 36% to 100% over 4 sessions. Maintenance probes conducted using the iPod were 100% and 96%. This data shows a significant increase in the number of steps Sam completed correctly using the iPod that were continued during maintenance probes.

Figure 1. Percentage of steps correctly completed by Sam



◆ – Baseline, ● – Intervention, ▲ – Maintenance

After Sam met skill acquisition criteria for cleaning the bathroom (4 sessions) a baseline probe for vacuuming showed Sam completing 52% of the steps correctly. This probe was consistent with his baseline average of completing 45% of the steps in the vacuuming task correctly. After Sam viewed the second video modeling task, or the vacuum task, on the iPod prior to vacuuming, the percentage of steps completed correctly immediately increased from 52% to 85% and eventually reached 100%. Maintenance probes for the vacuuming task conducted using the iPod indicated Sam was able to complete 100% of the steps correctly.

Baseline data collected for cleaning outside, a new task for Sam, indicated that he was not able to correctly complete any of the steps across data collection 3 sessions. During subsequent baseline probes conducted after task acquisition of the other target skills the number of steps completed correctly for cleaning outside went from 0% to 46%. A possible reason for this accelerating baseline was that a new job coach started after his initial baseline was established but prior to the baseline probes. After the introduction of the intervention, the percentage of correctly completed steps went from 46% to 87% over one session and stabilized at 95%. The data from the third and final task supports the data accrued from the earlier tasks: there was immediate improvement that continued over time in the number of steps Sam was able to correctly complete when he completed the task after viewing the video on the iPod.

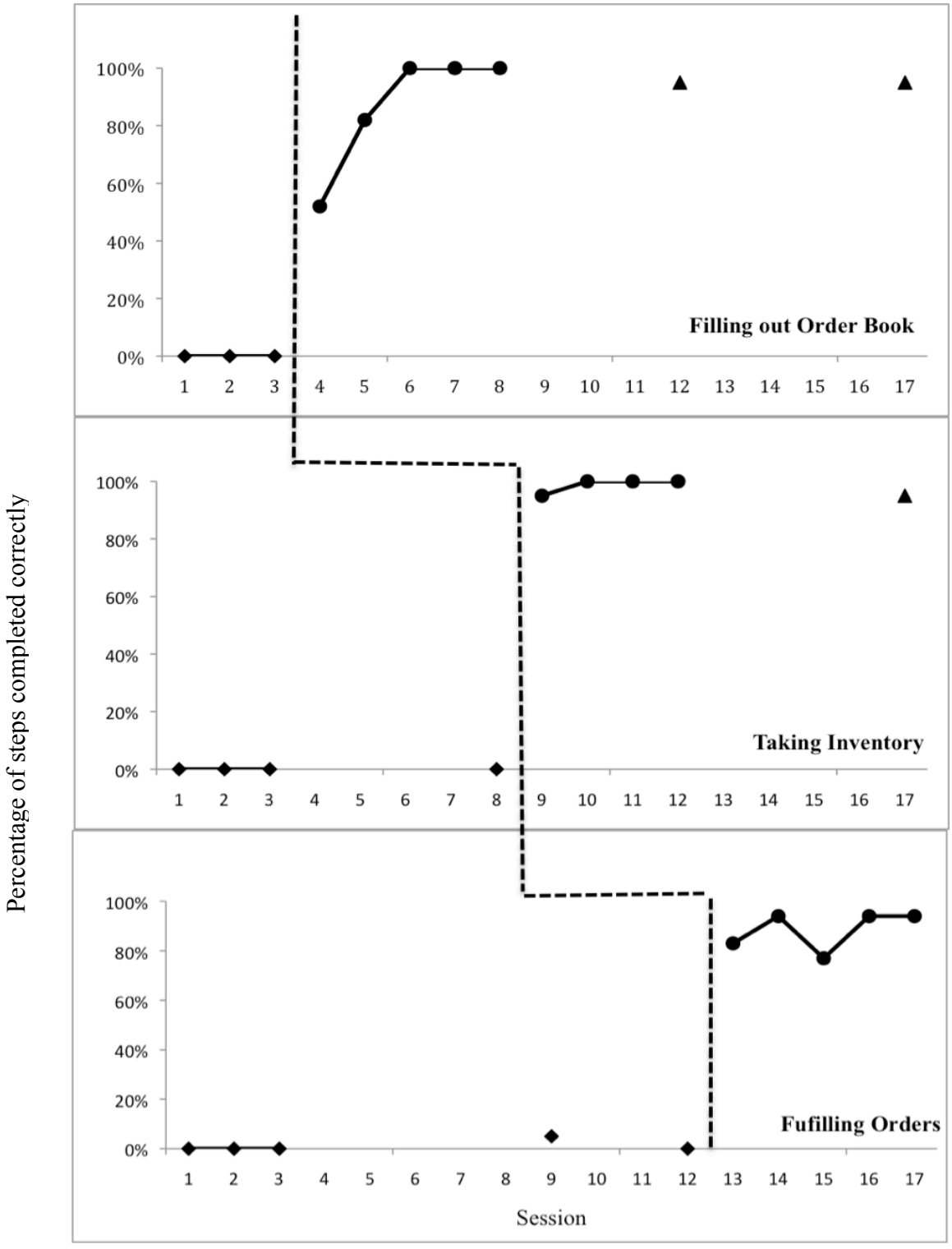
When the means for each phase were examined, Sam showed significant improvement between baseline and intervention phases. For the cleaning bathroom task, the baseline mean was 34% as compared to 96% during the intervention phase. The baseline mean for vacuuming was 45% as compared to 95% during the intervention phase; and cleaning outside was 18% and increased to 93% during the intervention phase.

Alex

The selected target tasks for Alex were filling out the order book, taking inventory and fulfilling orders. Filling out the order book consisted of a three ring binder with separate pages for each shelf of the machine. Each page had a picture of the item and a place directly below the item where a Velcro number was placed indicating how many of that item was needed to fill the machine. Alex was responsible for counting how many of each item was needed to fill the machine and place the correct number below the item in the book. Fulfilling orders required Alex to use the order book to put together a box filled with the items needed to refill the vending machine that were identified during the filling out the order book task. All three of the target tasks were new to Alex is reflected in the baseline data reported in Figure 2. For the task of filling out the order book, Alex was not able to successfully complete any of the steps during any of the three baseline observations. When the intervention was introduced, the percentage of steps correctly completed increased from 0% to 52%. In the subsequent intervention sessions, Alex's skills completion increased 82% and eventually reached 100%. Maintenance probes for filling out the order book conducted using the iPod indicated Sam was able to complete 95% of the steps correctly, which was a 5% decrease.

For the taking inventory task, Alex was not able to complete any of the steps necessary to complete the second target task resulting in a baseline of 0% over four observations. After the iPod intervention was introduced, Alex showed a significant increase in skill step completion moving from 0% to 95% over one session achieving 100% during the intervention phase. During maintenance probe conducted after acquisition of the final task, Alex completed 95% of steps correctly.

