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Teaching Culinary Skills using Video Modeling to Individuals with Traumatic Brain Injury

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by

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ABSTRACT

Individuals with Traumatic Brain Injury (TBI) often need to be taught independent living skills in order to reintegrate into community settings. This study examined the use of video modeling to teach culinary skills to three individuals with TBI. Video modeling is easily accessible, inexpensive, and not reliant on an additional person to directly teach skills. For all three participants, video modeling resulted in increases in cooking skills using a task analysis created for each food item prepared. For one participant, the skills maintained over two weeks and generalized to a novel food. For another participant video modeling was insufficient in reaching high skills levels therefore a second phase utilizing reinforcement and corrective feedback was implemented. This phase demonstrated with the additional component including reinforcement and corrective feedback, the third participant reached high skill levels.

CHAPTER 1:

INTRODUCTION

Individuals with Traumatic Brain Injury (TBI) suffer from a variety of impaired brain functions that may affect one's thinking, memory, emotions, bodily movements, and/or sensations (Centers for Disease Control and Prevention, 2015). Acquired TBI is caused from a bump or blow to the head, which can result in a range of mild to severe injuries. In the case of severe brain injuries, the effects can be long lasting. The leading causes of TBI are falls (40%), unintentional blunt trauma (15%), motor vehicle crashes (14%) and assaults (10%) (CDC, 2015; Langlois, Rutland-Brown, & Wald, 2006). Injuries from these types of accidents can cause lasting damage to cognitive functions, potentially impeding an individual's ability to live independently.

A variety of daily living skills are necessary to achieve independent functioning. Skills include self-care (e.g., dressing, brushing hair), hygiene (e.g., brushing teeth, showering, washing hands), preparing and cooking meals and community living skills (e.g., grocery shopping) (Domire & Wolfe, 2014; Goldenberg, Daumüller, & Hagmann, 2001). The ability to successfully engage in daily living skills can result in improvements in the quality of life for a person with TBI (D'Ateno, Mangiapanello, & Taylor, 2003; Himle, Miltenberger, Flessner, & Gatheridge, 2004; Shipley-Benamou, Lutzker, & Taubman, 2002; Van Laarhoven, Zurita, Johnson, Grider, & Grider, 2009). Therefore, many individuals with TBI often require assistance from family members or a rehabilitation center to re-train these skills.

Hoofien, Gilboa, Vakil, and Donovick (2001) examined the lives of TBI patients 10-20 years after the injury across multiple categories to identify the longevity effects a TBI can have on individuals' independent living skills. While the authors found positive results in patients' vocational opportunities, independent activities and independent functioning over time, there was a higher burden placed on the spouses or families of TBI patients. Another study that examined the effects of severe TBI at 10-20 years post injury did not demonstrate such positive results (Thomsen, 1984). Individuals with severe injury made gains in employment and some maintained the ability to complete household chores. However, these happened years after the initial injury and not within the window of opportunity for the most growth (Thomsen, 1984). One of the biggest strains both authors discussed was the family relationship with siblings and spouses. The strain on the family can manifest in various ways including both the emotional impact and direct care needs. Often individuals with TBI require direct care which can result in family members spending 5-80 hours a week performing activities of daily living for their family member (Griffin et al., 2012). This strain can be reduced if the family member with TBI lives in a rehabilitation center that is structured to teach daily living skills to increase independence.

Rehabilitation centers use various teaching methods to train independent living skills and the goal of most centers is community integration. Community integration includes employment, social relationships, and independent living (Sander, Clark, & Pappadis, 2010). This process can be costly; however, the benefits outweigh the costs for the participant and the taxpayers (Abrams, Barker, Haffey, & Nelson, 1993). Therefore, rehabilitation centers rely on effective, efficient, and empirically-based strategies to teach skills. Physical therapy, occupational therapy, speech therapy, educational therapy, and behavioral therapy are offered to increase the quality of life for individuals with TBI; however, there are few systematic teaching strategies that have been researched with this population (Bennett, Niedzwecki, Korgenski, & Bratton, 2013; Brown, Watanabe, Hoffman, Bell, Lucas, & Dikmen, 2015).

Fadyl and McPherson (2009) conducted a systematic review on the methods of teaching vocational skills to individuals with TBI. They concluded there are three broad models of vocational rehabilitation: program-based, supported employment, and a case coordinated approach. Most program-based rehabilitation includes intensive teaching, work help, and job support. These program models are mostly based on the NYU Medical Center Head Trauma Program developed by Ben-Yishay, Silver, Piasetsky, and Rattok (1987). Supported employment utilizes on the job coaching to teach the desired behavior in the actual environment. Wehman et al. (1994) demonstrated three case studies in which on the job coaching (i.e., modeling and feedback) increased work performance for each individual. A case coordinated approach includes a supervisor determining the vocational needs and certain types of rehabilitation an individual requires. Malec and Moessner (2006) found that individuals with TBI under the case coordinated approach kept their community based jobs for the year follow-up. However, the methods are time consuming and rely on an adequately trained teaching agent which an individual might not have access to upon leaving a rehabilitation center.

