Training Personal Information to Children Diagnosed with Autism Spectrum Disorder

by

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ABSTRACT

TITLE: Training Personal Information to Children Diagnosed with Autism Spectrum Disorder

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For many children diagnosed with Autism Spectrum Disorder, learning emergency information such as their parents’ names, contact information, or important health information may be useful in case of elopement, getting lost, or abduction. In the present study, I evaluated the use of video self-modeling (VSM) to facilitate acquisition of personal information in comparison to echoic prompts using a parallel treatments design with children with ASD. Components of the intervention included: a test, followed by the prompt (e.g., echoic or VSM) for no response given or for an incorrect response. The use of VSM involves the learner viewing a video of oneself successfully demonstrating a target behavior with the goal of the learner engaging in the correct response in the future. The VSM prompt involved the participants viewing a brief video segment of themselves being asked the target question, stating personal information, followed by praise and reinforcement as the consequence. Additional procedures included the use of a cue (i.e., open hand followed by a snap), and a differential observing response (i.e., the participant was given an echoic cue of the differential words before the test) to increase correct
responding. All three participants scored 0% correct independent responding during baseline followed by idiosyncratic results for targets taught through VSM and echoic prompting. At least two-thirds of mastered targets generalized across environments and therapists, and maintained for up to two weeks after treatment. Future research should conduct a component analysis of the video self-model to conclude key components promoting successful learning.
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<td>ASD</td>
<td>Autism Spectrum Disorder</td>
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<td>BL</td>
<td>Baseline</td>
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<td>BLA</td>
<td>Behavior Language Assessment Form</td>
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<td>BST</td>
<td>Behavioral Skills Training</td>
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<td>CTD</td>
<td>Constant Time Delay</td>
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<td>DOR</td>
<td>Differential Observing Response</td>
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<td>DR</td>
<td>Differential Reinforcement</td>
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<td>DTT</td>
<td>Discrete Trial Training</td>
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<td>DV</td>
<td>Dependent Variable</td>
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<td>EC</td>
<td>Error Correction</td>
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<td>EIBI</td>
<td>Early Intensive Behavioral Intervention</td>
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<td>FR</td>
<td>Fixed Ratio Schedule</td>
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<td>GEN</td>
<td>Generalization</td>
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<td>GME</td>
<td>Generalized Matching Equation</td>
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<td>hr</td>
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<td>IOA</td>
<td>Inter-Observer Agreement</td>
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<td>IST</td>
<td>In Situ Training</td>
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<td>MNT</td>
<td>Maintenance</td>
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<td>MSWO</td>
<td>Multiple Stimulus Without Replacement Preference Assessment</td>
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<tr>
<td>Abb</td>
<td>Term</td>
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<td>PRB</td>
<td>Probe</td>
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<td>PTD</td>
<td>Parallel Treatments Design</td>
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<td>PTD</td>
<td>Progressive Time Delay</td>
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<td>TX</td>
<td>Treatment</td>
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<td>VB-MAPP</td>
<td>Verbal Behavior Milestones Assessment and Placement Program</td>
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<td>VM</td>
<td>Video Modeling</td>
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Dedication

I would like to dedicate this project to all the kids who felt like they were just a little too different. Be your own role model and shine on.
INTRODUCTION

According to the Center for Disease Control, the prevalence of ASD is estimated to be one in 68 children as of 2012 (Christensen et al., 2012), and is characterized by deficits in social interaction and communication along with restricted interests and stereotyped behaviors (World Health Organization, 1992). According to a caregiver survey from the Interactive Autism Network (Anderson et al., 2012), nearly half of children diagnosed with Autism Spectrum Disorder (ASD) elope from safe places such as their home, stores, and schools causing stress to their families and caregivers. Elopement is defined as “a dependent person exposing him or herself to potential danger by leaving a supervised, safe space or the care of a responsible person” (p. 2, Anderson et al., 2012). Correlational analysis shows children with ASD (4 to 17 years old, N = 10634) are at a 50% higher risk of injuries and fatal accidents due to elopement compared to typically developing children (Anderson et al., 2012). Interventions to help keep children...
with ASD safer and able to speak for themselves when lost are both relevant and invaluable.

**Early Intensive Behavioral Intervention**

Four decades of research in the field of Applied Behavior Analysis (ABA) show effective results, including teaching skills and reducing aberrant behaviors, in neurotypical individuals as well as those with neurodevelopmental disabilities like ASD (Axelrod, McElrath, & Wine, 2012). Approaches such as discrete trial training (DTT) benefit many children with ASD. DTT involves the establishment of motivation for the participant, a discriminative stimulus (e.g., an instructor presenting materials), a response from the participant (e.g., the participant touching a circle), and a consequence (e.g., a teacher declaring, “good job touching the circle!”). Using a DTT approach, many children made progress on academic and behavioral goals via the use of repeated trials to teach a variety of skills such as verbal behavior, social behavior, and academics. Lovaas (1987) pioneered the use of DTT in an intensive behavioral therapy program for young children with ASD who spent between 20 to 40 hr per week in one-on-one training. Using DTT, therapists presented rapid and repeated learning opportunities in a structured format. Children in the DTT group showed dramatic improvements in academic and behavioral goals in contrast to those who received either no intervention.
(control) or who received only a few hours per week of typical educational programming. Furthermore, 47% of the DTT intervention group participants passed first grade in mainstream classrooms. Later replications of the Lovaas study demonstrated similar improvements for children receiving 20 to 40 hr of early intensive behavioral intervention (EIBI), and recent meta-analyses of current research show moderate to high effects on improving cognitive, social, and behavioral goals in children with ASD using EIBI (Eldevik, Hastings, Hughes, Jahr, Eikeseth, & Cross, 2009; Howard, Sparkman, Cohen, Green, & Stanislaw, 2005; McEachin, Smith, & Lovaas, 1993; Weiss, 1999).

**Behavioral Skills Training**

A recent study found that between the years 2007 to 2016, over 900 children (under 21 years old) diagnosed with ASD were reported missing (National Center for Missing and Exploited Children [NCMEC], 2016). Accordingly, there is a trend in ABA research toward teaching children with ASD safety skills to improve their ability to seek help from adults during a crisis situation, and to communicate enough information to assist an adult with helping them (Gunby, Carr, & LeBlanc, 2010; NCMEC, 2016). A common thread in safety research involves the use of behavior skills training (BST). BST includes components such as providing instructions, modeling, role play, and feedback (Miltenberger, 2008).
One area of promising research focused on teaching individuals with ASD and other disabilities to avoid abduction lures by strangers (Ledbetter-Cho et al., 2016; Gunby et al., 2010; Gunby & Rapp, 2014; Bergstrom et al., 2014). Gunby et al. (2010) used BST to teach three boys (ages 6 to 8) diagnosed with ASD a three-part abduction-prevention response: (a) saying “no” when presented with an abduction lure by a stranger, (b) immediately leaving and running to a safe area (e.g., inside the day-care building), and (c) immediately reporting the event to a familiar adult” (p. 108). During baseline, participants failed to engage in the desired safety responses to simulated abduction lures from confederate strangers. Training involved vocal instructions, providing video and in vivo modeling of the correct responses, role play, and feedback in the form of praise or error correction. After training, participants mastered all three steps and generalized the responses to the natural environment and to four different kinds of lures: (a) simple, (b) incentive, (c) helping, and (d) authority (Gunby et al., 2010). A limitation of Gunby et al. (2010) was that the confederate abductors were all females.

Bergstrom et al. (2014) expanded the literature by performing a systematic replication of Gunby et al. (2010) involving three boys with ASD (ages 10 to 12) who were trained to engage in the same three-step abduction-prevention response. During treatment, participants were trained in their home setting. The results from post-training tests showed that the participants generalized the abduction-
prevention response in untrained natural environments with familiar confederate male abductors and novel male confederates (Bergstrom et al., 2014).

Additionally, BST has been used in conjunction with in situ training (IST) to teach five children (4 to 9 years old) how to avoid abduction lures from strangers and familiar individuals (Rodriguez, 2016). Rodriguez (2016) established a “safe-word” or secret password between the child and trusted adults as a way for the participants to discriminate between safe and unsafe individuals. Participants were lured by confederate unfamiliar adults, familiar adults, and trusted adults during baseline and in post-training probes and were taught to engage in either of the following correct responses: “(a) ask for the safe-word, say no, run, report the lure to a helping professional or caregiver; or (b) ask for the safe-word, say okay, leave with the trusted adult, and report the use of the safe-word to their caregiver” (p.32, Rodriguez, 2016). Results showed that two participants mastered the desired response post-BST and three participants showed mastery post-IST in relation to using a safe-word to discriminate trusted adults.

BST and IST were also used to teach children with ASD to seek help when lost in public (Bergstrom, Najdowski, & Tarbox, 2012). Bergstrom et al. (2012) taught three boys (10-11 years old) diagnosed with ASD to seek help when lost in public. Researchers implemented a treatment package consisting of rules (i.e., yell for mom and dad, find a worker in the store, tell the worker she/he is lost), role
play, and praise. Researchers guided the participants through stores prompting them to engage in the correct steps in the sequence, followed by verbal praise for completion of each step. Participants met mastery criteria by independently performing all three steps within five to seven treatment sessions. Researchers noted that participants in the study possessed advanced verbal skills, and that future studies should investigate pre-requisite skills required to learn the rule-governed intervention, which potentially includes younger children with less advanced verbal repertoires.

