5-26-2020

Video-Based Interventions: Teaching Adults and Preschoolers

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VIDEO BASED INTERVENTIONS: TEACHING ADULTS AND PRESCHOOLERS

A Dissertation

Submitted to the Graduate Faculty of
Louisiana State University and
Agricultural and Mechanical College
in partial fulfillment of the
requirements for the degree of
Doctorate of Philosophy

in

The Department of Psychology

by
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B. S., University of Louisiana at Lafayette, 2014
M. A., Louisiana State University, 2017
August 2020

ACKNOWLEDGEMENTS

I would first like to thank my parents and family for their support during my academic career.

I would like to thank my major professor Dr. George Noell of Louisiana State University. His support and feedback throughout this project provided me with the assistance necessary to complete this study.

I would also like to thank my committee members that were involved in the thesis process: Dr. Mary Lou Kelly and Dr. Frank Gresham. Their thoughtful input was invaluable in facilitating the completion of this study.

Lastly, I would like to thank my previous undergraduate advisor, Dr. Hung Chu Lin of the University of Louisiana at Lafayette. Her unfailing support and encouragement continues to motivate me through the pursuit of my doctorate degree.

TABLE OF CONTENTS

ABSTRACT

Long gone are the days in which technology is looked upon as a trivial novelty. Whether evoking positive or negative reactions, advancements in technology continue to alter our daily environments. One such example is Video Based Interventions (VBI). VBI utilize video recording to facilitate the acquisition of various skills and behaviors (Rayner, Denholm, & Sigafoos, 2009). While it may sound like a simple intervention at first, many procedural variations of have been examined in research and practice. The two experiments comprising the current study examined the effectiveness of video models when used in conjunction with other instructional methods. Experiment I examined the effectiveness of video prompting when paired with backward chaining. This treatment package was used to promote functional skill acquisition in preschool and kindergarten age children. Experiment II then used video modeling combined with performance feedback to teach the aforementioned video prompting treatment package to novel adults. During this experiment, the adults' performance was assessed via treatment adherence when working with typically developing children. All child participants acquired and maintained their target skills through the use of the video-based treatment package. Adult participants were also able to maintain sufficient levels of treatment adherence upon completion of the adult video training. Social validity data indicated that both interventions were acceptable and practical methods of skill acquisition. This study's findings support previous research regarding the effectiveness of video-based treatment packages when training children and treatment agents (Bellini & Akullian, 2007; Giannakakos et al., 2016; McCulloch & Noonan, 2013; Mechling, 2005; Moore & Fisher, 2007; Keenan, Keenan et al., 2007; Reeve et al., 2007).

CHAPTER 1. INTRODUCTION

Observational learning and imitation are extremely useful for facilitating skill acquisition in both adults and children (Bandura, 1977; Meltzoff, 1990). This concept was described in Bandura's (1977) social learning theory, which stated that individuals use everyday observations to guide their behavior. Bandura (1977) found that these observations not only facilitated skill acquisition, but can serve to increase an individual's beliefs about their ability to perform the skill (i.e. self-efficacy; Stajkovic & Luthans, 1998). Since then, researchers have searched for new ways to make learning via observation more efficient. Various methods from behavioral skills training (BST; Parsons, Rollyson & Reid, 2013) to interactive computerized training (ICT; Higbee et al., 2016) have been effective for both child and adult instruction (Johnson et al., 2005). Although effective, these methods can often be resource intensive (Higbee et al., 2016). For example, BST is typically presented as a multi-step, in-vivo training method requiring 25-40 hours of hands-on training (Koegel, Russo, & Rincover, 1977). ICT presents itself as a comprehensive, multi-module training package, but has had inconsistent generalization results (Higbee et al., 2016). As an alternative, video-based interventions (VBI) have been used to teach children (Bellini & Akullian, 2007) and adults (McCulloch & Noonan, 2013) specific skills or interventions. This alternative serves as a more practical, low-cost way to provide targeted skill instructions.

VBI utilize video recordings of a model's behavior for teaching purposes. This teaching format can provide numerous benefits including reduced errors in the modeled behavior, portability, ease-of-access, and low resource cost (Keenan et al., 2017). These advantages have contributed to recent increasing emphasis on VBI in both research and practical applications. In addition to the aforementioned benefits, VBI have been shown to be effective for use in numerous settings, with various individuals, and with various skills (Bellini & Akullian, 2007;

Catania et al., 2009; Giannakakos et al., 2016; McCulloch & Noonan, 2013; Neef et al., 1991; Rayner, Denholm, & Sigafoos, 2009).

The following studies examined the effectiveness of VBI as the vehicle for providing self-care skills intervention to children and in preparing adults to implement that intervention with children. The majority of the research on VBI's effectiveness has been done either with children with developmental disabilities (Aykut et al., 2014; Bellini & Akullian, 2007; Cannella-Malone et al., 2006; Graves et al., 2005; Norman, Collins, & Schuster, 2001) or for staff training purposes (McCulloch & Noonan, 2013; Moore & Fisher, 2009; Neef et al., 1991; Reeve et al., 2007). While the literature for the use of VBIs has been positive (Bellini & Akullian, 2007; Giannakakos et al., 2016), there is little information regarding its effectiveness when used to teach novel practitioners to implement video modeling procedures for typically developing (TD) children (Wright & Prescott, 2017).

The use of VBIs for the training of adult staff members has been proven to be an efficient alternative to previous training methods (Giannakakos et al., 2016; McCulloch & Noonan, 2013). However, there is a lack of research involving the use of VBIs to teach adults video prompting interventions. The current study attempts to address these issues. Experiment I examined a treatment package that combines video prompting and backward chaining to teach functional skills to TD preschoolers. These procedures were then taught to novice adults through the use of video modeling and performance feedback in Experiment II. The main purpose of this study was to provide clinics and schools with a readily accessible way of training staff, teachers, and potentially parents to facilitate skill acquisition in children. The findings from this study serve to increase our knowledge of both effective training methods for treatment agents and the evidence-based practices they can use.

CHAPTER 2. LITERATURE REVIEW

Video Based Intervention

VBIs make use of advances in recording technologies by allowing easy access to the repeated playback of a model or modelled behavior. In this form of instruction, the participant watches a video recording in order to observe the performance of a behavior or skill. While ease-of-access for the learner is one readily apparent advantage, Thurston and Urbanska (2017) recently conducted a systematic review and meta-analysis in which they described other advantages of using VBIs. One benefit described is that VBIs allow for the removal of irrelevant behaviors and can provide the observer with a clear representation of the target behavior. As a result, the learner has access to a highly accurate and consistent model. VBIs also provide the user with the ability to present exemplars of many different types of behaviors in various settings (Keenan et al., 2017). VBI's ease-of-access and flexibility has caused it to become popular among practitioners (Bellini & Akullian, 2007; Keenan et al., 2007). The VBI literature has identified a number of procedural variations including video feedback, video modeling, video self-modeling, point-of-view modeling, video prompting, and computer-based video instruction (Rayner et al., 2009; Keenan et al., 2017).

Video feedback interventions are those in which an individual's behavior is recorded and then reviewed by a researcher or supervisor (Keenan et al., 2017). During this review, the individual is also able to rate and receive feedback on their performance (Dowrick, 1999). The basic idea behind this type of VBI is that individuals will be able to foster more realistic perceptions of their own abilities and behavior by receiving feedback and reviewing their past performance. Prior research supports the effectiveness of this instructional method for multiple populations including individuals with multiple developmental disorders (Embregts, 2000; Embregts, 2002), those with internalizing disorders (Embregts, 2003), and those with ASD

(Thiemann & Goldstein, 2001). Embregts (2000) found the use of video feedback was effective in decreasing inappropriate target behaviors (i.e. hitting, pushing, verbal threats, and insults) in adolescents with mild intellectual disability (ID). Embregts (2002) then went on to examine video feedback for use in the instruction of social skills and reduction of inappropriate behaviors. While a reduction in inappropriate behaviors was found for all participants, Embregts (2002) was unable to demonstrate any reversal effects. It appears that the skill learning that occurred as part of the study did not allow a verification of baseline with a return to baseline. Across studies, research supports the effectiveness of video feedback for skill acquisition (Embregts, 2003; Mechling, 2005; Thiemann & Goldstein, 2001).

Across all the variations, video modeling (VM) appears to be the most common VBI. This simply allows for the observation and imitation of a pre-recorded behavior. While the majority of the support for the use of VM derives from studies with individuals with ASD, its effectiveness is also supported for use with TD children as well (Bellini & Akullian, 2007; Cardon & Azuma, 2012; Mechling, 2005; Taylor, Levin, & Jasper, 1999). VM has been shown to be effective in the instruction of play skills (Taylor et al.,1999), self-help skill acquisition (Norman et al., 2001), and many other skills (Cardon & Azuma, 2012; Shipley-Benamou, Lutzker, & Taubman, 2002; Shrestha et al., 2013).

Taylor and colleagues (1999) used two multiple probe design experiments to assess the effectiveness of video modeling when used to teach play comments to two children with ASD. In the first study, each child was shown pre-recorded, scripted play comments being exchanged between an adult and the child's sibling. For the second study, Taylor and colleagues (1999) used a forward chaining procedure combined with pre-recorded, unscripted play comments. In both studies, the children participated in practice sessions (adult), probe sessions (sibling), and retention sessions (sibling) using the same verbal stimuli as presented in the video. The results from these studies indicate that video modeling is an effective method for increasing both scripted and unscripted play comments in children with ASD.

For students with down syndrome and ASD, Norman and colleagues (2001) examined the effectiveness of a treatment package that combined video modeling and video prompting to facilitate self-help skill acquisition. Using a multiple probe design, 2 students with down syndrome and one with a combined presentation of ASD and attention deficit hyperactivity disorder (ADHD) were shown a video that provided three different prompts; 1) verbal prompt, 2) text prompt, and 3) modeled prompt. The results indicate that the video-based treatment package was effective in promoting skill acquisition. Norman and colleagues (2001) also noted that as the children became more accustomed to the prompts, it took them fewer sessions to reach mastery. Lastly, the students were also found to have maintained the mastered skills post-treatment (Norman et al., 2001).

In a slightly different vein, Cardon and Azuma (2012) examined the effect of in-vivo versus video presentations on the visual attending of children with ASD and their TD peers. The children in this study observed puppet shows presented via video and in-vivo and each child's visual attention was measured. Cardon and Azuma (2012) found that TD children maintained their attention longer than children with ASD. Also, both the TD children and the children with ASD had longer attention spans for the video recording compared to the in-vivo puppet show. These studies serve to highlight the benefits of using VM for both TD children and those with ASD.

The third form of VBI, video self-modeling (VSM), involves the active observation and imitation of a pre-recorded behavior in which the learner is the actor (Mechling, 2005). Researchers hypothesize that individuals are able to build high levels of self-efficacy (i.e. beliefs related to one's own capabilities; Stajkovic & Luthans, 1998) through the observation of their own accomplishments (Bray & Kehle, 1996; Mechling, 2005). Some research has supported this and found a correlation between changes in skill acquisition and changes in self-efficacy (Bradley, 1993; Stajkovic & Luthans, 1998). Bellini and Akullian (2007) also found video modeling and VSM to be identifiable as an evidence-based practices based on the criteria outlined by Horner and colleagues (2005). In terms of research support, a meta-analysis was conducted by Bellini and Akullian (2007) regarding VM and VSM for individuals with ASD. They found that, in studies that targeted functional skills, both VM and VSM were not only effective in self-help skill acquisition, but also in the generalization and maintenance of the newly learned skills (Bellini, Akullian, & Hopf, 2007).In more recent research, Kurnaz and Yanardag (2018) used a multiple probe design to examine the effectiveness of VSM for the instruction of active video game skills to children with ASD. Results revealed that VSM was effective in video game skill acquisition and the video game playing behavior was both maintained and generalized (Kurnaz & Yanardag, 2018).