Figure 2. Percentage of steps correctly completed by Alex



◆ – Baseline, ● – Intervention, ▲ – Maintenance

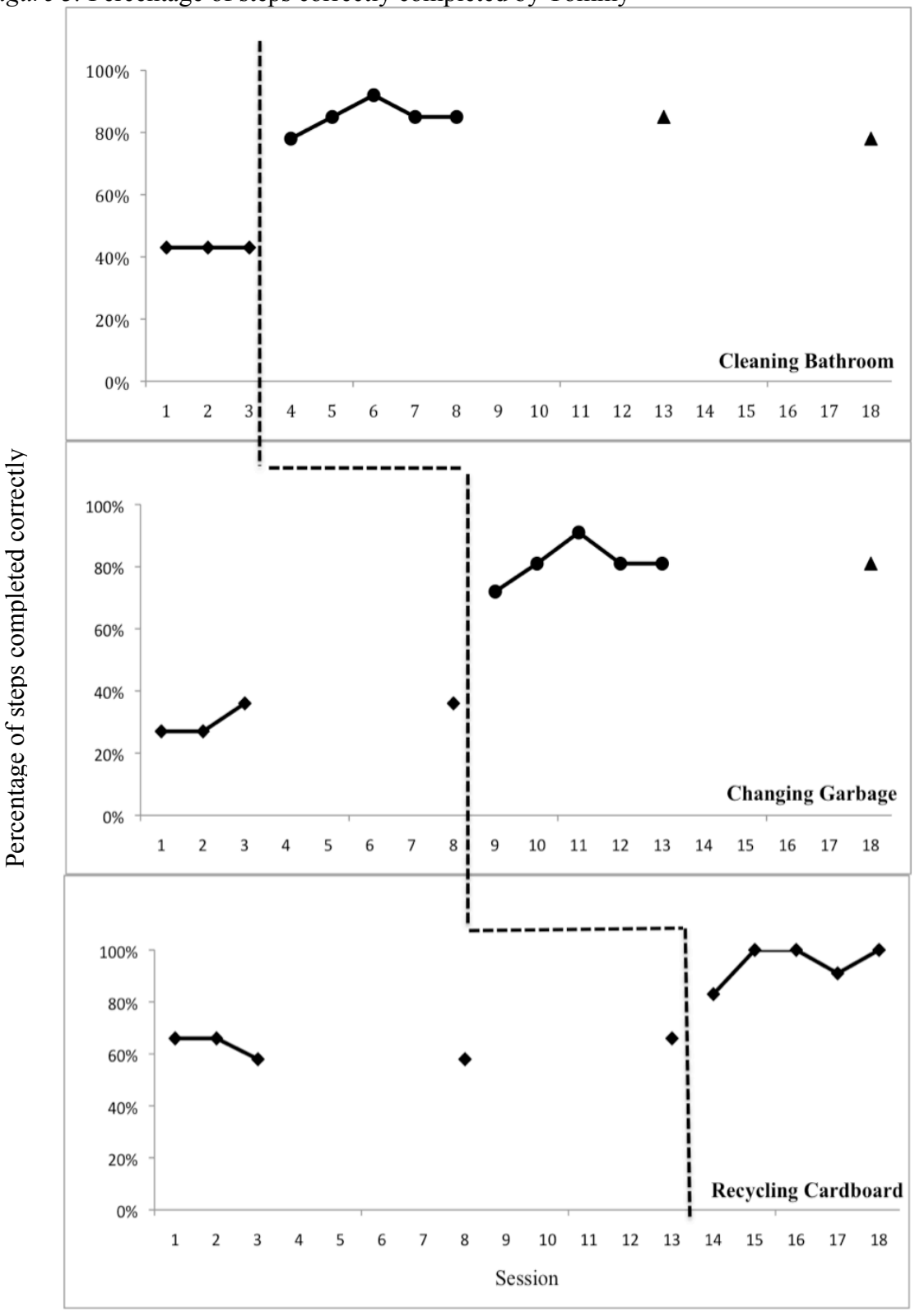
For the fulfilling orders task, Alex had a baseline of 0% over three sessions. This increased to 5% during the first probe observations and then returned to 0% during the second probe observation. After the intervention was introduced, Alex showed a substantial increase going from 0% to 83% during the first session with the iPod. While using the iPod, Alex continued to improve at fulfilling orders eventually reaching 100%.

For the filling out the book task, the baseline mean was 0% as compared to 87% during the intervention phase, the baseline mean for taking inventory was 0% compared to 98% during the intervention phase, and fulfilling orders was 0% as compared to 88% during the intervention phase.

Tommy

The selected target tasks for Tommy were cleaning the bathroom, changing the garbage and recycling cardboard. Prior to the start of the study, Tommy had been performing all three tasks but was not performing the selected target tasks to meet his employers expectations. When Tommy used the iPod there was a marked change in performance from baseline to intervention; with a substantial increase in number of steps completed correctly (see Figure 3). For the cleaning bathroom task, Tommy was able to correctly complete 43% of the steps during the baseline, and increased skill completion to 78% during the first session with the iPod. These increases were consistent in his performance on the other two selected target tasks. For the changing the garbage task, Tommy's score was 36% in the last baseline probe. It increased to 72% during the first session with the iPod. The recycling cardboard task went from 66% to 83% during the first session with the iPod.

Figure 3. Percentage of steps correctly completed by Tommy



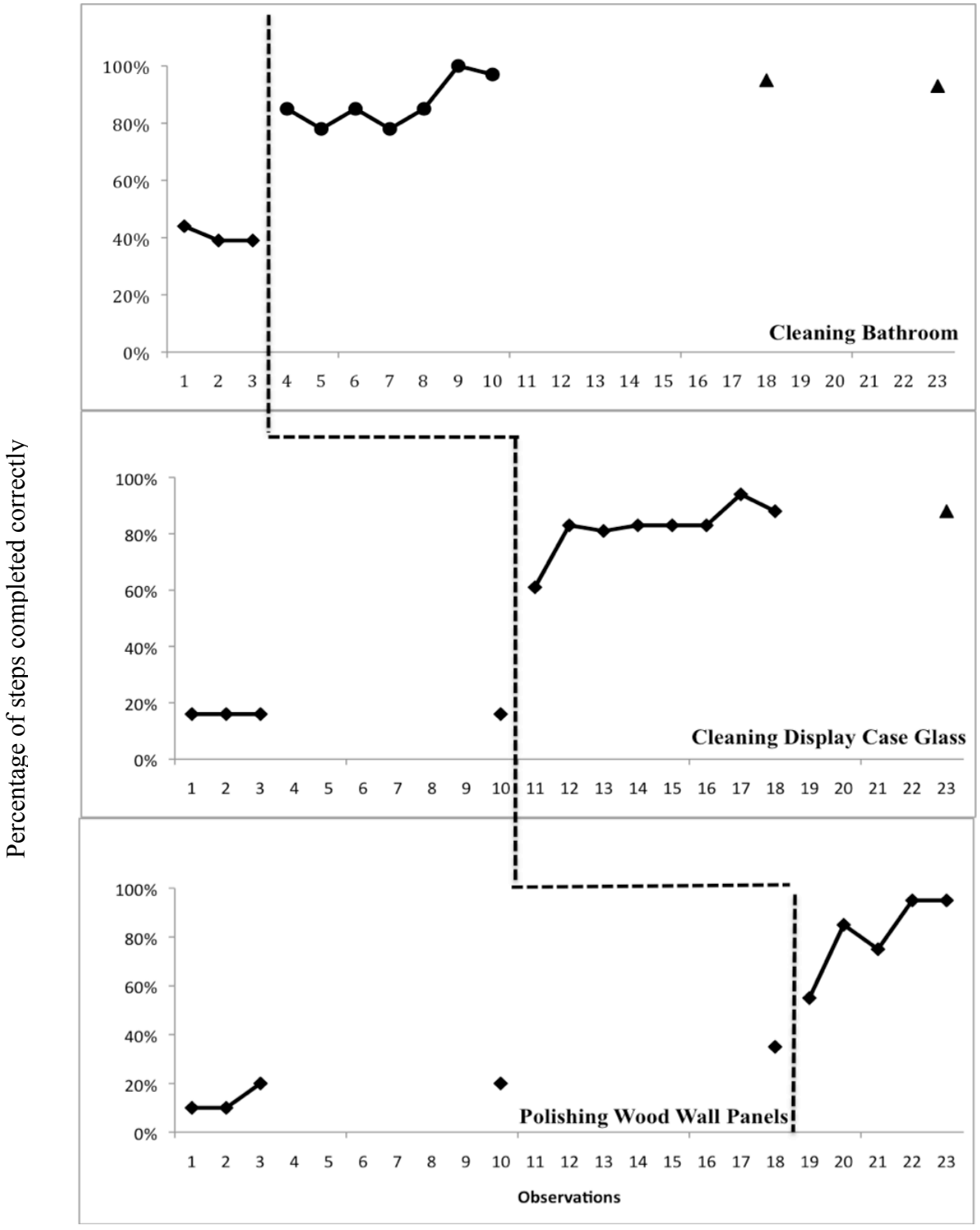
When the means of each phase were compared, there was a noticeable difference in the percentage steps completed correctly for each task across baseline and instructional phases. For the cleaning bathroom task, the baseline mean was 43% as compared to 85% during the intervention phase, the baseline mean for changing the garbage was 30% compared to 81% during the intervention phase, and recycling cardboard was 63% as compared to 95% during the intervention phase.