Prior abduction-prevention safety studies focused on training participants on the correct response when approached by another individual initiating the interaction, presenting an important first step in instruction. Individuals with ASD would further benefit from learning social skills that allow them to initiate and respond to others when necessary, such as in an emergency where a child is separated from his or her caregivers. The Bergstrom et al. (2012) study focused on teaching individuals with ASD to initiate social interactions to obtain help when lost. When seeking help, the next step would be to provide the helper pertinent information to find the child’s caregivers and return him or her to safety.
Intraverbal Training Procedures

The question-and-answer interaction between individuals, such as that between a lost child and a helping adult, is known as an *intraverbal* response, based on Skinner’s (1957) analysis of verbal behavior and the functional classification of language into distinct categories, called verbal operants. Intraverbal responding is a type of verbal behavior—a verbal operant in which the verbal response differs (i.e. has no point-to-point correspondence) from the antecedent verbal stimulus (Cooper, Heron, & Heward, 2007). An example of an intraverbal exchange might be a teacher asking a child, “What sound does a cat make?” and the child answering, “meow.” Intraverbals are established by generalized conditioned reinforcement, for instance, praise statements (e.g., “good job,” or, “yes, that’s right”), high fives, or tokens placed on a token board. A recent study showed that descriptive praise, whereby the reinforcing agent delivers praise for the specific behavior desired (e.g., “good job saying meow,” or, “yes, meow is right”), is more effective than general praise, whereby a general comment such as “good job,” or “nice” follows an appropriate behavior (Polick, Carr, & Hanney, 2012).

The published literature on intraverbal training in the last decade (2005 to 2015) showed that eight out of 19 studies on direct intraverbal training focused on the effectiveness of an *echoic* prompt (Aguirre, Valentino, & LeBlanc, 2016). An echoic is a type of verbal operant in which the verbal response has point-to-point
correspondence with the antecedent verbal stimulus (Cooper, Heron, & Heward, 2007). An echoic prompt occurs when the discriminative stimulus is a statement or question, and the therapist provides an immediate verbal model of the expected response. For instance, a teacher directing a child by saying, “say flower” and a student echoing the word “flower.” An example of an intraverbal exchange using an echoic prompt might be a teacher asking, “What sound does a cat make?” followed by the teacher saying, “meow” after a specified time delay and the child thereafter answering, “meow.”

In addition to the echoic prompt, some researchers have also found the textual prompt to be more effective than echoic prompts, in teaching intraverbal skills to individuals with autism (Finkel & Williams, 2001; Vedora, Meunier, & Mackay, 2009). An advantage of using textual prompts is the object permanence of the stimulus compared to the transitory nature of echoic prompts (Vedora, Meunier, & Mackay, 2009). Textual stimuli may also set the occasion for individuals with autism to attend to the prompt, rather than to a person—an important factor to consider for individuals who have difficulties interpreting social cues (Charlop-Christy, Le, Freeman, 2000, as cited in Vedora, Meunier, & Mackay, 2009). Researchers recruited participants with reading as a pre-requisite skill in the prior studies evaluating textual prompts (Finkel & Williams, 2001; Vedora, Meunier, & Mackay, 2009); participants were six to seven-year-old males who functioned
above their academic levels and were capable of identifying sight words (Finkel & Williams, 2001; Vedora, Meunier, & Mackay, 2009). These findings add to the mixed reviews regarding the prompts used in intraverbal training procedures per current literature reviews (Aguirre, Valentino, & LaBlanc, 2016; Vedora & Conant, 2015). Ultimately, participants with a learning history consistent with the evaluated prompting styles are most successful during skill acquisition (Coon and Miguel, 2012).

**Video Modeling Approaches in ASD**

An alternative evidence-based teaching strategy that requires little to no response effort from the learner is the use of video modeling (VM) and video self-modeling (VSM). Numerous replications demonstrate the effectiveness of video modeling to teach skill acquisition of socially significant behaviors to individuals across a wide range of settings (Dowrick, 2012a, 2012b; Bellini & Akullian, 2007; Krouse, 2001; Plavnick & Ferreri, 2011; Nikopoulos & Keenan, 2004; Catania, et al., 2009; Boudreau & Harvey, 2013; Geiger et al., 2010; Allen et al., 2010). VM involves showing the learner one or more model individuals performing the target behavior prior to performing the task, and video self-modeling (VSM) typically includes viewing oneself acting in a scene (Bellini & Akullian, 2007). The roots of VM and VSM derive from Social Learning Theory, which affirms that individuals
possess the ability to learn by observing others and the consequences in their surrounding environment without receiving direct reinforcement (Bandura, 1977).

Results indicate that learning through social observation demonstrates effective results when the learner attends to a model who shares similar social and physical characteristics (Bandura, 1977). Self-modeling (SM), derived from Bandura’s Social Learning Theory (1977), utilizes the learner as his or her own model when successfully demonstrating a target behavior. Video self-modeling (VSM) allows the learner to observe a video of himself or herself, serving in place of the model individual (Dowrick & Raeburn, 1977). The learner correctly performs the target behavior on video then observes the video prior to the next opportunity of performing the task. Researchers demonstrated the utility of video modeling and VSM by teaching a wide range of behaviors such as social skills (Boudreau & Harvey, 2013; Lang et al., 2011; Nikopoulos & Keenan, 2004), academic skills (Delano, 2007; Marcus & Wilder, 2009; Geiger et al., 2010), and work-related tasks (Catania et al., 2009; Nielsen et al., 2009). Learner demographics ranged from typically developed to nontypically developed children and adults.

Researchers established the success of video modeling and VSM in producing skill acquisition, however research lacks support for one method being more effective than the other. Geiger et al. (2010) compared in vivo modeling with
video modeling to teach a drawing task to three children with autism. Participants showed no preference for either technique, and both methods produced acquisition (Geiger et al., 2010). Marcus and Wilder (2009) compared VM and VSM to teach textual responses to three children with autism. The VSM condition resulted in better efficacy in teaching participants the task, and caregivers anecdotally reported social significance in the VSM methods. Social significance refers to the applied nature of the questions and treatments being deemed acceptable by society (Baer, Wolfe, & Risely, 1968). Researchers have also evaluated individual preferences and attending to in vivo and video presentations, finding that neurotypical children and children diagnosed with ASD visually attend to video presentations for longer durations compared to in vivo stimuli (Cardon & Azuma, 2012), which leads to better skill acquisition (Charlop-Christy, Le, Freeman, 2000). The mixed results from previous studies occasion clarification to determine best practice. Accordingly, the versatility of the VSM procedure expands the possible applications to be explored.

**Purpose**

The aforementioned studies focused on procedural safety and incorporated social validity through caregiver reports for children with ASD. In the present study, I investigated the effects of VSM on teaching safety information to children
with ASD to extend and illustrate a possible differentiation between teaching methods. The purpose of this study was to evaluate whether VSM as a teaching procedure proved effective at training and maintaining intraverbal responses to questions about personal emergency information. I compared the effects of a VSM prompting procedure to a commonly used format for intraverbal training, the echoic prompting procedure, to teach three young children with ASD to respond to four questions that would guide a helping adult to assist them with finding a caregiver.
METHOD

Participants

The participants in this experiment included three boys (M_{age}= 5.3 years, age range: 4 – 8 years) diagnosed with Autism Spectrum Disorder. All participants attended a clinic specializing in ABA services to teach academic, social, and behavioral skills. Caregivers responded to a recruitment flyer (see Appendix A) and voluntarily signed consent forms allowing their children to participate in the study (see Appendices B, C, & D). All parents provided permission for researchers to videotape the participant for the video self-modeling procedure, interobserver agreement, and treatment integrity. Participants were screened prior to selection for problems that might have precluded participation, such as noncompliance during daily motor activities, medical diagnoses such as visual or auditory deficits, medications, and physical capabilities. Participants indicated their availability during session times for at least nine sessions of five trials each. To preserve confidentiality, the participants received pseudonyms in the following sections and be referred to as Gerry (8 years), Shane (4 years), and Ryan (4 years).

Inclusion criteria. Participants were selected based on a prior diagnosis of ASD and clinical records denoting verbal behavior skills as assessed by therapists
using the Behavioral Language Assessment Form (BLA; Sundberg & Partington, 1998) and the Verbal Behavior Milestones Assessment and Placement Program (VB-MAPP; Sundberg, 2008). The BLA is an informant based assessment which therapists use to rate 12 categories of behavior including social, cognitive, and verbal skills (Sundberg & Partington, 1998). The VB-MAPP is an assessment tool which provides a visual representation of a child’s verbal skills in comparison to typically developing children (Sundberg, 2008), and serves as an assessment guide for determining curricular interventions to improve communication skills. The VB-MAPP categorizes verbal skills into 16 areas of speech, factoring in environmental factors that set the occasion for each behavior and show the child’s strengths and areas for improvement pertaining to verbal skills (Sundberg, 2008). The three levels of the VB-MAPP correspond to approximate age ranges of the verbal skills observed in typically developing children; Level 1 = 0 to 18 months, Level 2 = 18 to 30 months, Level 3 = 30 to 48 months (Sundberg, 2008). The VB-MAPP and BLA were used to determine the participants’ level of verbal skills upon enrollment in services at the ABA clinic. Scores from sections of these assessments were compared between participants prior to treatment (see Table 1).

All participants demonstrated independent vocal responding. Based on clinical records, all participants scored at least nine out of 10 points on the echoic section of the VB-MAPP meaning all participants vocalize most early consonant
sounds, three-letter syllables, and can imitate some variations in pitch, stressed syllables, and loudness (Sundberg, 2008). All three participants also scored no higher than three out of a possible 10 points on the intraverbal section of the VB-MAPP indicating that they engaged in rote verbal responses to fill in the blank opportunities (i.e. Twinkle, twinkle, little star, or A, B, C, D, E, F, G...). Participants had no prior training directly on the target questions about personal emergency information before beginning the study. All participants were able to independently identify their first name and a picture of themselves. During initial probes, they responded incorrectly to the two sets of personal emergency information questions (i.e., mother’s and father’s names and phone numbers).