The terminology used to describe VSM can be confusing. Often times, researchers may refer to this form of VBI by one of its two variations; positive self-review (PSR) and feedforward (Dowrick, 1999). PSR typically involves an individual observing their best or most appropriate performances (Dowrick, 1999). Clare and colleagues (2000) examined the effectiveness of PSR in increasing on-task behavior. Using a multiple baseline design across participants, three students watched recordings of their own appropriate on-task behavior. Performance was assessed via a momentary time sampling with 10-second intervals during 15-minute observation sessions. A composite of peer on-task behavior was also obtained for other students in the class via direct observations. The results from this study found that PSR was an effective method of increasing the on-task behavior of TD children (Claire et al., 2000). The post-treatment improvements were also found to have been both maintained at 6 to 8 weeks and generalized to novel classrooms.

The other type of VSM, feedforward, involves the active observation of a skill that the observer has yet to learn or has learned and is now observing its performance in a novel scenario (Bellini et al., 2007; Mechling, 2005). Bellini and colleagues (2007) used the feedforward technique to increase social engagement in pre-school age children with ASD. Adult prompted social interactions were recorded and then edited to remove the adult prompt. During treatment, each child watched their respective video at the start of every school day. After watching the video, each child's performance was assessed via a 30-minute observation of "free-play" with their peers. Children were not reinforced for appropriate social engagement. These findings indicate that feedforward was an effective way of increasing and maintaining social engagement in this population (Bellini et al., 2007).

The fourth type of VBI, point-of-view video modeling (POV-VM), involves a recorded behavior shown from a first-person point-of-view (Mechling, 2005). While there is some research supporting the use of POV-VM in skill acquisition, the majority of this research involves its use in conjunction with computer-based packages (Mechling, 2005). For example, Mechling, Gast, and Barthold (2003) combined video prompting and POV-VM into a computer-based treatment package for teenage students with ID. This treatment package was examined for its effectiveness when used to teach three students with ID the skill of using a debit card to make purchases. During treatment, each student watched the videos twice a day and was provided opportunities to interact with a simulated ATM experience. Correct responses received verbal praise and gestural prompts were provided for incorrect responses. Overall, the package was found to be effective in promoting both acquisition and generalization of the purchasing skill (Mechling et al., 2003).

In terms of studies that examined POV-VM when presented in the absence of a computer package, the results are generally positive (Hine & Wolery, 2006; Norman et al., 2001; Schreibman Whalen, & Stahmer, 2000; Shipley-Benamou et al., 2002; Sigafoos et al., 2005). Schreibman and colleagues (2000) examined the effectiveness of POV-VM when used to promote the reduction of disruptive behavior during transitions in children with ASD. In this study, participants were shown videos of the environment that they would be transitioning to. Generalization probes with and without irrelevant video (i.e. video of a novel environment that the child was not going to visit) were also conducted. The purpose of the probes was to 1) assess behavior change without the video priming and 2) assess behavior change in reference to an irrelevant video. During treatment, children were shown the videos and then immediately taken to the environment shown in the video. Generally, Schreibman and colleagues (2000) found that POV-VM was an effective method of reducing problem behaviors related to transitions in this population. Findings also revealed that the reduction in problem behavior had generalized to novel environments.

Shibley-Benamou and colleagues (2002) also used POV-VM for children with ASD to teach daily living skills. Using a multiple probe design, three children were taught individualized living skills via POV-VM. During treatment, the children were shown the video and prompted to perform the corresponding behavior. One unique aspect of this study is that the researchers did not provide physical assistance. After watching the video, each child was given a prompt to perform the task. If the child did not comply within 60s, a second prompt was made. If noncompliance continued, then the attempt would be incomplete and all materials would be removed. Praise was provided for attempts in all conditions, but praise and a preferred reward were provided for reaching the mastery criterion of a task (i.e. 100%). The results from this study found that POV-VM was an effective method for promoting life skill acquisition in children with

ASD. All children performed at least 75% of the target task steps 1 month after treatment. Overall, the research literature supports the use of POV-VM for skill acquisition and priming purposes (Mechling, 2005; Schreibman et al., 2000; Shipley-Benamou et al., 2002).

Video prompting is the fifth form of VBI in which a pre-recorded behavior is presented to the observer in many small clips (Keenan et al., 2017). Cannella-Malone and colleagues (2006) used a multiple-probe across participants design with an alternating treatments design to compare and contrast the effectiveness of VM and POV-video prompting. In this study, six adults with developmental disabilities were taught to complete two daily living tasks; putting away groceries and arranging a place setting at a table. During the POV-video prompting sessions, 10 video clips were made for each task (one for each step). After watching the video, the participant was prompted to complete the corresponding step. If the step was incomplete 30s after the prompt, the step was completed by the researcher in a discreet manner and the video for the next step in the task was presented. During the video modeling sessions, a single video was made to depict each task in its entirety. After watching the video model, participants were prompted and given 30s to initiate the task. The researchers also used error correction in the form of verbal feedback and re-watching the video for continuous incorrect responding. Results indicate that video prompting was more effective in skill acquisition for all participants and across both behaviors compared to VM (Cannella-Malone et al., 2006). By allowing the individual to watch and master each step of the skill in isolation, the researchers concluded that the observer is able to learn behaviors more effectively than standard video modeling (Cannella-Malone et al., 2006).

In recent research, Knight, Kuntz, and Brown (2018) also used video prompting to promote skill acquisition, but for academics. Using a multiple probe across participants and behaviors design, two students with ASD and one student with ID were taught two individualized academic skills. The selected skills ranged from fractions to geographical problem solving. During treatment, each child was shown the video prompt and then asked to perform the step. The children were also allowed to pause and rewind the video during the training. The results indicated that video prompting was effective for academic skill acquisition in children with ASD and ID. These results parallel those of previous studies, providing support for the use of video prompting (Cannella-Malone et al., 2006; Knight et al, 2018; Le Grice & Blampied, 1994; Sigafoos et al., 2006; Tiong et al., 1992).

The sixth form of VBI, interactive video instruction, involves the observation of a pre-recorded step in a behavior which is then followed by a response prompt (Mechling, 2005). Progression to novice steps are then determined by a correct or incorrect response. The effectiveness of this intervention was examined for the instruction of grocery store sight words to young adults, ages 16-19, with ID (Kyhl, Alper, & Sinclair, 1999). Using a multiple baseline design, each participant was presented with a video stimulus that asked, "Look at the word. This word is _____". Participants were then prompted to identify the correct word. Verbal praise was given for correct responses and incorrect responses resulted in the video being replayed and the child being prompted again. A generalization phase was also conducted in which participants were required to find a target word in the store and verbalize it. Maintenance and follow-up phases were also conducted to assess the stability of learning. Findings indicate that the interactive video instruction was effective in the instruction of sight words for this population (Kyhl et al., 1999). The results were also generalized and maintained for up to five months after treatment (Kyhl et al., 1999).

The last form of VBI is computer-based video instruction (CBVI). Through the combination of video recording and computer-based instruction, CBVI uses multimedia to present a complete sensory package of instruction (Mechling, 2005). Researchers hypothesize that this form of VBI can lead to increased rates of attention as a result of computers and media files being associated with recreational video games (Mechling, 2005; Nusir et al., 2013). Nusir and colleagues (2013) examined the impact of CBVI when used to teach basic math skills to first grade, TD students. In this study, 145 students were randomly assigned to two groups and learned two different math topics. For the first topic, one group was taught via the CBVI and the other group was taught via traditional methods. After instruction, the CBVI group was assessed via a computer-based quiz while the traditional group was assessed via a paper quiz. Once testing was complete, the groups were reversed in terms of the instructional approach used to teach the second topic. Nusir and colleagues (2013) found that the CBVI led to significantly better test scores than the traditional teaching method.

Positive results have also been demonstrated for simulation-based CBVI (Holzinger et al., 2009). Holzinger and colleagues (2009) assessed the effectiveness of a simulation program when used to teach various topics (i.e. complex physiological models, bloodflow, etc.). The simulation used in this experiment presented multiple solid-mathematical models in dynamic 2D and 3D formats. This was designed to allow for greater insight regarding blood circulation dynamics and other topics such as defects and effects of diseases. Using a quasi-experimental design, 96 medical students were divided into three conditions; 1) taught using a conventional text-based format, 2) taught via simulation alone, and 3) taught using simulation and additional support. Results revealed that students performed significantly better when given additional support while being taught via the simulation. Student performance did not differ when taught in the text format compared to the stimulation alone. These results parallel those of other research, providing support for the use of CBVI as an instructional method under some but not all conditions (Holzinger et al., 2009; Lancaster, Schumaker, & Deshler, 2002; Mechling, Gast, & Langone 2002; Mechling & Gast, 2003; Mechling & Langone, 2000; Nusir et al., 2013).

Theoretical Foundations

The theoretical foundations for VBIs derive primarily from the observational learning literature (Bellini & Akullian, 2007; Meltzoff, 1990). Bandura (1971) became a major proponent of this construct within social learning theory (Bellini & Akullian, 2007). Built on the idea of individual agency, this theory proposes that individuals can exert their own intentional influence on events in their environment (Bandura, 2012). While agency is a part of social learning theory, it doesn't ignore the fact that human behavior is influenced by a mix of personal, behavioral, and environmental determinants (Bandura, 2012). In short, this theory states that, while we are agents in our environment, our behavior is still influenced by many other factors (Bandura, 2012). One factor that is emphasized within social learning theory is the observation of others in our environment (Bandura, 1977).

Building on the basic behavioral principles of operant and classical conditioning, Bandura (1977) argued that individuals use the actions of others as templates for their own behavior. These templates for behaviors allow us to not only gain information related to its performance, but we're also able to witness the consequences of behavior without having to produce it (Bandura, 1977). In what is likely his most well-known study, Bandura and colleagues (1961) exposed preschool children to aggressive and non-aggressive models. The main purpose of this study was to examine whether or not children would imitate a behavior in a setting in which the model is absent (Bandura et al., 1961). Seventy-two participants were split into three main groups of 24; an aggressive model group, a non-aggressive model group, and a control group. Results showed that observation of aggressive models not only produced similar aggressive behavior, but this behavior was significantly more aggressive than the behavior produced by non-aggressive and control groups.

A later study conducted in a similar manner further examined imitative learning of aggression (Bandura et al., 1963). Subjects were divided into three experimental groups and one control group of 24. Each experimental group observed a different variation of aggression towards a bobo-doll; in-vivo aggression, pre-recorded aggression with a human model, and pre-recorded aggression with a cartoon model. Results showed that groups who had observed any aggressive model produced almost twice the amount of aggressive behavior compared to controls (Bandura et al., 1963). Bandura (1965) then went on to examine differences in imitation for behavior that was either punished or rewarded. In this study, participants either observed an aggressive model being rewarded, an aggressive model being punished, or an aggressive model with no consequences. Children in the model-rewarded condition produced more aggressive behavior than those in the control or model-punished condition. Conversely, children in the model-punished condition produced less aggressive behavior than their counterparts and were able to describe the model's behavior at a later time. The findings support the idea that both response inhibition and disinhibition can be transmitted vicariously (Bandura, 1965). These three studies, as well as the results of previous studies, highlight the effects of observation on learning and performance (Frying et al., 2011).

Subsequent to these seminal findings, researchers have tried to find ways of making learning via observation more effective. D'Innocenzo and colleagues (2016) examined gaze pattern as a specific factor that was hypothesized to facilitate better learning via observation. In this experiment, the gaze of novice individuals was guided when observing a task to improve skill acquisition. D'Innocenzo and colleagues (2016) hypothesized that improved skill acquisition for a golf swing would occur when participant attention is guided towards task-relevant cues. Participants viewed one of three different videos. The first video involved an expert golfer swinging a golf club 10 times. The second video involved a similar situation, but with color cues placed in the video as an attempt to highlight important motor actions. The final video presented information related to the history of golf as a sport. Results revealed accelerated rate of learning in participants whose gaze was directed towards task-relevant cues of performance (D'Innocenzo et al., 2016). Also, the participants who did not receive guidance relative to their gaze did not improve immediately after watching the video, whereas those who received assistance did (D'Innocenzeo et al., 2016). These results, and many others like them, provide robust support for the impact that active and focused observation has on learning (Boucheix & Lowe, 2010; Jarodzka et al., 2013; de Koning et al., 2007).