Kyle

The selected target tasks for Kyle were cleaning the bathroom, cleaning the display case glass, and cleaning a wood wall panel. Prior to the start of the study, Kyle had been performing all three of the selected target tasks; however he was not performing the selected target to proficiency as reflected in his baseline scores (see Figure 4). After implementing the iPod intervention, Kyle's performance substantially increased in number of steps completed correctly. Baseline data for cleaning the bathroom showed Kyle was able to complete 40% of the steps correctly. During the first session in which iPod was introduced, his performance increased to 85%. For the cleaning the display case glass task, Kyle had a score of 16% in the last baseline probe and a score of 61% on the first session with the iPod. The task of cleaning the wood wall panel went from 35% to 55%.

When the means of each phase were compared, there was a noticeable difference in the percentage of steps completed correctly for each task across baseline and intervention phases. For the cleaning the bathroom task, the baseline mean was 40% as compared to 86% during intervention phase, the baseline mean for the cleaning the display case task was 16% compared to 82% during the intervention phase, and cleaning the wood wall panel task was 19% as compared to 81% during the intervention phase.

Figure 4. Percentage of steps correctly completed by Kyle



◆ – Baseline, ● – Intervention, ▲ – Maintenance

Social Validity

The second research question was, *What is the social validity of using an iPod as a delivery model for video modeling interventions?* Results were analyzed using qualitative data analysis methods. Results are presented from participants, employers and job coaches pertaining to the social validity of the intervention

After coding and analyzing the transcripts from the semi-structured informal interviews, several common themes emerged. Common themes included: (a) the videos were helpful, (b) the participants liked using the iPods, and that (c) it was socially acceptable to use the iPod at work. Findings from all of the participants, employers and job coaches will be presented together according to the themes that emerged.

One of the major overarching themes was that the participants, job coaches and employers, all thought using the iPod was helpful. Sam stated, "Using the iPod helped me significantly improve at my job." The participants were asked why they thought using the iPods was helpful. Alex stated that he liked using the iPod because the iPod showed him how to do his job. Tommy thought using the iPod helped because it showed him exactly how his boss wanted him to do the job step-by-step. When Kyle was asked what difference using the iPod had on his job he stated, "I did a better job after I watched the iPod." So while the reasons varied among participants they indicate the iPod helped them improve their skills.

While all of the job coaches and employers thought using the iPods had a positive impact on participant performances at work, they each had different thought as to why it helped. Sam's job coach thought that watching videos made Sam think about if he was doing each step or the task as it was shown in the video. He also said that the videos helped Sam remember how to do each task and kept him focused. Alex's job coach said that he thought that using the iPod

helped him understand the function of what he was doing and how to get it done. Tommy's employer indicated that using the iPod led to consistence: Tommy was not forgetting things, such as restocking the paper towels in the bathroom, as he did prior to using the iPod. All of the employers noticed an improvement in the target tasks when the iPod was used.

There was an overwhelming consensus among those interviewed that all of the participants enjoyed watching the videos on the iPods. Sam, Tommy and Kyle's job coach all said they thought using the iPods was cool. Kyle' job coach and Sam's employer said Sam and Kyle liked using the iPod because they talked about using the iPod all the time. Alex's job coach gave several reasons as to why Alex liked using the iPod. The first was that Alex laughed frequently while watching the videos and the second reason was Alex's willingness to participate in the study and use the iPod demonstrated that he liked it. The job coach stated that if Alex doesn't like to do something he will let you know.

When examining the social validity of using the iPod the general consensus among the participants, employers, and job coaches was that it was socially acceptable and appropriate to use an iPod at work for each participant and their respective employment site used in this study. Some of the participants were cautious if they thought it was OK to use an iPod at work. Sam remarked, "You will have to ask the boss but I think after he sees my job improvement he will be ok with it."

The job coaches agreed that in most cases it was generally socially acceptable to use an iPod if it was being used to help an individual do his or her job. Sam's job coach said that it was not a problem to use the iPod at the bowling alley but that generally it depended on the type of business as to whether an iPod would be acceptable. Alex's job coach said that using an iPod was "absolutely" socially acceptable and that "if Alex had a job in the future that wanted him to

learn a new task that was complex with multiple steps, I am sure they would let him use an iPod." Kyle's job coach said that it was fine to use an iPod in his current job placement. She also said that at some jobs it would not be acceptable because employees are not allowed to have music, but that if properly explained most employers would allow the use of an iPod for job training only.

Most of the employers, with the exception of Alex's employer, all thought using an iPod at work was socially acceptable. Sam's employer stated he didn't believe that watching the videos took away from time Sam was supposed to be working. He also stated that he believed that the iPod was acceptable because many employers make their employees watch instructional videos for job training, and the iPod was essentially an instructional video for Alex to help him with on the job training. Tommy's boss said the he thought it was fine if he used the iPod and that he had not heard any of the other employees complaining about it. He also said that he understands that there may be some people who are bothered by it but that was in that particular work environment. He did say that most of his employees would not be allowed to use personal electronic devices but since this was such a clearly defined reason, he had no problem with the iPod use because he saw it as a tool to help Tommy with his job. The responses from the participants, job coaches, and employers indicate that it is socially acceptable to use an iPod at work taking into account several factors. As with most accommodations, the feasibility and social acceptability will depend on each individual situation.

Summary

According to the multiple probe design, increases in the percentage of steps correctly completed for the four participants following the introduction of the iPod intervention were demonstrated. In addition, the initial effects of the data demonstrate that all four participants

maintained an elevated performance of target skills at maintenance. All four participants met established levels of task acquisition (80%). Overall, each of the participants and a majority of employers and job coaches had positive comments about the intervention.

CHAPTER FIVE

Discussion

The purpose of this study was to explore if video modeling, when presented on a video iPod, would increase independent task completion in individuals with ASD in employment settings. The study was also designed to determine the social validity of using the video iPod. This chapter discusses summarizing the current findings, discuses limitations of the current study, discuses implications for practitioners, and discussing future research possibilities.

Summary of Findings

The findings from this study support the use of video modeling delivered through an iPod with increased independence among young adults with ASD on vocationally-related tasks performed in employment settings. Analysis of the observational data indicated a functional relationship replicated across tasks and participants in task performance between baseline and intervention which was sustained in maintenance probes. These finding are consistent with previous studies and add to the growing body of literature related to both the effectiveness of video modeling in individuals with ASD and using a handheld video player (iPod) in employment settings (Van Laarhoven et al., 2009, Cihak, et al., 2008, Cihak, et al., in press).

The data shows that using the iPod to deliver a video modeling intervention in a vocational setting was associated with an increase in the percentage of steps completed correctly for each of the three selected target tasks in all four of the young adults who participated. In addition, each participant met criterion with each of his three tasks once the iPod was introduced, suggesting that this was a powerful instructional tool.

Observational data were collected for all four young adults during baseline, intervention and maintenance sessions documenting the percentage of steps they were able to correctly

complete for each of the selected target tasks. In a multiple-baseline design, the researcher must demonstrate experimental control before a claim of causality can be made. In other words, there must be reliable evidence that the independent variable (video modeling) was responsible for the change in the dependent variable(s) (percentage of steps completed correctly) and that a functional relationship existed between video modeling delivered through an iPod and the percentage of steps completed corrected for each selected target task.

In this study, experimental control was observed when there was change in the dependent variable from baseline to intervention in one task while a stable baseline was maintained for the other tasks. The strongest conclusions about the variables may be made when the behavior change is immediate and high after the intervention has been implemented. Due to the individualized nature of the intervention, specific findings from each participant's observational data will be discussed individually.

Sam. Upon visual inspection of Sam's data, it was apparent that the introduction of the iPod led to immediate gains across all three of the target tasks. Sam's participation in the study produced a few issues requiring further examination: the difficulty of selecting the target tasks; the accelerating baseline for the second task (cleaning outside); and the level of familiarity with technology prior to the study.