Gerry was a seven-year-old boy with ASD enrolled in a local private school and receiving daily ABA services in a clinical setting with a client to therapist ratio of 2:1. Gerry turned eight years old while participating in the study. Gerry scored 54 points out of a possible 60 points on the BLA and 73 points out of a possible 120 points on his most recent VB-MAPP (see Table 1). Gerry’s assessment scores classified him as a Level 2 learner (i.e. exhibiting the verbal skills of an 18 to 30-month-old child). Gerry’s treatment plan goals included increasing intraverbal fill-in responses (i.e. “wash your… hands”, “sing a… song”, etc.) and responding to intraverbals pertaining to personal information (i.e. “How old are you? Eight”, “What state do you live in? Florida”, etc.). All of Gerry’s sessions were conducted
in the evaluation room at the autism clinic. Due to health conditions, edibles were not used as a consequence or potential reinforcer. During therapy sessions, Gerry’s primary reinforcer for independent responding was time to watch videos on an iPad, which was used exclusively as a putative reinforcer.

Shane is a four-year-old boy with ASD enrolled in pre-kindergarten at a local private school. Shane received ABA services in an autism clinic with a client to therapist ratio of 3:1. Shane scored 52 out of 60 points on the BLA and 73.5 points out of a possible 120 points on the VB-MAPP assessment (see Table 1). Shane’s assessment scores classified him as a Level 2 learner (i.e. exhibiting the verbal skills of an 18 to 30-month-old child). Shane’s echoic scores showed he was able to repeat most vocal samples of early consonant sounds and three-letter syllables within three tries. Shane’s intraverbal targets during therapy sessions consisted of responding to yes-or-no questions (i.e. “Is this red? No. Is this blue? Yes.”), and his treatment plan goals included responding to questions about personal information (i.e. name, age, address, etc.). All of Shane’s sessions were conducted in the evaluation room at the autism clinic. The preference assessment with Shane showed his highest preference was for M&Ms, followed by other non-edible tangibles, which varied from session to session. Shane received M&Ms as his potential reinforcer followed by the delivery of other tangible items for the remainder of his reinforcer time after engaging in correct responses.
Ryan was a four-year-old boy with autism enrolled in pre-kindergarten at a local private school. Ryan received ABA services in an autism clinic with a client to therapist ratio of 3:1. Ryan scored 43 out of 60 points on the BLA and 36.5 points out of a possible 120 points on the VB-MAPP assessment (see Table 1). Ryan’s initial assessment scores classified him as a Level 1 learner (i.e. exhibiting the verbal skills of an 0 to 18-month-old child). However, Ryan’s cumulative VB-MAPP score does not reflect his current skill level as the assessment was completed more than a year prior to recruitment. Upon more recent evaluation by the researcher, Ryan scored 9.5 out of 10 points on the echoic section, or Level 2, on the VB-MAPP. The researcher also tested the intraverbal skills sections of the VB-MAPP and found that Ryan was on par with Gerry and Shane’s scores (see Table 1). All of Ryan’s sessions were conducted at the autism clinic, however sessions took place in the evaluation room and in a treatment room due to space constraints. The researcher initially presented Ryan with preferred leisure items available in session as his potential reinforcers available during the preference assessment for this study. Ryan’s preferences varied between a singing Cookie Monster toy, puzzles, and an alphabet book. Before starting the first session of treatment for Set 2, the researcher introduced the availability of the iPad as a potential reinforcer for working in the evaluation room. The iPad became the
preferred tangible consequence for the remaining sessions until data collection was completed.

**Setting and Materials**

Sessions were conducted with participants in the treatment rooms in an autism clinic where all participants received behavioral therapy. The evaluation room included a rectangular table, two chairs for the participant and researcher, a temporary blue wall to block sight of toys and stimuli stored in the treatment room, a datasheet on the table, and available preference items in the form of edibles and tangibles. The datasheet was created by the researcher with the target questions, target answers, and assigned prompting level (see Appendix E). Target responses were not reported to protect the participants’ confidential information. A 43 cm laptop screen with video editing software, digital video player, and a digital video recorder was used to develop and play the video model for participants. The researcher placed the laptop on the table facing the participant for the duration of all sessions displaying a black screen, unless utilized for playing the video prompt. The primary and secondary researchers recorded interobserver agreement data and treatment integrity data in the same room during sessions, when present in vivo. For participant 3, Ryan, the alternative treatment room was larger than the evaluation room, and was set up with a round wooden table approximately the
same size as the one in the evaluation room. The stimuli on the walls, larger toys, and stored items in the room were not blocked off for Ryan’s sessions. The datasheet, potential reinforcers, and laptop were all placed on the table, matching the arrangement in the evaluation room.

**Experimental Design**

A parallel treatments design (PTD; Gast & Wolery, 1988) was used for this study. The PTD is a single subject design in which two concurrent multiple baseline designs are replicated across behaviors, using counterbalancing to control for the difficulty and learning history of target responses. During the baseline phase, the experimenter asked each participant two target sets of questions (i.e., two questions per set) regarding personal information. After three baseline sessions showing stable performance in terms of level, trend and variability, the experimenter assigned one question using an echoic prompt and the other question using a video self-modeling prompt. The experimenter implemented the two prompting procedures during treatment to compare their efficacy. While the first target set underwent intervention, questions in the second target set remained in baseline. Upon the first target set reaching mastery criteria or showing stable differentiation, the investigator re-probed all target questions in the first and second sets to determine if the treatment to the target questions in the first set influenced
the remaining target questions. The researcher then implemented training procedures for the questions in the second set, while questions in the first set remained in baseline. After the targets in the second set reached mastery criteria or showed stable differentiation, all target questions across sets were re-probed. The completion of treatment for both sets were followed by generalization probes for all targets in different environments with different therapists. Maintenance probes were conducted by the primary researcher two weeks after the completion of the second treatment phase.

**Dependent Variables and Measurement**

The dependent variables included the percent correct versus incorrect responses to each target question per session. Each session consisted of five trials (i.e., one trial block) per target question, for a total of ten target questions (i.e., two trial blocks) per treatment session. Only complete and independent responses were scored as correct. Partial responses, prompted responses, and correct responses during error corrections were scored as incorrect. Data collection continued until the participants’ responses met the mastery criteria of at least 80% correct independent responding for at least one target question in a set across at least three consecutive sessions. Primary data were scored on a data recording sheet in vivo (see Appendix E). The number of trials to criterion were also compared between
matched questions taught using echoic prompts versus video self-modeling prompts.

**Procedure**

**Pre-Assessment.** Extant data regarding mastered skills was used to select a list of intraverbal questions pertaining to each participant’s personal information that had not already been taught. Caregivers and therapists provided information used to create a list of potential target questions, which were probed. Specific questions were selected based on input from the participants’ caregivers. Questions were matched according to topography (i.e. names with names, numbers with numbers) to determine question sets. Each set was assigned one target taught using an echoic prompt and one taught using the VSM prompt. Target questions, sets, and assigned prompts were the same for all three participants (see Appendix E).

**Preference Assessment.** A Multiple-Stimulus Without Replacement (MSWO) preference assessment (DeLeon & Iwata, 1996) was conducted prior to each session to determine stimuli the participants preferred, to be used as putative reinforcers following sessions. The MSWO was conducted by placing an array of stimuli in front of the participant, then instructing the participant to, “pick one.” The unchosen stimuli were removed, and the participant was given approximately 30 to 45 s to engage with the chosen stimulus. The researcher removed the chosen
stimulus and represented the unchosen stimuli in an array in a different order from the previous presentation. The presentation of stimuli, instruction to “pick one,” withdrawal of unchosen stimuli, and allotted time to engage with the chosen stimulus was repeated until all stimuli were chosen. The highest preferred stimulus was used as the consequence for correct independent responses to the target questions and served as the consequence for correct responses to mastered tasks if the participant erred on the target question.

**Baseline.** Questions were randomly ordered prior to each session. The researcher introduced herself to the participant and asked the participant to perform a series of two to three mastered tasks before asking a target question. The researcher asked the participant one target question at a time, followed by a praise statement if the participant answered correctly, or a general statement acknowledging the response (e.g., “okay,” or, “thank you,” in a neutral tone, accompanied by neutral affect) if the answer was incorrect. The researcher scored each trial as a correct or incorrect response based on the information previously obtained from the participant’s caregiver. If the target questions were answered incorrectly, the researcher asked the participant to perform two more mastered tasks and provided a break if answered correctly (i.e., the participant was on a FR2 schedule for mastered tasks after incorrect responses to target questions to avoid adventitiously reinforcing incorrect responses). The researcher ended the session
once all target questions were asked five times. Baseline sessions were run once per day per participant.

**Video Creation.** After baseline sessions showed stable responding, the researcher scheduled a video creation session with each participant. The video creation session took place in the same evaluation room with the same stimulus arrangement, except no trials were run. The researcher started the video recorder and ask the participant to remain silent for a few seconds. Then the researcher used an echoic prompt to instruct the participant to repeat after her (i.e. “Say ____”), stating the answer to one of the target questions without the question being asked. Once the participant repeated the sample response, the researcher waited 10 s and asked the participant to repeat the next word or phrase. The researcher interspersed the demand to repeat target responses with random words and numbers to control for any correlation between the repeated vocal responses and the target questions asked in baseline. The experimenter repeated this procedure for all target answers, providing an echoic prompt as a sample response. Once all target answers were recorded, the researcher used the Easy Video Maker © program to combine the video and vocal response of each participant. The videos showed the participant facing the camera, then the researcher inserted the voice over asking a target question, followed by the participant’s pre-recorded vocal target response, followed
by the researcher providing vocal praise and a video clip of the participant receiving his preferred stimulus as selected during the MSWO.