In addition to increases in the rate of skill acquisition, other hypothesized benefits to learning via observation include increases in self-efficacy (Bandura, 1982; Law & Hall, 2009). Bandura (1982) defined self-efficacy as a personal expectation of one's capability to perform a behavior, action, or task in a given situation. The expectations of personal efficacy were then broken down into four principle factors; performance accomplishments, vicarious experience, verbal persuasion, and physiological states. The source of performance accomplishments relates to the personal successes that an individual experience. Repeated failures at a task punish, whereas, repeated successes reinforce performance. As a learning history of successes is developed and strengthened, the individual is less likely to be affected by failures in the future and more likely to generalize their increased self-efficacy to other situations. Collins (1982) examined this idea by having children at high, medium, and low levels of mathematical ability complete difficult math problems. Results indicate that, regardless of ability, participants with higher levels of academic self-efficacy performed better and were more adaptive when using a failing strategy than their peers with self-doubt (Collins, 1982). Meece, Wigfield and Eccles (1990) also examined the influence of past academic performance on current outcomes for children. Results indicate that performance was directly related to ability perceptions, expectancies, and value perceptions. In other words, children who had done better in the past, had more positive expectations for their performance in the future (Meece et al., 1990).

The second source of information, verbal persuasion, describes the concept of altering human behavior via verbal behavior. The idea behind this source of information is that individuals can alter self-efficacy by suggesting that someone can successfully perform the task at hand (Bandura, 1977). Often times, this suggestion is reinforced by information related the individual's past performance on other tasks. Verbal persuasion is less focused on increasing the individual's own performance and more focused on enhancing their cognitive beliefs related to their performance (Stajkovic & Luthans, 1998).

The third source of information, physiological states, deals more with the individual's emotional state. Bandura (1977) argues that anxiety and stress can influence an individual's perceived self-efficacy. Perceptions related to the management of anxiety or stress in the face of difficult situations were also hypothesized to influence self-efficacy (Bandura, 1993). Individuals that have low self-efficacy related to their ability to cope with stressful situations typically experience more stress (Bandura, 1988). However, through the use of mastery experiences related to emotional regulation, Bandura (1993) argues that individuals are able to increase their perceived self-efficacy and become more resistant stressful events.

The fourth and final source of information, vicarious experience, is based on the observation of others. While the gains in self-efficacy and performance via modelling and vicarious observation alone are fairly weak, they can still have an impact on performance (Bandura, 1977; Law & Hall, 2009). There is a great deal of research examining the effect of observation on efficacy in many domains (e.g. business: Stajkovic & Luthans, 1998; and sports: Bruton, Mellalieu, & Shearer, 2016; Feltz, Short, & Sullivan, 2008; Law & Hall, 2009). This increase in self-efficacy as a result of observation was first proposed in his paper titled *Self-*

Efficacy: Toward a Unifying Theory of Behavioral Change (Bandura, 1977). Bandura (1982) argued that observing others can influence our beliefs about our own performance (Bandura, 1982; Law & Hall, 2009). Law and Hall (2009) went on to examined this hypothesized increase in self-efficacy by examining the beliefs of adult novice athletes. In this experiment, adult participants completed both an observational learning questionnaire (FOLQ) and a self-efficacy questionnaire. Results indicate that when learning an independent sport, observational learning was able to predict increased self-efficacy for learning techniques and strategies. Prior research has also shown that observers can then generalize the increases in self-efficacy to other, novel behaviors (Bandura, 1969; Bandura, 1977; Lewis, 1974; Ritter, 1969). While observational learning and VBIs have been shown to be effective, these methods are not typically used in isolation (Bellini & Akullian, 2007). One intervention that VBIs are typically paired with for skill acquisition is response chaining (Slocum & Tiger, 2011).

Response Chaining

Response chaining procedures involve breaking a behavior or skill down into a number of steps that are then taught in a sequential fashion (Slocum & Tiger, 2011). Steps are typically presented with a verbal prompt from the instructor, followed by an attempt from the learner. The linking of behaviors into chains produced by this form of instruction allow the individual to slowly build up mastery of the skill. (Cooper, Heron, & Heward, 2007; Teague, Gittelman, & Park, 1994). Both the research literature and its popularity among practitioners support the idea that response chaining is an effective method for facilitating the skill development (Batra & Batra, 2006; Rayner, 2011; Slocum & Tiger, 2011; Smith, 1999).

There are two major approaches to chaining procedures; part and whole. Part procedures typically consist of dissecting a behavior into a number of steps that are presented in sequence to the individual. As a result, part procedures require the individual to learn the skill one step at a time (Teague et al., 1994). Take the learning of a behavioral sequence ABCD for example. When using part procedures, the individual will master A prior to attempting B and so on. Whole chaining procedures consist of an individual attempting and mastering the behavior or skill as a whole. The entire ABCD chain would be presented on each instructional trial (Teague et al., 1994). Prior research has suggested that this may have some advantages as it eliminates the time and expertise needed to break down a skill or behavior (Teague et al., 1994).

Research has examined the differences in treatment effects for part and whole training. Steffens' (1900; cited by Teague et al., 1994) conducted an experiment in which participants memorized poetry. For this experiment, there was a whole condition (memorized an entire stanza) and a part condition (memorized each line of the stanza in sequence). In the end, Steffens found that memorizing the entire stanza was more efficient than memorizing each line. This question was subsequently taken up by Naylor and Briggs (1963) in which an effect for variation in task complexity and organization was found for the two procedures. Part training was found to be more effective for unorganized, complex tasks, whereas, whole training was found to be more effective for organized tasks (Naylor & Briggs, 1963). In more recent research, Khalil and Elkhider (2015) examined the research literature behind learning and instruction. In their literature review, the theoretical basis for instructional materials was provided and discussed in terms of its practicality for classroom settings. One instructional model presented in this review was the four-component instructional design system (4C/ID-model). This instructional model holds that learning to perform a complex skill involves mastering the components that comprise that skill (Van Merriënboer, Clark, & De Croock, 2002) . According to Khalil and Elkhider (2015), this model is typically used for complex learning and consists of four major components; 1) scaffolding, 2) cognitive learning strategies (i.e. mental models, cognitive feedback, etc.), 3) supportive information, and 4) part-task practice. Within the 4C/ID model, heavy emphasis is placed on allowing the learner to gain frequent, repeated practice with various features of a behavior (Kahlil & Elkhider, 2015). Through this practice, the learner will be able to reach a high level of automaticity with their target skill (Van Merriënboer et al., 2002).

In addition to the part and whole distinction, researchers have also described chaining procedures as forward chaining, backward chaining, and total task (Walls, Zane, & Ellis, 1981). The first procedure, forward chaining, is a part procedure that begins the chaining process with the first step in the chain. In this procedure, participants attempt the first step and are provided reinforcement contingent upon step completion. Once the step has been mastered, the participant was then required to perform both the mastered step and a novel step to obtain reinforcement. Forward chaining can be useful due to its ability to combine low complexity behavior response chains into larger, more complex chains (Walls et al., 1981). An alternative to forward chaining is backward chaining. This form of response chaining begins with the last step in the chain, which is the target of initial training. Once the participant has mastered the step, the second to last step is presented in addition to the last step. Steps will continue to be presented and chained in this manner until the participant has mastered the entire task or behavior. One benefit to backward chaining is that it maintains consistency related to the reinforcement requirements (Rayner, 2011). This is because the participant will always receive reinforcement after the last step, in contrast to forward chaining. The final response chaining method to be discussed is total task. Total task and whole task response chaining are essentially the same procedure, in that the entire task is presented on every trial.

There is consensus in the research literature regarding the idea that training methods should be selected based on task difficulty and individual needs (Cooper et al., 2007). Walls and colleagues (1981) compared the effects of backward, forward, and total task training when used to teach task assembly skills to adults with ID. Each participant was trained using each of the three methods for three different target tasks; assembly of a carburetor, bicycle brake, and meat grinder. Overall, both backward and forward chaining proved to be more effective than total task in terms of error reduction (Walls et al., 1981). In more recent research, Al-Ajlan (2015) conducted a comparative study to examine whether forward or backward chaining is more effective when used as reasoning strategies. Results indicate that backward chaining is more effective for goal or hypothesis driven reasoning, whereas forward chaining is more effective for data-driven reasoning (Al-Ajlan, 2015). While the research is consistent that certain methods are more effective for certain things, there is no consensus regarding which method is universally more effective (Cooper et al., 2007). The previously described chaining procedures are commonly used to instruct children, but they can also be used in adult instruction.

Training Treatment Agents

Bolstered by research support, treatments derived from the foundations of applied behavior analysis (ABA) continue to dominate the skill development literature (Higbee et al., 2016). While effective, one potential drawback to ABA procedures is that training staff can be resource intensive. The majority of formal training on ABA occurs during either graduate or commercial training and can often be intensive and time-consuming (Baer, Wolf, & Risley, 1968, Higbee et al., 2016). For example, training staff to properly use and understand behavioral strategies is typically done in a behavioral skills training (BST) format. Koegel and colleagues (1977) used a modified multi-response baseline to monitor the behavior of 11 teachers who were being trained to use behavior modification techniques with children with Autism Spectrum Disorder (ASD). While the training procedures established target behaviors and promoted generalization, the teachers required 25 to 40 hours of hands on training to achieve appropriate treatment integrity (Koegel et al., 1977). In more recent research, Parsons and colleagues (2013) assessed the effectiveness of BST when used to train staff to conduct BST. Findings support the idea that BST is an effective method of training staff and acceptability results indicate that BST is an acceptable training method (Parsons et al., 2013). Using simulated training sessions to assess the performance of staffs' BST skills, Parsons and colleagues (2013) found that all participants were able to increase their proficiency post-training. While effective, BST carries with it the same limitation as other ABA based strategies in that it can often be very resource intensive and logistically challenging (Higbee et al., 2016; Koegel et al., 1977).

Self and Remote Instruction

Self-instructional manuals have been developed to provide less resource intensive training approaches. Fazzio and Martin (2006) developed a self-instructional manual to teach Discrete Trial Training (DTT). Arnal and colleagues (2007) then examined the effectiveness of this manual by using it to teach undergraduate students to implement DTT procedures. Using two experiments, one with undergraduate students and one with experienced tutors, Arnal and colleagues (2007) found self-instruction to be a viable method for instruction. Since then, the manual has been revised, replicated, and its effectiveness was then assessed by Thiessen and colleagues (2009; Fazzio & Martin, 2007). Using the revised self-instructional manual, Thiessen and colleagues (2009) trained four undergraduate students to implement DTT procedures with a confederate child with autism. Averaging a training time of 4 hours and 34 minutes, the self-instructional manual proved to be an effective method for teaching DTT (Thiessen et al., 2009).

A second method for the instruction of behavioral strategies is ICT (Fazzio et al., 2009). ICT provides a low cost method for staff to be trained and receive feedback remotely by removing many of the logistical problems associated with group staff training. ICT is often presented in an "all-in-one" online fashion, in which an individual is presented with a program consisting of video models, integrated quizzes, and self-practice opportunities. By bridging the logistical gap between trained professionals and rural areas, ICTs can train individuals that may not be able to meet for an in-person training experience (Higbee et al., 2016; Pollard et al., 2014). This instructional method also allows individuals to receive either immediate or remote feedback to their performance in a more efficient manner. In the past, ICT has been used to train staff on a number of topics including computing (Kekkonen-Moneta & Moneta, 2002), medical education (Ruiz, Mintzer, & Leipzig 2006) and environmental science information (Wright, 2008).

The literature on the use of ICT to train staff on behavioral procedures is growing, but appears promising (Granpeesheh, 2010; McCulloch & Noonan, 2013; Nosik, 2011; Nosik, 2013; Pollard et al., 2014; Higbee et al., 2016). McCulloch and Noonan (2013) were among the first researchers to test this form of instruction for behavioral strategies. Using a multiple baseline design across participants, McCulloch and Noonan (2013) examined the effectiveness of online training videos (OTV) when used to teach mand training procedures to three paraprofessionals. The researchers found that the OTVs were not only able to increase correct implementation, but participants also maintained performance over time.