While Sam, his employer and his job coach were all very supportive of his participation in the study, there was some debate as to what the selected target tasks should be. Initially, one of the target tasks selected was changing the garbage inside the bowling alley. This task consisted of Sam changing the garbage in a systematic way and then sanitizing the garbage cans. After his coworker was filmed performing the task and a task analysis was performed, baseline data was collected. The first baseline observation showed that Sam was able to complete over

90% of the steps in the task correctly. Upon sharing the baseline results with the job coach, it was decided that a new task should be selected that left more room for improvement. It was at that point that cleaning outside was selected as the third and final task. This finding is of interest because it demonstrates that selecting the proper target task is a dynamic process and could potentially impact the effectiveness of the intervention if particular attention is not paid to task selection

A visual inspection of Sam's observational data showed an accelerated baseline for the third task (cleaning outside). During the first three baseline sessions, Sam was not able to complete any of the steps correctly, however completion of steps increased to 40% during baseline probes. One possible reason for this accelerating baseline was that halfway through the study, the local agency where Sam's job coach was employed closed their employment department. Sam's services were subsequently transferred to another agency and he was given a new job coach. This new job coach was not initially aware of the study and may have provided some direct instruction on the cleaning the outside task, which could have led to the accelerating baseline.

Observational data collected during maintenance probes indicated the skills acquired during the intervention phase were maintained over time. Sam's data suggested that using the iPod was effective at helping him acquire new tasks and improving his performance on tasks he was currently performing but not to his employer's criteria.

Alex. A visual inspection of Alex's data showed that the introduction of the iPod was associated with significant gains across all of the target tasks. It should be noted that all three of the selected target tasks for Alex were new and the baseline observations were his first exposure to the tasks. The target tasks took place in two different locations. The vending machine was

located at the local airport which is where the filling out the order book; taking inventory took place was also a new setting for Alex. The house where fulfilling orders took place was familiar to Alex as it was where one of his friends lived. He had been to the house on multiple occasions but he had never seen any of the materials needed to fulfill orders or had taken part in fulfilling any orders prior to the study.

Alex's participation in the study was similar to what he would face starting a new job in a new setting. While findings from Alex's data may not generalize to all young adults with ASD, they may offer insight into how young adults with ASD can be taught new tasks in new employment settings.

While Alex made significant improvement on all three of the target tasks immediately after the iPod was introduced, the most improved task was the "taking inventory" task. After only using the iPod once, Alex went from not being able to complete any of the steps correctly to completing 95% of the steps. This dramatic jump in performance is interesting because the taking inventory task shared several skills and steps with the filling out the order book task. Steps common to both tasks were opening and closing the vending machine. Even though Alex was able to correctly learn the steps for filling out the order book, he was unable to apply these same common steps to correctly take inventory.

For two of the target tasks, Alex did not make any substantial improvement after the initial jump after the iPod was introduced. This suggests that some individuals may not make any improvements after their initial gains. For the other task, Alex reached 100% after only three sessions with the intervention. This adds support that using the iPod not only is effective at teaching new tasks, but that for certain individuals with ASD it does this within a relatively short period of time.

Maintenance probes indicated the skills Alex acquired during the intervention phase were maintained over time. These results demonstrate that new vocational tasks taught using the iPod were maintained over time when the participant was allowed to continue to use the iPod. Using iPods to help young adults with ASD start a new employment opportunity appears to be beneficial in helping acquire and maintain new skills.

Tommy. A visual inspection of Tommy's data showed that the introduction of the iPod was associated with immediate gains across all of the target tasks. During informal conversations with Tommy's employer about potential vocational tasks, the employer indicated that Tommy was currently able to do most of his assigned jobs, but that he was not completing them to the degree the employer required. For example, Tommy was changing the garbage but would change the cans regardless of how full it was. This meant that he would put a new garbage bag in if there was a single piece of paper in the garbage can, rather than waiting until the garbage was at least ½ full. So, for Tommy, his goals related to improving the quality of completing the task rather than learning new skills.

Tommy did not experience as large of an initial increase with the introduction of the iPod as the other participants. His largest initial increase was 35% for cleaning the bathroom going from 43% in the last baseline observation to 78% in the first intervention observation. His smallest increase was 17% for cardboard recycling. Possible reasons for the smaller gains experienced by Tommy were that issues related to quality and judgment are harder to learn. The gains made by Tommy were, however, substantial and significant according to both Tommy and his employer.

While Tommy did not experience as large of increase as the other participants, these gains were maintained over time. During maintenance probes, the data showed the

improvements experienced during the intervention phase were maintained over time. These results suggest gains made to currently performed tasks are long-term. This opens the possibility that periodically using iPods to maintain a high level of quality in task performance.

Kyle. A visual inspection of Kyle's observational data showed a significant increase immediately after the introduction of the iPod. These gains were consistent across all of the selected target tasks. Kyle experienced a significant increase immediately after the iPod was introduced to the bathroom cleaning task, with an initial jump from 41% to 85%, and stabilizing to an average of 86%. However, it did take several sessions of using the iPod before he reached over 80%, which was the criteria for acquisition of the target task. Data from the second target task, cleaning the display case, showed the number of steps he was able to complete went from 16% to 61% after one session with the iPod, and a second increase to 83% after the second session. Data from third targeted task which involved cleaning wood wall panels went from 35% to 55% immediately after introduction of the iPod. The second data point immediately after the introduction of the iPod was 85% which is close to the 81% which was the average during the intervention.

The fact that Kyle was able to reach the 80% criterion on all of the target tasks in under three sessions after the introduction of the iPod helps to establish that this intervention is not only effective at teaching vocational tasks to young adults with ASD but that with some individuals in some vocational settings the task acquisition can occur in a short period of time.

Kyle's observational data indicated the experienced gains in task performance were maintained over time with continued use of the iPod. It should be noted that a month after the completion of the study, the researcher was informed by Kyle's job coach that Kyle's iPod had been lost. The job coach wanted to get the videos used in the study loaded onto a new iPod as

Kyle's task performance had reverted back to where they were prior to the study. Because this occurred after the study there is no data to analyze. The unfortunate event of losing the iPod illustrates that when the iPod is withdrawn there is the possibility of task performance reverting to baseline levels.

Another interesting point to note was that a few weeks prior to the start of the study, Kyle's performance at work had been revaluated by his job coach and special education teacher and it was decided that in order to be successful, Kyle needed more direct supervision at work and a para-professional was assigned to stay with and supervise Kyle his entire shift. While the study was taking place, the para-professional was instructed not to provide any of the prompting that had been used in the past related to the three target tasks. After the completion of the study, Kyle's job coach indicated that Kyle's performance at work had increased so dramatically that a plan was being put into place where Kyle would continue working during the summer without the supervision of a para-professional. The job coach indicated the reason the para-professional was no longer needed was that using the iPod had decreased the amount of direct supervision Kyle needed by increasing the amount of work he is able to independently complete.

Social Validity of the Intervention

Several interesting observations were made from the data collected related to the social validity of the intervention that were consistent with previous studies (Taber-Doughty et al., 2008; Van Laarhoven et al.; 2009, Cihak et al., in press). The first is that the participants', employers and job coaches agreed that using the iPod had a positive impact on the individuals' job performance. The second is that all of the participants liked using the iPod to watch the videos. The third finding was that three of the four employers agreed that using the iPod at work

was socially acceptable and they would allow their other employees to use an iPod in the future if it was used to help with job performance.

One of the greatest strengths of the intervention according to Kyle's job coach was that using the iPod was age appropriate. She noted that when Kyle started the job, the employer wanted to use an activity schedule commonly used by much younger students with Velcro strips to represent each task. The job coach thought it was not appropriate for Kyle to use this type of activity schedule. The fact that Kyle was able to make significant gains in job performance may be in part that the iPod was more age appropriate alternative.

Tommy, Sam, and Kyle's job coaches each talked about how they thought using the iPod at work was "cool" which was consistent with the findings of Taber-Doughty and colleagues (2008). This coolness factor was brought up by multiple stakeholders. While no data was collected as to if this coolness factor had any impact on the overall effectiveness of the intervention, it is possible that the participants were more willing to watch the videos on an iPod as opposed to delivering the same videos on a similar portable media device. The effect this "coolness" factor has on the current study and similar studies should not be underestimated.

