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Contingent Reinforcement Modeled Consequences

Neil D. Symonds
St. Cloud State University, ndsymonds@yahoo.ca

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by

Neil D. Symonds

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Kimberly Schulze

Abstract

Children with autism who have deficits in social and communication skills are often limited in their capacity to learn play skills. Video modeling has been used to teach scripted play skills to children with autism and many variations have been used to determine which techniques are most important. Children have been observed to readily imitate behaviors exhibited by a model in the presence of a model and have generalized those responses to a new setting in the absence of a model.

The purpose of this study was to determine whether observing consequences provided to the model (positive reinforcement or no observed positive reinforcement) influenced skill acquisition of video modeled play skills. An A-B-A-C-A-X experimental design counterbalanced for order of presentation, and X representing the most effective treatment condition was utilized with four children diagnosed with autism.

The results of the study indicated that neither contingent reinforcement (CR) nor no reinforcement (NR) conditions were more effective than the other for teaching modeled actions and scripted verbalizations during play. Decreases in unscripted verbalizations were observed during both CR and NR video modeling conditions.

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Chapter I

INTRODUCTION AND REVIEW OF LITERATURE

Individuals with Autism Spectrum Disorder (ASD) exhibit impairments in social communication and social interaction, and restricted and repetitive patterns of behavior, interests, or activities (American Psychiatric Association, 2013). The prevalence of children diagnosed with autism in Canada is one in 68 (Health Canada, 2015) and continues to increase (Centers for Disease Control and Prevention, 2013). Children with autism who have deficits in social and communication skills are limited in their capacity to learn play skills (Terpstra, Higgins, & Pierce, 2002). As a result, children with autism often withdraw from social situations due to their lack of appropriate social and communication skills (Liber, Frea, & Symon, 2008). Teaching appropriate play skills may lead to group inclusion and enhanced social opportunities while decreasing the collateral effects of social withdrawal.

Tureck and Matson (2012) documented the lack of appropriate and inappropriate social skills among children with ASD. Two matched groups of children (42 with a diagnosis of autism disorder or Pervasive Developmental Disorder Not Otherwise Specified, and 77 non-ASD) were administered the Matson Evaluation of Social Skills for Youngsters-II over multiple years. The children diagnosed with ASD had higher ratings on the hostile and inappropriate social skills and lower ratings on the adaptive and appropriate social skills than children without ASD. Additional research suggests that children with ASD display less frequent and varied independent play behaviors than typically developing peers, or peers with other disabilities (Barton & Wolery, 2010; Kasari, Freeman, & Paparella, 2006).

This literature review will discuss video modeling as an effective intervention for teaching scripted play skills (independent, pretend, socio-dramatic, etc) to children with ASD.

Teaching Play Skills

Play skills are important for the development of young children and an integral part of their daily routine. Acquiring these skills can promote social and communicative interactions with their peers (McConnell, 2002). In addition, children can use play to build creativity and develop their social skills (Hurwitz, 2003; Tsao, 2002). Lovinger (1974) found that a group of 4-year-old children who received a play intervention consisting of enriching the natural play of children, using experiences the children had had to play out, and creating a play situation and encouraging the children to become involved resulted in an increases in language use compared to a control group who did not receive the intervention. A similar study conducted by Christakis, Zimmerman and Garrison (2007) found when plastic blocks were distributed to children, and their families were given suggestions on how to play (e.g., sorting blocks by color, stacking them high, etc.), children acquired greater vocabulary growth compared to a control group who did not receive play blocks or instructions on how to play.

Play behaviors have been correlated positively with advanced language in young children (Ungerer & Sigman, 1984). Reynolds, Stagnitti and Kidd (2011) found that children from low socioeconomic areas with low elaborate play skills developed greater language abilities, narrative language, complex play and peer social competence in a school with a play-based curriculum compared to children from a traditionally structured classroom. In a similar study, O'Connor and Stagnitti (2011) found that children participating in a play intervention showed a significant decrease in play deficits became less socially disruptive, and more socially connected

with their peers compared to children participating in traditional classroom activities. In addition, the play intervention was successful improving child's play, behavior, language, and social skills.

Teaching play skills to children can be beneficial. It is important to determine how to teach play skills to children with autism as they do not follow normal development and engage in inappropriate behaviors that interfere with the development of appropriate play skills.

Video Modeling

Video modeling is procedure that typically involves presenting a participant with a videotaped sample of models engaging in a specific series of scripted actions and/or verbalizations (MacDonald, Clark, Garrigan & Vangala, 2005). Video modeling has been used to teach discrete and chained skills, social, communication, and other functional skills to children diagnosed with autism (Apple, Billingsley, Schwartz & Carr, 2005; MacDonald, Sacramone, Mansfield, Wiltz & Ahearn, 2009; Nikopoulos & Keenan, 2004; Reagon, Higbee & Endicott, 2006; Sancho, Sidener, Reeve & Sidener, 2010). Charlop-Christy, Le, and Freeman (2000) compared video modeling with in-vivo modeling for teaching developmental skills to children with autism. Video modeling led to faster acquisition of skills than in vivo modeling. Moreover, skills generalized across different persons, settings, and stimuli following video modeling presentations but did not generalize following in-vivo modeling.

Haring, Kennedy, Adams, and Pitts-Conway (1987) taught three adolescents with autism to purchase items from a community store using in-vivo modeling. After the participants reached 90% accuracy in one setting on operational steps in the task analysis, a video modeling component was implemented. The video modeling component increased the number of accurate

social responses that occurred within the first training setting and generalized to new settings. In a similar study, Alcantara (1994) found that students began to acquire purchasing skills using video modeling alone.

Video modeling has been effective for teaching self-help skills to children with autism. Keen, Brannigan and Cuskelly (2007) assessed the effectiveness of video modeling by teaching toilet training to five young boys with autism. Children in the treatment condition received video modeling combined with operant conditioning strategies, whereas the control group received only operant conditioning strategies. The results demonstrated that the frequency of in-toilet urinations was greater for the group who received the treatment condition than children who did not. Shrestha, Anderson and Moore (2012) used video modeling to teach a four-year old boy with autism to prepare a bowl of cereal, eat his snack, and clean up afterwards. The results demonstrated that video modeling led to rapid acquisition of the skills. In addition, the mastery criterion was met after five sessions.

Video modeling has been effective for teaching various fine and gross motor tasks to children with autism (Mechilng & Swindle, 2012). The follow section will review scripted play skills using video modeling.

Scripted Play Using Video Modeling

Children with autism are unlikely to ask questions, offer information, or comment spontaneously about play materials or interests (Taylor & Levin, 1998). Video modeling has been demonstrated to be an effective intervention for teaching children with autism to make comments while playing (Maione & Mirenda, 2006; Taylor, Levin, & Jasper, 1999). Moreover, video modeling has been effective for teaching scripted play to children with autism. D'Ateno,

Mangiapanello, and Taylor (2003) used video modeling to teach complex play sequences to a preschooler with autism. Three separate video vignettes using an adult model were taped for each of the three play sequences. The materials used were a baking set, shopping set (i.e., shopping cart with plastic food), and a tea party set (i.e., a table and dishes). The number of scripted statements (i.e., verbal statements and motor responses) varied between 10 and 12 statements across the three different play scripts. During baseline, a play set was presented to the participant who was instructed to "play." Baseline sessions lasted 5 minutes or until the participant left the play area for more than 15 seconds. During video modeling, the participant was taken to a separate room and was asked to watch a video segment of the adult speaking the script while performing the actions. A minimum delay of 1 hour occurred between the presentation of the video and the participant's access to the play set materials. As a result of watching the video model, the participant increased the number of scripted verbal and modeled responses. It was concluded that video modeling was effective in teaching long play sequences, without prompts, error corrections or reinforcement, in preschoolers with autism.

The complex play sequence in the study by D'Ateno et al. (2003) required the participant to relate objects to one's self and interact with those objects in a pretend manner. Another type of play includes manipulating characters to act out a scene or an event (i.e., putting a small fireman's hat on a character and giving him a hose to extinguish a fire). According to LeBlanc et al. (2003), manipulating characters requires more complex social behavior. To further evaluate the effects of manipulating characters to act out various events, MacDonald et al. (2009) used video modeling to teach play scripts to children with autism with typically developing peers. The three play sets used for the experiment were an airport, a zoo, and a Playskool grill. The

videos created for each play set contained 14 to 17 vocalizations and action scripts each. During baseline, the children were given 4 minutes to play and no prompts were given to the children. The experimenter re-directed the children back to the toys if they tried to leave the area. During video viewing sessions, the children viewed the videotape twice consecutively and then they were directed towards the play material to play for 4 minutes. Participants were encouraged to copy the models to initiate the scripts that were previously viewed on the video. The results showed that during baseline there was minimal appropriate play between the children. Following the video modeling procedure, the participants acquired both verbalizations and play actions, and skill performance was maintained over time. Increases in verbal interactions and cooperative play were also acquired without experimenter delivered reinforcement or response prompts other than the video.

MacDonald et al. (2005) taught scripted play to two boys diagnosed with autism using video modeling. Each video included an adult model engaging in up to 17 scripted verbalizations and 15 play actions within a scripted play scenario. The play sets used for the study included a town (i.e., a building with an opening and closing garage door, a girl, a cat, a fireman, a pilot, and other objects such as a helicopter, swing, and fire engine), a ship (i.e., containing stairs, a steering wheel, a crow's nest, a pirate, a captain, a dog, and other objects such as a treasure chest, a cannon, and a telescope), and a house (i.e., containing a kitchen with an opening and closing door, a living room, a bedroom, a mother, a boy, a dog, and other objects such as a bed, a table, and two chairs). The dependent measures recorded were scripted verbalizations and scripted play actions; unscripted play actions were also recorded. During baseline, the child was given 4 minutes to play with the toys. If the child left the play area before

the 4 minutes expired, he was re-directed back to the table with the toys. The training sessions were similar to baseline except that the video model using a television and VCR was shown twice consecutively before the session began. Immediately following the viewing, the child was directed to the play stimuli and the instructor presented the instruction to play. Once the mastery criterion was reached following the video presentation, mastery probes were conducted without the video. This condition was conducted identically to the baseline condition. If an accuracy of 80% was achieved during this condition for actions and verbalizations, the next play set was introduced in the training condition. Follow up probe sessions were conducted on mastered scripts and were identical to the baseline condition. The results demonstrated that video modeling was effective in extending scripted play sequences for both children. Although video modeling was effective and scripts were achieved within five to seven sessions, unscripted play was not apparent.