Granpeesheh and colleagues (2010) examined differences in treatment effectiveness for ICT compared to traditional didactic group training. Overall, findings indicate that both methods were effective for the training of behavioral principles, but participants in the traditional training group had slightly better performance (Granpeesheh et al., 2010). Higbee and colleagues (2016) examined the effectiveness of ICT with both novel and veteran special education practitioners in Brazil. They found that ICT continued to be effective even across cultures, furthering support for this instructional method. While effective, one limitation to the use of ICT is that it can often require extensive training time for participants to complete all the training modules. Long training times and the technical challenges to preparing materials can make this form of instruction particularly difficult to use effectively (Higbee et al., 2016; Pollard et al., 2014). This study and many others that suggest ICT can be an effective method of instruction for training staff on behavioral strategies (Granpeesheh et al., 2010; Higbee, 2016; Nosik, 2013; Pollard, 2014).

In addition to self-instruction manuals and ICT, teleconsultation has been used to train staff working with children that have mild problem behavior. Deldar and colleagues (2016) defined teleconsultation as a method of consultation that is performed with the intent of removing geographical and distance barriers to allow for communication between health care providers. While traditional problem-solving consultation has been shown to be effective practice, it can be difficult to provide this service to more rural areas (Kratochwill, Altschaefl, & Bice-Urbach, 2014).

Bice-Urbach and Kratochwill (2016) examined the effectiveness of teleconsultation on behavior support outcomes for students living in rural communities. Student-teacher dyads were created based on level of need and only students with disruptive behaviors were included in the study. Using a randomized multiple-baseline across participants design, Bice-Urbach and Kratochwill (2016) provided consultation services to each teacher individually. Using Skype video conferences, the consultant guided the teachers through the entire consultative process. Classroom observations were conducted via video cameras and disruptive behaviors were broken down and operationalized into three to five core behaviors. A goal attainment scale (GAS) was also completed by the teachers as a way of measuring their perceptions of student behavior within the classroom setting. Bice-Urbach and Kratochwill (2016) found that teleconsultation was an effective method for improving the students' behavioral outcomes. Through the use of videoconferencing and remote communication, teleconsultation is proving to be an effective way to reduce the barriers many school psychologists face when attempting to provide services to rural schools.

Video modeling is a fourth alternative for the training of staff on the use of behavioral strategies. Video modeling has been used to teach staff a variety of skills including functional analysis (Moore & Fisher, 2007), skill training for individuals with ASD (Reeve et al., 2007), respite-care (Neef et al., 1991), and DTT (Catania et al., 2009). Inspired by Iwata and colleagues (2000), Moore and Fisher (2007) examined the effectiveness of part and complete video modeling, which differed in terms of the number and variety of clinician behaviors explained, on staff acquisition of functional analysis methods. This study is important because the videotapes included multiple exemplar scenarios of clinician behavior, something that had been thought to increase participant generalization across situations. By using video modeling, Moore and Fisher (2007) were able to successfully train the staff to implement the procedures. They also found that, when more information was provided, participants had larger and more consistent treatment effects (Moore & Fisher, 2007).

Giannakakos and colleagues (2016) also used video modeling for the instruction of behavioral strategies. Using a video model with voiceover instruction (VMVO) and in-vivo performance feedback, three graduate students were trained to implement a most-to-least prompting procedure (Giannakakos et al., 2016). Overall, VMVO with performance feedback was effective in the instruction of the target procedure and moderate to high levels of generalization were found for untrained procedures. Interestingly, participants demonstrated immediate increases in performance of the strategies post video viewing. One participant achieved 100% treatment integrity after watching the video. Giannakakos and colleagues (2016) also noted that providing feedback took less time than having participants re-watch the video. These results suggest that providing only performance feedback after watching the video can be a resource-effective alternative to simply having staff replay a training video. Researchers are finding that VBIs, while effective, typically require some form of performance feedback in order for participants to reach adequate performance levels (Giannakakos et al., 2016; Moore & Fisher, 2007).

As our world continues to grow and change, we endlessly continue our pursuit of improved technologies, methods, and practices. Observational learning is one such method that researchers have set out to improve (Bellini & Akullian, 2007; Keenan et al., 2017). As a result, VBIs were created to overcome many of the barriers to learning that accompany traditional observational learning (Bellini & Akullian, 2007; Thurston & Urbanska, 2017). Overall, VBIs continue to demonstrate themselves as a cost-effective alternative to other staff instruction. However, one major consensus in the literature is that VBIs are less effective when used in isolation. Practitioners may need to combine VBIs with written protocols, performance feedback, etc. when training staff or children. As a result, it is important for practitioners to consider the specific components they may need to include when implementing a VBI. The current literature also suggests that the nature of the target skill and practitioner resources should be taken into consideration when choosing an instructional format.

CHAPTER 3. RATIONALE FOR THE CURRENT STUDY

The research regarding the use of technologically enhanced instructional methods for adults is flourishing, but there are still many unanswered questions and many procedural variations to examine. Research regarding the use of video modeling for staff training is limited but promising (Giannakakos et al., 2016; Rosales et al., 2015; Weldy et al., 2014). If video models could be used to teach practitioners interventions such as response chaining using video prompting, then schools and clinics would have a readily accessible way of training staff, teachers, and potentially parents to facilitate skill acquisition. The following experiments examined the use of video modeling and performance feedback to train staff to facilitate skill acquisition in TD preschoolers via the use of a VBI.

Two experiments were conducted. The first experiment examined the combined effectiveness of video prompting and backward chaining to teach shoe tying skills to TD preschoolers. The extant research supports the effectiveness of VBIs when paired with chaining procedures (Aykut et al., 2014; Moore et al., 2013; Rayner, 2011; Shrestha et al., 2013; Tereshko, MacDonald, & Ahearn, 2010). Based on previous findings, we hypothesized that the treatment package would be effective for the acquisition of target behaviors. We also hypothesized that, after having reached mastery of the behavior while engaged with the treatment package, the participants would be able to reliably demonstrate retention of the acquired behavior. Experiment I was used to set the predicate for Experiment II by establishing the efficacy of the initial child training procedure.

The procedures in the first experiment were then incorporated into an instructional video. This video was used as an instructional medium for training novice adults to use video prompting and backward chaining in Experiment II. In this study, the novice adults' performance was assessed via treatment adherence. Based on the previous staff training literature, we hypothesized that video modeling would prove to be an effective medium for facilitating accurate procedural performance (Catania et al., 2009; Giannakakos et al., 2016; Moore & Fisher, 2007; Neef et al., 1991). The target behavior of each child in Experiment II was be selected based on their individual needs. Each child's imitation ability was also evaluated through the use of a short pre-assessment. We hypothesized that video modeling would be effective in facilitating accurate performance of the video prompting treatment package. We also hypothesized that the children in Experiment II would both learn and maintain the target skill.

CHAPTER 4. METHODS

Experiment I

Subjects, Setting, and Materials

Three typically developing children were recruited to participate in this study. The age of the selected children ranged from four to five years of age. For the purposes of this study, the names of the three children are Bruce, Diana, and Barry. All three participants wore velcro or slip-on shoes prior to the start of the study and were recruited from a private school located in the southeastern United States. Parental written consent and child assent were obtained for each child prior to the start of the study. Caregivers were also asked to complete a short demographic questionnaire for their child. All interventions occurred in the same room. The room contained a table accompanied by an iPad, as well as chairs for both the researcher and the child. Each child was assigned a token board and earned tokens for following directions (i.e. watching the video and completing trials). Three tokens were required to earn play time with a set of preferred rewards (i.e. iPad games, a soccer ball, a coloring book, a sensory ball, and Legos).

Demographic Questionnaire. The caregivers of each child completed a demographic questionnaire prior to the start of the experiment. In this questionnaire, caregivers provided information regarding their child's age, name, gender, birth order, ethnicity, language spoken at home, etc. The caregiver's also included their own age, education level, and occupation.

Stimuli. Due to the target skill for these children being shoe tying, a model shoe was created as a training stimulus for this study. This shoe utilized two differently colored shoe laces that were connected so that the child could easily discriminate which lace was used to perform specific actions in the shoe tying steps (Rayner, 2011). Additionally, pipe cleaners were used to hold the shoe laces together for steps that required unlearned, prerequisite fine motor behavior patterns (i.e. steps 4-6). For example, step four requires the child to wrap a shoe lace around a loop before performing steps five and six. A visual depiction of the mock shoe can be found in Appendix F.

A series of brief video models using this shoe were then prepared for each chain of the shoe tying skill. These video stimuli were similar to the stimulus used by Hine and Wolery (2006). The video was recorded using a digital video camera, from a first person point-of-view, and their duration varied from 10 to 30 seconds depending on the number of steps recorded. 6 videos were created to demonstrated the chains (i.e. if the child was working on step four, the video would display steps four to six consecutively). The steps in the chain are described below.

Dependent Variable and Operational Definition

Step completion was the dependent variable used in this study for all three phases. The shoe tying behavior in the video was broken down into 6 steps with both the modeled behavior as well as verbal instructions; (1) cross the left lace over the right lace and drop, (2) pick up lace end on the right and push underneath both laces, pull tight, (3) pick up left lace, fold it in half and hold, (4) use left hand to wrap left lace around loop, (5) push left lace under the bottom of the loop, and (6) pull on both loops until tight. In order for a step to be counted as "independently completed", the child had to complete the step after the video prompt and without additional prompts. If a step was completed incorrectly, a verbal prompt was provided. If the child continued to perform the step incorrectly, a verbal combined with physical prompt was provided for that step. The child was then prompted to continue their attempt with the remaining steps. Completion of each trial was only contingent on completion of the relevant step(s), regardless of the prompt level. No time limit was assigned to the children's trials. The number of trials needed to reach mastery in the intervention phase as well as the number and type of additional prompts required to reach mastery for each step were also recorded. Children that refused to attempt the step or watch the video were reminded that they could only earn tokens by “following directions and [insert specific direction]”. Continued noncompliance resulted in the child being given the option to return to their classroom.

Data Collection

Data was recorded after each trial within daily sessions. In order to parallel the backward chaining procedure data collection began with the final step in the chain. This process of recording data while working backward through the task continued throughout the entire study. During all probe sessions, the skill was presented in a backwards chaining format, beginning with the last step in the chain as described above. If the child completed the last step, then the last two steps were presented. The data collection trials proceeded in this fashion backward through the chain. Once the child was unable to perform the step, the session was terminated. During treatment, consecutive independent chain completions resulted in an additional step being added to the chain. This continued until the child was able to perform the entire chain. The number of steps completed in each phase was recorded and used as the child’s step completion score.

Interobserver Agreement and Procedural Checklist

Interobserver agreement (IOA) was obtained and calculated as described below for both the imitation screening procedure (IDE; described below in “pre-assessment”) as well as for 25% the experimental trials. This calculation was completed by taking the number of agreements between the independent observers and dividing by the total number of agreements plus disagreements. The coefficient was then multiplied by 100 to compute the percentage (%) of agreement. Additionally, an independent observer recorded treatment adherence using a checklist based on the research protocol. Treatment adherence was then calculated by dividing the total number of correctly performed items by the total number of items on the checklist. The IOA for the study was 95% and the treatment adherence was 98%.

Experimental Design

This study used a multiple probe design with three phases: Baseline, Treatment, and Retention (Horner & Baer, 1978). The baseline phase consisted of a minimum of three consecutive baseline trials. The treatment phase consisted of multiple treatment trials. Lastly, the retention phase consisted of three retention trials one week after the treatment phase.

Independent Variable. The independent variable used in this experiment was the video augmented backward chaining procedure. The video stimuli used were recorded using an adult as the model (see description above).

Reward Selection. In order to determine preferred rewards, a multiple stimulus without replacement preference assessment (MSWO) was conducted (DeLeon & Iwata, 1996). Each child was brought into a room and asked to sit at a table. The child was shown an array of potential reinforcers/rewards and asked to pick one. After selecting the preferred reward, the child was allowed to play with the item and the researcher for two minutes. After two minutes, the item was removed and the reduced array was presented again. This procedure continued until each child had selected four highly preferred items. These five items were be categorized as "preferred rewards" and all other items were be removed. The items selected among the children were generally consisted and included a coloring book, a soccer ball, iPad games, and a Splat Ball.