All of the social validity data was positive. This data included informal observations made throughout the study and the interviews conducted with the participants and stakeholders at the conclusion of the study. The data strongly supported the conclusion that participants, job coaches and employers all had positive overall opinions regarding the use of the iPods. All of the participants, and a majority of the stakeholders, indicated they thought using the iPod had a positive impact on their work performance. While generalizing social validity data should be done with caution, several possible theories have emerged regarding the acceptability of the intervention (Taber-Doughty et al., 2008; Van Laarhoven et al.; 2009). It very well could be that

individuals with ASD may be open and receptive to interventions using iPods and employers are not opposed to allowing the use of iPods to improve job performance.

Other Findings

One interesting observation of the four young adults was the way each interacted with the iPod. Prior to the introduction of the intervention, each participant went through pre-training on how to properly operate the iPod and access the correct videos. While each participant used same model of iPod, some latitude was given as to the accessories they used in conjunction with each iPod, such as a preferred case and headphones.

When the iPod was initially introduced, each of the four participants was instructed to sit down and watch the correct video on the iPod immediately prior to completing the task. After viewing the video, they took the iPod with them and started the task. During the pre-training sessions, in addition to learning how to use the iPod, the participants were instructed that they could refer back to the iPod while they were completing the task if they needed to.

For his first targeted task using the iPod, Sam would watch the video in its entirety immediately prior to cleaning the bathroom. Initially, Sam would try to watch the iPod while he was cleaning the bathroom pausing the iPod after each step essentially turning the iPod into a video prompting device. Pausing the video appeared to work as long as Sam did this after each step and then immediately completed that step. If Sam watched a step and then completed that step and the following five steps, when he referred back to the iPod it was now five steps behind and he had to wait for the video to catch up. Sometimes Sam would go so far ahead he would have to wait 2-3 minutes for the video to catch up to where he was.

Both Sam and his job coach indicated during their interviews that they thought the intervention worked best when the iPod was used prior to completing the task and not during.

Sam's job coach thought it was best if Sam watched the iPod before he started the task and then only refer to it during the task if he needed to. Sam supported this during his interview when he stated: "It was easier for me to watch the videos before hand and memorize how to do the job. If I watched them while I was doing the job it took longer as I had to stop and watch the videos and fast forward them." This differed from findings by Taber-Doughty and colleagues (2008) in which the majority of the participants indicated they preferred to watch the videos while performing the task.

One possible reason Sam did not like to refer to the movies while completing the task may be due to the length of the movie. The first video showing how to clean the bathroom and was over 12 minutes and may have been excessive in length. Subsequent videos for Sam and the other participants were edited to take the overall time into account.

A visual inspection of Sam's observational data did not show any significant differences in the percentage of steps he was able to complete correctly when he used the iPod during task completion as opposed to only watching it before completing the task. This indicates that for some individuals, it may be just as effective to watch the videos immediately prior to completing the task and not during.

Alex came into this study having used an iPod for entertainment on a daily basis. During the pre-training sessions, Alex was instructed on how to use the iPod to access the videos and then given the latitude to interact with the iPod and videos as he saw fit. Unlike Sam, who preferred to use a belt clip for the iPod, Alex used a lanyard and wore the iPod around his neck while completing the task. He also used the built in stand on the iPod case to stand the iPod up on a table while viewing the video before engaging in the task.

When the first video was introduced, Alex turned the iPod into a video prompting device. He would watch the video depicting the step being completed correctly, then pause the iPod and complete the step before watching the next step. For each if the selected tasks, Alex would view the video immediately prior to engaging in the task and then use the iPod as a video prompting device. Alex would only use the iPod as a prompting device the first couple times he completed the task. Once he had learned the task, he would only watch the iPod prior to initiating the task. On one occasion, Alex arrived early, and it was apparent he was anxious to get started. When the iPod was given to Alex, he stated he did not want to use the iPod and proceeded to complete the target task at the same rate of independence as when the iPod was used. The fact that Alex was able to complete the task without the iPod supports the idea that for some individuals with ASD it may be possible to maintain a high level of task performance after the iPod is withdrawn.

This study was the first time that Kyle had used an iPod. Due to Kyle's functioning level and lack of familiarity with iPods and their operation, the pre-training sessions took longer. But just as with the other participants, Kyle was able to demonstrate that he could independently use the iPod to access and watch the appropriate videos. Kyle watched the videos prior to engaging in the task, and he used the stand on the iPod case to prop the iPod up on a table. He also used a lanyard to wear the iPod around his neck.

When Kyle initially began to use the iPod, he would watch the videos immediately before and then use the iPod as a video prompting device as he cleaned the bathroom listening to rather than watching the videos. There was some trial and error as he started to refer to the iPod during the task. Kyle frequently completed more than one step at a time on his own and would then have to watch steps on the video that he had already completed. However, after time, Kyle learned not to complete a step until it was shown on the video. It should be noted that Kyle was

very prompt dependent. At the start of the study, he would hesitate to do anything unless he was prompted. During observations, Kyle would ask the researcher what he was supposed to do next. The response given every time was to refer to the video. No data collection system was in place to document how often these prompts to use technology occurred. At no time was any prompting given related to any of the steps in the task being observed for Kyle or any of the other participants. So it is possible that using the iPod replaced the human prompts with those of the iPod.

About halfway through the study, Kyle began to alter his use of the iPod in what was thought by his job coach as an effort to get attention. On several occasions Kyle would flip the iPod upside down while he was watching the video and wait to be prompted to flip the iPod around. This problem was remedied by informing Kyle that if could only use the iPod if he used it correctly and it was no longer an issue.

One potentially significant observation made during the study was that several of the participants' repeated out loud the written instructions from the videos word for word as they were completing the task. They were repeating the steps in the task in such a manner that there was no question as to where the information they were repeating was coming from. An example Kyle would say "check for pink urinal cake." This is word for word as the step is described in both written and verbal format in the video. Sam and Alex were also observed repeating instructions from the video word for word as they were completing the task. These anecdotal observations provide evidence that both the written and verbal instructions added to the videos were retained by the participants and used during task completion.

It should be noted that one of the most challenging parts of the study was finding individuals with ASD that were employed in competitive situations. During the recruitment

process several young adults with ASD expressed interest in participating in the study but were unable to participate due to their lack of current employment.

Limitations

Due to the nature of single subject research, several threats to internal validity were present. However, an attempt was made by the researcher to identify and address these threats. Kazdin (1982) identified several potential threats to internal validity that were taken into account in the design and implementation of this study. These threats included: history, maturation and selection biases.

History refers to any events other than the intervention that may affect the results. This could occur if a co-worker provided training on a targeted task prior to or during the baseline, intervention or maintenance phase. This was controlled by speaking with co-workers and job coaches and asking them not to provide any training or support related to the targeted tasks throughout the duration of the study. However, about halfway through the study, the local agency where Sam's job coach was employed closed their employment department. Sam's services were subsequently transferred to another agency and he was given a new job coach. This new job coach was not initially aware of the study and may have provided some direct instruction on the cleaning the outside task, which could have affected the results.

Controlling for external validity made it possible to explore if there was a causal relationship between the independent variable and the dependant variable. However some of the characteristics of the study may limit the generality of the results. One threat to external validity was reactive experimental arrangements. The participants may perform differently knowing they are being observed and are participating in a research study. The design mitigated this by being as unobtrusive as possible while implementing the intervention and conducting observations.

One limitation of the study is lack of female representation. Considering the ASD ratio typically seen in the general population is usually 4 to 1 and can go as high as a 10 males to 1 female ratio. Therefore, results from a study with no female participation group need to be considered with caution.

A potential limitation is the fact that not all of the participants achieved 100% independence for the selected target tasks. While the goal was for each of the participants to reach 100%, this was only achieved for three of twelve possible tasks. The participants however, did demonstrate substantial improvements and 12 of 12 tasks were at criterion. One possible reason for not achieving 100% could be due to the fact that certain steps in the tasks do not lend themselves well to video-based instruction. Another possibility could be that the videos did not properly show each of the steps required to complete the task. It should be noted that the tasks that did not reach 100% would be considered acceptable in most employment situations according to the employers.