Boudreau & D'Entremont (2010) examined the effects of video modeling for teaching play scripts to two children diagnosed with ASD. The variables measured were modeled and un-modeled actions, and scripted and unscripted verbalizations. During baseline, each child was instructed to play with his toys located in front of him for approximately 5 minutes. During the video modeling phase, each child watched the video of the adult model engaging with the toy sets. Immediately following the video, each child was instructed to play with his toys in a manner similar to the baseline condition except each child was given 10 minutes to play. A video modeling and reinforcement treatment package was assessed following the video modeling intervention. Reinforcement included verbal praise and physical contact for both children contingent on imitating modeled actions and scripted verbalizations. In addition, Child 1

received occasional tokens, which were later cashed in for an enjoyable activity. The results of the study displayed that both children rapidly acquired modeled actions and scripted verbalizations following video modeling. When video modeling was combined with reinforcement, the frequency of modeled actions and scripted verbalizations increased.

Variations of Video Modeling

Researchers have used multiple variations of video modeling to find out which techniques are most important. These variations include different characteristics of the model such as adults (Charlop & Milstein, 1989), peers (Simpson, Langone, & Ayres, 2004), the learner (Wert & Neisworth, 2003), and animations (Ogletree, Fischer & Sprous, 1995) and point-of-view (POV) modeling (watching the model perform, and watching hands) (Charlop & Milstein, 1989; Hine & Wolery, 2006; Schreibman, Whalen, & Stahmer, 2000; Shipley-Benamou, Lutzker, & Taubman, 2002). Bellini and Akullian (2007) provided a synthesis of existing research on video modeling interventions for individuals with ASD. The meta-analysis consisted of 23 studies comparing video modeling and video self-modeling interventions across social communication skills, functional skills, and behavioral functioning. The results demonstrated video modeling and video self-modeling intervention strategies were equally effective for promoting acquisition of social communications skills, functional skills, and behavioral functioning in individuals with ASD.

Other-as-model paradigms have shown video modeling is effective when using peers as models (Simpson et al., 2004), first person (Norman, Collins & Schuster, 2001), and siblings and adults (Taylor et al., 1999). Charlop and Milstein (1989) used adults as models to teach three children with autism conversational speech. The models were two familiar adults engaging in

the particular conversation. In addition, different adults were featured in the various videotapes. The results demonstrated the participants were able to acquire conversation speech using adults as models. Sherer et al. (2001) conducted a similar study and found no significant differences in acquisition of conversation skills regardless of whether participants watched themselves or others perform the task. In addition, reviews of Ayres and Langone (2005), Delano (2007), and Mechling (2005) reported no difference in the relative effectiveness of self or other as a model.

Studies have also investigated video modeling strategies to determine efficient ways to teach skills to children with autism. Akmanoglu, Yanardag and Batu (2014) compared the effectiveness and efficiency of providing video modeling and graduated guidance together with video modeling alone to teach role-playing skills to four children with autism. A task analysis was developed using materials for teaching playground play, breakfast play, and carrying fruits with truck play. An adapted alternating treatment design was used to calculate the percentage of correct responses on the steps of the task analyses of the target skills for each participant. The results demonstrated that both teaching methods were equally effective for teaching the target skills to three participants. Video modeling combined with graduated guidance was required to teach the target role-play skills to the fourth participant. The results further demonstrated that combining video modeling with graduated guidance seemed to be more efficient regarding the number of training sessions and trials, and correct and incorrect responding during training. The percentage of incorrect responses for two participants was greater with video modeling and graduated guidance conditions whereas for the other two participants video modeling alone resulted in a greater percentage of incorrect responses. Lastly, video modeling combined with

graduated guidance seemed more efficient regarding total time spent for training for all participants.

Smith, Ayres, Mechling and Smith (2013) compared the effects of video modeling with narration versus video modeling (no narration) in the acquisition of functional skills of four adolescent boys with autism. Task analyses were created for 12 behavioral sets containing between three and eight steps for a single task. Tasks included putting salsa in a bowl, putting crackers on a platter, making fruit punch, putting streamer on the wall, pouring a drink in a glass, setting out dinnerware, hanging up a party sign, setting up Life, putting confetti on a table, putting flowers in a vase, putting address labels on an envelope, and setting up Twister. Individual behaviors chains were divided into three behavior sets that were subjected to either a video modeling, video modeling with narration, or control condition. The results showed that all participants responded with over 80% accuracy in both video modeling conditions. Effectiveness and efficiency were measured by analyzing the percentage of correct responses in each behavior set, the number of trials to reach criterion, and the number of errors received. Video modeling with narration was more efficient for two participants while narration was not a critical component for the other participants.

Observational Learning

Observational learning refers to the acquisition of novel operants as a result of observing contingencies related to the actions of others (Catania, 1998). Vicarious learning, a type of observational learning, refers to an increase or decrease of an observer's behavior that is similar to the behaviors depicted by a model, based on whether the model's behavior is reinforced or punished (Bandura, 1977). Previous research has demonstrated that children can readily imitate

behaviors exhibited by a model in the presence of a model (Bandura & Huston, 1961) and can generalize those responses to a new setting in the absence of a model (Bandura, Ross, & Ross, 1961). Bandura et al. (1961) exposed participants to live aggressive models, models that were subdued or non-aggressive in their behaviour, or a control group. The results demonstrated that participants in the aggression condition reproduced many of the verbal and physical aggressive behavior resembling that of the model. Alternatively, participants in the non-aggressive and control conditions showed virtually no imitative aggression. Bandura, Ross, and Ross (1963) extended the results of their previous study by using film-mediated aggressive models. Participants were exposed to a real life aggression condition, a human film-aggression condition, or a cartoon film-aggression condition. The results confirmed that exposure to aggressive models increased the probability that participants will respond aggressively on later occasions. Participants who observed the aggressive human and cartoon models on film engaged in nearly twice as much aggression than the control group.

Proposal

Video modeling has shown to be an effective procedure for teaching social and play skills to some children with autism. Research has investigated the characteristics of the model, POV video modeling, and various video modeling strategies. The purpose of this study was to investigate the effect of consequences experienced by the model on skill acquisition. Specifically, to determine whether observing consequences provided to the model (positive reinforcement or no observed positive reinforcement) influences skill acquisition of video modeled play skills.

Chapter II

METHOD

Participants, Setting, and Materials

Four participants diagnosed with ASD were selected for this study. Participants were recruited from a large Autism service provider in Winnipeg, Manitoba, and from Facebook social media; Autism Winnipeg PACE page. Participant 1 was a 4-year-old boy, Participant 2 was an 8-year-old boy, Participant 3 was a 4-year-old boy, and Participant 4 was a 10-year-old boy. Each participant exhibited deficiencies in spontaneous play behavior (i.e., exhibited repetitive and self-stimulatory behaviors), and were able to display pre-requisite skills in both vocal imitation and motor imitation with objects. Each child was tested and able to reach a criterion of four, under motor imitation using objects according to the Assessment of Basic Language and Learning Skills–Revised (ABLLS-R). Specifically, performing at least 10 actions with at least two different actions for each object. In addition, each child obtained a minimum score of 25/30 points from group three on the Early Echoic Skills Assessment (EESA) consisting of three-syllable combinations.

Sessions were conducted one to three times a week during the day, evenings, and weekends. Each session was conducted in a play area at the participant's place of residence (i.e., the basement and recreation room), a cubby (i.e., cubicle) in a classroom, or in a testing room of a large Autism service provider in Winnipeg, Manitoba. The play area at the participant's place of residence was a well-lit area that contained a table and a chair. Play toys associated with the video modeled play scenarios were available within the play area. Additional toys (not related to video model play scenarios) in the surrounding area were removed to reduce distractions. The

testing room in the facility of the Autism service provider contained a two-way mirror with blinds, a table, two chairs, and filing cabinets.

The play materials selected for this experiment were a Breyer® Stablemates® Red Stable Set and two Playmobil® Super Sets (i.e., activity playground and penguin habitat). The Stable Set included a Red Stable, Stablemates® liver chestnut pinto, apricot dun Quarter Horse, four corral fences, water trough, jump, and three racing barrels. The activity playground included a rock-climbing wall, rotating carousel, functioning zip line, climbing net, two figures (i.e., lady and boy), and a playground set with two chairs; and the penguin habitat included a pool, penguin slide, one figure (i.e., lady), one penguin, a bucket, a fish, three attached penguin eggs, and two plastic nests. A video camera was used to film the play sequences and a laptop computer to show the videos. Other items included objects to test motor imitation skills (see Appendix C, Item 2), and the Early Echoic Skills Assessment (EESA) datasheet (see Appendix C, Item 2).

Response Definition, Data Collection, and Reliability

The dependent variables measured were the percentage of modeled actions and scripted verbalizations, the number of un-modeled and unscripted verbalizations, and the percentage of consecutive steps completed in the task analysis. In addition, appropriate play and inappropriate play using 5 second partial interval recording (PI-5) were scored. Modeled and un-modeled actions and scripted and unscripted verbalizations were defined based on the study conducted by Boudreau & D'Entremont (2010).

Modeled actions were defined as motor responses that matched the actions of the model and resulted in the same changes to the environment as seen in the video (see Appendix A, Table 1).

Un-modeled actions were defined as motor responses that did not meet the definition of modeled actions but that were contextually relevant to the ongoing scenario. Slight variations and repetitions of the same motor responses were only scored for the first occurrence.

Scripted verbalizations were defined as vocalizations that matched the exact statements of the model, while allowing for the following exceptions: (a) the child was able to substitute, add, or omit one word, (b) the child could change the form of the verb or adjective slightly from that of the model if the meaning was clearly identical, and (c) the child made a clearly imitative, yet slightly different verbalization in the same context as demonstrated in the video scenario (see Appendix A, Table 1).

Unscripted verbalizations were defined as vocalizations that did not meet the definition of scripted verbalizations but that were contextually relevant to the ongoing scenario. Repetitions of the exact wording of a previous utterance were scored only for the first occurrence.

Appropriate play was defined as motor responses and vocalizations that either matched the actions and verbalizations of the model, were contextually relevant to the ongoing scenario, or were non-contextual motor and verbal responses as observed in pretend play.

Inappropriate play was defined as motor responses and vocalizations that were disruptive (i.e., too loud, flicking objects off or around the table, repetitively picking up and dropping objects), used too much force (i.e., breaking toys or forcing them in a manner which may have caused them to break), and placing objects in one's mouth.