Procedure

Each child was accompanied into the intervention room by a researcher and was informed that they were going to watch a video and then try to tie the shoe. Children were also told that by following directions (i.e. watching the video, completing trials, and general compliance), they would be able to place a reward token on their token board. The child was then prompted to watch the relevant video and perform the corresponding step chain. After all three trials were completed and all tokens placed, the child was given two-five minutes of play time with a reward of their choosing. All children participated in the three phases of the study; baseline, treatment, and retention.

Pre-assessment. The results from a short pre-assessment procedure were used as inclusion criteria in order to evaluate each child's' fine motor skills and attentional skills. The assessment consisted of an observation session in which a participant is asked to imitate various modelled behaviors.

The imitation pre-assessment was scored on a five-point scale which ranges from zero to four points. Children were assessed on three imitative categories; 1) gross motor imitation, 2) fine motor imitation, and 3) imitation with an object. This scale was modified from the Imitations Disorders Evaluation scale (IDE) used by Malvy and colleagues (1999). Each imitation category consisted of four, different behaviors. Children received points based on the number of successful imitations. Zero points were awarded if there were no observations of the behavior, one point if only one behavior was successfully imitated, two points if two behaviors were successfully imitated, three points if three behaviors were successfully imitated, and four points if all four behaviors were successfully imitated. At the end of the pre-assessment session, the child's points were reviewed for inclusion. Inclusion for this study required a score of two or higher on each item. See Appendix E for the imitation assessment form.

Baseline. During the baseline phase, data collection trials were provided as described above under data collection. A series of three initial baseline trials were conducted for each participant. After each baseline trial, the researcher praised the child for performing or attempting to perform the behavior. After this, two-to-five minutes of play time were provided with the preferred group of rewards. No instructions, assistance, or treatment other than the initial verbal prompt were provided.

Treatment. Data collection during the treatment phase was also conducted as described above. The video intervention with backward chaining treatment continued until the participant reached mastery of the behavior. The participant's left or right shoe was replaced with the prepared model shoe and they were verbally prompted to watch the video for their current step chain. After watching the step on video, the participant was prompted to imitate the video on the model shoe. Once presented, the child must independently complete the steps within the step chain for them to be counted as "completed independently". Once completed, these procedures were repeated for the next session. This process continued until the participant was able to complete all steps in the chain independently on three consecutive sessions. Once this requirement was met, the step at the start of the chain was considered "mastered" and a new step was added. The subsequent session consisted of a presentation of the mastered step as well as a novel step in the chain. This process continued until each participant achieved mastery on all of the steps.

The number of step attempts needed to obtain access to the reward tokens increased as the child's proficiency increased (i.e. if the child has mastered step 6, then they had to attempt step 6 and 5 in subsequent trials). Following failed attempts at step completion, the researcher stated, "I like how hard you tried". If the child did not complete the step within five seconds of the prompt or made an error, a verbal prompt was conducted to aid the child in completing the step. If the verbal prompt only was not sufficient, a verbal and physical prompt was provided. After the trials was complete, the child was given a reward token. In this case, both the number of steps completed independently and with either a verbal or combined verbal and physical prompt were recorded.

Retention. One week after the treatment phase was completed, participants entered the retention phase. Each participant was brought into the intervention room and their shoe was replaced with the untied model shoe. The participant was then prompted to tie the shoe. Other than the verbal prompt, the participants were given no assistance or further instruction. Participants were given three minutes to complete the full chain. Once the child finished their attempt, or if the time ran out, they were praised and given a reward token. This process was performed for a total of three trials. After all retention trials were completed, participants were rewarded with two minutes of free play with a preferred reward.

Experiment II

Subjects, Setting, and Materials

Three adults and three typically developing children were recruited to participate in this study. The age of the selected children ranged from three to five years old. Parental written consent and child assent was obtained for each child prior to the start of the study. The adults were two graduate students and one undergraduate student selected from the Louisiana State University's student population, who also consented to participate in the study. The children were selected from a private school located in a city in the southeastern United States. Due to the children and adults being paired together, the adult and child pairs are as follows: Wilma and Fred (age 5); Lois and Lana (age 3), Doreen and Nancy (age 3). Fred was the only male participant, all other participants were female. All child participants wore velcro shoes prior to the start of the study. Caregivers were also asked to complete a short demographic questionnaire for their child. All phases of the experiment and training occurred in similar rooms. Adult participants were all trained in a room containing a table accompanied by a laptop, as well as chairs for both the adult and the researcher.

Demographic Questionnaire. The caregivers of each child completed a demographic questionnaire prior to the start of the experiment. In this questionnaire, caregivers provided information regarding their child's age, name, gender, birth order, ethnicity, language spoken at home, etc. The caregiver's also included their own age, education level, and occupation.

Stimuli. The training video stimulus for the experimental phase contained three main parts. In the first part of the experimental video, the researcher verbally described 1) the adult and child's rights pertaining to the experiment and 2) the experimental procedures. The second part of the video included information on managing materials and a brief role-play to demonstrate the procedures of the phase. Lastly, the third part of the video presented strategies for handling mild problem behavior. The video also reviewed criteria for step mastery and procedures for step advancements. Adult participants were also provided with a protocol sheet during treatment sessions. This sheet reviewed experimental procedures in a brief format and was provided in order to mirror the accessibility of protocol information in the real-world.

The video stimulus that were presented to the child participant during the treatment phase were derived from the video stimuli used in Experiment I. Due to the child participants having different developmental proficiencies with regards to their fine motor abilities, two target skills were used. Fred was assigned the skill of tying a shoe knot, whereas Lana and Nancy were assigned the skill of tying an overhand knot. The physical stimulus for the shoe knot was similar to the model shoe used in Experiment I. The physical stimulus for the overhand knot consisted of different colored shoe laces set into a piece of thick cardboard. Visual depictions of the training stimuli can be found in Appendix F.

Post Video Training Assessment. After the adult participants completed the video training, their content knowledge of the training was assessed via a series of questions. These questions covered a number of topics presented in the training video and were displayed in a multiple-choice and short answer format. Assessments were completed via pencil and paper.

Adults that failed the assessment would have been asked to re-watch the training video and attempt the assessment again. This procedure was not needed in the current experiment.

Treatment Agent Report. All treatment agents were asked to complete a modified version of the Intervention Rating Profile-15 (IRP-15; Martens, Witt, Elliott, & Darveaux, 1985). This assessment was modified to provide satisfaction and acceptability ratings for the video-based treatment package and adult video training (see Appendix C). After completing treatment, adult participants were asked to rate the included interventions, using a one-to-six Likert scale.

Dependent Variables and Operational Definitions

The main dependent variables for this study were the accuracy with which the adult participants implement the intervention and the child participants' step completion progress. The behavior of adult participants was recorded by an observer regarding how well they adhered to the treatment protocols. In addition, the adults were assessed after watching the training video regarding their content knowledge .

The shoe tying behavior in the video used the same steps and definitions as those in Experiment I. The overhand knot behavior in the video was broken down in four steps with both the modeled behavior as well as verbal instructions; (1) bring the left lace over near the right lace and drop, (2) bring the right lace over to the left side and drop, (3) pick up right lace end and push underneath both laces, and (4) grab both lace ends and pull tight. Criteria for independent step completion, the provision of verbal or a combination of verbal and physical prompts, and procedures for child noncompliance mirror those found in Experiment I.

Data Collection

The primary dependent measure was the percentage of treatment components implemented correctly during each session, measured via direct observation. A copy of the treatment integrity data collection sheet can be found in Appendix D. A secondary measure for the adult performance on multiple-choice quizzes specific to each training video was recorded. Lastly, adult participant satisfaction related to the video training and video-based treatment package was assessed via a modified version of the IRP-15. Data collection for child participants mirrored the experimental procedures found in Experiment I.

Interobserver Agreement and Procedural Checklist

Interobserver agreement (IOA) was obtained and calculated for both the imitation screening procedure as well as for experimental trials. Independent observers observed and scored procedural integrity for 25% of the sessions conducted by the researcher and adult participants. In terms of procedural integrity, the researcher used a standardized protocol that listed specific dialogue, actions, order of processes, and procedures. IOA was calculated by dividing the number of agreements between the independent observers by the total number of agreements plus disagreements. The coefficient was then multiplied by 100 to compute the percentage (%) of agreement. The calculated IOA for this study was 97%.

Experimental Design

This study used a multiple probe design with three phases: Baseline, Treatment, and Retention (Horner & Baer, 1978). The baseline phase was conducted for child participants and consisted of three consecutive baseline trials followed by baseline probes. The treatment phase was conducted for both adult and child participants. This phase consisted of multiple treatment trials over a series of weeks. Lastly, the retention phase was conducted for child participants and consisted of three retention trials one week after the treatment phase.

Independent Variable. The independent variables used in this study were the adult video training and the video augmented backward chaining procedure used in Experiment I. Adult participants watched the video and were assessed on its contents prior to the start of the treatment phase.

Reward Selection. Reward selection for this study was performed by the researcher and mirrored the procedures presented in Experiment I. The items selected among the children included a coloring book, iPad games, a Splat Ball, and Legos.

Procedure

All procedures used in this study relevant to the child participants mirrored those presented in Experiment I. All adult participants were accompanied into the intervention room by a researcher and were informed that they are agreeing to participate in a research study. Their rights as participants were also discussed. After consent was obtained, adult participants were asked to watch a short training video and complete a written assessment. Adult participants only participated in the treatment phase trials. Child participants completed trials across all phases. Baseline and follow-up session were conducted by a trained researcher.

Pre-assessment. Each child participant was assessed by the researcher using pre-assessment procedures. Pre-assessment performance was used to evaluate each child's fine motor and attentional skills. The implementation and scoring of this procedure mirrored those presented in Experiment I. See Appendix E for the imitation assessment form.

Baseline. Baseline session and data collection procedures mirrored those presented in Experiment I. All baseline trials and probes were conducted by the researcher. No instructions, assistance, or treatment other than the verbal prompt was provided.

Treatment. Data collection during treatment trials occurred as described above. Adult participants were trained on treatment procedures via the video training. After watching the video, the researcher assessed the participant's knowledge of the video content. Upon successful completion of the assessment, the participant began to conduct treatment trials with the child participant. During this period, the adult employed the experimental treatment procedures presented in Experiment I with a child participant. It is important to note that the adult participants were able to make step progression decisions independently, but were required to contact and receive approval from the researcher prior to the introduction of novel steps. The researcher also kept track of each child's step performance and directed the adult participant to advance the child participant's target step if the data called for progression and the adult had not recognized this. Adult participants that consistently performed under 88% (i.e. made more than one error in treatment adherence) in three daily sessions were given brief feedback after the third session. Adults that continued to underperform for three more consecutive sessions were given in-vivo feedback in their next session. For child participants, treatment procedures mirror those presented in Experiment I.

Retention. The retention phase procedures used in this study mirrored those presented in Experiment I and were conducted by the researcher.

CHAPTER 5. RESULTS

A graph of participant performance is presented in Figures A.1 and B.1. Across both studies, no child participant was observed to have completed a step related to their target skill during the baseline trials. All child participants also engaged in behaviors that were not related to the target skill during baseline trials. These behaviors were mostly a variation of the child picking up a lace and 1) putting it in the shoe or 2) pushing it under the other laces. It is worth noting that during treatment, participants' data occasionally returned to zero correct responses. This occurred as an artifact of the data collection and training procedure with backward chaining. Often, a participant would struggle with a novel step and subsequently needed some form of additional prompt on previously mastered steps.

With regards to adult performance, Figure B.1 provides treatment adherence data. All adult participants received perfect scores on the post-training assessment and maintained sufficient implementation throughout the duration of the study. Table C.1 summarizes the adults' ratings of treatment acceptability and perceived effectiveness of the adult video training. Overall, all three adult participants rated the interventions positively and found it to be low-cost in terms of time and effort.

Experiment I

Bruce

Prior to his inclusion into the study, Bruce received a perfect score on all items of the modified IDE scale. When looking at treatment performance, Bruce was able to master steps 6 and 5 completely independently. He did not require verbal or combined physical and verbal prompts until he reached step 4. Overall, Bruce obtained mastery of the chain in 43 trials and received additional prompts on 48% of those trials. Majority of these prompts were verbal only (verbal only: 57%; combined physical and verbal: 43%). Additionally, Bruce was observed to have retained full mastery of the chain one week after treatment.