Another limitation to the study that should be taken into account when interpreting the results of this study is that the videos for Alex and Kyle included voice-over instructions. There is no way to know how much if any impact the verbal instructions had on task acquisition. Sam and Tommy experienced similar results to Alex and Kevin and their videos did not contain verbal instructions. Originally, the intervention was only to present written instructions the verbal instructions were added due to concerns from Alex and Kyle's job coaches that they may not be able to read the written instructions in the videos.

A final limitation to the study was that data regarding the amount of prompts to use the iPod was not collected. Kyle was the only participant that needed any prompting to use the iPod. This may have weakened treatment fidelity because the prompts to use technology were not

monitored. This situation could be avoided in future research as prompting could impact the intervention results. Instructional consistency for each participant was monitored and maintained throughout the course of the study by following the treatment fidelity checklist. Data collected from the treatment fidelity checklist was above 95% for all of the participants (see Appendix H).

Future Research

Currently a limited amount of research has been conducted studying the effectiveness of delivering video-based interventions on handheld devices for teaching individuals with ASD (Taber-Doughty et al. 2008; Van Laarhoven et al., 2009, Cihak, et al., in press). Findings from this study expand the current research base by demonstrating that a fairly inexpensive commonly used device, the video iPod, can be an effective tool for teaching vocational skills in vocational settings. Although all four of the participants in this study showed skill increases, generalizing the findings should be done with caution due to the unique characteristics of each participant and the individualized nature of the intervention. Taking these factors into account, along with informal observations made throughout the duration of this study, the researcher has identified several potential areas that warrant further exploration and study.

While all of the software and devices used in this study are commercially available, a certain level of technical expertise is required to produce, edit, format and add the videos to the iPod. Taking this into account, some of the biggest barriers to using this technology could be: the cost to the practitioner or parent, training, the length of time required to produce the materials, and the cost of the iPods. Future research should investigate methods for training personnel to use video technology.

To encourage use of this technology, a cost benefit analyses should be conducted to determine if handheld devices would reduce costs associated with hiring additional personnel

needed to support young adults with ASD, such as job coaches in employment settings. An example of the cost saving potential can be illustrated with Kyle's situation. After the completion of the study, Kyle's job coach indicated that Kyle's performance at work had increased so dramatically that a plan was being put into place where Kyle would continue working during the summer without the supervision of a para-professional. The job coach indicated the reason the para-professional was no longer needed was that using the iPod had decreased the amount of direct supervision Kyle needed by increasing the amount of work he is able to independently complete.

Future research should be conducted to determine the best way to maintain acquired skills over time. The current study allowed the participants to use the iPods during maintenance probes. Additional research is needed to determine if the iPod can be faded after task acquisition. Another area to explore would be if task acquisition could be maintained over time with periodic use of the iPod. Periodically using the iPod may act as a refresher reinforcing task performance. Another possibility is that some individuals may need to use the iPod each time the task is performed to maintain an acceptable level of task performance.

Further investigations are needed to replicate the findings with additional students. In addition, future studies are needed to explore video modeling compared to video-self modeling on young adult acquisition of skills. In the present study, only three tasks were targeted. Future studies might examine the differences in skill acquisition rates when there is a delay between when the videos are viewed and the skill is performed. Additional studies are needed to validate the value of student participation in choosing instructional methods. Future studies may investigate the impact of using the same or differing forms of equipment on student performance and preferences.

Furthermore, future studies should explore if there is a difference between including auditory or written prompts with the videos. Another area of study should focus on issues related to improving the quality of existing skills as opposed to teaching new skills. Other areas that warrant further study should explore if the complexity of the tasks or skills being taught has any impact on the effectiveness of the intervention. One final area of potential exploration should look into if judgment skills related to vocational tasks or responsibilities could potentially be taught using this type of intervention.

Implications for practitioners. Practitioners working with young adults with ASD should use evidence-based practices whenever possible. Investigating and studying what practices and interventions are effective with this population is important not only for young adults with ASD but also their families, employers, service providers, and society in general (Simpson, 2005).

The concept of video modeling has a solid research base supporting its effectiveness across a broad range of skills, populations and settings. To date not a lot of research has been conducted studying its use with young adults with ASD in employment settings and in using a portable media player such a video iPod as a delivery device. The following should be considered by practitioners (including families and employers) who are interested in using a portable media player such and an video iPod to deliver video modeling interventions for individuals with ASD.

During the course of this study, and in speaking with stakeholders, it became apparent that certain vocational tasks better lend themselves to video-based instruction. For example, cleaning the bathroom requires the young adult to perform a series of complex steps that would be difficult to show with static pictures. When complex tasks are being taught, videos may be a better instructional option. Consistent with Van Laarhoven (2009), it is recommended that

combining multiple steps in the task analysis into shorter segments rather than presenting each step separately may increase the efficiency that skills can be taught. For instance, the tasks that were selected for this study were very complex and involved many steps (i.e., Kyle, cleaning bathroom = 41 steps).

Steps that logically went together were combined into one step rather than filming a separate step for each item as the task analysis indicated. Including a title screen for every step in cleaning the bathroom was not practical because of the extraneous time that would subsequently be added to the video. For example, the cleaning the display case task required a total of three steps just to gather the correct cleaning supplies. Rather than include a separate screen introducing each step, the participant viewed one video clip that showed all three of the cleaning supplies being collected in a sequential manner. This type of editing made it possible to reduce the overall length and practicality of the videos.

Most of the videos were short, based on the relative simplicity of the task being performed. However, the vacuuming task for Sam's baseline model contained 27 steps and was over 8 minutes long. While some of the steps were condensed to make for a shorter playing time, some tasks were performed from beginning to end in order to minimize confusion on the part of the participant. For example, portions of the video showed the model vacuuming large areas of carpet. These segments of the video could potentially be shortened so that just the beginning and the end of vacuuming each section were shown, rather than the entire process. It will be up to the professional wisdom of the practitioner, based on the relative complexity of the task, as to which steps should be shown in their entirety and which should be condensed to make for a shorter overall viewing time.

One additional recommendation for practitioners is to add written and verbal instructions to the videos. Such enhancements to the videos may lead to improved task acquisition when compared to traditional video modeling videos that do not contain verbal or written directions. Video enhancement was accomplished in the study by adding a white screen with black text for each step or collection of steps being modeled as determined by the task analysis. Verbal instructions can be added by including a voiceover along with the written instructions. In the present study multiple participants adapted the iPod and listened rather than watched the video as they simultaneously performed the task. Including a voice over on the screens with the written steps would assist the individual to keep track of what step they are on if they are listening to rather than watching the iPod.

Conclusions

Overall, the findings presented are generally consistent with those of other research exploring VM and the use of handheld technologies (Taber-Doughty et al. 2008; Van Laarhoven et al., 2009). Observational social validity data revealed that each of the young adults improved the percentage of steps independently completed and that using an iPod was socially acceptable.

Adaptive behavior in vocational settings was also observed among the young adults participating in the study. As evidenced by observations, three of the four participants modified their use of the iPod—turning it essentially into a video promoting device. Each participant was observed watching an individual step on the iPod, pausing the video, completing the step and then watching the next step.

Another conclusion is that when using an iPod to deliver video modeling, individualization of the video is critical. To ensure that only those steps the individual is unable to perform are taught, the intervention should be structured and administered by a trained

professional to optimize improvement. For example, some young adults may be familiar with how to operate an iPod and be able to successfully navigate to the videos while others may need extensive pre-training.

Finally, using portable media players such as video iPods to teach vocational skills to young adults with ASD is a promising strategy. The characteristics of video based instruction match well with the common strengths and needs individuals with ASD. The present study added to the research base in this area, contributed to an increased understanding of available video based technologies that may be used to help teach employment skills, offered recommendations for practitioners wishing to implement this technology and identified areas where additional research is needed.

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Appendix A
Informational Flyer

Using Video Modeling Delivered Through iPods to Teach Vocational Tasks to Young Adults with Autism Spectrum Disorders (ASD)

The purpose of this study is to determine whether completion of vocationally-related tasks can be taught to students with autism spectrum disorders (ASD) or other disabilities using Video Modeling (VM). The study will also explore the feasibility of delivering the intervention through a portable video player such as an iPod. Additionally, it will explore the social validity of using an iPod to deliver the intervention.