To determine an effective approach to teach skills to individuals with TBI, researchers have investigated computer-based cognitive retraining (CBCR), virtual reality, video feedback, and video modeling (Christiansen et al., 1998; Li, Alonso, Chadha, & Pulido, 2015; Schmidt, Fleming, Ownsworth, & Lannin, 2013; Schwentor, 1993). CBCR is designed to be an easily accessible intervention, since it is software that can be played on a computer. CBCR is designed to replace the cognitive deficit of the injury and teach new skills (Giuffrida, Demery, Reyes, Lebowitz, & Hanlon, 2009; Lynch, 2002). These skills included typing, using a subway schedule, and medication sorting that would increase an individuals' independence. While these computer programs were successful for individuals with TBI to acquire and maintain the directly taught skills, the skills did not generalize to novel tasks (Giuffrida et al., 2009; Li et al., 2015; Zickefoose, Hux, Brown, & Wulf, 2013).

Virtual reality (VR) has been used to teach balance, driving, and cooking skills within the TBI population (Bart, Agam, Weiss, & Kizony, 2011; Caglio et al., 2012; Christiansen et al., 1998; Cuthbert et al., 2014). VR is a computer generated three-dimensional simulation, which allows for an individual to interact within the simulated environment via headset. This technology allows for an individual with TBI to be placed into the desired environment and directly taught skills. Christiansen et al. (1998) created a simulated kitchen for individuals with TBI to evaluate VR's effect on the skill of making soup. Thirty steps were task analyzed and data were collected on the number of clicks until the individual completed the skill. Results indicated that it was an effective teaching tool based on the test and retest scores. However, VR can be expensive, as headsets sell for $599 (www.vrealities.com). Alternative commercially available VR gaming does not support the same acquisition results as the higher quality, more expensive VR gear (Caglio et al., 2012).

Given the cost of VR, other interventions using less expensive technology may be more feasible to implement such as video feedback and video modeling. Schmidt and colleagues (2013) used video feedback to teach meal preparation skills to individuals with TBI. Researchers used a randomized controlled trial to compare types of feedback (i.e., verbal + video feedback, verbal feedback, control group), to determine which feedback would result in the most self-awareness. Self-awareness was defined as correct steps in completing a meal preparation of spaghetti, an omelet, or toast. Verbal + video feedback, which was composed of viewing the video after the session and discussing with the researcher the participants' strengths and limitations, was the most effective in preparing a meal as the participants made the least amount of errors in this phase. However, video feedback requires effort on the teaching agent to watch the video and highlight the areas for improvement for the participant.

Video modeling (VM) was also found to be an effective method for teaching daily living skills to individuals with TBI (Hung, Agarwal, Nadeem, Shah, & Ciuffreda, 2011; Nikopoulos, Nikopoulus-Smymi, & Konstantopoulos, 2013; Schwentor, 1993). VM was used to teach individuals how to type, identify figures, and money matching accuracy (Hung et al., 2011). VM was also found to increase the emergence of speech with one individual with TBI, and results generalized to produce untrained words (Nikopoulos et al., 2013).

Given that many individuals today learn skills through finding and watching videos or apps on the internet (e.g., home repair, cooking, etc), this may be an easily accessible and available avenue for individuals with TBI to learn new skills. Only one known study was found that used video modeling to teach cooking skills to individuals with TBI; however, this study used video self-modeling (McGraw-Hunter, Faw, & Davis, 2006). Individuals created and watched a video of them completing all steps of a stovetop or oven cooked meal. Results indicated that video self-modeling plus feedback was effective for three of the four participants in teaching cooking skills. Interestingly, participants in this study were instructed to watch the entire video before engaging in any of the cooking steps. It seems customary that when cooking or completing any task that involves multiple steps, an individual should be allowed to perform a step then read or watch the next step (e.g., when following a cooking recipe, it seems natural to follow steps one by one while one is cooking instead of memorizing the steps). Additionally, watching a video of someone else, such as an expert, instead of oneself could improve external validity.

The current study evaluated the use of video modeling to teach culinary skills to individuals with TBI. A generic video was created (similar to videos found on the internet such as YouTube) to teach the cooking skill of following a recipe with the prospect that the taught skills might generalize to different cooking videos. The purpose of this study was to determine if video modeling was effective at teaching the culinary skills of following a recipe to individuals with TBI. Generalization of the trained skill to a novel recipe video was a secondary interest of the study.

CHAPTER 2:

METHOD

Participants

Three individuals with traumatic brain injury (TBI) residing at a post-acute rehabilitation center for brain and spinal cord injuries in Central Florida were included in this study. The participants were recruited using a preapproved flyer. In order to be included in the study, participants needed to have simple meal preparation skills (e.g., making a sandwich), upper body strength and safety skills to perform the stovetop or oven cooking decided by the staff of the rehabilitation center by passing a cooking safety checklist regulated by the center (Appendix A). This checklist ensured that the participants had the motor, balance, and dexterity to safely cook independently. The participants communicated in full-length sentences and read easy recipes.