**Treatment.** The researcher matched target questions based on type and difficulty and assigned two questions per set. In each set, one target question was assigned to either the echoic prompting procedure or the VSM procedure (see Appendix E). In Set 1, “What is your mom’s name?” was assigned the echoic prompt, while the question, “What is your dad’s name?” was assigned the VSM prompt. In Set 2, the question, “What is your mom’s phone number?” was assigned the echoic prompt, while the question, “What is your dad’s phone number?” was assigned the VSM prompt. Treatment for each set of questions was implemented independently from the treatment of the other set. In the first treatment phase, questions from Set 2 remained in baseline, and only target questions from Set 1 were asked. In the second treatment phase, questions from Set 1 remained on hold and only target questions from Set 2 were asked.

Target questions were quasi-randomly ordered prior to each session, with each target question repeated no more than two consecutive trials. The researcher scored responses on the datasheet in vivo. If a secondary researcher was not available in vivo, the primary researcher used the laptop’s camera to record the session. The researcher started each session with an MSWO preference assessment.
Once all stimuli were chosen, the researcher would remind the participant of his first choice stating, “We’re working for ________”.

During each trial, the participant was asked to perform a series of two mastered tasks followed by a target question. If the participant responded correctly, the researcher immediately provided a specific praise statement (e.g. “Good job! Your mom’s name is _______), accompanied by the delivery of the participant’s highest preferred stimulus for 30 to 45 s. If the participant did not provide a response within 3 s of the target question, the researcher implemented a constant time delay 3 s (CTD, Wolery et al., 1992) for the assigned prompt (i.e. echoic or VSM). The CTD meant the latency between the target question and the prompt remained the same for all trials throughout treatment. For example, if the researcher asked, “What’s your mom’s name?” and the participant did not provide an answer within 3 s, the researcher delivered the vocal echoic prompt, “[Name]”. If the participant echoed, “[Name]”, the researcher provided specific verbal praise accompanied by the highest preferred reinforcer for 30 to 45 s. If the participant did not echo the prompted response, the researcher conducted error correction by stating the verbal prompt and providing the target response immediately (i.e. with a 0 s time delay).

For the target questions assigned to the VSM prompting procedure, if the participant did not provide an answer within 3 s after the question, the researcher
said, “look here,” while pointing to the laptop screen and simultaneously playing the video prompt. If the participant correctly answered the re-test after the prompt, the researcher provided specific verbal praise accompanied by the highest preferred reinforcer for 30 to 45 s. For example, if the question was “What’s your dad’s name?” and the participant did not respond within 3 s, the researcher played the video self-model for that target question showing the participant on the laptop screen with the voice-over series providing the verbal prompt, model response, and consequence. The researcher then re-tested the target question, “What’s your dad’s name?” and provided praise for the participant’s correct response. If the participant provided an incorrect response during the re-test, the researcher conducted error correction.

The researcher ended the session once all target questions in the set were asked five times (i.e., one trial block per target question). Treatment sessions were conducted for a maximum three times per day per participant. Treatment sessions continued until the data met mastery criteria for three sessions in a row above 80% independent responding or until the data displayed stable differentiation between prompting styles.

**Error Correction.** If the participant answered incorrectly during the initial test, the researcher provided a consolation statement (e.g., “not quite” or “nice try”) to acknowledge the participant’s answer, followed by the assigned error correction.
The researcher conducted error correction procedures (see Appendix F) until the participant provided the correct response, with a maximum of two corrections. If the participant provided the correct response during error correction, the researcher moved on to ask the participant to engage in two mastered tasks (i.e. “touch your nose,” “clap your hands,” etc.) before providing the participant’s highest preferred stimulus for 30 to 45 s. If the participant was unable to engage in the target response after the second test in error correction, the researcher conducted the series of error correction procedures a third time. Instead of testing the participant during the third error correction series, the researcher provided an echoic prompt for the correct response then moved on to mastered tasks and a 30 to 45 s break with the availability of the participant’s highest preferred stimulus.

**Cued Response Sessions**

One participant, Ryan, engaged in vocal stereotypy, repeating the researcher’s statements, and failed to demonstrate effective acquisition using the echoic or VSM procedures. For Ryan, the investigator added a response cue during treatment of Set 1, and a differential observing response (DOR, Kisamore, Karsten, & Mann, 2016) during treatment of Set 2. The researcher added the cue to prompt Ryan in Set 1 after observing no response to the verbal antecedent, followed by a script of the entire trial during Ryan’s inter-trial breaks (i.e. Ryan was playing and repeatedly reciting “What’s your dad’s name? … Good job! Your dad’s name is
The cue consisted of an open hand raised at eye level beside the researcher’s face as the target question was asked, followed by a finger snap immediately after the target question was finished (Marchand-Martella, Slocum, & Martella, 2004). For example, “What’s your mom’s/dad’s name?” with the added cue was conducted as such: [open hand] “What’s your mom’s/dad’s name?” [snap], followed by a 3 s constant time delay. The cue was also applied to the error correction procedure. During error correction for the target assigned to the echoic prompt, the researcher proceeded to implement the cue—[open hand] “What’s your mom’s name?” [snap], “Name.” The cue was also applied to error correction for the target assigned the VSM prompt—as the video played the researcher held up the open hand, snapped after the target question, “What’s your dad’s name?” and continued to let the video play until completion.

During the treatment of Set 2, Ryan combined the target responses producing an incorrect response for both questions in the set (i.e., Ryan responded with the same incorrect 10-digit number regardless of the question asked). The researcher added a differential observing response (DOR) modeled after a study by Kisamore, Karsten, & Mann (2016) which used the DOR to teach multiply controlled intraverbals. Multiply controlled intraverbals are questions or statements that require the individual to conditionally discriminate between the relevant components of the discriminative stimulus to produce a response that satisfies the
controlling variables (Kisamore, Karsten, & Mann, 2016). For example, when asking the question, “What is your mom’s phone number?” the listener is required to respond appropriately with the following: (a) a number, (b) a phone number, and (c) a phone number associated with his mom.

In the current study, the DOR consisted of an echoic trial whereby the researcher stated an abbreviation of the pertinent portion of the target questions. For example, the DOR trial consisted of the researcher giving the demand, “Say, ‘mom’s phone number.’” If Ryan attempted to answer the question instead of stating the echoic response, the researcher interrupted him by holding up an open hand, saying “no,” and repeated the demand, “Say, ‘mom’s phone number.’” If Ryan said, “mom’s phone number,” the researcher provided specific praise, “Good! Mom’s phone number.” Then the researcher would ask the target question, “What’s your mom’s phone number?” followed by a 3 s constant time delay. The DOR was used accordingly with dad’s phone number—Ryan was instructed to “Say, ‘dad’s phone number.’” If Ryan attempted to answer the question instead of stating the echoic response, the researcher interrupted the incorrect response by holding up an open hand, saying “no,” and repeating the demand, “Say, ‘dad’s phone number.’” If Ryan said, “dad’s phone number,” the researcher provided specific praise, “Good! Dad’s phone number.” Then the researcher asked the target question, “What’s your dad’s phone number?” followed by a 3 s constant time
delay. Researchers implemented the DOR to assist Ryan in discriminating between the two questions in Set 2 and to clarify that there were two target questions being asked.

**Treatment Evaluation.** The researcher collected probe data after the completion of each treatment phase. Probe sessions were conducted identical to baseline procedures—all target questions were randomized before the session and the researcher prompted a series of two to three mastered tasks before asking a target question. The researcher provided praise as differential reinforcement for the participants’ correct answers accompanied by 30 to 45 s of interaction with his highest preferred stimulus. If the participant answered incorrectly, the researcher provided a neutral statement (e.g. “okay,” in a neutral tone) to acknowledge the participant’s answer but did not provide error correction. If the target questions were answered incorrectly, the researcher asked the participant to perform two more mastered tasks and provided a break after two correct responses (i.e., the participant was on a FR2 schedule for mastered tasks after incorrect responses to target questions). The researcher ended the probe session once all target questions were asked five times (i.e., 20 trials). A probe session was also conducted two weeks after the completion of the final intervention session to evaluate the maintenance of skills.
**Generalization.** Each participant was tested for generalization in two different environments and with two different therapists. All target questions were randomized before the session and the researcher asked the participants to complete a series of two to three mastered tasks before asking a target question. The scoring during generalization probes involved the participant’s independent answers on the “best of three” trials. If the participant correctly answered a target question during the first two trials, the third trial was disregarded. If the participant erred during the first or second trial for a specific target, all three trials were conducted for that target.

The researcher provided praise as differential reinforcement for the participants’ correct answers accompanied by 30 to 45 s of interaction with his highest preferred stimulus. If the participant answered incorrectly, the researcher provided a neutral statement (e.g., “okay,” in a neutral tone) to acknowledge the participant’s answer, but did not provide error correction. If the target questions were answered incorrectly, the researcher asked the participant to perform two more mastered tasks and provided a break after two correct responses. The researcher ended the generalization probes once all target questions were completed “best of three” (i.e., eight trials if all target questions were answered correctly or up to 12 trials if the participant provided at least one incorrect response per target question). The researcher calculated the percent correct for each target question.
Data Analysis

The researcher graphed the percentage of correct responses for all participants (see Figures 1, 2, and 3). The figures will show each participants’ scores per session per target response for all phases. Visual analysis was used to analyze variability, level, and trend within and between phases for each target. The means and ranges for each phase and condition were calculated. The trials to criterion per target question were summed and compared between targets taught using the echoic prompt and targets taught using the VSM procedure (see Figures 4 and 5). Scores for interobserver agreement and treatment integrity were calculated using percentages and will be reported with means and ranges for each phase.