Diana

Diana also received a perfect score on her items for the IDE scale. During treatment, Diana would often look at the researcher and wait for a verbal prompt when learning a new step in the chain. However, this behavior decreased towards the end of the step progression. Overall, Diana obtained mastery of the chain in 52 trials and received additional prompts on 46% (verbal only: 50%; combined physical and verbal: 50%) of those trials. Diana also retained full mastery of the chain one week after treatment.

Barry

Barry imitated all items on the IDE assessment, aside from one in which he was required to follow items with his eyes. For this item, Barry was only observed to have successfully completed the requirement two out of four times. In treatment, Barry often had to be redirected to watch repeated presentations of the video model and was easily distracted. Overall, Barry required the highest number of trials to learn the skill and obtained mastery of the chain in 60 trials. 35% of those trials required additional prompts with majority being combined verbal and physical (verbal only: 29%;. combined verbal and physical: 71%)

Experiment II

Wilma and Fred

Fred obtained a perfect score on the modified IDE scale during the pre-assessment and entered the study with a target skill of tying a model shoe. Fred’s target skill was to complete a full shoelace knot on a model shoe. In terms of progression, he had the highest degree of step accuracy on step six (100%) and the step one chain (80%). He made the most errors on the step four chain, with only seven out of 17 trials containing independent performances. Overall, Fred required 57 trials to obtain mastery of the target skill. 44 percent of those trials required additional prompts with majority of those prompts being verbal (verbal only: 87%; combined verbal and physical: 13%). Fred was also observed to have performed the entire target skill independently during the retention trials.

With regards to Wilma's progress, she initially performed below acceptable levels of treatment adherence (77%) due to not performing steps two of the nine in the treatment program. However, Wilma soon corrected these errors independently and went on to have consistent performance above the necessary criterion. Wilma's results obtained from the modified IRP-15 indicate that she did not have much experience with VBIs prior to the study. Even so, she found the intervention to be an effective method of skill acquisition.

Lois and Lana

During the pre-assessment, Lana was only able to perform three out of the four fine motor imitation attempts. It is likely that the last behavior, making discrete items out of playdough, required pre-requisite fine motor skills that Lana had not yet obtained. For her treatment phase, Lana's target skill was to complete an overhand knot. Lana performed step six and the step five chain completely independently. She made the most errors on the step 2 chain, with only four out of ten trails containing independent performances. Overall, Lana required 28 trials to obtain mastery of the target skill. 46% of those trials required additional prompts with majority of the prompts being a combination of physical and verbal (verbal only: 46%; combined verbal and physical: 54%). Lana initially had some difficulty crossing the laces in the step 3 chain (she crossed right over left instead of left over right), but was able to correct this behavior for the final two trials.

In terms of Lois' performance, she initially made performance errors when implementing the ninth step by failing to present the child with reward stickers before bringing them back to class. Even so, she maintained sufficient performance (i.e. only one or no errors) throughout the entire treatment phase. When looking at her modified IRP-15 ratings, Lois also rated the intervention and adult video training positively.

Doreen and Nancy

Similar to Lana, Nancy was did not perform the task of making a discrete item out of playdough. She completed three out of four of the discrete imitation responses (Item 5). The discrete imitation response that Nancy had failed was that of waving her arms in circles. Nancy was observed to have made correctly imitated the arm circles, but did not cease their performance until given a verbal prompt. Nancy's target skill was also to complete an overhand knot. She was observed to have completed step four and the step three chain with a high degree of accuracy (100% and 75%). Compared to Lana, Nancy only required five trials to learn the step two chain. However, they both required a similar amount of trials to reach mastery of the step one chain. Overall, Nancy required 22 trials to obtain mastery of the target skill. Only 38% of those trials required additional prompts with majority of the prompts being a combination of physical and verbal (verbal only: 29%; combined physical and verbal: 71%). Nancy was also observed to have performed the entire target skill independently during all retention trials.

Doreen initially did not meet the study criteria in terms of treatment adherence on her first treatment day, making errors on steps two and nine in the treatment adherence checklist. Anecdotally, she stated that she realized her errors after the child had already been sent back to class. After this initial day, her performance improved and maintained appropriate levels of treatment adherence throughout the duration of Nancy's treatment. With regards to her treatment acceptability ratings, she stated that she had not had previous experiences with VBIs, but generally found the intervention to be effective. She also noted that while the adult video training was effective, she would have liked to see more exemplars of experimental procedures.

CHAPTER 6. DISCUSSION

The current experiments were conducted to examine two main issues. The first was to examine the effectiveness of a video modeling treatment package when used to teach TD preschoolers fine motor skills. This treatment package was hypothesized to not only be effective in promoting skill acquisition in TD preschoolers, but also in promoting retention of the newly acquired skills. The second reason was to examine the effectiveness of a video training package when used as an instructional medium for staff training. Through the use of this training, a hypothesis was made that adult participants would display high levels of treatment adherence when implementing a video-based treatment package with preschoolers.

This chapter presents the major findings from these studies as they relate to the research literature on VBIs for both child-based treatments and the training of treatment agents. This will discuss how our research findings serve to answer our research questions and how these answers extend the current literature. Connections between these findings and observational learning theories will also be presented. Finally, the chapter will conclude with limitations found of the current experiments, directions for future research, and a short summary of this document's major takeaways.

Interpretation of the Findings

Overall, both treatment packages were found to be effective instructional approaches for teaching skills to child and adult participants. Through the use of the video prompting combined with backward chaining intervention, the child participants acquired independent mastery of their developmentally appropriate target skill. This replicates prior research separately demonstrating the efficacy of backward chaining for teaching self-care skills and for video models as a teaching approach (Bellini & Akullian, 2007; Catania et al., 2009; Giannakakos et al., 2016; McCulloch & Noonan, 2013; Neef et al., 1991; Rayner, Denholm, & Sigafoos, 2009). This skill was then found to have been retained in all child participants one week after mastering their skill. All child participants did, however, require some form of additional verbal or physical prompt to achieve full independence with the target skill paralleling prior work (Bellini & Akullian, 2007). All adult participants received perfect scores on the post-training assessment and consistently implemented the intervention accurately over the course of the study. This replicates prior research demonstrating the efficacy of VBIs in the training of adult treatment agents (Catania et al., 2009; Moore & Fisher, 2007). Lastly, the adult video training was found to have been socially acceptable by the adult participants. This finding parallels and expands on previous research regarding the trainee perception of video-based instructional methods as practical, user friendly, and appropriate training methods with positive treatment outcomes (Giannakakos et al., 2016).

Video-Based Interventions Continue to Improve

The conclusions regarding the effects of the VBIs used in these experiments replicate past research demonstrating the efficacy of VBIs (Aykut et al., 2014; Bellini & Akullian, 2007; Cannella-Malone et al., 2006; Giannakakos et al., 2016; Graves et al., 2005). As stated previously, VBI is an overarching term that is used to cover a variety of procedural variations in which video recordings are used for intervention (Rayner et al., 2009; Keenan et al., 2017). As a result, there is a need to determine exactly what features are effective and practical when using VBIs. More specifically, there is a need for more research regarding the types of procedures that should be combined with specific types of VBIs to enhance their effectiveness when teaching skills (Banda, Dogoe, & Matuszny, 2011; Rayner et al., 2009).

Focusing specifically on video prompting, Banda and colleagues (2011) conducted a meta-analysis to examine 18 video prompting studies conducted with persons with developmental disabilities. Their findings indicate that video prompting was effective when combined with other evidence-based strategies such as least-to-most prompting and video feedback. However, they also noted that researchers tend to use video prompting when teaching skills related to cooking, vocational trades, or safety procedures. Little research has gone on to examine video prompting when used to teach self-help skills like dressing and grooming. Even so, the research is promising (Banda et al., 2011; Grab & Belfiore, 2016; Richard & Noell, 2018). For example, Grab and Belfiore (2016) as well as Richard and Noell (2018) examined the effectiveness of video prompting when teaching shoe tying. While the studies had differing age groups for their participants, their findings indicate that video prompting was effective in facilitating skill acquisition, retention, and generalization. The current study's findings show that video prompting can also be an effective method of the acquisition of complex self-help skills. These findings also support previous research regarding the effectiveness of video prompting when combined with other evidence-based strategies.

The findings from the present study support those of previous research regarding the effectiveness of this form of instruction (Cannella-Malone et al., 2006; Knight et al, 2018; Le Grice & Blampied, 1994; Sigafoos et al., 2006; Tiong et al., 1992). These results also provide additional information regarding the use of video prompting when teaching complex fine motor tasks to TD preschool age children. As we know from previous research, motor control is an important aspect of a child's development and can even impact early academic performance (Feder & Majnemer, 2007; May-Benson, Ingolia, & Koomar, 2002; Simner, 1982). This is due to much of a child's school day requiring active participation in some motor task. Improvements in the development of early motor dexterity have been shown to occur with repeated practice and intervention (Feder & Majnemer, 2007; McGlashan et al., 2017). While each child's fine motor skills were not assessed at the conclusion of the study, prior research supports the idea that the child participants may have made improvements in their general manual dexterity (McGlashan et al., 2017). These improvements are likely due to the nature of the backward chaining intervention that causes participants to repeatedly perform previously mastered steps while learning new ones. This intervention, combined with a fine motor skill, ultimately provided our child participants with more experiences and practice related to fine motor activities.

Lastly, findings from the pre-assessment portion of Experiment I provides additional information regarding target skill selection when preparing a VBI. While all child participants involved performed well enough to reach the inclusion criteria, younger participants were observed to have made more errors with complex fine motor imitation. As a result, these participants were assigned a less complex fine motor task compared to their older peers. It is important to note that we did not directly assess differences in performance for tasks based on their complexity. Even so, this should be examined in future research as developmentally inappropriate target skills may lead to increased performance errors and, subsequently, decreased motivation and attention to the task. Researchers, practitioners, and parents should always consider their child's developmental abilities when selecting target skills for VBIs (Rayner, 2011).

Training Treatment Agents via a Video Medium

In addition to its usefulness with children, past research has also taken advantage of VBIs for staff training purposes (Giannakakos et al., 2016; McCulloch & Noonan, 2013). Through the use of video modeling, teleconsultation, and ICT, researchers have been successful in training treatment agents on a number of different topics (Bice-Urbach & Kratochwill, 2016; Fazzio et al., 2009; Higbee et al., 2016; Moore & Fisher, 2007; Pollard et al., 2014). Indeed, the results from the presented studies support the findings from previous research regarding the effectiveness of video-based trainings for treatment agents.

In addition to its effectiveness, one of the most cited benefits this training method pertains to its low-cost and ability to bridge logistical gaps that many rural practitioners face (Bice-Urbach & Kratochwill, 2016; Fazzio et al., 2009; Higbee et al., 2016; Pollard et al., 2014). For example, Giannakakos and colleagues (2016) made use of a VBI with voice over instructions to train graduate students to implement least-to-most prompting. The researchers found that while creation of the video may incur initial costs (i.e. buying a video camera, time spent in material preparation, etc.), the final product can be repeated many times at no additional cost (Giannakakos et al., 2016). While the video training used in Experiment II was only viewed once, this video could be uploaded on a video-sharing platform and replayed unendingly by practitioners at no additional cost.

One interesting difference regarding adult participant performance in Experiment II compared to the trainees in prior research was the absence of performance feedback. Previous researchers have argued and in some cases demonstrated that, while effective, VBIs typically require some performance feedback component in order to ensure high levels of treatment adherence (Giannakakos et al., 2016; Moore & Fisher, 2007). However, the adult participants in this study were able to self-correct and maintain sufficient performance throughout the duration of the study with only the video training and written protocol. While the presented training was not “interactive”, it did have many components similar to those found within ICT and self-instructional manuals (Fazzio et al., 2009; Higbee et al., 2016; Pollard et al., 2014). These results may lend support for the use of a more condensed form of ICT or self-instructional manual when training staff on single, specific interventions. It is also important to acknowledge that the current sample is small with one undergraduate student and two graduate student participants. It is also possible that the adult participants in this study were simply more motivated or prepared to learn than many staff members.