Informed consent was acquired by the participants and if necessary, their legal guardian. One participant was his own guardian, so he signed his own consent form. The other two participants had legal guardians, and consent was acquired through contact with their guardians. Both participants signed an assent form after receiving consent from their legal guardians. All the names used are pseudonyms to preserve participant privacy.

Roger was a 34-year-old English speaking male who once worked in the Air Force. He acquired brain injury via a recreational motorcycle accident in 2011. Roger demonstrated many independent living skills. Although he lived off campus, he was transported to campus every day to participate in therapy. Stark was a 30-year-old Spanish speaking male who had traumatic brain injury and was a paraplegic. He worked in construction and acquired his brain injury during a workplace accident in 2009. Banner was a 51-year-old English speaking male who had traumatic brain injury. He acquired his brain injury in 1993 during a work-related accident from a 20 ft. fall. Banner displayed a lack of fluid motor movements but was able to cook.

Setting

Three separate kitchens were used for each participant. Roger cooked in the unused group home kitchen that consisted of a freezer, refrigerator, oven and stovetop burners, counter space, and a sink with running water. All cooking session were done in the same kitchen with the exception of the first data point during intervention for Roger. Stark cooked in his apartment off campus. The kitchen included a microwave, freezer, refrigerator, oven and stovetop burners, counter space, and a sink with running water. Banner lived in an apartment on campus with one roommate. The kitchen consisted of a top freezer refrigerator, a double bowl sink with running water, a dishwasher, an oven and stovetop, burners, a microwave over the stove, and two large counters.

Materials

A Samsung HD CMOS Sensor camera HMX-F90© was used to film all sessions. Session videos were stored on a SanDisk SDHC memory card and transferred to a computer with a Dynex USB Memory Card Reader. Videos for the video modeling sessions were created with the same camera. Videos created for the video modeling sessions were edited on a Dell laptop with editing software. The videos were watched on the Dell laptop. In addition to the technology, the food, pots, pans, and recipes were provided as needed depending upon each participant's choice of dish (see Appendix B). Recipes were broken down into task analyses (see Appendix C). The timers were on the microwaves that the kitchens were all equipped with. A fire extinguisher and baking soda were located on a nearby counter as a precautionary measure.

Dependent Variables and Data Collection

The dependent variable was the number of steps performed correctly on the task analysis for the meal being prepared. The meal being prepared was determined using an open-ended preference assessment. The primary investigator discussed various meal ideas with the participants, and as long as the meal could be cooked on the stovetop or in the oven it was permitted. The task analyses varied on the number of steps, depending on the participant's cooking preference.

The percentage of correct steps for each participant was determined by the correct number of steps completed divided by the total number of steps in the task analysis and multiplied by 100 for a percentage. The task analyses for each participant are in Appendix C.

Interobserver Agreement

The primary investigator (PI) of this study was the main data collector, and research assistants were graduate students of an Applied Behavior Analysis program.
Observers scored a plus if the participant completed the step correctly and a minus if the participant completed the step incorrectly. Agreement was calculated by adding the total number of agreements and then dividing by the total number of agreements plus disagreements and multiplying by 100 for a percentage. For Roger, IOA during baseline was collected for 33% of sessions and the average was 88%. During intervention, IOA was calculated for 50% of sessions and was 100%. For Stark, IOA during baseline was calculated for 60% of sessions and was 100% agreement. During intervention it was calculated for 66% of sessions and was 100% agreement. For Banner, IOA during baseline was collected for 33% of the sessions and ranged from 82-94% and during intervention it was calculated for 50% of sessions and was 100%

agreement.

Experimental Design

This study used a non-concurrent multiple baseline across participants' design. The multiple baseline across participants' design demonstrates experimental control by visually displaying an effect on the behavior only when the intervention is implemented (Kazdin, 2011). Although each participant undergoes an AB design, control is demonstrated in the replication of the behavior effect across participants.

Procedures

All participants experienced the same first two phases (i.e., baseline, video modeling intervention). Stark and Roger underwent the same two conditions, baseline and video modeling. Stark had additional maintenance and generalization probes following video modeling. Banner needed an additional phase that included reinforcement and corrective feedback. All sessions were filmed in order to calculate IOA and treatment integrity.

Assessment. An open-ended preference assessment was conducted to determine the food each participant cooked throughout the study and the preferred items to be received after completing each session for participating. After obtaining consent and assent, the researcher sat with the participants and discussed foods they would like to prepare. The researcher asked for a food that they would not mind preparing multiple times. The researcher also discussed potential items that could be used as reinforcers for participation in each session. Roger requested to learn how to make pecan pie and did not seem interested in learning any other recipe. Stark requested to learn to cook Spanish rice. Banner requested to learn to make pancakes and demonstrated an interest in learning how to make a cobbler. Roger and Stark declined any additional reinforcement for participation, however Banner requested a vanilla iced coffee for participation which he received after each baseline and intervention session.