Interobserver Agreement

Interobserver agreement (IOA) data were collected for the dependent variables, correct versus incorrect responses to each target question asked. Secondary observers were trained prior to data collection and were given verbal instructions accompanied by a textual outline of scoring procedures during each session observed. IOA was calculated using the exact count method, in which the percentage agreement per question is calculated based on two independent observers (Cooper, Heron, & Heward, 2014). IOA data were collected for 40% of sessions across all phases. IOA data were collected in vivo for 15% of sessions in
the same treatment room where sessions were conducted. Video recordings of sessions were provided to secondary researchers for 25% of sessions in the event a second observer was unavailable at the time of the session. Additional training and task clarification would have been provided if agreement fell below 80%, however, IOA scores remained above 80% for all participants’ sessions observed. For all participants, the total agreements per observed session averaged 99% (range: 80% to 100%).

**Treatment Integrity**

Researchers evaluated treatment integrity for 36% of the sessions across all phases of the experiment using in vivo methods and video recordings. Treatment integrity observers were trained prior to data collection and given verbal instructions accompanied by a textual outline of scoring procedures during each session observed. Treatment integrity was calculated using the total count of trials presented with the: (a) correct antecedent, (b) use of assigned prompting procedure, and (c) corresponding consequence to the participant’s response (see Appendix G). Treatment integrity for observed sessions across all participants averaged 97% (range: 90% to 100%).
Social Validity

The primary researcher developed a questionnaire for the secondary researchers to voluntarily complete regarding this study (see Appendix H). The primary researcher conducted all trials during baseline and treatment sessions, but did not participate in a social validity survey. Items were rated on a 5-point Likert-type scale, ranging from 1 (strongly disagree) to 5 (strongly agree). Researchers completed the survey for multiple participants after the study. Questions focused on the efficacy at improving verbal responses regarding personal information, feasibility of the study, and likelihood of continuing the procedure to enhance maintenance. All three secondary researchers strongly agreed (5) that “the participants learned important information” (see Table 2). Overall, the survey results showed that observers found the echoic prompt more engaging for participants, easier to implement, and more practical for future teaching opportunities, when compared to the VSM prompt (see Table 2).
RESULTS

General Results

Graphs displaying results for Gerry, Shane, and Ryan are depicted in Figures 1, 2, and 3, respectively. A summary of participants’ average percentage of correct independent responding per phase is shown in Table 3. All participants demonstrated incorrect responding across all target questions during baseline sessions. Overall, results showed that the effectiveness of the VSM prompting procedure was idiosyncratic for the acquisition of intraverbal behavior pertaining to personal information. During treatment of Set 1, stating parents’ names, two of the three participants responded with 80% independence by the second treatment session when taught the target response using the VSM prompting procedure, while during treatment of Set 2, parents’ phone numbers, two of the three participants responded with 80% independence in fewer sessions when taught the target response using the echoic prompting procedure. All target questions trained using the echoic prompting procedure reached mastery criteria during treatment for Set 1 and Set 2 for all three participants (see Figures 1, 2, and 3).

During generalization probes, the participants met mastery criteria for the targets acquired using the echoic prompt in ten out of twelve sessions, while only
four out of six sessions met mastery criteria for targets acquired using VSM prompts. Gerry and Shane showed maintenance of the target skills two weeks after treatment to correctly and independently respond to the questions taught through both VSM and echoic prompting, while Ryan showed mixed results (see Figures 1, 2, and 3). Additionally, there is a slight incongruence when comparing the number of sessions until three consecutive blocks of 80% correct independent responding and the generalization and maintenance of those same targets (see Table 3). The first target to reach mastery criteria between the echoic or VSM prompt did not always lead to the most durable target.

The average duration of the videos used during treatment of Set 1, parents’ names, and Set 2, parents’ phone numbers lasted 17 s (range: 15 s to 20 s), and 28 s (range: 24 s to 34 s), respectively. Considering the length of the VSM prompts, each video added an average of 11 s (range: 8 s to 15 s) per viewing due to the addition of the consequence for correct responding in the video. The average duration of each session of baseline, treatment for Set 1, and treatment for Set 2 lasted 16 min (range: 12 to 22 min), 15 min (range: 6 to 26 min), and 26 min (14 min to 40 min), respectively. The treatment sessions for Set 2 required longer durations due to the nature of the questions and required responses (see Appendix E).
Gerry

Gerry exhibited no correct responses during baseline for targets in either set of questions (see Figure 1; see Table 3). He learned his parents’ names in Set 1 with both the VSM and echoic prompting procedures. However, Gerry quickly met mastery criteria using the VSM prompting procedure—by the second session—and met three consecutive sessions at or above 80% of opportunities by his fourth session. Gerry maintained 80% correct independent responding during the probe after treatment for Set 1, before implementing intervention in Set 2. During the treatment of Set 2, Gerry learned his mother’s phone number using the echoic prompting procedure in 28 trials, and scored at least 80% correct independent responding by the eighth session. Gerry was not able to correctly independently respond to the question, “What is your dad’s phone number?” which was taught using the VSM prompting procedure. Responding to the target taught using VSM remained at 0% correct independent responding throughout the treatment of Set 2. During the second probe session after the completion of treatment of Set 2, he showed maintenance of the skills taught in Set 1 and the acquired target in Set 2, with all three targets maintained at 100% correct independent responding. During generalization probes, Gerry generalized the targets taught using echoic prompting in two novel environments and with two different therapists during 100% of opportunities with correct independent responding. Gerry did not generalize the
intraverbal skill taught using the VSM procedure, showing only 33% correct independent responding with novel therapists, and 67% correct responding in novel environments. After two weeks, the participant was asked the same target questions to test for maintenance. Gerry maintained the targets taught using the echoic prompting procedure, responding correctly and independently for 100% of opportunities. Gerry also maintained the target taught using the VSM prompt for 67% of opportunities—the same score for generalization in different environments.

**Shane**

Shane responded with 0% correct responses during baseline for targets in both sets of questions (see Figure 2; see Table 3). During the treatment phase for Set 1, Shane met mastery criteria for the target taught using VSM prompting by his second session, scoring 80% correct independent responding, but dropped below mastery criteria during the following session. Shane met mastery criteria for correct independent responding for three consecutive sessions at 80% or above for targets taught with either prompting procedure. Both targets taught in Set 1 maintained during the probe before implementation of Set 2, scoring 100% correct independent responding.

During the instruction of Set 2, Shane met mastery criteria of the target taught using echoic prompting by his second session with 100% correct
independent responding. However, the target taught using echoic prompting dropped below mastery criteria and showed some variability until Gerry responded with correct independence again at 100% during his ninth session, followed by stability in the following two trials (see Figure 2). Shane showed 80% correct independent responding to the target taught using the VSM prompt by his fifth session and maintained independent responding at or above 80% for the following six trials until the treatment of Set 2 was completed. Following the treatment of Set 2, Shane responded to all target questions in sets one and two correctly during the probe with 100% independence.

During the generalization probes for question Set 1, Shane generalized the target response to the question taught using the VSM prompt, “What is your dad’s name?” across novel environments and with novel people, answering with 100% independence for all opportunities. Shane generalized the target response to the question taught using echoic prompting, “What is your mom’s name?” across different environment and with different therapists for only 67% of opportunities. Analyzing Set 2, Shane generalized both targets across environments and with different therapists for 100% of opportunities with independence. Two weeks later, Shane responded correctly and independently to 100% of opportunities for both question sets one and two for targets taught using the echoic prompting and VSM prompting procedures.
Ryan

Ryan exhibited no correct responses during baseline across either target set of questions (see Figure 3; see Table 3). Ryan did not respond enough to the original VSM and echoic prompting procedures during treatment for Set 1 to reach mastery criteria. Ryan correctly and independently responded during his fourth treatment session to, “What’s your mom’s name?” on one out of five trials assigned to the echoic prompt, however he did not independently respond to the prompt for the following four sessions. Once the cue was added, Ryan responded to both questions in treatment; 60% for “What is your mom’s name?” (echoic prompt) and 40% for “What is your dad’s name?” (VSM prompt). Ryan met mastery criteria using the echoic prompting procedure plus cue by the second session and met three consecutive sessions at or above 80% of opportunities by his fourth session. Ryan scored 0% for sessions two, three, and four during the treatment using the VSM prompting procedure plus cue. The researcher ended treatment for the target questions assigned to Set 1 after stable responding. Ryan maintained 100% correct independent responding during the probe after treatment for Set 1, before Set 2 for the target taught using the echoic prompt plus cue.

During the treatment of Set 2, Ryan learned his mother’s phone number using the echoic prompting procedure in 14 trials, and his dad’s phone number using the VSM prompt in eight trials (see Figure 3; see Table 3). However, Ryan’s
responding showed a decreasing trend after the initial responses and he engaged in 0% correct independent responding during treatment sessions four and five for Set 2. Specifically, Ryan repeated the entire question issued by the interventionist rather than providing the appropriate intraverbal response. Ryan delivered the same incorrect response for both target questions in Set 2, regardless of the prompt. The researcher added a differential observing response to the echoic and VSM prompting procedures during the sixth treatment session for Set 2 questions. Ryan showed immediate improvement in responding during the first session of VSM prompting plus DOR, correctly and independently responding for 100% of opportunities. Ryan met mastery criteria for correct independent responding during the third session of using echoic prompting plus DOR, and responded above mastery criteria for three consecutive sessions by the eighth session of echoic prompting plus DOR. Ryan’s responding to “What’s your dad’s phone number?” remained variable with an average correct response during 68% (range: 40% to 100%) of opportunities over eight sessions during treatment using VSM prompting plus DOR, and showed a decreasing trend for three consecutive sessions when treatment ended.