Data was collected on a datasheet corresponding to the toy set being recorded. Each datasheet included the date, session, participant, toy set, and condition (i.e., video modeling no reinforcement, and video modeling CR). In addition, each datasheet had columns to record

modeled and un-modeled actions, scripted and unscripted verbalizations, consecutive steps completed in the task analysis, appropriate play and inappropriate play (see Appendix C, Items 3, 4, and 5). If the participants emitted a scripted verbalization, modeled action, and performed the correct step of the task analysis, a (Y) was circled on the datasheet beside the response emitted. However, if the participants did not engage in scripted verbalizations, modeled actions, or the correct step of the tasks analysis, a (N) was circled on the datasheet beside the response. If the participants emitted an unscripted verbalization or un-modeled action, a description of the response was written down and the total number of responses was recorded. If the participant engaged in appropriate play during a 5 second interval (PI-5), an "A" will be recorded on the datasheet. Alternatively, if the participant engaged in inappropriate play during a 5 second interval, an "I" will be recorded on the datasheet. If the participant did not engage in appropriate or inappropriate play during a 5 second interval (PI-5), an "x" will be recorded.

Interobserver agreement was calculated by a second observer on 30% of the baseline sessions and 25% of each condition using a video camera. Reliability was calculated for each dependent variable by dividing the number of agreements by the number of agreements plus disagreements and multiplying by 100%.

For Participant 1, a total of three baseline sessions, two CR sessions, and one NR session were recorded for reliability. Reliability scores for baseline sessions were 100% modeled actions, 100% for scripted verbalizations, 100% for steps completed in the task analysis, 75% for un-modeled actions, 100% for unscripted verbalizations, 98.61% for intervals of appropriate play, and 100% for intervals of inappropriate play. For the CR sessions, reliability scores were 100% for modeled actions, 100% for scripted verbalizations, 100% for steps completed in the

task analysis, 60.71% for un-modeled actions, 75% for unscripted verbalizations, 96.88% for intervals of appropriate play, and 88.54% for intervals of inappropriate play. Lastly, reliability scores for the NR session were 87.5% for modeled actions, 100% for scripted verbalizations, 80% for steps completed in the task analysis, 87.5% for un-modeled actions, 40% for unscripted verbalizations, 100% for intervals of appropriate play, and 97.92% for intervals of inappropriate play.

For Participant 2, a total of four baseline sessions, two CR sessions, and one NR session were recorded for reliability. Reliability scores for baseline sessions were 100% for modeled actions, 93.75% for scripted verbalizations, 100% for steps completed in the task analysis, 82.86% for un-modeled actions, 65% for unscripted verbalizations, 99.48% for intervals of appropriate play, and 100% for intervals of inappropriate play. For the CR sessions, reliability scores were 100% for modeled actions, 100% for scripted verbalizations, 100% for steps completed in the task analysis, 52.94% for un-modeled actions, 54.55% for scripted verbalizations, 95.83% for intervals of appropriate play, and 98.96% for intervals of inappropriate play. Lastly, reliability scores for the NR session were 100% for modeled actions, 87.5% for scripted verbalizations, 100% for steps completed in the task analysis, 41.66% for un-modeled actions, 87.5% for unscripted verbalizations, 100% for intervals of appropriate play, and 100% for intervals of inappropriate play.

For Participant 3, a total of four baseline sessions, two CR sessions, and one NR session were recorded for reliability. Reliability scores for baseline sessions were 96.88% for modeled actions, 100% for scripted verbalizations, 100% for steps completed in the task analysis, 65% for un-modeled actions, 75% for unscripted verbalizations, 96.35% for intervals of appropriate play,

and 100% for intervals of inappropriate play. For the CR sessions, reliability scores were 100% for modeled actions, 100% for scripted verbalizations, 100% for steps completed in the task analysis, 45.45% for un-modeled actions, 100% for scripted verbalizations, 100% for intervals of appropriate play, and 100% for intervals of inappropriate play. Lastly, reliability scores for the NR session were 100% for modeled actions, 100% for scripted verbalizations, 100% for steps completed in the task analysis, 63.64% for un-modeled actions, 100% for unscripted verbalizations, 83.33% for intervals of appropriate play, and 85.42% for intervals of inappropriate play.

For Participant 4, a total of four baseline sessions, one CR session, and two NR sessions were recorded for reliability. Reliability scores for baseline sessions were 87.5% for modeled actions, 100% for scripted verbalizations, 100% for steps completed in the task analysis, 53.33% for un-modeled actions, 100% for unscripted verbalizations, 82.81% for intervals of appropriate play, and 95.31% for intervals of inappropriate play. For the CR session, reliability scores were 100% for modeled actions, 100% for scripted verbalizations, 100% for steps completed in the task analysis, 90% for un-modeled actions, 100% for unscripted verbalizations, 93.75% for intervals of appropriate play, and 100% for intervals of inappropriate play. Lastly, reliability scores for the NR sessions were 93.75% for modeled actions, 100% for scripted verbalizations, 100% for steps completed in the task analysis, 52.94% for un-modeled actions, 100% for unscripted verbalizations, 89.58% for intervals of appropriate play, and 92.71% of intervals of inappropriate play.

Experimental Design and Conditions

An A-B-A-C-A-X design counterbalanced for order of presentation, and X representing the most effective condition was used to determine whether consequences applied to the model influenced learning play skills. For example, two participants were separated into two groups. All three toy sets were presented to each participant twice during baseline. Two conditions were used. The CR condition referred to the video model where the model was provided with an edible for each scripted motor and verbal response emitted. The NR condition referred to the video where the model was demonstrating the specific motor and verbal behaviors but did not receive reinforcement (i.e. the experimenter did not come into view and deliver a small edible). Example. All children were observed interacting with all the play set materials (Play Set 1, Play Set 2, Play Set 3) counterbalanced for order during baseline. Then two children were exposed to (CR video), and two children observed (NR video). Following video modeling training, children were then exposed to Play Set 2 materials during the second baseline. Then, children who were first exposed to CR video modeling, were then shown the NR video while children who were first exposed to NR video modeling, were then shown the CR video with Play Set 2 materials. Following Play Set 2 materials video modeling exposure, all children were then exposed to Play Set 3 materials for the final baseline condition. Following the Play Set 3 baseline, the video model condition that was found to be most effective in teaching play skills were then used for all children when Play Set 3 video model was introduced. Each toy set, modeled action, and scripted verbalization were matched to each other to control for the level of difficulty across acquiring each skill (e.g., taking horse out of the stable; say, “I’m thirsty” vs. putting a man in a chair; say, “Go play” vs. walking a penguin up the steps; say, “I’m hungry”).

Motor Imitation with Objects Assessment

The participant was sitting at a table in front the experimenter before the trial began. There were no objects on the table to reduce distractions from the environment. The experimenter presented the instruction, "Do this" and then performed an action with an object (i.e., wave a stick up and down). The participant was required to perform the same action. The trials continued until the participant either performed at least 10 actions with at least two different actions for each object, or obtained five cumulative errors (see Appendix C, Item 1). The participant needed to successfully complete all requirements to advance to the next assessment.

Early Echoic Skills Assessment

The participant was sitting down at a table facing the experimenter before the trial began. There were no objects on the table to reduce distractions from the environment. The experimenter presented the instruction, "Say" followed by the three-syllable combination being assessed. The participant had three attempts to give his best response. A score of 1 was given if the participant said the exact three-syllable combination, a score of 0.5 was given if the participant said a recognizable response with incorrect or missing consonants or extra syllables, and a score of 0 was given if the participant did not respond, said incorrect vowels, or missed syllables (see Appendix C, Item 2). Thirty three-syllable combinations were assessed and the participant was required to obtain a score of at least 25 in order for continued participation.

Preference Assessment

The participant was seated at the table in front of the experimenter and the experimenter presented three edible items (i.e., Smarties ®, Teddy Bear Cookies, Gummy Worms) spaced out

evenly in front of the child. The experimenter delivered the instruction, "pick one" and waited for the participant to point towards or touch one of the items. The first item selected by the participant was used as the reinforcing edible item in the study. If the participant reached for more than one edible item, the first one selected was chosen. Alternatively, if the participant did not select an item, the experimenter placed his fingers on the child's elbow and moved it forward in order to guide his hand towards the items.

Baseline

During baseline, all appropriate motor and vocal responses emitted by the participants were recorded and scored by the experimenter for each toy set. A toy set was placed in front of the child with the corresponding characters and objects placed in identical positions to characters and objects seen in the video. Once the toy set and materials were presented, the experimenter delivered the verbal instruction, "play with the toys." The participants were given 4 minutes to play, the same length as the study by MacDonald et al. (2005). If the participant left the play area for more than 15 seconds, he was re-directed back to the toys. If the participant was unwilling to participate and go back to the play set after being redirected three times during a trial, the child was allowed to leave the play area and another trial was rescheduled at a later date. After two rescheduled sessions, that participant was not asked to participate in the study. No additional prompting was provided and two initial baseline sessions were conducted for each participant.

Contingent Reinforcement

During the CR condition, the participants were seated at the same table where sessions were conducted. All materials were removed from the table to minimize distractions. A

computer was placed in front the participants and the experimenter delivered the verbal instruction “watch the video.” Following the viewing of the video, the experimenter digitally rewound the video and re-presented the verbal instruction “watch the video” for the participants to view a second time consecutively. If the participants looked away during the video, the experimenter delivered a verbal prompt “look” followed by a gestural prompt (i.e., pointing to the computer screen). Alternatively, if the participants started talking during the video, the experimenter delivered a verbal prompt “listen” followed by a gestural prompt (i.e., pointing to the computer screen). Each video (ranging from 59 seconds to 2 minutes and 32 seconds) consisted of the experimenter performing 8 specific actions and verbalizations (see Appendix A, Table 1). The video began with the model saying, “I want (reinforcing item)” before performing the modeled actions and verbalizations. The model seen in the video received the selected edible contingent on every action (scripted motor action demonstrated) and scripted vocalization emitted in the video (i.e., a total of 16 edibles). For example, the step "Take horse one out of the stable and say, I’m thirsty", the model received one edible for taking the horse out of the stable (modeled action), and one edible for saying I'm thirsty (scripted verbalization). Therefore, the amount of reinforcement delivered was equal across all videos in the CR condition (eight for modeled actions, and eight for scripted verbalizations for a total of 16 edibles per video). Edibles were placed in the model’s hand following modeled and scripted responses. This condition continued until participants reached a criterion of 80% or better for two consecutive sessions, or fell below 80% on five consecutive sessions. Each session lasted 4 minutes and no prompts were provided to the participant. All appropriate motor and vocal responses emitted by the participants were recorded and scored by the experimenter for each toy set.