Task analysis creation. Prior to the baseline sessions, the researcher created a task analysis for each participant depending upon the meal he chose to prepare. The recipes were from online sources and broken down into individual steps. For example, an online pecan pie recipe stated to mix all ingredients together. The task analysis took each ingredient and made individual steps for measurement. Then the task analysis added the measured ingredient to the mixture. The task analyses can be referenced to in Appendix C. Roger's task analysis had 25 steps, Stark's task analysis had 23 steps, and Banner's task analysis had 17 steps.

Baseline. During the first phase, the discriminative stimulus, "Cook **_____**" (i.e. "Cook pecan pie, Spanish rice, pancakes (depending on the participant)") was delivered and the participants were scored on the accuracy of each step in the task analysis. A recipe card was provided to each participant that described the steps to make each food item. The recipe was found from an online source and included all the steps in the task analysis. Although Stark spoke some English, his first language was Spanish therefore the recipe card was translated into Spanish. Throughout baseline there was no additional instructions or specific feedback other than the provided recipe card. At the end of each session the participant was thanked for participating and Banner also received an iced coffee for participation. The times for cooking the specific meals varied however, pecan pie took an average of 1hr45m, Spanish rice took 45m, and pancakes could take about 30-45m.

Video creation. The PI and research assistants created all video models, therefore the Pi and the research assistants were the models acting out the cooking. The video model was created using the individualized task analysis (that was derived from the recipe) for each participant. The model said every step that she was doing while she was completing the step. The model thanked the viewer at the end of the video for watching and making the food. Since Stark's first language was Spanish, the videos were recorded in Spanish. The videos varied in time depending on the number of steps. The pecan pie video was 12:23m, the Spanish rice was 8:47m, and the pancake video was 5:36m.

Video modeling. At the beginning of each session, the participant was told its time to cook and was directed to the kitchen to watch the video of the model cooking the meal. The video was open and ready to view when the participant entered the room. The participants were directed to watch, listen, and do what the video instructed. The participant was also instructed on where the play button and pause button were located. Occasionally Stark and Banner would ask questions during the video or during the cooking session and the researcher instructed them to follow the instructions that they observed in the video. The participant was scored by the researcher on the correct independent completion of the steps in the task analysis (same as in baseline). At the end of the session, the researcher thanked the participant for participating. Mastery criterion for this phase was three consecutive sessions scoring 90% or higher on all of the steps. If a participant did not engage in a step correctly, the step was marked as incorrect. If a participant ever engaged in a behavior that could lead him to physical harm, the researcher would have verbally prompted the safety step. This was not necessary for any participants.

Reinforcement and corrective feedback. For Banner the video modeling alone was insufficient in acquiring high levels of culinary skills. An additional reinforcement and corrective feedback phase was implemented. This phase included watching the video, discussing the correct and incorrect steps he had been consistently engaging in, and setting a criterion of needing 80% or higher of steps completed correctly in order to receive a reinforcer from a selection of baking goods (e.g. brownie mix, cookie mix, and muffin mix) and coffee. Results from the open-ended preference assessment showed Banner had interest in baking and coffee.

Maintenance. Two weeks after meeting the mastery criterion, data were collected on the maintenance of the acquired cooking skills for Stark.

Generalization. Generalization data were collected following the maintenance phase. During the generalization probe, Stark was instructed to cook pasta using a different video created by the researcher and a recipe card created by the researcher. The recipe was from an online search on how to make pasta. A task analysis was created based on the recipe, found from an online source, and is in Appendix C. A Spanish speaking research assistant was used to create the video so the video was in Spanish. Stark was scored using the same dependent variable during intervention, the percentage of steps completed correctly.

Treatment Integrity

Treatment integrity data were collected for the correct implementation of the intervention by the PI for each participant. The treatment integrity checklist is located in Appendix D. Treatment integrity was calculated by adding the number of correct steps/total steps multiplied by 100 for a percentage. Treatment integrity was collected for 66% of sessions for both Roger and Stark and was always 100%. Treatment integrity was collected for 50% of sessions during the video modeling phase for Banner and was 100%.

Social Validity

Social validity data were collected from the participants to determine the acceptability of the intervention. At the end of the generalization and maintenance tests, or at their last session in the case of Roger and Banner, the participants were given the Treatment Evaluation Inventory-Short Form (TEI-SF), a 9-item questionnaire scored on a 5-point Likert scale (Kelley, Heffer, Gresham, & Elliot, 1989). A score of 1 meant strongly disagree and a score of 5 meant strongly agree.

For the purposes of this study, some of the TEI-SF was changed due to the participant and the abilities of the participants. For example, one item was: “I believe it would be acceptable to use this treatment with individuals who cannot choose treatment for themselves”. If someone is unable to choose to increase his or her cooking repertoire, then this specific treatment would not apply to him or her. After modifications, the questionnaire included six items and is located in Appendix E.

Results from the social validity questionnaire revealed that all three participants found the intervention to be an acceptable way of learning how to cook (mean=4.33). The participants liked the procedure (mean=4) and would be willing to use this intervention to learn a new skill (mean=3.67). The participants found this treatment to be effective (mean=3.67), believed this treatment would result in permanent improvement (mean=4), and had an overall positive reaction to this treatment (mean=4.33). Some participants did state that they would like to learn a different meal than the same one throughout the study.