The second probe session after the completion of treatment for Set 2, showed that the skills taught in sets one and two, did not maintain at 80% for trials. Interestingly, the targets taught using the combined VSM prompting procedures
(i.e., dad’s name and phone number) scored higher percentages than those taught using combined echoic prompting procedures (i.e., mom’s name and phone number). During generalization, Ryan generalized the targets taught using echoic prompting and VSM prompting in two novel environments and with two different therapists for 100% of opportunities with correct independent responding. After two weeks, the participant was asked the same target questions to test for maintenance. Ryan maintained the target response taught using the echoic prompting procedure for his mom’s name, however only responded independently for 33% of opportunities when asked his mom’s phone number. Ryan also maintained the target response taught using the VSM prompt when asked his dad’s phone number, but only responded independently for 33% of opportunities when asked his dad’s name.
DISCUSSION

The present study supports the findings in the reviewed literature such that the efficacy of prompting procedures are idiosyncratic (Aguirre, Valentino, & LaBlanc, 2016; Vedora & Conant, 2015) and correlate to the learner’s history with teaching procedures (Coon & Miguel, 2012). Through visual inspection and data analysis, the graphs depicting the data showed that the targets taught through the echoic prompting procedures maintained better during a two week probe than intraverbal responses pertaining to personal information taught through VSM prompting procedures for these specific participants. The VSM prompt was novel to all three participants, whereas the echoic prompting procedure was used routinely during Gerry, Shane, and Ryan’s therapy sessions. The fact that the echoic prompting style was familiar to this set of participants and was more effective than the novel procedure supports the findings by Coon and Miguel (2012) which suggested that learning history largely influences future readiness to learn through similar teaching procedures.

Additionally, it is important to note that Gerry was seven years old at the beginning of the study, and turned eight during treatment, making him twice the age of the other two participants. Gerry’s learning history and experience with ABA skill acquisition procedures may have strengthened his capability to learn the
target responses through echoic prompting over VSM prompting. Sundberg and Sundberg (2011) found age to be positively correlated with intraverbal skills in neurotypical children who were tested using an 80-item intraverbal subtest, a finding consistent with Poon and Butler (1972, as cited in Sundberg & Sundberg, 2011). However, contrary to prior research (Sundberg & Sundberg, 2011) age did not reliably correlate to intraverbal skills for individuals diagnosed with autism to the extent verbal assessment scores predicted. The current study supports this finding after comparing Gerry’s VB-MAPP scores (at eight years old) on the echoic and intraverbal subtests to those of Shane (at four years old, see Table 1), who completed treatment for this study in the same number of sessions (see Figures 1 and 2; see Table 3).

The present study extends the literature by focusing specifically on teaching socially significant intraverbal skills pertaining to emergency personal information. Although the social validity survey results slightly favored the echoic prompting procedure, the results unanimously showed that target questions selected for this study—parents’ names and phone numbers—are important responses for children with autism to learn regardless of the teaching procedure used (see Table 2). Bergstrom et al. (2012) used BST and IST to teach 10 to 11-year-old boys to actively seek help when lost in public, however, not all individuals are adequately prepared to take an active role in seeking assistance. The target responses in the
present study can be utilized for more passive individuals, especially young children, who are likely to be approached by adults when lost, rather than vice versa.

Moreover, Marcus and Wilder (2009) reported anecdotal data of social significance for the VSM procedures over the VM procedures. In the current study, the use of the VSM prompting procedure evoked emotional responding in all three participants. The initial response to the video creation was positive as the participants directed extended periods of attention to the camera after seeing themselves on the laptop screen, each manipulating his gross motor movements. The participants’ attention toward the video stimulus was not directly measured in the current study, but all participants were observed to exhibit positive affects when viewing the VSM prompts during initial treatment sessions. No research was found which reported emotional responding to the viewing of video self-modeling as the dependent variable. However, the participants’ behavior in attending to the camera and video screen can be related to the results from the Cardon & Azuma (2012) study which found that individuals preferred the video presentation to in vivo presentations. Interestingly, although Gerry and Ryan selected the iPad as their highest preferred stimulus in the MSWO, they both engaged in variable responding to the targets taught through the VSM prompt. I hypothesize multiple possible explanations for these results: (a) the video-self model used was not reinforcing
enough independently, and needed additional stimuli to engage the learner, (b) the video-self model was engaging enough to attract the participants’ attention but not maintain it for the entire trial, (c) the participants developed satiation to the video-self model after repeated presentations, (d) access to videos on the iPad overshadowed the video-self model, or (e) a combination of the aforementioned scenarios. Further analysis is required to pinpoint the variables contributing to the success of the VSM prompting procedures for certain participants, like Shane, who found success in acquiring both target responses taught through the VSM prompt. Future studies would benefit from conducting a component analysis of these factors.

Despite the variable results collected from the three participants in the present study, the current VSM prompting procedures expand the literature by teaching socially significant intraverbal skills pertaining to personal information. Prior research using VM and VSM has spanned a range of target behaviors (Dowrick, 2012a, 2012b; Bellini & Akullian, 2007; Krouse, 2001; Plavnick & Ferreri, 2011; Nikopoulos & Keenan, 2004; Catania, et al., 2009; Boudreau & Harvey, 2013; Geiger et al., 2010; Allen et al., 2010), and researchers have evaluated various prompting styles to teach intraverbal skills (Aguirre, Valentino, & LaBlanc, 2016; Vedora & Conant, 2015), but the current study evaluated a combination of VSM procedures and intraverbal procedures specific to emergency
personal information. All three participants engaged in independent responding to at least one target taught using the VSM prompt. The implications of this study suggest that some children with autism may learn intraverbal responses to personal information when given a video self-model. Future studies should evaluate whether VSM proves to be an effective skill acquisition procedure without direct teaching, for example, if the child is given free access to the video.

Additionally, the differentiation between the echoic and VSM prompted target responses for Gerry and Ryan may be explained by the Generalized Matching Equation (GME; Baum, 1975, as cited in Borrero et al., 2010). The GME is a model which predicts and explains choice behavior given independent concurrent schedules while accounting for reinforcement rates and individual biases (Borrero et al., 2010). In the current study, the delay to delivery of preferred stimuli may have skewed the relative rate of reinforcement enough to influence the relative rate of responding, favoring the strengthening of the target responses taught using the echoic prompt. For example, during Set 2, the target questions, “What is your mom’s phone number?” and “What is your dad’s phone number?” Gerry correctly responded to the question, “What is your mom’s phone number?” taught through the echoic prompt, and received specific praise along with immediate access to his highest preferred stimulus, the iPad. During subsequent trials, when asked, “What is your dad’s phone number?” a question for which Gerry had not yet
received reinforcement, Gerry requested the alternative question, “mom’s phone number” repeatedly. Gerry potentially received his putative reinforcer for 50% of the trials if he responded to both target questions with the one response that had been reinforced; Gerry scored 100% for one question (i.e. 5/5 correct for “What is your mom’s phone number?”) and 0% for the other question (i.e. 0/5 correct for “What is your dad’s phone number?”), using the same response. This response pattern was also observed during Ryan’s first treatment phase in learning his parents’ names. Once Ryan received his putative reinforcer for responding correctly to “What is your mom’s name?” which was taught using the echoic prompt, all of Ryan’s answers to the target questions in Set 1 became his mom’s name.

The GME accounts for participant biases when analyzing choice; each participant in this study may have had biases towards his primary caregiver, influencing his vocal response to the target questions. The implication of this finding suggests that researchers should account for the latency to reinforcement delivery when comparing prompting procedures and when programming for error correction. Researchers should counter-balance or randomly assign treatments to the target questions in future studies to minimize biases in responding. Researchers should also consider interspersing multiple teaching targets for participants in
future studies to avoid rote responding, promoting differential responses to multiply controlled variables.

Regardless, the parallel treatment design represented an efficient method of systematically evaluating results via the rapid alternation between target questions to compare the two prompting procedures. The procedures used in the present study were also cost effective, considering the echoic prompting procedure took no preparation of materials prior to running the treatment session. Similarly, the VSM prompting procedure proved to be an economical method of teaching with the utilization of available technology and free digital software found on the internet. In terms of time, the pre-session preparation for the VSM prompt required approximately one hour per participant to record the audio and video and to edit the video model. Moreover, the target questions selected for this study required minimal research as caregivers provided the pertinent personal information, which may serve vital in case of an emergency.

A few limitations warrant discussion regarding methodological issues, participant characteristics, logistics, and timeline of events. First, all three participants engaged in challenging behaviors as the treatment sessions progressed, consistent with escape-maintained behavior as suggested by their behavior intervention plans. I hypothesize a few variables correlate to the challenging behaviors and emotional responding—extinction of the incorrect response, the
inadvertent conditioning of the VSM prompt as an S-delta, or the error correction procedure—both of which may have signaled additional demands and an added time delay to the delivery of preferred stimuli. Extinction is the process by which a previously reinforced response no longer produces reinforcement. When behaviors are put on extinction, individuals may engage in extinction bursts, emotional behavior, aggression, and behavioral contrasts (Cooper, Heron, & Heward, 2007). In the current study, putative reinforcers were withheld if the participant responded incorrectly, essentially placing incorrect responses on extinction. Additionally, the display of the VSM prompt delayed access to the putative reinforcers if the participant required error correction procedures, possibly conditioning the VSM prompt as a signal for reinforcement unavailable (i.e., an S-delta).

The prompting procedures in the current study were intended to be implemented as a constant time delay of 3s, but due to the participants providing incorrect responses before the lapse of the constant time delay (CTD), participants experienced error correction procedures during most trials. The CTD prompting procedure is as efficient as progressive time delay (PTD) prompting when measuring efficiency by the number of trials or sessions until mastery (Wolery et al., 1992). In a review of the research, Walker (2008) showed that PTD reduces the percentage of participant errors and mean number of sessions to satisfy mastery criteria through fading of the prompt. However, the CTD (also known as constant
prompt delay) was implemented in recent intraverbal research when comparing prompting procedures (Allan et al., 2015) and when evaluating intraverbal training procedures (Ingvarsson & Hollobaugh, 2010; Kisamore, Karsten, & Mann, 2016; Braam & Poling, 1983, as cited in Kisamore, Karsten, & Mann, 2016). The CTD was particularly successful in teaching participants multiply controlled intraverbals when combined with differential reinforcement and error correction (Kisamore, Karsten, & Mann, 2016). A multiply controlled intraverbal is a verbal behavior which is contingent upon the conditional discrimination of the verbal prompt. For example, in the target question, “What is your mom’s phone number?”, the listener must discriminate that “What…” means there is a question, and that the question is not simply asking for any “phone number”, but his “mom’s phone number” to produce the correct response.