No Reinforcement Condition

This condition was similar to the CR conditions except the video did not include the adult providing any reinforcement. All appropriate motor and vocal responses emitted by the participants were recorded and scored by the experimenter for each toy set.

Time Delay

A graduated 2-second time delay procedure used by Wall and Gast (1997) and Liber et al. (2008) was used to teach the modeled actions and scripted verbalizations to participants who fell below the 80% criterion on five consecutive sessions following the introduction of the most effective intervention. Each session began by the experimenter presenting the instruction to the participants "go play with your toys." A 0 second delay was used to prompt each step of the video modeling procedure until the participant completed all the steps with 100% prompted and unprompted correct responses for two consecutive sessions. The prompts given were either direct or indirect vocal statements, or gestural prompts. Each correct response resulted in verbal praise and encouragement for the participant to complete the task (e.g., good job, keep going). A 2-second prompt delay was then given between each modeled action until each participant achieved 100 % correct prompted or unprompted responses across three consecutive sessions. Prompt delays increased by 2 seconds after three consecutive sessions of a higher rate of unprompted versus prompted responses than the previous time delay.

Chapter III

RESULTS

Motor Imitation with Objects and Early Echoic Skills Assessments

Each participant was assessed for motor imitation with objects and echoic skills. Figure 1 (Appendix B) shows the number of independent object imitation responses for all participants. The results showed that Participant 1, Participant 2, Participant 3, and Participant 4 responded independently to 15, 15, 13, and 12 exemplars, respectively. Figure 2 (Appendix B) shows the score on the EESA, three-syllable combinations, for all four participants. The results showed that Participant 1, Participant 2, Participant 3, and Participant 4 scored 29.5, 25, 29, and 29.5, respectively. These results demonstrated that all four participants reached the required skill level to participate in the study.

Table 2 (Appendix A) summarizes the total mean number of modeled and un-modeled actions, scripted and unscripted verbalizations, and intervals of appropriate and inappropriate play for each condition. During the first baseline condition, the total mean number of modeled actions was 1.7 and the total mean number of un-modeled actions was 6.3. During the CR condition, the total mean number modeled and un-modeled actions increased compared to the first baseline (i.e., 2.8 and 10.3, respectively). During the second probe baseline condition, there was a decrease in the total mean number of modeled actions compared to the CR condition (i.e., 2), however the total mean number of un-modeled actions increased to 10.9. During the NR condition, the total mean number of modeled and un-modeled actions was slightly lower than the CR condition (i.e., 2.4 and 9.1, respectively). During the final probe baseline condition, the total mean number of modeled actions decreased to levels comparable to the first baseline condition

(i.e., 1.7), however the total mean number of un-modeled actions increased to 11.3. During the final intervention conditions, the total mean number of modeled and un-modeled actions was greater in the CR condition (i.e., 1.2 and 7.6, respectively) compared to the NR condition (i.e., 0.8 and 1.9, respectively).

During the first baseline condition, the total mean number of scripted and unscripted verbalizations was 0.1 and 4.2, respectively. During the CR condition, there was increase in scripted verbalizations (i.e., 1.2), however the total mean number of unscripted verbalizations decreased to 2.8. During the second probe baseline condition, the total mean number of scripted and unscripted verbalizations was comparable to the first baseline condition (i.e., 0.3 and 5.5, respectively). The total mean number of scripted and unscripted verbalizations in the NR condition was similar to the CR condition (i.e., 1.2 and 2.8, respectively). During the final baseline probe session, the total mean number of scripted and unscripted verbalizations was comparable to previous baseline conditions (i.e., 0.7 and 4.1). During the final intervention conditions, the total mean number of scripted verbalizations was greater in the CR condition (i.e., 0.9) compared to the NR condition (i.e., 0.7), however the total mean number of unscripted verbalizations was greater in the NR condition (i.e., 3.8) than the CR condition (i.e., 1.1).

Appropriate and inappropriate play was recorded in each session using 5s partial interval recording. A total of 48 intervals were recorded in each session. The total mean number of intervals of appropriate play in the first baseline condition, the CR condition, and the second probe baseline condition were similar (i.e., 41.5, 42.7, and 42, respectively). During the NR condition, the total mean number of appropriate play intervals decreased to 32.5 and increases were observed in the final baseline probe session (i.e., 39.8). During the final intervention

condition, the total mean number of appropriate intervals in the CR condition (i.e., 32.2) was similar to the first NR condition, and the total mean number of appropriate play intervals in the final NR condition decreased to 11.3. During the first baseline condition, the total mean number of inappropriate play was 1.9. The total mean number of inappropriate play intervals in the following CR condition, second probe baseline condition, NR condition, and third probe baseline condition were similar (i.e., 5, 5, 4.9, and 5, respectively). During the final intervention conditions, decreases in the total mean number of inappropriate play intervals was observed for both CR and NR conditions (i.e., 0.5 and 1.3, respectively).

Actions and Verbalizations

The mean number of actions (modeled and un-modeled), verbalizations (scripted and unscripted), and intervals of appropriate and inappropriate play were calculated in each condition for each participant. Table 3 (Appendix A) shows the results for Participant 1 and Participant 2, and Table 4 (Appendix A) shows the results for Participant 3 and Participant 4. Both tables were created to separate participants based on the order of conditions presented. During the first baseline condition for Participant 1 and Participant 2 (Appendix A, Table 3), the total mean number of modeled actions was 3 and the total mean of un-modeled actions was 7.7. During the following NR condition, the total mean number of modeled and un-modeled actions increased slightly for each participant (i.e., 3.8 and 9.6, respectively). During the second probe baseline condition, the total mean number of modeled actions returned to previous baseline levels (i.e., 3), however, the total mean number of un-modeled actions continued to increase slightly (i.e., 9.8). During the following CR condition, the total mean number of modeled actions was comparable to the NR condition (i.e., 3.7) and the total mean number of un-modeled actions continued to

increase (i.e., 12.7). During the final baseline probe session, the total mean number of modeled actions fell slightly below initial baseline levels (i.e., 2.5) and the total mean number of un-modeled actions continued to increase (i.e., 13). During the final intervention condition, each participant was exposed to the most effective treatment condition. Participant 1 was exposed to the NR condition and Participant 2 was exposed to the CR condition. For Participant 1, the total mean number of modeled actions returned to initial baseline levels (i.e., 3), and for the first time, the total mean number of un-modeled actions decreased (i.e., 7.7). For Participant 2, the total mean number of modeled actions was comparable with the total mean number of modeled actions in the first CR condition (i.e., 4.7), and similarly to Participant 1, the total mean number of un-modeled actions decreased (i.e., 6).

During the first baseline condition for Participant 3 and Participant 4 (Appendix A, Table 4), the total mean number of modeled actions was 0.4 and the total mean number of un-modeled actions was 5. During the following CR condition, the total mean number increased for both modeled and un-modeled actions (i.e., 2 and 7.8, respectively). During the second probe baseline condition, the total mean number of modeled actions decreased to just above baseline levels (i.e., 1), and the total mean number of un-modeled actions continued to increase (i.e., 12). During the following NR condition, the total mean number of modeled actions fell below the total mean number of modeled actions in the CR condition (i.e., 1), and the total mean number of un-modeled actions decreased to levels similar to the CR condition (i.e., 8.5). During the final baseline probe condition, the total mean number of modeled actions decreased to just above initial baseline levels (i.e., 0.8), and the total mean number of un-modeled action increased slightly from the previous NR levels (i.e., 9.5). For the final treatment condition, both

Participant 3 and Participant 4 were exposed to the CR condition. The total mean number of modeled actions was 0; however, the total mean number of un-modeled actions was 12.2, the greatest of all conditions. These results suggest that neither the CR nor NR conditions were more effective than the other for teaching modeled actions using video modeling to children with autism during play.

In addition, Table 5 (Appendix A) displays the mean number of modeled and un-modeled actions for Participant 1 and Participant 2 during each condition for each play set, and Table 6 displays the mean number of modeled and un-modeled actions for Participant 3 and Participant 4 during each condition for each play set. Individual data was also displayed for each participant and baseline sessions were summarized into 3 categories: (a) baseline sessions prior to video modeling exposure (i.e., prior to the participant viewing a modeled video for the play set in question), (b) baseline sessions following the NR condition, and (c) baseline sessions following the CR condition. Individual data for modeled actions for Participant 1, Participant 2, Participant 3, and Participant 4 is displayed in Tables 7, 8, 9, and 10 (Appendix A), respectively, and data for un-modeled actions for Participant 1, Participant 2, Participant 3, and Participant 4 is displayed in Tables 11, 12, 13, and 14 (Appendix A), respectively.

During the first baseline condition for Participant 1 and Participant 2 (Appendix A, Table 3), the total mean number of scripted verbalizations was 0.3 and the total mean number of unscripted verbalizations was 7.6. During the following NR condition, the total mean number of scripted verbalizations increased (i.e., 2.4), however, the mean number of unscripted verbalizations decreased (i.e., 5.7). During the second baseline probe condition, the total mean number of scripted and unscripted verbalizations decreased to levels similar to the initial baseline

condition (i.e., 0.7 and 10.3, respectively). During the following CR condition, the total mean number of scripted and unscripted verbalization was very similar to the NR condition (i.e., 2.4 and 5.1, respectively). During the final baseline probe condition, the total mean number of scripted and unscripted verbalizations returned to levels similar to the initial baseline condition (i.e., 1.3 and 8.2, respectively). During the final NR condition for Participant 1, the total mean number of scripted verbalizations was similar to the previous CR and NR conditions (i.e., 2.7), however, the total mean number of unscripted verbalizations increased to 15. For Participant 2, the total mean number of scripted and unscripted verbalizations in the CR condition was both 3.3, respectively.