CHAPTER 3:

RESULTS

The participants observed in this study demonstrated the ability to consistently perform half of the steps correctly on the task analyses in baseline. Figure 1 shows each participant's percentage of steps completed accurately during all phases of the study. In the baseline phase, none of the participants achieved 100% accurate completion of the steps for their specific task analysis. All three participants showed increases in steps completed on the task analysis after implementation of the video modeling. However, one participant, Banner, only showed a small increase in steps completed in the video modeling phase.

The results for Roger showed a range of steps completed correctly from 52-58%, averaging 50% throughout the baseline phase. With the implementation of video modeling, the number of steps completed correctly increased. The range of steps completed correctly during intervention was 68-92%, ending at 92%. The first data point, the 68%, was conducted in a different kitchen with a different type of oven within the facility. Upon returning to the original kitchen where baseline was conducted, Roger immediately increased the number of steps completed correctly. At the end of the intervention the only steps Roger was performing incorrectly were preheating the oven and measuring 1tbsp of vanilla extract. Neither of which were critical failures, although it could be critical to not preheat the oven. Right at the end of the video modeling phase, Roger left rehabilitation services and returned to his home state making it impossible to collect maintenance or generalization data.

The results for Stark during baseline showed the range of number of steps completed correctly as 57-70%, with an average of 65.6%. During intervention, the number of steps completed correctly increased immediately and reached 100%. At the two-week maintenance and generalization tests, Stark demonstrated an ability to maintain the skills by correctly completing 100% of the steps for the food cooked in intervention (e.g., Spanish rice). While testing for generalization, Stark showed that with the video and a recipe card for a novel food (e.g., pasta with red sauce) he was able to correctly complete 94% of the steps.

The results for Banner demonstrated a stable level during baseline ranging from 53-69% of steps completed correctly, with an average of 60%. Upon implementation of intervention, there was a very slight increase from the last data point in baseline. During video modeling, the data ranged from 65-76%, with an average of 71.8%. With the additional phase of corrective feedback and reinforcement, Banner showed an immediate increase in steps completed correctly, ending at 94%. At the end of the video modeling and corrective feedback and reinforcement he was only missing checking the pan with water to see if it is hot, which is not critical to the making of pancakes.

CHAPTER 4:

DISCUSSION

The results indicated that video modeling was effective in increasing culinary skills for two of the three participants and lthough a feedback and reinforcement component was needed for one participant to reach mastery criterion. For one participant the results maintained over time and he generalized the skills of watching a video model to create a novel food. Overall, participants seemed to enjoy the intervention and were aggregable to using the intervention in the future. This study replicates the results of McGraw-Hunter and colleagues (2006); however, differed in the type of video modeling utilized to teach the cooking skills Overall, video modeling was an acceptable intervention to learn to cook by all participants and required minimal effort on the part of the researcher suggesting that video models (as found on the internet) might be successful in teaching cooking skills to individuals with TBI.

Two participants were able to reach mastery criterionwith the use of video modeling within four sessions. This rapid rate of acquisition is similar to the results found in McGraw-Hunter and colleagues' (2006) study. Roger and Stark demonstrated an immediate increase in level following the implementation of video modeling. Roger increased by an average of 26% and Stark increased by an average of 20%. With the first data point in the intervention phase for Roger, there were some differences in setting. Roger was cooking in a different apartment with a different type of oven and microwave. This was due to electrical issues at the kitchen he had been cooking in during baseline. He did express some displeasure at the change of location, which could have affected his performance during the intervention. During the video modeling phase, after a session Stark was able to tell the researcher the steps he missed (e.g. forgetting to turn down the temperature). The researcher continued to thank him for cooking and he later corrected the previous mistakes in the following sessions. During the video modeling intervention, while Stark was cooking he engaged in several distractors, such as family and friends visiting and making a phone call. However, none of these distractors impeded his cooking and this most represented a realistic cooking experience.

For Banner, video modeling was not effective at reaching mastery criteriaon Initially, he needed additional prompting to continue to watch the video to completion. He did demonstrate an understanding of the necessary steps (i.e. stating he was going to put the burner on 5 instead of between 2-4 as the video instructed, cook multiple pancakes instead of one at a time), but continued to cook the pancakes the way he wanted to cook them instead of following the recommendations from the video model. Therefore, it was hypothesized that his lack of improvement might not be a skill deficit but rather a lack of rule-governed behavior. There is also the potential that Banner wanted to make as many pancakes at one time creating a competing contingency. Therefore, an additional phase with corrective feedback and additional reinforcement was implemented. With the contingency to follow the instructions, Banner was able to performed 94% of the steps correctly.

Although all participants had the opportunity to cook along with the tape, all of the participants decided to watch the entire video and then begin the cooking. Only Roger went back to look at a specific section of the video one time. This could imply that the ability to rewind and re-watch might not be a crucial component to teach individuals with TBI as all participants demonstrated the ability to learn to cook from watching the entire video at once. It was also observed that the participants continued to use the recipe card after viewing the video. The data improved following the video modeling intervention, perhaps the videos transferred stimulus control to the recipe card. There is also the possibility that there was a motivational component that led to quicker learning of the skills.