Research Questions

1. Will video modeling (independent variable), delivered through a portable video player , increase independent completion, of new vocationally-related tasks or those currently being performed (dependant variable, operationally defined) by young adults with ASD?
2. What is the social validity of using an iPod as a delivery model for video modeling interventions?

Target tasks will be identified and defined by the researcher in collaboration with the participant, employer, parent, teacher and/or job coach. The researcher will observe each student during the performance of the task and collect data regarding the completion of tasks in the routine. All of the observations will be video recorded with the consent of the participant and the employer.

The intervention will consist of a video of a co-worker performing the task correctly. This video will be loaded onto an iPod and viewed by the participant while they complete the task being performed on the video.

The investigator will provide pre-training instruction on how to use the iPod to access the intervention prior to the introduction of the first intervention. Once the participant has shown acquisition of the intervention, then the intervention will be introduced to the second behavior and the same process will occur for the third behavior. The same procedures will be used with the second and third behavior.

After the intervention the participants, employers, parents, teachers and job coaches will be asked to fill out a survey designed to measure the social validity of the intervention.

Participants-

Participants will be recruited from local agencies serving individuals with disabilities. The participants will range in age from 16- 29 years of age. They must currently be employed (paid or unpaid) and working in some type of a vocational setting. Approval will be obtained from the employer by the researcher prior to the study. They will have a psychological diagnosis of ASD that qualified them for services under the Individuals with Disabilities Education Act (IDEA). They may or may not still be attending school or receiving special education services. Participation in the study will be strictly voluntary. Participants will be given a gift (not to exceed $50) at the completion of the study for their participation.

Ethical Issues

The University of Kansas Human Subjects Committee has given approval for this study and determined that the participants involved will be at minimal risk (HSCL #17696). Participants will be required to sign consent documents prior to participation. Participants who are not legally able to give consent will need their guardian to sign the consent form. The study is voluntary and participants can stop at any time for any reason. All videotaped recording of the

participants will be stored on a password protected computer that only the researcher has access to.

Duration

The study will take approximately six weeks. The researcher will conduct three one hour observations per week. This timeframe is an estimate and the study may last longer depending on each participant's unique situation.

For more information or if you are interested in participating contact:

Ryan Kellems, M. Ed.
rkellems@ku.edu
785-608-7283

Appendix B

Parent / Guardian Consent Form

Approved by the Human Subjects Committee Lawrence Campus, University of Kansas. Approval expires one year from 2/10/2009. HSCL #17696

Using Video Modeling Delivered Through iPods to Teach Vocational Tasks to Young Adults with Autism Spectrum Disorders (ASD).

INTRODUCTION

The Department of Special Education at the University of Kansas supports the practice of protection for human subjects participating in research. The following information is provided for you to decide whether you wish your child to participate in the present study. You may refuse to sign this form and not allow your child to participate in this study. You should be aware that even if you agree to allow your child to participate, you are free to withdraw at any time. If you do withdraw your child from this study, it will not affect your relationship with this unit, the services it may provide to you, or the University of Kansas.

PURPOSE OF THE STUDY

The purpose of this study is to determine whether completion of vocationally- related tasks can be taught to students with autism spectrum disorders (ASD) or other disabilities using Video Modeling (VM). The study will also explore the feasibility of delivering the intervention through a portable video player such as an Ipod as well as the social validity of using an Ipod to deliver the intervention.

PROCEDURES

If you agree to participate in this study, the investigator will request verification of your child's qualification for special education service from either a medical professional such as your family doctor or psychiatrist or from their IEP (Individualized Education Plan) through the school. Then, the investigator will observe your child in vocational situations. Baseline observations will occur for two weeks with three observations per week; the intervention observations will occur for two weeks with three observations per week; and the maintenance observations will occur 3 weeks after the last intervention observation occurs; two observations will take place to record maintenance results. The total time of observations will occur for 8 weeks. The investigator will provide instruction on the intervention three times per week during the

intervention phase. The observations may be video taped and for the researchers to review. Only the researchers will have access to the video recordings.

RISKS

If you agree for your child to participate in this study, they may be some slight anxiety. The anxiety would occur when the researcher observes your child. Since the activities will involve activities taking place in a vocational setting your child's co-workers may notice they are being observed. Preparation on the intervention should minimize the risks associated with the intervention.

BENEFITS

Your child will benefit from participating in study by having improved vocational skills and completing more activities independently at work. This may be something they will be able to use in other parts of their daily life.

PAYMENTS
For participating in this study, you child will receive a gift under $50 in value.

PARTICIPANT CONFIDENTIALITY
Your child's name will not be associated in any way with the information collected about your child or with the research findings from this study. The researcher(s) will use a study number or a pseudonym instead of your child's name. The researchers will not share information about your child unless required by law or unless you give written permission. This information will be used by the investigator for a period of two years from the study's start date. Your permission indicates that this information will be kept open to the investigator for that time period, but your child's name and any identifying information will not be shared or distributed through this study.

REFUSAL TO SIGN OR OPTION TO CANCEL CONSENT AND AUTHORIZATION
You are not required to sign this Consent and Authorization form and you may refuse to do so without affecting your right to any services you are receiving or may receive from the University of Kansas or to participate in any programs or events of the University of Kansas. However, if you refuse to sign, your child cannot participate in this study.

CANCELLING THIS CONSENT AND AUTHORIZATION

You may withdraw your consent to allow participation of your child in this study at any time. You also have the right to cancel your permission to use and disclose information collected about your child, in writing, at any time, by sending your written request to:

Ryan Kellems
University of Kansas, Department of Special Education
521 J.R. Pearson Hall
1122 West Campus Rd.
Lawrence, KS. 66045

If you cancel permission to use your child's information, the researchers will stop collecting additional information about your child. However, the research team may use and disclose information that was gathered before they received your cancellation, as described above.

QUESTIONS ABOUT PARTICIPATION

If you have any questions about this study and the level of participation you or your child will do, please contact one of the investigators listed at the bottom of this consent form.

PARTICIPANT CERTIFICATION:
I have read this Consent and Authorization form. I have had the opportunity to ask, and I have received answers to, any questions I had regarding the study. I understand that if I have any additional questions about my child's rights as a research participant, I may call (785) 864-7429 or write the Human Subjects Committee Lawrence Campus (HSCL), University of Kansas, 2385 Irving Hill Road, Lawrence, Kansas 66045-7563, email dhann@ku.edu.

I agree to allow my child to take part in this study as a research participant. By my signature I affirm that I have received a copy of this Consent and Authorization form.

_____ _____
Type/Print Participant's Name Date

_____
Parent/Guardian Signature

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Appendix C

Participant Consent Form

Approved by the Human Subjects Committee Lawrence Campus, University of Kansas. Approval expires one year from 2/10/2009. HSCL #17696

Using Video Modeling Delivered Through iPods to Teach Vocational Tasks to Young Adults with Autism Spectrum Disorders (ASD).

INTRODUCTION

The Department of Special Education at the University of Kansas supports the practice of protection for human subjects participating in research. The following information is provided for you to decide whether you wish to participate in the present study. You may refuse to sign this form and not participate in this study. You should be aware that even if you agree to participate, you are free to withdraw at any time. If you do withdraw from this study, it will not affect your relationship with this unit, the services it may provide to you, or the University of Kansas.

PURPOSE OF THE STUDY

The purpose of this study is to determine whether completion of vocationally- related tasks can be taught to students with autism spectrum disorders (ASD) or other disabilities using Video Modeling (VM). The study will also explore the feasibility of delivering the intervention through a portable video player such as an iPod as well as the social validity of using an Ipod to deliver the intervention.

PROCEDURES

If you agree to participate in this study, the investigator will request verification of your qualification for special education service from either a medical professional such as your family doctor or psychiatrist or from your IEP (Individualized Education Plan) through the school. Then, the investigator will observe you in vocational situations. Baseline observations will occur for two weeks with three observations per week. Baseline and all other observations will consist of the researcher observing the participant performing various work related tasks at their place of work. These observations may be recorded if consent is first obtained from the participant. The intervention observations will occur for two weeks with three observations per week; and the maintenance observations will occur 3 weeks after the last intervention observation occurs; two observations will take place to record maintenance results. The total time of observations will

occur for 8 weeks. The investigator will provide instruction on the intervention three times per week during the intervention phase.