During the first baseline condition for Participant 3 and Participant 4 (Appendix A, Table 4), the total mean number of scripted verbalizations was 0 and the total mean number of unscripted verbalizations was 0.8. During the following CR condition, the total mean number of scripted increased to 0.1 and the total mean number of unscripted verbalizations decreased to 0.6. During the second baseline probe session, the total mean number of scripted verbalizations returned to 0, and the total mean number of unscripted verbalizations was 0.7. During the following NR condition, the total mean number of scripted verbalizations and unscripted verbalizations was 0. During the final baseline probe session, the total mean number of scripted and unscripted verbalizations remained at 0. During the last treatment condition, both Participant 3 and Participant 4 were exposed to the CR condition. The total mean number of scripted and unscripted verbalizations increased (i.e., 0.2 and 0.5, respectively). These results suggest that neither the CR nor NR conditions were more effective than the other for teaching scripted verbalizations using video modeling to children with autism during play.

In addition, Table 5 (Appendix A) displays the mean number of scripted and unscripted verbalizations for Participant 1 and Participant 2 during each condition for each play set, and Table 6 (Appendix A) displays the mean number of scripted and unscripted verbalizations for Participant 3 and Participant 4 during each condition for each play set. Individual data for scripted verbalizations for Participant 1, Participant 2, Participant 3, and Participant 4 is displayed in Tables 15, 16, 17, and 18 (Appendix A), respectively, and data for unscripted verbalizations for Participant 1, Participant 2, Participant 3, and Participant 4 is displayed in Tables 19, 20, 21, and 22 (Appendix A), respectively.

Tables 23, 24, 25, and 26 (Appendix A) show the mean number of consecutive steps completed in the task analysis per session for Participant 1, Participant 2, Participant 3, and Participant 4, respectively. Participant 1 completed a mean number of 0.3 consecutive steps per session in the NR condition and 0 steps in all the other conditions. Participant 2 completed a mean of 2 in the baseline following NR condition, 1.8 in the CR condition, 1.7 in the NR condition, 1 in the baseline following CR condition, and none in the baseline prior to video modeling exposure sessions. Lastly, Participants 3 and 4 did not complete any consecutive steps of the task analysis in any of the conditions.

Appropriate and Inappropriate Play

During the first baseline condition, the total mean number of appropriate and inappropriate play intervals for Participant 1 and Participant 2 (Appendix A, Table 3) was 43.9 and 0.8, respectively. During the following NR condition, the total mean number of appropriate play intervals decreased to 38 and the total mean number of inappropriate play intervals increased to 4.6. During the second baseline probe session, the total mean number of appropriate

play intervals returned to baseline levels (i.e., 43.7) and the total mean number of inappropriate play intervals remained at levels compared to the NR condition (i.e., 4.8). During the following CR condition, the total mean number of appropriate play intervals increased to 44.4 and the total mean number of inappropriate play intervals decreased to 3.6. During the final baseline probe condition, the total mean number of appropriate play intervals was 43.5 and the total mean number of inappropriate play intervals was 2. During the final treatment condition, the total mean number of appropriate play intervals for Participant 1 in the NR condition was 45 and the total mean number of inappropriate play was 5.3. For Participant 2, the total mean number of appropriate play in the CR condition was 40.3 and the total mean number of inappropriate play was 0.3.

Table 4 (Appendix A) shows the mean number of appropriate and inappropriate play intervals for Participant 3 and Participant 4. During the initial baseline condition, the total mean number of appropriate play intervals was 39.2 and the total mean number of inappropriate play intervals was 3. During the following CR condition, the total mean number of appropriate play intervals remained similar to the baseline condition (i.e., 40.9), however, the total mean number of inappropriate play intervals doubled (i.e., 6.3). During the second baseline probe session, the total mean number of appropriate and inappropriate play intervals remained comparable to levels in the CR condition (i.e., 40.3 and 5.2, respectively). During the following NR condition, the total mean number of appropriate play intervals decreased to 27, however, the total mean number of inappropriate play intervals remained at 5.2. During the final baseline probe condition, the total mean number of appropriate play intervals increased to 36 and the total mean number of inappropriate play intervals increased to 8. Finally, both Participant 3 and Participant 4 were

exposed to the CR condition and the total mean number of appropriate play intervals increased to 44.2 and the total mean number of inappropriate play intervals decreased to 0.8.

In addition, Table 5 (Appendix A) displays the mean number of intervals of appropriate and inappropriate play for Participant 1 and Participant 2 during each condition for each play set, and Table 6 (Appendix A) displays the mean number of intervals of appropriate and inappropriate play for Participant 3 and Participant 4 during each condition for each play set. Individual data for intervals of appropriate play for Participant 1, Participant 2, Participant 3, and Participant 4 is displayed in Tables 27, 28, 29, and 30 (Appendix A), respectively, and data for intervals of inappropriate play for Participant 1, Participant 2, Participant 3, and Participant 4 is displayed in Tables 31, 32, 33, and 34 (Appendix A), respectively.

Teaching Play

Following the video modeling interventions, a time delay prompting procedure was used to teach Participant 3 and Participant 4 the steps in the task analysis for all three play sets. The participants were required to independently complete all the steps in the task analysis consecutively. Participant 3 (see Appendix A, Table 35) completed all the steps in the task analysis independently for the stable set, playground set, and penguin set by Session 13, Session 12, and Session 9, respectively. Participant 4 (see Appendix A, Table 36) learned how to consecutively complete up to 40% of the steps independently for the stable set by Session 9, 40% for the playground set by Session 15, and 30% for the penguin set by Session 9. Sessions continued to be conducted for the stable set and penguin set, and the percentage of consecutive steps completed in the task analysis for the stable set varied between 10% and 30% until Session

15. The percentage of unprompted steps completed in the task analysis stabilized at 20% for the penguin set from Session 10 to 15.

Chapter IV

DISCUSSION

The purpose of this study was to determine whether observing consequences provided to the model (positive reinforcement or no observed positive reinforcement) influenced skill acquisition of video modeled play skills. Each participant achieved no less than the minimum scores required for both motor imitation with objects and early echoic skills assessments.

During the study, four participants were exposed to three different play sets using either CR or NR video modeling in counter balanced order and the results demonstrated that neither CR nor NR video modeling conditions were more effective than the other for teaching modeled actions and scripted verbalizations during play for these four participants. In addition, video modeling conditions (CR or NR) did not appear to influence the number of un-modeled actions; however, unscripted verbalizations appeared to decrease during most video modeling conditions for these four participants during play.

After viewing both CR and NR videos, Participant 2 maintained the acquired mean number of modeled actions during the following baseline probe sessions (see Appendix A,Table 8). Participant 3 maintained the mean number of modeled actions for the playground set in the baseline probe session following the CR condition (see Appendix A, Table 9). Participant 4 maintained the mean number of modeled actions during both baseline probe sessions following CR and NR conditions (see Appendix A, Table 10). Lastly, Participant 1 did not maintain modeled actions in baseline probe sessions (see Appendix A,Table 7). The absence of maintenance for Participant 1 could have been due to a satiation effect. Following the first couple NR sessions, Participant 1 vocalized that he did not like the stable set anymore and

requested to play with the penguin set. Sessions with the stable set continued for the NR condition and the participant did not complete any modeled actions or scripted verbalizations in the baseline probe following NR condition. This pattern continued throughout the study for Participant 1 and the final NR condition was reduced to three sessions. As a result, sessions for the remaining participants were reduced to three sessions to minimize satiation effects.

Although it was speculated that the CR condition might have increased the number of modeled actions during play, the actions in the video for the NR condition were less interrupted. During the CR condition, the model in the video performed an action and paused for a couple seconds while an edible was delivered in his hand. As a result, videos in the CR condition were longer in duration and participants had to focus longer or were prompted to either "look" or "listen" when they looked away or started talking. It is possible that the reinforcer being delivered in the video for the CR condition competed with the negative reinforcement (removal of delay) in the NR condition, which resulted in videos with shorter durations and fluid consecutive actions.

The mean number of un-modeled actions per session for Participant 2 was greatest in the baseline following NR condition (see Appendix A, Table 12). For Participant 4, the mean number of un-modeled actions per session was lowest in the baseline following NR condition (see Appendix A,Table 14). Furthermore, the mean number of un-modeled actions per session was greatest in the NR condition (along with baseline following NR condition) for Participant 3 (see Appendix A, Table 13) and the mean number of un-modeled actions per session was lowest in the NR condition for Participant 1 (see Appendix A,Table 11). For Participant 3, the mean number of un-modeled actions per session was lowest in the CR condition; however, for

Participant 4, the mean number of un-modeled actions was greatest in the CR condition. Similar to the study by Boudreau and D'Entremont (2010), the number of un-modeled actions decreased in the CR condition for three participants compared to baseline sessions prior to video modeling conditions. In the study conducted by Boudreau and D'Entremont (2010), reinforcement was delivered to the participant for imitating modeled actions and scripted verbalizations. One difference was the number of un-modeled actions during baseline sessions prior to video modeling in the current study was higher for all four participants than in the study by Boudreau and D'Entremont (2010). This suggests that the participants in the current study may have had higher levels of play skills to begin.

One scripted verbalization was vocalized for Participant 3 (see Appendix A, Table 17) and Participant 4 (see Appendix A, Table 18) throughout the study (in the CR condition), and the mean number of scripted verbalizations per session was highest in the NR condition and baseline following CR condition for the other two participants (see Appendix A, Tables 15 and 16). During the early echoics skills assessment, each participant was capable of scoring at least 25/30 for imitating three-syllable combinations. Participant 2 scored the lowest of all participants (i.e., 25); however, had the greatest mean number of scripted verbalizations per session than all four participants. Alternatively, Participant 4 scored 29.5/30 points for the early echoics skills assessment and only imitated one scripted verbalization. Although Participant 3 and Participant 4 were capable of imitating vocalizations one-on-one, imitating vocalizations during play was almost absent. One explanation is that these participants had previous experience learning vocal imitation skills daily through an early intervention autism program. Participants may not have had the same experience with video modeling. Participant 2 had a greater mean number of

scripted verbalizations per session in the NR condition compared to the CR condition. Similarly to modeled actions, the videos in the NR condition were uninterrupted, as scripts did not stop for the delivery of a reinforcing edible.