No participants engaged in any harmful behaviors during the sessions. Therefore, there was no need for the researcher to step in and prohibit a dangerous behavior from occurring while cooking. The baking soda and fire extinguisher were not necessary. All of the participants were very diligent about making sure all of the cooking utensils were clean prior to cooking. All participants initiated washing hands prior to cooking and they were very creative at problem solving when an unexpected issue arose (i.e. using a butter knife to open the lid of tomato paste after opening with a can opener). Only one participant wanted an additional reinforcer that was provided from the researcher for completing a session, most participants wanted the researcher to taste the food. They were very excited to hear how their food tasted and often asked for the researcher to taste the food at the end of the session. The researcher complied with tasting the food but did not provide any feedback besides a statement thanking the participant for participating.

Several limitations should be addressed. Roger and Banner were unable to complete the maintenance and generalization probes following the completion of video modeling. These probes could have demonstrated the ability to take the learned skills and apply it to a novel food. Although the data do not necessarily show practice effects, it did appear the participants were getting more fluent in making the dish throughout intervention. All three participants did express an interest in learning something else besides the meal they had initially chosen after many sessions of making the same dish. Another limitation is that all of the participants were male. In the future it would be beneficial to look at females with TBI and increasing culinary skills.

No data were taken on the number of prompts required for the participant to watch the video during the video modeling. Although there are no data to support, Banner required more prompts to remain engaged with the video. A limitation is this lack of data, as it would have been an interesting analysis to see a potential correlation between the number of prompts required and the percentage of steps completed correctly.

Future research should include making a novel dish every time within the video modeling phase. There was no evidence of practice effects as demonstrated in the baselines of the participants. Baselines ranged from 3-6 sessions and no participant had shown any improvement within baseline. Another area of future research could look at the model used in the video modeling, to see if a person performed better with a model similar to themselves. Due to the similar results demonstrated in self-video modeling and video modeling, it could be beneficial to compare the different methods and determine if one method is more successful than the other.