Giannakakos and colleagues (2016) also stated that the current research literature regarding staff training methods rarely assesses trainee satisfaction. The findings from Experiment II provides more information regarding trainee satisfaction with training methods and treatment methods. Overall, both the adult training video and the video-based treatment package were found to have been rated positively when looking at practicality, ease-of-use, and treatment outcomes. These ratings were consistent across adult participants even though one participant had little prior experience with VBIs. Additional comments made by adult participants indicated that the breadth of the video training was a positive feature. By reviewing not only treatment procedures, but also participant rights, navigation of the iPad device, and methods for handling problem behaviors, participants reported feeling confident when working with their assigned child.

Implications for Theory and Practice

Chapter 2 previously discussed the theoretical foundation for VBIs. Bandura's (1971) social learning theory is the most comprehensive account for the underlying mechanisms of VBIs. One important component of this theory is the idea of observational learning. Bandura (1971) stated that the observation of others can allow individuals to gain information to use as templates for their own behavior. This information contains many important features such as behavioral performance and consequences of a behavior. The findings from these experiments are congruent with social learning theory's account of observational learning. By observing pre-recorded footage of a behavior, all participants were able to learn and perform their assigned target behavior. However, due to the child participants requiring additional verbal and physical prompts to achieve mastery, it is important to know that simple observation may not be sufficient. This finding supports those of previous research regarding the effectiveness of videos when used in isolation (Giannakakos et al., 2016; Moore & Fisher, 2007). While the intervention selected for use with a video model can depend on a number of factors (i.e. available resources, complexity of the skill, client characteristics, etc.), the necessity of combining of multiple elements is supported in the research literature (Giannakakos et al., 2016; Moore & Fisher, 2007).

When looking at these results and how they apply to a practical setting, it is important for practitioners to consider the specific needs of the children they treat. There are many procedural variations of VBIs that have been combined with many other evidence-based interventions (Bellini & Akullian, 2007). By thoroughly examining their child's developmental abilities and carefully selecting target behaviors (i.e. complexity, pre-requisite skills, etc.) practitioners will be better equipped to select an appropriate VBI (Bandura et al., 2011). Once the appropriate methodology and target skill have been selected, the practitioner can then use a recording of their own behavior or the behavior of another for skill acquisition purposes. As previously stated, this recording can even be edited to filter out errors in performance and extraneous background stimuli.

With regards to the training of treatment agents, the results from Experiment II display the effectiveness of a brief adult video training package. The results from this training also support the previous literature regarding the use of remote, computer-based video training (Granpeesheh et al., 2010; McCulloch & Noonan, 2013). Practitioners looking to employ the use of similar trainings should provide some form of performance feedback and written protocol in addition to the video training. This will ensure adequate implementation of procedures post-training (Giannakakos et al., 2016; Moore & Fisher, 2007).

Overall, VBIs have been proven to be an effective for numerous purposes and in numerous forms. However, practitioners have a number of factors to consider when selecting an appropriate VBI. The interplay of these factors becomes extremely important when making this decision. With regards to complex fine motor tasks, like the ones selected in this study, practitioners should generally look to employing video-prompting methods along with some form of chaining procedure and potentially provide supports such as performance feedback as needed.

Limitations and Recommendations for Future Research

While the interventions presented in the current studies facilitated skill acquisition and treatment adherence, there are a number of limitations. Due to the use of an atypical model shoe, the generalizability of the shoe tying skill may have been limited. More credibility could have been given to conclusions regarding mastery of the shoe tying skill if a generalization phase was added. This phase could have assessed child performance when tying a typical lace shoe provided by their parents. Future research on the stimulus generalization of fine motor tasks learned via VBIs could add to the findings in these studies. Additionally, future research could also employ and examine the effects of using multiple exemplars when training fine motor tasks.

With regards to the adult video trainings, one potential limitation may be that the adults only viewed the training once. As a result, the findings from this study may not generalize when considering training videos that are shared via readily accessible media formats such as YouTube ©. While it may not be practical for practitioners and staff to re-watch videos that are longer in duration, future studies should examine the effectiveness of chunking information within multiple videos (Giannakakos et al., 2016). Chunking information in this format may make it more practical for staff to replay the training videos if questions arise regarding a specific topic.

While the adult video training package was effective for the purposes of this research, it was not compared to other traditional methods of staff training. Therefore, we can only provide this form of instruction as an alternative, rather than an improvement. Future research could compare these types of procedures with the in-person didactics and role-play that is commonly seen in staff training seminars. Additionally, no measures of trainee self-efficacy were obtained. This information would have been useful in explaining trainee performance upon entering treatment. Lastly, while the current research did present positive findings related to trainee satisfaction and acceptability, parent social validity data was not obtained. This data could have bolstered findings regarding parent acceptability and satisfaction related to the use of VBIs. Future research regarding VBIs should include information on both parent and practitioner social validity data.

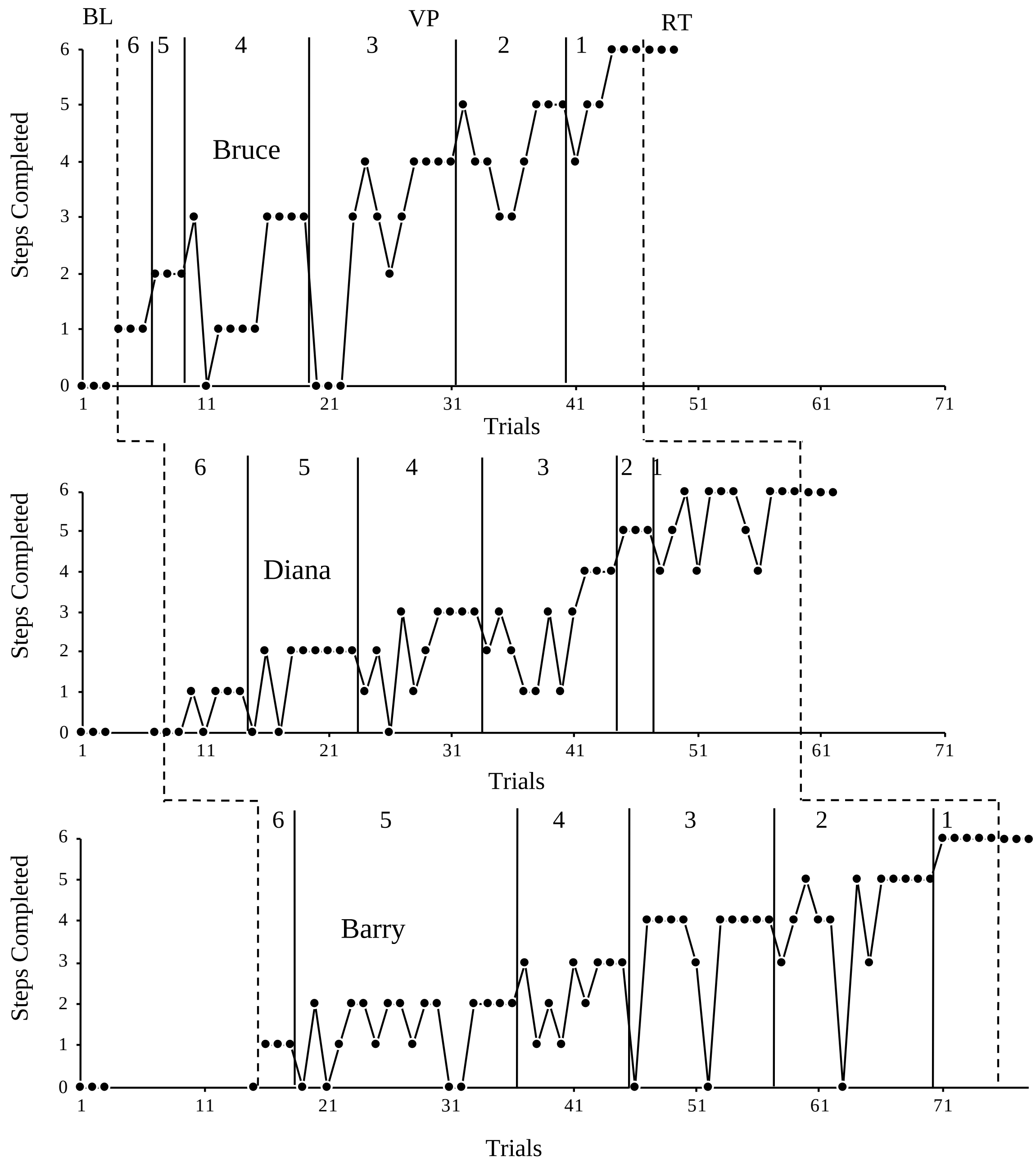
Conclusion

In society's everchanging landscape, new technologies continue to arise. These not only change the ways in which we navigate our world, but also provide opportunities to improve on old methodologies. VBIs are one such product of this change in which technology is utilized to improve how we learn from others. Past research has found this form of instruction to be an effective method for teaching children and adults (Bellini & Akullian, 2007; Catania et al., 2009; Giannakakos et al., 2016; McCulloch & Noonan, 2013; Neef et al., 1991; Rayner, Denholm, & Sigafoos, 2009). In addition to its effectiveness, VBI also allow individuals to overcome many attention, logistic, and resource barriers to observational learning (Giannakakos et al., 2016; Thurston & Urbanska, 2017).

The results from the current study support previous research regarding the effectiveness of VBIs when training both children and staff (Bellini & Akullian, 2007; Catania et al., 2009; Giannakakos et al., 2016; McCulloch & Noonan, 2013; Neef et al., 1991; Rayner, Denholm, & Sigafoos, 2009). All child participants maintained their target skills through the use of the video-based treatment package and follow-up. This provides important information regarding the effectiveness of VBIs when used to teach complex fine motor tasks. Parents and practitioners utilizing VBIs in applied settings are encouraged to carefully match target behaviors and intervention components with their child's specific needs. Adult participants in Experiment II consistently acceptable levels of treatment adherence were observed post video training. These participants also rated both the intervention used and the video training positively, further supporting the research literature regarding the social validity of VBIs (Giannakakos et al., 2016). In other words, these findings also show that this method of instruction can be performed with a high degree of trainee satisfaction (Giannakakos et al., 2016).

The presented findings regarding VBIs, along with the many benefits that accompany them, make them a popular alternative to traditional instructional methods. However, there is still little information on what variations are most effective. Future research should work to parse out effective treatment components within the various types of VBIs. The inclusion of this information would work to better guide practitioners in their selection of appropriate interventions.