Comparably to scripted verbalizations, unscripted verbalizations were very low for Participant 3 and Participant 4 throughout the study. During play sessions, Participant 4 made many vocalizations that were not contextually relevant to the on-going scenario. The vocalizations included calling the experimenter by name and repeating previous phrases vocalized by his mother or siblings. In contrast to Participant 4, Participant 3 did not make any vocalizations that were not contextually relevant to the on-going scenario. For Participant 3, only one unscripted verbalization was said during the study in the baseline prior to video modeling exposure condition. The mean number of unscripted verbalizations per session for Participant 1 nearly doubled in the baseline probe session following NR condition compared to all other conditions. Most of these unscripted verbalizations were statements that were accompanied by inappropriate play but met the definition of unscripted verbalizations (i.e., hi-ya, the door is stuck, open the door I say). It is possible that the increase in unscripted verbalizations were influenced by satiation with the stable set. Play sets were randomly assigned to either the CR or NR condition; however, baseline probe sessions following NR condition were only conducted with the stable set. A total of two sessions were conducted in the baseline probe following NR condition for Participant 1. The mean number of unscripted verbalizations per session for Participant 2 varied across all conditions, ranging from 4 to 8.3. Participant 2 was observed completing steps in the task analysis and would either restart the steps from the

beginning for the remainder of the session, or engage in novel play. All other participants did not display the same characteristics.

The percentage of appropriate play intervals was calculated for all four participants. In addition, the percentage of inappropriate play intervals was later added as a dependent variable as sessions progressed. Although intervals of appropriate and inappropriate play occurred separately, it was possible for intervals to be recorded as both appropriate and inappropriate (i.e., a participant manipulating objects as observed in play but also had an object in his mouth at the same time). During baseline sessions prior to video modeling exposure, the percentage of appropriate play was above 90% for Participant 1, Participant 2, and Participant 3. Participant 4 occasionally fixated on objects in the room, and removed his glasses and from his face and started manipulating them during sessions. Intervals of appropriate play remained above 90% for Participant 2 in all conditions and above 90% for Participant 3 in all conditions except the NR condition (i.e., 72.9%). During the NR condition (stable set), Participant 3 was holding the jump and moving it along the cubby wall. The percentage of appropriate play was lowest for all four participants when playing the stable set. The stable set was used for Participant 1 in the NR condition, Participant 2 in the final CR condition, Participant 3 in the NR condition, and Participant 4 in the NR condition. When other play sets were exposed to the NR condition, the mean number of appropriate play intervals per session was 45/48 for Participant 1 (playground set), and 45.7/48 for Participant 2 (penguin set). One explanation could be the lack of cause and effect components with the stable set. When playing with the playground set, participants would often bring the zip line slide to the top of the climbing net and release it, watching it slide down to the bottom. Similarly, when playing with the penguin set, participants would often bring the

penguin, lady, or other objects to the top of the slide and push them down, watching them fall into the pool. When participants engaged in these actions repetitively, it met the definition of appropriate play. The stable set did not have a cause and effect component. Participant 4 was observed picking up racing barrels and dropping them repeatedly which did not meet the definition of appropriate play. In addition, Participant 3 was observed applying pressure to the jump which resulted in the jump bending. These actions could have been attempts to create cause and affect conditions when playing with the stable set; however, would have been considered inappropriate play based on the definition.

A time delay procedure was used to teach Participant 3 and Participant 4 the steps of the task analysis for each play set. During the prompting procedure, each child was verbally praised for completing each step (prompted or unprompted) in the task analysis. Participant 3 completed all the steps of the task analysis for each play set without prompts in 13 sessions or less. It is possible that the verbal praise following the steps of the task analysis was more reinforcing than watching the delivery of the edible item to the model. Participant 4 was only able to complete between 30% and 40% of the steps in the task analysis unprompted within 15 sessions. For the stable set and penguin set, the percentage of unprompted responses began to decrease. Following Session 12, sessions were conducted on the weekend in an attempt to increase the child's interest with the play sets. Increases of prompted responses were only observed for the playground set (i.e., 40%). Following Session 15, a decision was made between the caregiver and experimenter to terminate teaching.

The time delay procedure was not used for Participant 1 and Participant 2. Following the completion of the video modeling procedure, Participant 1 vocalized that he no longer wanted to

play with the play sets following video modeling. The caregiver for Participant 1 and experimenter also decided that it would be in the child's best interest to opt out of time delay procedure. The caregiver for Participant 2 was pleased with the progress her child made and decided that teaching the steps in the task analysis would no further benefit her child.

Overall, this study was unique in determining whether observing consequences provided to the model (positive reinforcement or no observed positive reinforcement) would influence skill acquisition of video modeled play skills. The results suggested that neither CR nor NR conditions were more effective than the other for teaching skills acquisition of video modeled play skills. However, this study corroborates with prior research in that video modeling can effectively teach play skills to children with ASD (MacDonald et al., 2005; MacDonald et al., 2009; Mangiapanello et al., 2009). In the current study, the mean number of modeled actions per session was greater in video modeling (CR and NR) conditions than baseline conditions for 2 participants across all three play sets, and greater for two participants across two play sets. In addition, the mean number of scripted verbalizations per session was more effective for two participants in the CR condition.

Results from the study, however, contradict findings from Boudreau and D'Entremont (2010) in that reinforcement sessions during the video modeling phase appeared to have suppressed the frequency of novel play responses. A mean decrease in unscripted verbalizations was observed in most video modeling conditions; however, un-modeled actions fluctuated independent of video modeling conditions. One explanation could be that the definition of un-modeled actions was not concrete. Based on the definition of taken from the study by Boudreau and D'Entremont (2010), picking up the lady, putting her on the slide, and pushing her down,

could be interpreted a three different actions. Similarly, putting the lady on the slide, and pushing her down the slide, would be interpreted as two different actions, or picking up the lady, and pushing her down the slide, would be interpreted as two different actions. As a result, these similar scenarios would all have different IOA scores. It is possible that IOA score were low for un-modeled actions and unscripted verbalizations due to this effect.

Another explanation for contradictory findings could be that in the study by Boudreau and D'Entremont (2010), verbal praise, physical contact, and the occasional token was provided for imitating modeled actions and scripted verbalizations. In the current study, each participant viewed the model receive edible items in the CR condition. It is possible that viewing the item provided to the model did not act as a reinforcer, the edible items selected lost its effectiveness, or were not preferred to begin. Three edible items were selected prior to the study (chocolate, cookie, gummy) and participants selected a preferred item. Future studies may want to conduct preference assessments throughout the study to increase the likelihood that items selected remain preferred.

Additionally, future studies may look at the effects of whether observing consequences provided to the model would influence skill acquisition of video modeled play skills when performing a single action or verbalization. When participants viewed a series of actions and verbalization in the CR condition, participants frequently looked away and needed prompting to continue watching the video. Viewing videos of shorter durations might increase the participant's attention and reduce the likelihood of missed actions and verbalizations.

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Appendices

Appendix A

Tables

Table 1

Teaching Play Set Scripts

Red Stable Play Set Script	Activity Playground Play Set Script	Penguin Habitat Play Set Script
1. Take horse 1 out of the stable; say, "I'm thirsty" 2. Bring horse 1 to the water trough and put his head in. 3. Say "Glug glug glug." 4. Walk horse 1 to the obstacle course; say, "Time to exercise!" 5. Make horse 1 weave through the 3 racing barrels. 6. Make horse 1 jump over the jump; say, "I did it!" 7. Walk horse 1 to horse 2, horse 2 says, "You're fast!" 8. Horse 1 says, "Thank you!" 9. Walk horse 1 in the stable; say, "I'm tired!" 10. Put horse 1 on his side and say, "good night!"	1. Put man in chair; say, "Go play!" 2. Walk boy to climbing wall and walk him up. 3. Say, "I made it!" (Once he is at the top) 4. Walk boy back down walk and towards the carousel; say "Time to spin." 5. Make boy stand on carousel and spin it around. 6. Take boy off the carousel; say, "That was fun!" 7. Walk boy to man, man says, "Last one!" 8. Boy say, "Okay" 9. Walk boy up the climbing net; say, "Here we go" 10. Put boy on zip line, slide him down and say, "Weee."	1. Walk penguin up the steps; say, "I'm hungry" 2. Make lady drop bucket with fish in front of penguin. 3. Put penguin's beak to fish; says "Mmm, fish." 4. Walk penguin down steps to the nest and says, "Eggs are safe." 5. Walk penguin up steps to slide and move him down into pool. 6. Penguin says, "Yahoo!" 7. Walk penguin up steps to lady, lady asks, "Was that fun?" 8. Penguin says "Yes it was." 9. Penguin walks inside second nest and says, "time to rest" 10. Put penguin on side and say, "That's better!"

Table 2

Mean Number of Actions, Verbalizations, and Play Intervals per Session in Each Condition

Actions and Verbalizations	BL1	CR	BL2	NR	BL3	Final	
						CR	NR
Modeled actions	1.7	2.8	2.0	2.4	1.7	1.2	0.8
Un-modeled actions	6.3	10.3	10.9	9.1	11.3	7.6	1.9
Scripted verbalizations	0.1	1.2	0.3	1.2	0.7	0.9	0.7
Unscripted verbalizations	4.2	2.8	5.5	2.8	4.1	1.1	3.8
Appropraite Play	41.5	42.7	42.0	32.5	39.8	32.2	11.3
Inappropriate play	1.9	5.0	5.0	4.9	5.0	0.5	1.3

Note. In the table, the abbreviations refer to the following: baseline 1 (BL1), conditioned reinforcement (CR), baseline 2 (BL2), non-contingent reinforcement (NR), and baseline 3 (BL3). Intervention conditions are not written in the order they were presented to each participant.

Table 3

Mean Number of Actions, Verbalizations, and Play Intervals per Session in each Condition.