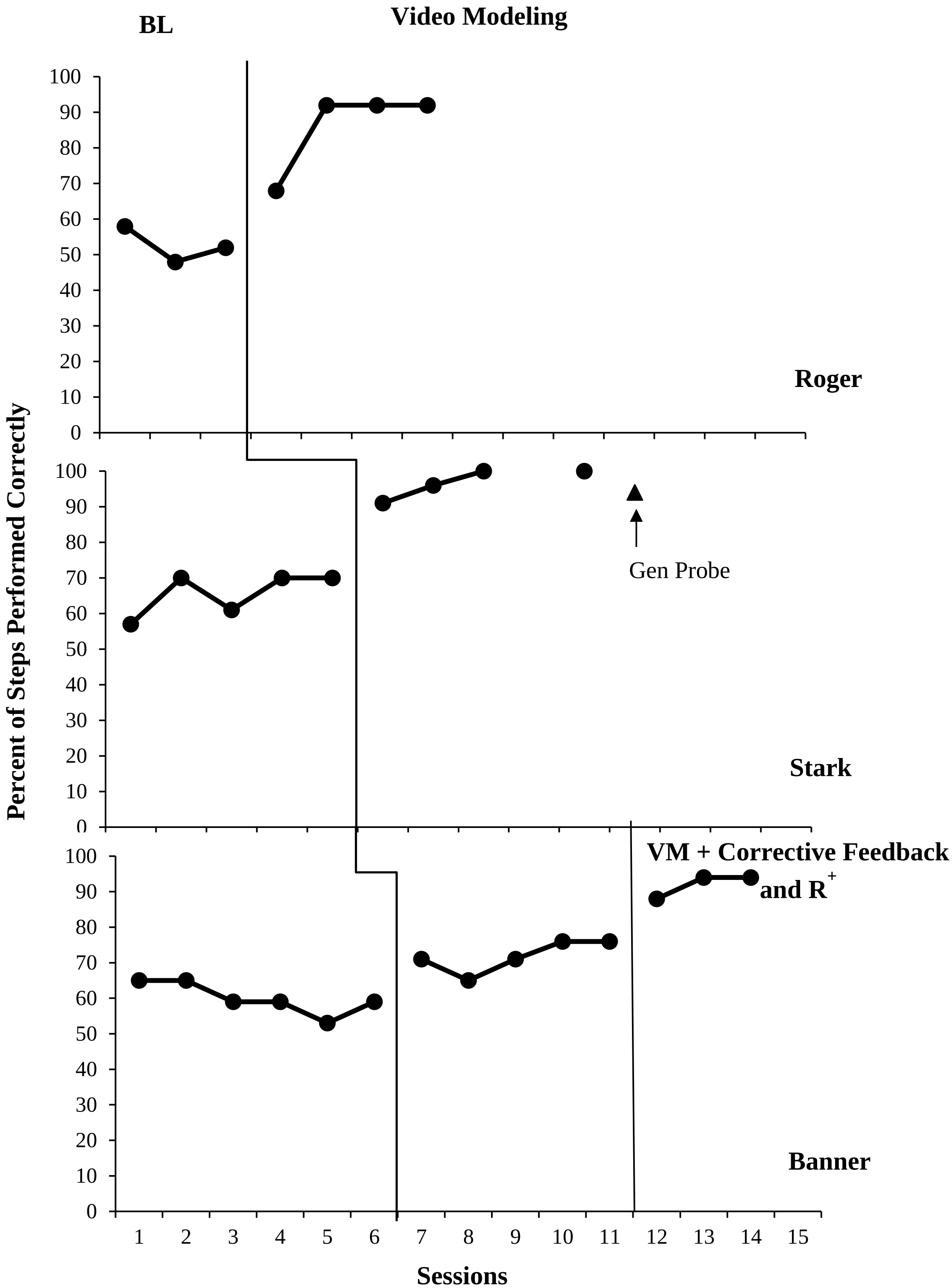

Figure 1. Results from video modeling intervention across three participants

CHAPTER 5:

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CHAPTER 6:

APPENDICES

Safety Checklist

[redacted]

FOOD PREPARATION CHECKLIST   Participant Name ______________________

FOOD PREPARED										
Date & Staff Initials										
Scoring Key	C	P	C	P	C	P	C	P	C	P
1. Identifies what is to be prepared (i.e meal plan, left overs)										
2. Washes hands										
3. Identifies needed ingredients (C) & gathers ingredients (P)										
4. Identifies needed cooking supplies (C) & gathers supplies (P)										
5. Locates directions on package/recipe										
6. Follows recipe sequence										
7. Opens containers/packages										
8. Measures ingredients										
9. Pours liquid										
10. Cuts food*										
11. Uses good safety skills (i.e. hot pads, knives, cleans spills, cooks on appropriate temp)*										
12. Attends to 2 or more tasks simultaneously										
13. Problem solves for self when confronted with a problem/question.										
14. Uses toaster										
15. Sets microwave										
16. Sets temperature on stove/oven										
17. Turns off stove/oven*										
18. Takes items in/out of oven/ Microwave safely*										
19. Wipes off counter tops/stove										
20. Puts dirty dishes in dishwasher										
21. Puts away unused ingredients/ leftovers										
22. Manages time to complete food prep on time										
23. Uses compensatory strategies and/or adaptive equipment (i.e. uses timer, dycem, affected extremity as an assist)										

SCORING SHEET

Cognitive
R. Refused
1. Max Cueing (7+ cues provided)
2. Moderate Cueing (4-6 cues provided)
3. Mild Cueing (2-3 cues provided)
4. Initiation Cueing (1 cue to get started)
5. Supervision (present but no cues)
6. Modified Independence (use of checklists, etc.)
7. Initiates Activity Independently

Physical
R. Refused
1. Total Assist (performs less than ≤10 % of task)
2. Maximal Assist (performs 25% of task)
3. Moderate Assist (performs 25 % to 75% of task)
4. Minimal Assist (performs 75% or more of task)
5. Supervision (no contact, no cues)
6. Modified Independence. (extra time or use of adaptive equipment)
7. Completely Independent (timely and safely)

List of Materials

Items provided:

- Roger
  - Food: Pecans, sugar, Karo syrup, vanilla extract, eggs, butter, pie shell
  - Instruments: pie pan, oven mitts, measuring spoons (table and teaspoon), 2 bowls, measuring cups (1 and ½ cups), rubber spatula, and Pam
- Stark:
  - Food: Rice, tomato paste, chopped onion, salt, chicken broth.
  - Instruments: pot, stirring spoon, can opener, measuring cups (1cup) measuring spoons (table and teaspoon), and Pam
- Banner:
  - Food: Water, and pancake mix
  - Instruments: Measuring cup (1 cup and 1/3 cup), bowl, frying pan, whisk, metal spatula

Pecan Pie Task Analysis

Pecan Pie	Date/Initials:
1. Preheat oven to 350	
2. Measure 1 cup Karo	
3. Add to bowl	
4. Measure 1 cup sugar	
5. Add to bowl	
6. Crack 3 eggs into Bowl	
7. Cut 2 tbsp butter	
8. Microwave to melt (30-45s total)	
9. Add to bowl	
10. Measure 1 tsp of vanilla extract	
11. Add to bowl	
12. Stir all ingredients in bowl (as long as eggs get broken up before next step)	
13. Measure 1 ½ cup of pecans	
14. Add to bowl	
15. Stir in bowl	
16. Mix until dissolved (make sure product is batter and not a lump)	
17. Spray pie pan with Pam	
18. Put pie crust in oven	
19. Pour batter into pie shell	
20. Put in oven	
21. Set timer for 60-70 minutes	
22. Wait	
23. When timer dings, remove using mitts	
24. Put on stove	
25. Turn off stove	
Total:	/25=