RISKS

If you agree to participate in this study, there may be some slight anxiety. The anxiety would occur when the researcher observes you. Since the activities will involve activities taking place in a vocational setting your co-workers may notice you are being observed. Preparation on the intervention should minimize the risks associated with the intervention.

BENEFITS

Your will benefit from participating in study by having improved vocational skills and completing more activities independently at work. This may be something you will be able to use in other parts of your daily life.

GIFT TO PARTICIPANTS

For participating in this study, you will receive a gift.

PARTICIPANT CONFIDENTIALITY
Your name will not be associated in any way with the information collected about you or with the research findings from this study. The investigator will use a number instead of your name to identify his or her results. The investigator will not share information about you unless required by law or unless you give written permission. This information will be used by the investigator for a period of two years from the study's start date. Your permission indicates that this information will be kept open to the investigator for that time period, but your child's name and any identifying information will not be shared or distributed through this study.

REFUSAL TO SIGN OR OPTION TO CANCEL CONSENT AND AUTHORIZATION
You are not required to sign this Consent and Authorization form and you may refuse to do so without affecting your right to any services you are receiving or may receive from the University of Kansas or to participate in any programs or events of the University of Kansas. However, if you refuse to sign, you cannot participate in this study.

In addition, you may withdraw your consent to participate in this study at any time. You also have the right to cancel your permission to use and disclose information collected about you, in writing, at any time, by sending your written request to:

Ryan Kellems
University of Kansas, Department of Special Education
521 J.R. Pearson Hall
1122 West Campus Rd.
Lawrence, KS. 66045

If you have any questions about this study and the level of participation you or your child will do, please contact one of the investigators listed at the bottom of this consent form.

PARTICIPANT CERTIFICATION:

I have read this Consent and Authorization form. I have had the opportunity to ask, and I have received answers to, any questions I had regarding the study. I understand that if I have any additional questions about my rights as a research participant, I may call (785) 864-7429 or write the Human Subjects Committee Lawrence Campus (HSCL), University of Kansas, 2385 Irving Hill Road, Lawrence, Kansas 66045-7563, email dhann@ku.edu.

I agree to take part in this study as a research participant. By my signature I affirm that I have received a copy of this Consent and Authorization form.

_____ _____

Type/Print Participant's Name Date

_____

Participants Signature

Researcher Contact Information

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Appendix D

Participant Assent Statement

Study of using IPods to teach work skills

Verbal explanation of the project

"I am interested in finding out what you think about learning work skills by watching videos on an iPod. I would like you to take part in a study that will ask you to watch videos on an iPod 3 times a week for 4 weeks and then two more times about 3 weeks later. The entire study will last 8 weeks. Before you watch the videos I will come and watch you at work 2 times for 30 minutes each time. At the end I would like to ask some questions about your experiences and feelings and how you think these things affect how you feel about using an iPod to learn work skills. If you don't feel like answering any questions, you don't have to, and you can stop speaking with me anytime and that will be all right. I will be happy to answer any questions you may have now or when we are talking together. Do you want to take part in this project?"

Appendix E

Observational Checklist

Participant ID #: _____

Vocational Task:

_____

_____

KEY: 1- Step completed correctly 0– Step not completed correctly

Dates / Task Analysis Steps:															
1.															
2.															
3.															
4.															
5.															
6.															
7.															
8.															
9.															
10.															
(B) Baseline / (I) Intervention															
Percentage of steps completed correctly															

Appendix F

Participant Social Validity Interview Guide

Please answer these questions about the videos you watched. You can choose to write your answers or say them out loud.

1. What did you think about watching the videos on the iPod?

2. What did you think about watching the videos as you worked?

3. What difference did watching the videos have on your job?

4. Would you like watching more videos at work showing you how to do things?

5. Who have you told about using the iPod at work?

Parent, Employer, Teacher, Job Coach Social Validity Interview Guide

Please answer these questions about the videos the participant watched on the video iPod

1. How do you think they enjoyed watching the videos on the iPod?

2. What do you think they thought about using the iPod while they worked?

3. What impact did watching the videos have on their performance at work?

4. Is this something you can see them using in the future? Why or why not?

5. Was it socially acceptable for them to watch the videos while they worked?

Appendix G

Target Task Materials

Participant	Cleaning the bathroom	Vacuuming	Cleaning outside bowling alley
Sam	Gloves, Trash can, Empty trash bags, Cleaning spray Glass cleaner Towel Broom Dustpan, Keys (paper towel, toilet paper dispenser).	Vacuum Extension cord	Gloves, Trash can, Empty trash bags, Broom Dustpan.
Alex	Filling out order book Airport order book Container with assorted numbers with velcro on the back Vending machine Vending machine key	Taking inventory Inventory book Vending machine Vending machine key	Fulfilling order Containers full of Snack inventory Empty red crate Airport order book
Tommy	Cleaning the bathroom Bucket Gloves Keys (bathroom and paper towel dispenser) Toilet cleaner Toilet brush Glass cleaner Paper towels Air freshener.	Changing garbage Garbage bags Utility cart Dumpster	Recycling cardboard Box cutter Utility cart Recycling dumpster
Kyle	Cleaning the bathroom	Cleaning the glass on a display case	Cleaning a wood wall panel

gloves, duster, bucket, toilet bowl cleaner, toilet brush, glass cleaner, paper towels, #3 cleaning spray, rags, broom, dustpan and swifter (mop)	Glass cleaner Squeegee Paper towels	Wood cleaner Rag Toothbrush.

Appendix H

Treatment Fidelity Checklist, LaCava (2008)

Step 1. Targeting a Behavior for Teaching	**Yes**	**No**	***NA**	**Notes**
1. Teachers/practitioners identify a target behavior that is important for the learner to be taught.				
2. Teachers/practitioners define and describe the target behavior so that it is observable and measurable.				
Step 2. Having the Correct Equipment				
1. Teachers/practitioners acquire a video recording device (e.g., hand-held video camera, digital camera, computer technology).				
2. Teachers/practitioners identify how the video will be played back (e.g., DVD, VCR, computer).				
3. Teachers/practitioners become familiar with the equipment and are comfortable using it.				
Step 3. Planning for the Video Recording	**Yes**	**No**	***NA**	**Notes**
1. Teachers/practitioners write a script or task analysis detailing exactly what needs to be said and/or done on the video.				
Step 4. Collecting Baseline Data				
1. Learners complete as much of the skill as possible.				

2. Teachers/practitioners collect baseline data to identify the steps of the task analysis that the learner can complete without assistance.				
Step 5. Making the Video				
1. Teachers/practitioners identify the kind of video that is appropriate for the learner (e.g., video modeling, self-modeling, point-of-view modeling, video prompting), based on the learner's skill level and preferences, as well as the target behavior.				
2. Teachers/practitioners prepare the model (with basic video modeling) or the learner (with self-modeling) for the video.				
3. Teachers/practitioners record a video that is satisfactory in quality and accurately reflects the steps of the task analysis.				
4. Teachers/practitioners edit the video and remove any errors and prompts.				
5. Teachers/practitioners complete voice-overs, if necessary.				
Step 6. Arranging the Environment for Watching the Video				
1. Teachers/practitioners identify the environment where the video will be watched, considering when and how it will be used within natural routines.				
Step 6. Arranging the Environment for Watching the Video (cont.)	**Yes**	**No**	***NA**	**Notes**
2. Teachers/practitioners ensure that the materials for the performance of the task match those on the video.				
Step 7. Showing the Video				

1. Teachers/practitioners allow the learner to watch the video and provide prompts necessary to gain and/or keep attention.				
2. Teachers/practitioners allow the learner to watch the video an appropriate number of times before expecting the learner to use the target behavior.				
3. For video prompting, teachers/practitioners stop the video after each step of the task analysis so the target behavior can be performed by the learner.				
Step 8. Monitoring Progress				
1. Teachers/practitioners collect data on the performance of the target behavior, noting the specific steps of the task learners were able to do independently.				
2. Teachers/practitioners note how often and when the learner watches the video when using the target behavior.				
3. If after collecting data on three to five occasions, learners are not making progress, teachers/practitioners should begin troubleshooting. If learners are making progress, instruction is continued until they have reached maximum proficiency				