Actions, Verbalizations and Play Intervals	Participant 1 Mean Number	Participant 2 Mean Number	Total Mean
Baseline			
Modeled Actions	2.7	3.3	3.0
Un-modeled Actions	8.8	6.5	7.7
Scripted Verbalizations	0.2	0.3	0.3
Unscripted Verbalizations	7.3	7.8	7.6
Appropriate Play	44.8	43.0	43.9
Inappropriate Play	1.5	0.2	0.8
No Reinforcement			
Modeled Actions	2.6	5.0	3.8
Un-modeled Actions	7.2	12.0	9.6
Scripted Verbalizations	0.8	4.0	2.4
Unscripted Verbalizations	3.0	8.3	5.7
Appropriate Play	30.4	45.7	38.0
Inappropriate Play	9.2	0.0	4.6
Baseline 2			
Modeled Actions	2.3	3.7	3.0
Un-modeled Actions	8.7	11.0	9.8
Scripted Verbalizations	0.0	1.3	0.7
Unscripted Verbalizations	12.3	8.3	10.3
Appropriate Play	40.0	47.3	43.7
Inappropriate Play	9.0	0.7	4.8
Contingent Reinforcement			
Modeled Actions	1.0	6.3	3.7
Un-modeled Actions	12.8	12.7	12.7
Scripted Verbalizations	0.4	4.3	2.4
Unscripted Verbalizations	4.8	5.3	5.1
Appropriate Play	41.2	47.7	44.4
Inappropriate Play	7.2	0.0	3.6
Baseline 3			
Modeled Actions	0.7	4.3	2.5
Un-modeled Actions	14.0	12.0	13.0
Scripted Verbalizations	0.0	2.7	1.3
Unscripted Verbalizations	11.0	5.3	8.2
Appropriate Play	42.7	44.3	43.5
Inappropriate Play	4.0	0.0	2.0
Final No Reinforcement			
Modeled Actions	3.0	-	3.0
Un-modeled Actions	7.7	-	7.7
Scripted Verbalizations	2.7	-	2.7
Unscripted Verbalizations	15.0	-	15.0
Appropriate Play	45.0	-	45.0
Inappropriate Play	5.3	-	5.3
Final Contingent Reinforcement			
Modeled Actions	-	4.7	4.7
Un-modeled Actions	-	6.0	6.0
Scripted Verbalizations	-	3.3	3.3
Unscripted Verbalizations	-	3.3	3.3
Appropriate Play	-	40.3	40.3
Inappropriate Play	-	0.3	0.3

Note. Intervention conditions are written in the order they were presented to the participant.

Table 4

Mean Number of Actions, Verbalizations, and Play Intervals per Session in each Condition.

Actions, Verbalizations and Play Intervals	Participant 3 Mean Number	Participant 4 Mean Number	Total Mean
Baseline			
Modeled Actions	0.3	0.5	0.4
Un-modeled Actions	3.5	6.5	5.0
Scripted Verbalizations	0.0	0.0	0.0
Unscripted Verbalizations	0.2	1.5	0.8
Appropriate Play	47.2	31.2	39.2
Inappropriate Play	0.0	6.0	3.0
Contingent Reinforcement			
Modeled Actions	1.8	2.2	2.0
Un-modeled Actions	3.4	12.2	7.8
Scripted Verbalizations	0.2	0.0	0.1
Unscripted Verbalizations	0.0	1.2	0.6
Appropriate Play	48.0	33.8	40.9
Inappropriate Play	0.2	12.4	6.3
Baseline 2			
Modeled Actions	1.0	1.0	1.0
Un-modeled Actions	9.7	14.3	12.0
Scripted Verbalizations	0.0	0.0	0.0
Unscripted Verbalizations	0.0	1.3	0.7
Appropriate Play	47.7	33.0	40.3
Inappropriate Play	0.0	10.3	5.2
No Reinforcement			
Modeled Actions	0.0	2.0	1.0
Un-modeled Actions	10.0	7.0	8.5
Scripted Verbalizations	0.0	0.0	0.0
Unscripted Verbalizations	0.0	0.0	0.0
Appropriate Play	35.0	19.0	27.0
Inappropriate Play	2.3	8.0	5.2
Baseline 3			
Modeled Actions	0.0	1.7	0.8
Un-modeled Actions	10.0	9.0	9.5
Scripted Verbalizations	0.0	0.0	0.0
Unscripted Verbalizations	0.0	0.0	0.0
Appropriate Play	46.7	25.3	36.0
Inappropriate Play	2.3	13.7	8.0
Final Contingent Reinforcement			
Modeled Actions	0.0	0.0	0.0
Un-modeled Actions	9.7	14.7	12.2
Scripted Verbalizations	0.0	0.3	0.2
Unscripted Verbalizations	0.0	1.0	0.5
Appropriate Play	47.7	40.7	44.2
Inappropriate Play	0.0	1.7	0.8

Note. Intervention conditions are written in the order they were presented to the participant.

Table 5

Mean Number of Actions, Verbalizations, and Play Intervals per Session in each Condition for each Play set.

Actions, Verbalizations and Play Intervals	Stable set							Playground set							Penguin set						
	BL1	NR	BL2	CR	BL3	Final		BL1	NR	BL2	CR	BL3	Final		BL1	NR	BL2	CR	BL3	Final	
						CR	NR						CR	NR						CR	NR
Participant 1																					
Modeled Actions	3.5	2.6	0.0	-	1.0	-	-	4.5	-	4.0	-	1.0	-	3.0	2.0	-	3.0	1.0	0.0	-	-
Un-modeled Actions	7.5	7.2	5.0	-	15.0	-	-	6.0	-	5.0	-	12.0	-	7.7	13.0	-	16.0	12.8	15.0	-	-
Scripted Verbalizations	0.0	0.8	0.0	-	0.0	-	-	0.5	-	0.0	-	0.0	-	2.7	0.0	-	0.0	0.4	0.0	-	-
Unscripted Verbalizations	8.0	3.0	13.0	-	19.0	-	-	7.5	-	0.0	-	10.0	-	15.0	6.5	-	24.0	4.8	4.0	-	-
Appropriate Play	42.0	30.4	25.0	-	39.0	-	-	46.5	-	47.0	-	43.0	-	45.0	46.5	-	48.0	41.2	46.0	-	-
Inappropriate Play	4.0	9.2	23.0	-	7.0	-	-	0.5	-	0.0	-	3.0	-	5.3	0.0	-	4.0	7.2	2.0	-	-
Participant 2																					
Modeled Actions	2.0	-	2.0	-	1.0	4.7	-	4.5	-	4.0	6.3	6.0	-	-	3.5	5.0	5.0	-	6.0	-	-
Un-modeled Actions	8.0	-	14.0	-	12.0	6.0	-	6.0	-	6.0	12.7	5.0	-	-	5.5	12.0	13.0	-	19.0	-	-
Scripted Verbalizations	0.5	-	0.0	-	0.0	3.3	-	0.5	-	1.0	4.3	5.0	-	-	0.0	4.0	3.0	-	3.0	-	-
Unscripted Verbalizations	6.0	-	10.0	-	7.0	3.3	-	7.5	-	7.0	5.3	4.0	-	-	10.0	8.3	8.0	-	5.0	-	-
Appropriate Play	44.0	-	48.0	-	45.0	40.3	-	46.5	-	48.0	47.7	44.0	-	-	38.5	45.7	46.0	-	44.0	-	-
Inappropriate Play	0.0	-	0.0	-	0.0	0.3	-	0.5	-	0.0	0.0	0.0	-	-	0.0	0.0	2.0	-	0.0	-	-

Note. In the table, the abbreviations refer to the following: Baseline 1 (BL1), No Reinforcement (NR), Baseline 2 (BL2), Contingent Reinforcement (CR), and Baseline 3 (BL3).

Table 6

Mean Number of Actions, Verbalizations, and Play Intervals per Session in each Condition for each Play set.

	Stable set							Playground set							Penguin set						
						Final							Final							Final	
Actions, Verbalizations and Play Intervals	BL1	CR	BL2	NR	BL3	CR	NR	BL1	CR	BL2	NR	BL3	CR	NR	BL1	CR	BL2	NR	BL3	CR	NR
Participant 3																					
Modeled Actions	0.0	-	0.0	0.0	0.0	-	-	0.0	1.8	3.0	-	0.0	-	-	1.0	-	0.0	-	0.0	0.0	-
Un-modeled Actions	3.5	-	11.0	10.0	10.0	-	-	3.5	3.4	9.0	-	7.0	-	-	3.5	-	9.0	-	13.0	9.7	-
Scripted Verbalizations	0.0	-	0.0	0.0	0.0	-	-	0.0	0.2	0.0	-	0.0	-	-	0.0	-	0.0	-	0.0	0.0	-
Unscripted Verbalizations	0.0	-	0.0	0.0	0.0	-	-	0.5	0.0	0.0	-	0.0	-	-	0.0	-	0.0	-	0.0	0.0	-
Appropriate Play	46.0	-	48.0	35.0	44.0	-	-	47.5	48.0	47.0	-	48.0	-	-	48.0	-	48.0	-	48.0	47.7	-
Inappropriate Play	0.0	-	0.0	2.3	7.0	-	-	0.0	0.2	0.0	-	0.0	-	-	0.0	-	0.0	-	0.0	0.0	-
Participant 4																					
Modeled Actions	1.0	-	0.0	2.0	2.0	-	-	0.5	-	1.0	-	1.0	0.0	-	0.0	2.2	2.0	-	2.0	-	-
Un-modeled Actions	5.0	-	15.0	7.0	6.0	-	-	7.0	-	14.0	-	9.0	14.7	-	7.5	12.2	14.0	-	12.0	-	-
Scripted Verbalizations	0.0	-	0.0	0.0	0.0	-	-	0.0	-	0.0	-	0.0	0.3	-	0.0	0.0	0.0	-	0.0	-	-
Unscripted Verbalizations	1.5	-	2.0	0.0	0.0	-	-	1.0	-	2.0	-	0.0	1.0	-	2.0	1.2	0.0	-	0.0	-	-
Appropriate Play	25.5	-	36.0	19.0	24.0	-	-	39.5	-	32.0	-	28.0	40.7	-	28.5	33.8	31.0	-	24.0	-	-
Inappropriate Play	9.0	-	14.0	8.0	21.0	-	-	2.0	-	11.0	-	2.0	1.7	-	7.0	12.4	6.0	-	18.0	-	-

Note. In the table, the abbreviations refer to the following: Baseline 1 (BL1), No Reinforcement (NR), Baseline 2 (BL2), Contingent Reinforcement (CR), and Baseline 3 (BL3).

Table 7

Number of Modeled Actions for Participant 1

	Conditions													
	Baseline 1		No Reinforcement		Baseline 2		Contingent Reinforcement		Baseline 3		Final			
											Contingent Reinforcement		No Reinforcement	
Play set	Sessions	Actions	Sessions	Actions	Sessions	Actions	Sessions	Actions	Sessions	Actions	Sessions	Actions	Sessions	Actions
Stable	2	7	5	13	1	0	-	-	1	1	-	-	-	-
Playground	2	5	-	-	1	4	-	-	1	1	-	-	3	9
Penguin	2	4	-	-	1	3	5	5	1	0	-	-	-	-

Conditions	Sessions	Number of Modeled Actions	Mean Number of Modeled Actions per Session
Baseline (before condition exposure)	9	24	2.7
No Reinforcement	8	22	2.8
Baseline Probe Following No Reinforcement	2	1	0.5
Contingent Reinforcement	5	5	1
Baseline Probe Following Contingent Reinforcement	1	0	0

Note. Intervention conditions are written in the order they were presented to the participant.