Spanish Rice Task Analysis

Spanish Rice	Date/Initials
1. Place pot on the stove	
2. Measure 2tbsp of olive oil	
3. Add to pot	
4. Turn on stove to medium (6-7)	
5. Measure 2 cups of rice	
6. Add to pot	
7. Stir until brown	
8. Measure 1 cup of onion	
9. Add to pot	
10. Stir until translucent (2-3m)	
11. Measure 3 cups of chicken broth	
12. Add to pot	
13. Open tomato paste with can opener	
14. Measure 1 tbsp of tomato paste	
15. Add to pot	
16. Measure 1tbsp of salt	
17. Bring to a simmer	
18. Reduce the heat to low (1-2)	
19. Cover the pot with the lid	
20. Set timer for 15-25minutes	
21. Cook for 15-25 minutes	
22. Remove from burner	
23. Turn off stove	
Total:	/23=

Pancake Task Analysis

Pancake	Date/Initials:
1. Place pan on stove	
2. Turn on stove medium-low (2-4)	
3. Measure 1 cup pancake mix	
4. Add to bow	
5. Measure 2/3 cup of water	
6. Add to bowl	
7. Stir all together	
8. See if pan is hot with water (must be before Pam)	
9. Spray pan with Pam	
10. Pour batter for <u>one</u> pancake	
11. Cook until bubbles throughout	
12. Leave pancake alone (except for separation of two but must be alone for entire side of cooking)	
13. Flip with spatula	
14. Cook other side	
15. Remove pancake from pan	
16. Turn off stove	
17. Take pan off of stove	
Total:	/17=

Pasta Task Analysis

Pasta	Date/Initials
1. Fill pot with water (3-4 way full)	
2. Place pot on stove	
3. Turn stove on medium (6-7)	
4. Wait for water to boil	
5. Once water is boiling, get pasta (small fistful)	
6. Break pasta in half	
7. Add to pot	
8. Stir	
9. Set timer for 8-10 minutes	
10. Wait 8-10 minutes	
11. Strain pasta in strainer	
12. Put back in pot	
13. Put on stove	
14. Turn on lower temperature (3-4)	
15. Pour sauce to cover pasta	
16. Let heat for two minutes	
17. Remove from heat	
18. Turn off stove	
Total:	/18=

Treatment Integrity Checklist

Treatment Integrity: Steps in Intervention: Video Modeling	Circle
1. The laptop is on and the participant's video is ready to view	Y N
2. The participant is guided to the computer and told to watch the video	Y N
3. The participant watches the video and throughout the video the researcher will remain silent.	Y N
4. After viewing the video, the researcher will deliver praise for participation.	Y N

Social Validity Questionnaire

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. I find this treatment to be an acceptable way of learning how to cook					
2. I would be willing to use this procedure if I had to learn a new skill					
3. I like the procedure used in this treatment					
4. I believe this treatment is likely to be effective					
5. I believe this treatment is likely to result in permanent improvement					
6. Overall, I have a positive reaction to this treatment					

IRB Approval Letter

USF UNIVERSITY OF SOUTH FLORIDA

RESEARCH INTEGRITY AND COMPLIANCE
Institutional Review Boards, FWA No. 00001669
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3/17/2016

Sarah Castro

ABA-Applied Behavior Analysis
13301 Bruce B Downs Blvd. Tampa,
FL 33612

RE: **Expedited Approval for Initial Review**

IRB#: Pro00024899

Title: Teaching Culinary Skills using Video Modeling to Individuals with Traumatic Brain Injury

Study Approval Period: 3/17/2016 to 3/17/2017

Dear Ms. Castro:

On 3/17/2016, the Institutional Review Board (IRB) reviewed and **APPROVED** the above application and all documents contained within, including those outlined below.

Approved Item(s):
Protocol Document(s):
Thesis Protocol

Consent/Assent Document(s)*:
Adult Minimal Risk .pdf
SB Assent .pdf

*Please use only the official IRB stamped informed consent/assent document(s) found under the "Attachments" tab. Please note, these consent/assent document(s) are only valid during the approval period indicated at the top of the form(s).

It was the determination of the IRB that your study qualified for expedited review which includes activities that (1) present no more than minimal risk to human subjects, and (2) involve only procedures listed in one or more of the categories outlined below. The IRB may review research through the expedited review procedure authorized by 45CFR46.110 and 21 CFR

56.110. The research proposed in this study is categorized under the following expedited review category:

(6) Collection of data from voice, video, digital, or image recordings made for research purposes.

(7) Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.

As the principal investigator of this study, it is your responsibility to conduct this study in accordance with IRB policies and procedures and as approved by the IRB. Any changes to the approved research must be submitted to the IRB for review and approval via an amendment. Additionally, all unanticipated problems must be reported to the USF IRB within five (5) calendar days.

We appreciate your dedication to the ethical conduct of human subject research at the University of South Florida and your continued commitment to human research protections. If you have any questions regarding this matter, please call 813-974-5638.

Sincerely,

Kristen Salomon, Ph.D., Vice Chairperson

USF Institutional Review Board