Another limitation regarding the current study pertains to the specific timeline of events and interruptions to the procedures. During the treatment phase for Set 2 for Shane, the subsequent effects of a major hurricane resulted in placing all sessions on hold for two weeks while the clinic remained closed. Prior to the hurricane, Shane engaged in higher rates of correct responding to the target taught using the echoic prompting procedure, while the target taught using the VSM prompt remained at 0% responding for three consecutive sessions. However, following the break, there was a switch in the strength of correct responding, and
Shane met mastery criteria with the target taught using the VSM prompt first. The break in treatment may have contributed to the inconsistency in responding, especially because Shane’s target responses for his parents’ phone numbers were mostly identical with only the last digit different.

Due to space constraints, Ryan’s sessions were run in two different rooms in the autism clinic, which potentially hampered acquisition. The investigator provided a highly preferred item to motivate him to transition to the new room for sessions. In hindsight, Ryan’s low rate of responding during treatment of Set 1 could have been due to the lack of motivation (i.e. he was satiated on puzzles and the Cookie Monster) or due to working in an environment with distractions (i.e. the stimuli in one treatment room could not be toned down, removed, or blocked off during sessions). Once the contingency of earning the iPad became available to Ryan during sessions, the video model reflected an inconsistent consequence between the model (i.e. access to puzzle) and the contingency in vivo (i.e. access to iPad). The highest preferred edible or tangible chosen during the video creation session served as the model consequence for the target responses in sets one and two taught using the VSM prompt. For Ryan, the modeled consequence in the VSM prompts was verbal praise in addition to access to a puzzle, however, Ryan’s MSWO preference assessment results varied during treatment sessions. Since the researcher did not conduct a reinforcer assessment using the stimuli selected in the
initial preference assessments, the highest preferred stimulus may not have elicited enough motivation to reinforce the target response modeled in the VSM prompt.

Surprisingly, Ryan scored higher percentages correct during the generalization probe sessions than during treatment for both sets one and two. During treatment of Set 1, Ryan did not respond to the target questions, however, he scripted the consequence modeled in the VSM prompt. When asked the target question, “What is your dad’s name?”, Ryan would pause for three to five seconds then echo, “Good job, Ryan. Your dad’s name is Sam!” during his break between trials. Ryan engaged in the vocalizations modeled by the therapist in the VSM prompt, but would not give the response modeled by himself, “Sam.” The additional cue was required to evoke target responding, breaking the flow of the stereotypic response. The open hand-snap cue was a prompt borrowed from Ryan’s ABA therapy sessions associated with choral responding. The cue served as an easy to implement prompt in addition to the echoic and VSM S\textsuperscript{D}s. Ryan’s echoic behavior may have functioned as practice for him after the treatment sessions concluded. Ryan’s parents reported practicing their phone numbers with him after treatment had ended, however, they did not report practicing their names.

Further replications of this study may consider selecting both male and female participants within and across different ages and intraverbal abilities. Current research shows that children with and without disabilities show various
forms of errors in response to intraverbal requests (see Sundberg & Sundberg, 2011; Michael, Palmer, & Sundberg, 2011). Future studies may also include a component analysis of the VSM prompt or a parametric analysis of the VSM variables such as volume, clarity, and duration to determine which factors contribute to participant engagement, retaining attention, and successful outcomes. Moreover, future studies may modify the prompt fading and error correction procedures individualizing the selected procedures for each participant. Regarding practicality, future studies should consider testing the participants’ preference for the VSM videos during leisure time and observe whether they acquire target responses without explicit training.
REFERENCES


Appendix A
Recruitment Flyer

Free Research Study!

**Purpose:** We hope to help your kids learn their emergency health and contact information.

- The study will begin in Summer 2017 and end in the fall.
- Participants will be asked to meet with the researcher at least 2 days a week for 30 minutes maximum.
- Sessions will include:
  - Video-taping for teaching purposes
  - Answering questions about personal emergency information

**Call for more information about this project!**

Diana Carlos, RBT
Graduate Student
School of Behavior Analysis
(386) 846-5659
dcarlos2015@my.fit.edu

Celeste Harvey, PhD, BCBA-D
Assistant Professor
School of Behavior Analysis
(321) 704 – 2181
aharvey.fit.edu
Appendix B
Letter of Consent for Participation

Please read this consent document carefully before you decide to participate in this study. The researcher will answer any questions before you sign this form.

**Study Title:** Using Video Self-Modeling to teach kids with ASD emergency information

**Purpose of the Study:** We are looking for kids with Autism Spectrum Disorder to learn their emergency information using video self-modeling.

**Procedures:** If you agree to let your child participate, s/he will be asked to answer questions about his/her personal emergency information such as age, date of birth, home address, emergency contact person, emergency contact number, allergies, medications, etc. If s/he cannot answer some of these questions, we will provide a script with the correct answers and create a video for them to watch. They will then be asked to answer the same questions after watching the video model.

**Settings:** Participants may choose the location of research meetings including: in-home/apartment, in the clinic, or other (please specify): ______________________

**Potential Risks of Participating:** There are no risks involved in participating in this study, beyond those risks experienced in everyday life.

**Potential Benefits of Participating:** The success of this study can possibly show a way to help kids with Autism learn his/her personal information. This skill may be useful if ever an emergency occurs.

**Compensation:** Participants will not be awarded any compensation for participation.

**Confidentiality:** All data will be stored in the principal investigator’s locked office or on a password protected computer file. Participant identities will be kept confidential and will not be shared with anyone outside of the research team. Your loved one’s data will be assigned a fictitious name for the entire study and for dissemination purposes. Data will be destroyed after seven years of the study, or
with the written request of the participant of participant’s representative at any given time at this address:

Celeste Harvey, PhD, BCBA-D  
Florida Institute of Technology  
150 W. University Blvd  
Melbourne, FL 32901

**Voluntary participation:**  
Your child’s participation in this study is completely voluntary. There is no penalty for not participating. Your child may also refuse to answer any of the questions we ask.

**Right to withdraw from the study:**  
You have the right to withdraw your child from the study at any time without consequence.

**Whom to contact if you have questions about the study:**  
Student Name: Diana Carlos  
Phone: (386) 846-5659  
Email Address: dcarlos2015@my.fit.edu

**Whom to contact about your rights as a research participant in the study:**  
Dr. Lisa Steelman, IRB Chairperson  
150 West University Blvd.  
Melbourne, FL 32901  
Email: lsteelma@fit.edu  
Phone: 321.674.8104

**Agreement:**  
I have read the procedure described above. I voluntarily agree to have my loved one participate in the procedure and I have received a copy of this description.

Participant Name: _____________________________

Consent given by (Print Name): _____________________________

Consent given by (Signature): _____________________________ Date: __________

Principal Investigator: _____________________________ Date: __________
Appendix C
Letter of Consent for Audio and Video Recording

Please read this consent document carefully before you decide to participate in this study. The researcher will answer any questions before you sign this form.

Study Title: Using Video Self-Modeling to teach kids with ASD emergency information

Purpose and Use of Audio Recording: Video and audio recording will be used for teaching due to the nature of the study (i.e. Video self-modeling). Video and audio recordings will also be used for data collection purposes and to calculate inter-observer agreement. Video and audio recordings will not be used for any other purposes (i.e. disseminations, conference presentations, etc.) without prior written consent of the participant or participant’s caregiver.

Settings: Participants may choose the location of research meetings including: in-home/apartment, in the clinic, or other (please specify): ___________________

Access to Video Recordings: Only the principal investigator, co-investigator, and research assistants will have access to the recordings for the purposes pertaining to this research study.

Storage of Video Recordings: All video and audio recordings will be immediately downloaded to a password protected computer and erased from the recorder. All video and audio recordings pertaining to this research study will be saved on a password protected computer and backed-up on a password protected external drive for a period of 5 years. The principal investigator will be the only person with knowledge of the password and access to the video recordings.

Specific identifiers that will be recorded: Due to the nature of this study, specific identifiers caught on audio will be disregarded.

Steps to avoid the inclusion of nonparticipants on the recordings: The video recording device will be centrally located on the participants’ table and all background noise and conversations will be disregarded for the entire project.
Deletion of Recordings: All video recordings will be deleted after a period of 5 years or at either the participant’s or participant’s caregiver’s written request to this address:

Celeste Harvey, PhD, BCBA-D
Florida Institute of Technology
150 W. University Blvd
Melbourne, FL 32901

Voluntary participation:
Your child’s participation in this study is completely voluntary. There is no penalty for not participating. Your child may also refuse to answer any of the questions we ask.

Right to withdraw from the study:
You and your child have the right to withdraw from the study at any time without consequence.

Whom to contact if you have questions about the study:
Student Name: Diana Carlos
Phone: (386) 846-5659
Email Address: dcarlos2015@my.fit.edu

Whom to contact about your rights as a research participant in the study:
Dr. Lisa Steelman, IRB Chairperson
150 West University Blvd.
Melbourne, FL 32901
Email: lsteelma@fit.edu Phone: 321.674.8104

Agreement:
I have read the video and audio-recording procedure described above. I voluntarily agree to have my child participate in the procedure and I have received a copy of this description.