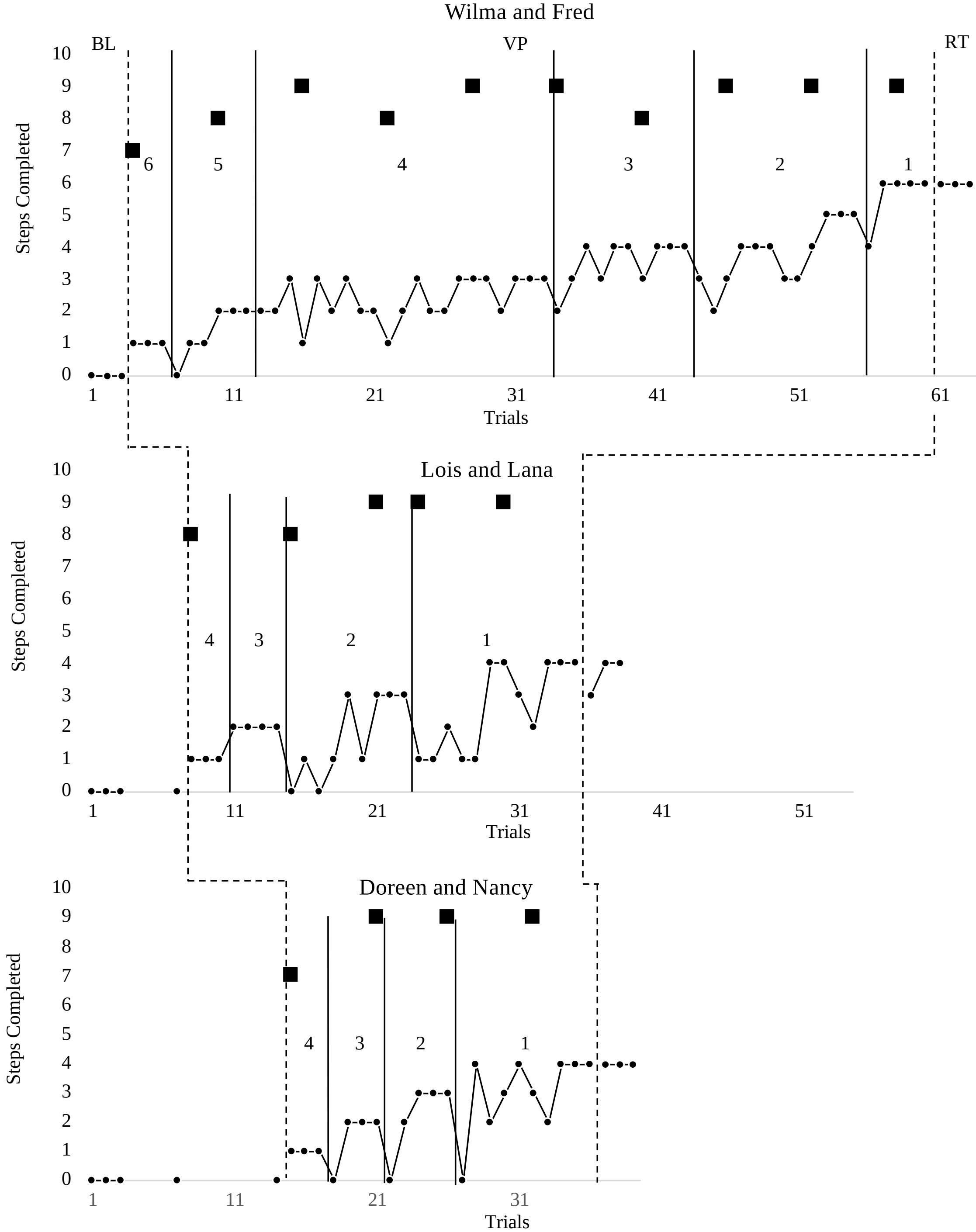
APPENDIX A. EXPERIMENT I DATA GRAPH



Note: BL = Baseline; VP = Video Prompting; RT = Retention

Figure A.1: A graphical representation of participants' performance in Experiment I. Dotted lines indicate phase changes and solid lines indicate the introduction of a new step.

APPENDIX B. EXPERIMENT II DATA GRAPH



Note: BL = Baseline; VP = Video Prompting; RT = Retention

Figure B.1: A graphical representation of participants' performance in Experiment II. Dotted lines indicate phase changes and solid lines indicate the introduction of a new step. Squares indicate adult participant performance.

APPENDIX C. MODIFIED POST-INTERVENTION RATING RESULTS

Modified POST-Intervention Rating Profile Results

Item	Adult Participants			
	Wilma	Lois	Doreen	Average
1. This would be an acceptable intervention for promoting a child's skill acquisition.	6	6	6	6
2. Most teachers would find this intervention appropriate for the acquisition of other target skills.	6	5	6	5.7
3. I would suggest this intervention to other teachers.	6	5	6	5.7
4. Most teachers would find this intervention practical for skill acquisition.	6	5	6	5.7
5. I would be willing to use this intervention in the classroom setting.	6	5	5	5.3
6. I would be willing to use this intervention in a clinic setting.	6	6	5	5.7
7. This intervention would be appropriate for a variety of children.	6	6	6	6
8. This intervention is consistent with those I have used in classroom settings (i.e. how much experience do you have with video based interventions).	3	5	3	3.7
9. The adult video training was adequate for learning the intervention.	5	5	6	5.3
10. I felt like the adult video training was costly in terms of time or effort.	2	2	1	1.7
11. I was satisfied with the outcome of this training.	6	6	6	6
12. Overall, this intervention would be beneficial for a child.	6	6	6	6

Table C.1. Adult participant satisfaction ratings regarding the video-based treatment package and adult video training.

APPENDIX D. TREATMENT ADHERENCE DATA COLLECTION SHEET

Date: _____________ Reviewer's Initials: ________ Adult: ___________ Child: _______

1. _____ Correctly prepare data sheet, video, tokens, token board and target step stimuli.
2. _____ Explain or remind child of instructions, tokens, rewards, and play time.
3. _____ Prompt the child to watch the video, play the video, and then prompt the child to attempt the skill.
4. _____ Assist the child if needed using first verbal and then a combination of verbal and physical prompts.
5. _____ Praise the child for their attempt and provide a reward token.
6. _____ Record child step completion on the data collection sheet.
7. _____ Repeat until session is complete.
8. _____ Provide the child with 2-5 minutes of play time with a reward of their choice.
9. _____ At the end of the training, allow the child to select a reward sticker of their choice and send them back to class.

Notes:

APPENDIX E. IMITATIONS DISORDERS EVALUATION SCALE (MODIFIED)

Imitations Disorders Evaluation Scale (Modified)

Modified IDE scale item	0	1	2	3	4
1 Ability to follow objects with eyes					
2 Ability to imitate gestures					
3 Fine Motor Imitation					
4 Gestural Imitations with objects					
5 Ability to imitate a behavior and then stop					

Table E.1: Representation of the modified IDE scale used in this study.

Examples of imitation situations used in direct observation (Malvy et al., 1999)

Item 1: Follow items held by someone else using only eye gaze.

Item 2: Gross motor skills imitation such as waving arms or jumping

Item 3: Fine motor skills imitation such as putting a string through a hole or writing a letter.

Item 4: Imitation of behaviors such as bouncing a ball or driving a toy car.

Item 5: Ability to make discrete imitation responses.

APPENDIX F. MODEL SHOE PICTURES

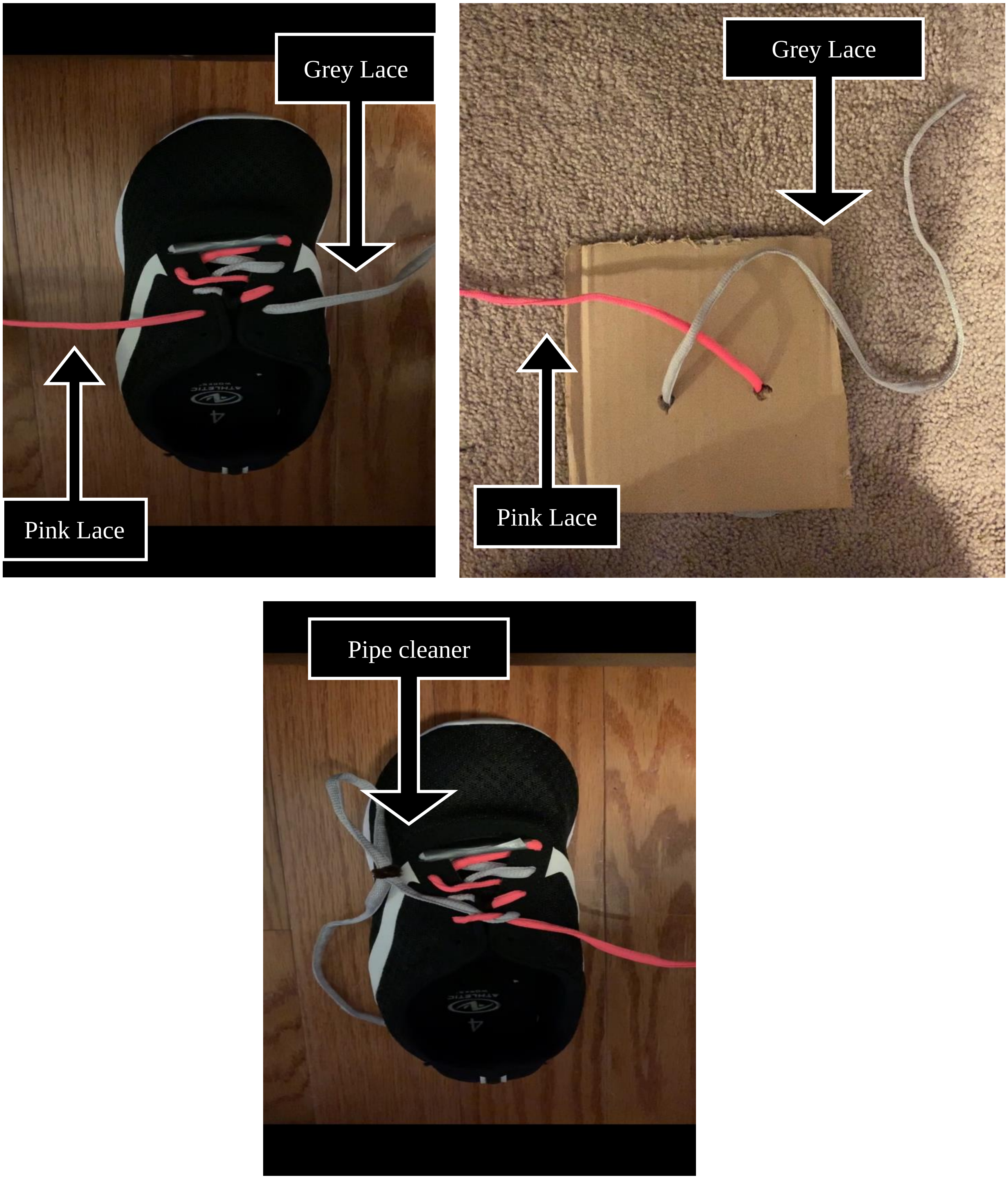


Figure F.1. Photographs of the child training stimulus.

APPENDIX G: INSITUTIONAL REVIEW BOARD APPROVAL

ACTION ON PROTOCOL APPROVAL REQUEST

Institutional Review Board
Dr. Dennis Landin, Chair
130 David Boyd Hall
Baton Rouge, LA 70803
P: 225.578.8692
F: 225.578.5983
irb@lsu.edu
lsu.edu/research

TO: George Noell
Psychology

FROM: Dennis Landin
Chair, Institutional Review Board

DATE: August 8, 2018

RE: **IRB#** 4083

TITLE: Video-Based Intervention: Teaching Children and Adults

New Protocol/Modification/Continuation: New Protocol

Review type: Full ___ Expedited _X_ **Review date:** 8/3/2018

Risk Factor: Minimal ___X___ Uncertain ______ Greater Than Minimal_______

Approved_____X_____ **Disapproved**__________

Approval Date: 8/8/2018 **Approval Expiration Date:** 8/7/2019

Re-review frequency: (annual unless otherwise stated)

Number of subjects approved: 32

LSU Proposal Number (if applicable)**:**

Protocol Matches Scope of Work in Grant proposal: (if applicable)

By: Dennis Landin, Chairman ______DLandin______

PRINCIPAL INVESTIGATOR: PLEASE READ THE FOLLOWING –
Continuing approval is CONDITIONAL on:

1. Adherence to the approved protocol, familiarity with, and adherence to the ethical standards of the Belmont Report, and LSU's Assurance of Compliance with DHHS regulations for the protection of human subjects*
2. Prior approval of a change in protocol, including revision of the consent documents or an increase in the number of subjects over that approved.
3. Obtaining renewed approval (or submittal of a termination report), prior to the approval expiration date, upon request by the IRB office (irrespective of when the project actually begins); notification of project termination.
4. Retention of documentation of informed consent and study records for at least 3 years after the study ends.
5. Continuing attention to the physical and psychological well-being and informed consent of the individual participants, including notification of new information that might affect consent.
6. A prompt report to the IRB of any adverse event affecting a participant potentially arising from the study.
7. Notification of the IRB of a serious compliance failure.
8. **SPECIAL NOTE: When emailing more than one recipient, make sure you use bcc.**

**All investigators and support staff have access to copies of the Belmont Report, LSU's Assurance with DHHS, DHHS (45 CFR 46) and FDA regulations governing use of human subjects, and other relevant documents in print in this office or on our World Wide Web site at http://www.lsu.edu/irb*

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VITA

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