Participant Name: ________________________________

Consent given by (Print Name): ________________________________

Consent given by (Signature): ___________________________ Date: __________

Principal Investigator: _____________________________ Date: __________
Appendix D
Assent Script for Participant and Video/Audio Recording

**Study Title:** Using Video Self-Modeling to teach kids with ASD emergency information

**Principal Investigator:** Diana Carlos, School of Behavior Analysis

**Supported by:** FIT

Hi, my name is _________. If you have any questions about what I am telling you, you can ask me at any time.

Your mom and dad said it’s okay for me to ask you questions. I’m going to ask you some questions about yourself. If you get them right, you can earn play time or some snacks. You can ask to stop at any time.

Do you understand?

Participant’s response: □ Yes □ No

Can I take a video of you for this project?

Participant’s response: □ Yes □ No

*End of verbal script.*

Check which applies below:

□ The participant is capable of understanding the study

□ The participant is not capable of understanding the study

____________________________________________________

Participant Name (Print)

____________________________________________________

Name (Print) and Signature of Person Obtaining Consent     Date
### Appendix E

**Data Recording Sheet (Sample)**

Participant ID: ____________  Date/ (S#): ________________

Researcher: ________________  IOA: ________________

Phase:  BL  TX  G  M

<table>
<thead>
<tr>
<th>Question</th>
<th>Score + if the child answered correctly or - if the child answered incorrectly. Prompted answers should be scored as -</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Echoic Prompt: What is your mom’s full name? (Answer: Mom’s name) Ex. Jane</td>
<td></td>
</tr>
<tr>
<td>1 VSM: What is your dad’s full name? (Answer: Dad’s name) Ex. John</td>
<td></td>
</tr>
<tr>
<td>2 Echoic Prompt: What is your mom’s phone number? (Answer: Mom’s phone number) Ex. 555-123-4567</td>
<td></td>
</tr>
<tr>
<td>2 VSM: What is your dad’s phone number? (Answer: Dad’s phone number) Ex. 555-987-6543</td>
<td></td>
</tr>
</tbody>
</table>

Total correct: _________ / _________ = ________%

Comments:  

Appendix F
Treatment Integrity and IOA Scoring Procedures

**Treatment Integrity Scoring:**

Echoic Prompt:
- SD: What is your mom’s name?
- Prompt after 3 s constant time delay for no response
- If independently correct provide SR+ for 30-45 s
- If incorrect, provide error correction up to 3x:
  - Prompt, Test
  - Prompt, Test
  - Prompt, Prompt

VSM Prompt:
- SD: What is your mom’s name?
- Prompt after 3 s constant time delay for no response
- If independently correct provide SR+ for 30-45 s
- If incorrect, provide error correction up to 3x:
  - VSM, Test
  - VSM, Test
  - VSM, Echoic prompt answer only

**IOA Scoring:**
- Score + for independent correct answers
- Score − for incorrect answers
  - Any non-independent correct answers (i.e. prompted, error corrected, or no response) will be counted as incorrect
### Treatment Integrity Data Sheet

**Treatment Integrity Scoring**

<table>
<thead>
<tr>
<th>Participant ID:</th>
<th>Date/ (S#):</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Researcher:</th>
<th>Tx Integrity:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MSWO:</th>
<th>Score + for each trial if the researcher provided the correct</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. _________</td>
<td>(a) verbal antecedent,</td>
</tr>
<tr>
<td>2. _________</td>
<td>(b) prompt, and</td>
</tr>
<tr>
<td>3. _________</td>
<td>(c) consequence.</td>
</tr>
</tbody>
</table>

**Randomized Questions:**

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
</table>

1. **Echoic Prompt:**
   What is your mom’s full name?

2. **VSM:**
   What is your dad’s full name?

3. **Echoic Prompt:**
   What is your dad’s phone number?

4. **VSM:**
   What is your mom’s phone number?

**Total correct:** _______ / _______ = _______ %

**Comments:**
Appendix H
Social Validity Questionnaire

Social Validity Questionnaire

Person filling out survey: __________________________

Relation to participant: __________________________

Participant's initials: ___________ Date: ____________

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Disagree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The participant learned important information.</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>2. I observed that the participant was engaged by the echoic prompt procedure.</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>3. I observed that the participant was engaged the video self-modeling procedure.</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>4. I observed that the echoic prompt was easy to implement.</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>5. I observed that the video self-modeling procedure was easy to implement.</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>6. The use of the echoic prompt should be used in future teaching opportunities.</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>7. The use of the video self-modeling prompt should be used in future teaching opportunities.</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
</tbody>
</table>
### Table 1

*Participant Demographics and Verbal Assessment Scores*

<table>
<thead>
<tr>
<th>Participant</th>
<th>Sex</th>
<th>Age</th>
<th>BLA Score</th>
<th>VB-MAPP Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Echoic</td>
</tr>
<tr>
<td>Gerry</td>
<td>M</td>
<td>7</td>
<td>54/60</td>
<td>10/10</td>
</tr>
<tr>
<td>Shane</td>
<td>M</td>
<td>4</td>
<td>52/60</td>
<td>10/10</td>
</tr>
<tr>
<td>Ryan</td>
<td>M</td>
<td>4</td>
<td>43/60</td>
<td>9.5/10</td>
</tr>
</tbody>
</table>

*Note.* BLA= Behavior Language Assessment Form. VB-MAPP= Verbal Behavior Milestones Assessment and Placement Program.

*Ryan’s overall VB-MAPP score (36.5) was over one year old at the start of the current study, however his scores for the Echoic and Intraverbal sub-sections were updated recently.*
Table 2

*Social Validity Survey Results*

<table>
<thead>
<tr>
<th>Survey Item</th>
<th>Average</th>
<th>Gerry</th>
<th>Shane</th>
<th>Ryan</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The participant learned important information.</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>2. I observed that the participant was engaged by the echoic prompt procedure.</td>
<td>4.25</td>
<td>4.5</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>3. I observed that the participant was engaged the video self-modeling procedure.</td>
<td>3.75</td>
<td>4</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>4. I observed that the echoic prompt was easy to implement.</td>
<td>4.25</td>
<td>4.5</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>5. I observed that the video self-modeling procedure was easy to implement.</td>
<td>3.25</td>
<td>3.5</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>6. The use of the echoic prompt should be used in future teaching opportunities.</td>
<td>4</td>
<td>4.5</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>7. The use of the video self-modeling prompt should be used in future teaching opportunities.</td>
<td>3.25</td>
<td>3.5</td>
<td>4</td>
<td>2</td>
</tr>
</tbody>
</table>
Table 3

Results Summary: Average Percentage Correct Per Phase

<table>
<thead>
<tr>
<th></th>
<th>BL</th>
<th>Treatment</th>
<th>Sessions to mastery</th>
<th>GEN</th>
<th>MNT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Gerry</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Echoic</td>
<td>0</td>
<td>54 0-100</td>
<td>7</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>VSM</td>
<td>0</td>
<td>83 60-100</td>
<td>3</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Echoic</td>
<td>0</td>
<td>45 0-100</td>
<td>10</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>VSM</td>
<td>0</td>
<td>0 0</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Shane</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Echoic</td>
<td>0</td>
<td>83 60-100</td>
<td>5</td>
<td>66</td>
</tr>
<tr>
<td></td>
<td>VSM</td>
<td>0</td>
<td>73 40-100</td>
<td>6</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Echoic</td>
<td>0</td>
<td>62 20-100</td>
<td>11</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>VSM</td>
<td>0</td>
<td>62 0-100</td>
<td>7</td>
<td>100</td>
</tr>
<tr>
<td>Ryan</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Echoic + Cue</td>
<td>0</td>
<td>80 60-100</td>
<td>4</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>VSM + Cue</td>
<td>0</td>
<td>10 0-40</td>
<td>-</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Echoic + DOR</td>
<td>0</td>
<td>68 0-100</td>
<td>8</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>VSM + DOR</td>
<td>0</td>
<td>68 40-100</td>
<td>-</td>
<td>100</td>
</tr>
</tbody>
</table>

Note. BL = baseline; GEN = generalization; MNT = maintenance. The column reporting sessions to mastery displays the number of sessions completed before the participant met mastery criteria of at least 80% correct independent responding for three consecutive sessions.

a Results reported for Ryan reflect modified prompting procedures.
Figure 1: Study Results, Gerry
**Figure 1. Gerry.** A parallel treatments design was used for the current study. The x-axis displays the number of sessions, while the y-axis represents the percentage of correct responses per session. The targets assigned to the echoic prompt are depicted by circle markers while the targets assigned to the VSM prompt are depicted by triangle markers. Mastery criteria was set at three consecutive sessions at or above 80% correct independent responding. DR Only = Differential Reinforcement Only. The programmed consequence during baseline sessions and probe sessions was verbal praise plus the delivery of the participant’s putative reinforcer for correct responding, and no programmed consequence for incorrect responding.
Figure 2: Study Results, Shane
**Figure 2. Shane.** A parallel treatments design was used for the current study. The x-axis displays the number of sessions, while the y-axis represents the percentage of correct responses per session. The targets assigned to the echoic prompt are depicted by circle markers while the targets assigned to the VSM prompt are depicted by triangle markers. DR Only = Differential Reinforcement Only. Mastery criteria was set at three consecutive sessions at or above 80% correct independent responding. Shane met mastery criteria for all targets taught using echoic and VSM prompts.
Figure 3: Study Results, Ryan
**Figure 3. Ryan.** A parallel treatments design was used for the current study. The x-axis displays the number of sessions, while the y-axis represents the percentage of correct responses per session. The targets assigned to the echoic prompt are depicted by circle markers while the targets assigned to the VSM prompt are depicted by triangle markers. DR Only = Differential Reinforcement Only. Mastery criteria was set at three consecutive sessions at or above 80% correct independent responding. Ryan only met mastery criteria for both targets taught using the enhanced echoic prompts, however did not meet mastery for either target using the VSM prompt.