Table 8

Number of Modeled Actions for Participant 2

	Conditions													
	Baseline 1		No Reinforcement		Baseline 2		Contingent Reinforcement		Baseline 3		Final: Contingent Reinforcement		Final: No Reinforcement	
Play set	Sessions	Actions	Sessions	Actions	Sessions	Actions	Sessions	Actions	Sessions	Actions	Sessions	Actions	Sessions	Actions
Stable	2	4	-	-	1	2	-	-	1	1	3	14	-	-
Playground	2	9	-	-	1	4	3	19	1	6	-	-	-	-
Penguin	2	7	3	15	1	5	-	-	1	6	-	-	-	-

Conditions	Sessions	Number of Modeled Actions	Mean Number of Modeled Actions per Session
Baseline (before condition exposure)	9	27	3
No Reinforcement	3	15	5
Baseline Probe Following No Reinforcement	2	11	5.5
Contingent Reinforcement	6	33	5.5
Baseline Probe Following Contingent Reinforcement	1	6	6

Note. Intervention conditions are written in the order they were presented to the participant.

Table 9

Number of Modeled Actions for Participant 3

	Conditions													
	Baseline 1		Contingent Reinforcement		Baseline 2		No Reinforcement		Baseline 3		Final: Contingent Reinforcement		Final: No Reinforcement	
Play set	Sessions	Actions	Sessions	Actions	Sessions	Actions	Sessions	Actions	Sessions	Actions	Sessions	Actions	Sessions	Actions
Stable	2	0	-	-	1	0	3	0	1	0	-	-	-	-
Playground	2	0	5	9	1	3	-	-	1	0	-	-	-	-
Penguin	2	2	-	-	1	0	-	-	1	0	3	0	-	-

Conditions	Sessions	Number of Modeled Actions	Mean Number of Modeled Actions per Session
Baseline (before condition exposure)	9	2	0.2
No Reinforcement	3	0	0
Baseline Probe Following No Reinforcement	1	0	0
Contingent Reinforcement	8	9	1.1
Baseline Probe Following Contingent Reinforcement	2	3	1.5

Note. Intervention conditions are written in the order they were presented to the participant.

Table 10

Number of Modeled Actions for Participant 4

	Conditions													
	Baseline 1		Contingent Reinforcement		Baseline 2		No Reinforcement		Baseline 3		Final: Contingent Reinforcement		Final: No Reinforcement	
Play set	Sessions	Actions	Sessions	Actions	Sessions	Actions	Sessions	Actions	Sessions	Actions	Sessions	Actions	Sessions	Actions
Stable	2	2	-	-	1	0	3	6	1	2	-	-	-	-
Playground	2	1	-	-	1	1	-	-	1	1	3	0	-	-
Penguin	2	0	5	11	1	2	-	-	1	2	-	-	-	-

Conditions	Sessions	Number of Modeled Actions	Mean Number of Modeled Actions per Session
Baseline (before condition exposure)	9	5	0.6
No Reinforcement	3	6	2
Baseline Probe Following No Reinforcement	1	2	2
Contingent Reinforcement	8	11	1.4
Baseline Probe Following Contingent Reinforcement	2	4	2

Note. Intervention conditions are written in the order they were presented to the participant.

Table 11

Number of Un-modeled Actions for Participant 1

	Conditions													
	Baseline 1		No Reinforcement		Baseline 2		Contingent Reinforcement		Baseline 3		Final: Contingent Reinforcement		Final: No Reinforcement	
Play set	Sessions	Actions	Sessions	Actions	Sessions	Actions	Sessions	Actions	Sessions	Actions	Sessions	Actions	Sessions	Actions
Stable	2	15	5	36	1	5	-	-	1	15	-	-	-	-
Playground	2	12	-	-	1	5	-	-	1	12	-	-	3	23
Penguin	2	26	-	-	1	16	5	64	1	15	-	-	-	-

Conditions	Sessions	Number of Unmodeled Actions	Mean Number of Unmodeled Actions per Session
Baseline (before condition exposure)	9	86	9.6
No Reinforcement	8	59	7.4
Baseline Probe Following No Reinforcement	2	20	10
Contingent Reinforcement	5	64	12.8
Baseline Probe Following Contingent Reinforcement	1	15	15

Note. Intervention conditions are written in the order they were presented to the participant.

Table 12

Number of Un-modeled Actions for Participant 2

	Conditions													
	Baseline 1		No Reinforcement		Baseline 2		Contingent Reinforcement		Baseline 3		Final: Contingent Reinforcement		Final: No Reinforcement	
Play set	Sessions	Actions	Sessions	Actions	Sessions	Actions	Sessions	Actions	Sessions	Actions	Sessions	Actions	Sessions	Actions
Stable	2	16	-	-	1	14	-	-	1	12	3	18	-	-
Playground	2	12	-	-	1	6	3	38	1	5	-	-	-	-
Penguin	2	11	3	36	1	13	-	-	1	19	-	-	-	-

Conditions	Sessions	Number of Unmodeled Actions	Mean Number of Unmodeled Actions per Session
Baseline (before condition exposure)	9	71	7.9
No Reinforcement	3	36	12
Baseline Probe Following No Reinforcement	2	32	16
Contingent Reinforcement	6	56	9.3
Baseline Probe Following Contingent Reinforcement	1	5	5

Note. Intervention conditions are written in the order they were presented to the participant.

Table 13

Number of Un-modeled Actions for Participant 3

	Conditions													
	Baseline 1		Contingent Reinforcement		Baseline 2		No Reinforcement		Baseline 3		Final: Contingent Reinforcement		Final: No Reinforcement	
Play set	Sessions	Actions	Sessions	Actions	Sessions	Actions	Sessions	Actions	Sessions	Actions	Sessions	Actions	Sessions	Actions
Stable	2	7	-	-	1	11	3	30	1	10	-	-	-	-
Playground	2	7	5	17	1	9	-	-	1	7	-	-	-	-
Penguin	2	7	-	-	1	9	-	-	1	13	3	29	-	-

Conditions	Sessions	Number of Unmodeled Actions	Mean Number of Unmodeled Actions per Session
Baseline (before condition exposure)	9	54	6
No Reinforcement	3	30	10
Baseline Probe Following No Reinforcement	1	10	10
Contingent Reinforcement	8	46	5.8
Baseline Probe Following Contingent Reinforcement	2	16	8

Note. Intervention conditions are written in the order they were presented to the participant.

Table 14

Number of Un-modeled Actions for Participant 4

	Conditions													
	Baseline 1		Contingent Reinforcement		Baseline 2		No Reinforcement		Baseline 3		Final: Contingent Reinforcement		Final: No Reinforcement	
Play set	Sessions	Actions	Sessions	Actions	Sessions	Actions	Sessions	Actions	Sessions	Actions	Sessions	Actions	Sessions	Actions
Stable	2	10	-	-	1	15	3	21	1	6	-	-	-	-
Playground	2	14	-	-	1	14	-	-	1	9	3	44	-	-
Penguin	2	15	5	61	1	14	-	-	1	12	-	-	-	-

Conditions	Sessions	Number of Unmodeled Actions	Mean Number of Unmodeled Actions per Session
Baseline (before condition exposure)	9	77	8.6
No Reinforcement	3	21	7
Baseline Probe Following No Reinforcement	1	6	6
Contingent Reinforcement	8	105	13.1
Baseline Probe Following Contingent Reinforcement	2	26	13

Note. Intervention conditions are written in the order they were presented to the participant.

Table 15

Number of Scripted Verbalizations Actions for Participant 1

	Conditions													
	Baseline 1		No Reinforcement		Baseline 2		Contingent Reinforcement		Baseline 3		Final: Contingent Reinforcement		Final: No Reinforcement	
Play set	Sessions	Verbalizations	Sessions	Verbalizations	Sessions	Verbalizations	Sessions	Verbalizations	Sessions	Verbalizations	Sessions	Verbalizations	Sessions	Verbalizations
Stable	2	0	5	4	1	0	-	-	1	0	-	-	-	-
Playground	2	1	-	-	1	0	-	-	1	0	-	-	3	8
Penguin	2	0	-	-	1	0	5	2	1	0	-	-	-	-

Conditions	Sessions	Number of Scripted Verbalizations	Mean Number of Scripted Verbalizations per Session
Baseline (before condition exposure)	9	1	0.1
No Reinforcement	8	12	1.5
Baseline Probe Following No Reinforcement	2	0	0
Contingent Reinforcement	5	2	0.4
Baseline Probe Following Contingent Reinforcement	1	0	0

Note. Intervention conditions are written in the order they were presented to the participant.

Table 16

Number of Scripted Verbalizations Actions for Participant 2

	Conditions													
	Baseline 1		No Reinforcement		Baseline 2		Contingent Reinforcement		Baseline 3		Final: Contingent Reinforcement		Final: No Reinforcement	
Play set	Sessions	Verbalizations	Sessions	Verbalizations	Sessions	Verbalizations	Sessions	Verbalizations	Sessions	Verbalizations	Sessions	Verbalizations	Sessions	Verbalizations
Stable	2	1	-	-	1	0	-	-	1	0	3	10	-	-
Playground	2	1	-	-	1	1	3	13	1	5	-	-	-	-
Penguin	2	0	3	12	1	3	-	-	1	3	-	-	-	-

Conditions	Sessions	Number of Scripted Verbalizations	Mean Number of Scripted Verbalizations per Session
Baseline (before condition exposure)	9	3	0.3
No Reinforcement	3	12	4
Baseline Probe Following No Reinforcement	2	6	3
Contingent Reinforcement	6	23	3.8
Baseline Probe Following Contingent Reinforcement	1	5	5

Note. Intervention conditions are written in the order they were presented to the participant.

Table 17

Number of Scripted Verbalizations Actions for Participant 3

	Conditions													
	Baseline 1		Contingent Reinforcement		Baseline 2		No Reinforcement		Baseline 3		Final: Contingent Reinforcement		Final: No Reinforcement	
Play set	Sessions	Verbalizations	Sessions	Verbalizations	Sessions	Verbalizations	Sessions	Verbalizations	Sessions	Verbalizations	Sessions	Verbalizations	Sessions	Verbalizations
Stable	2	0	-	-	1	0	3	0	1	0	-	-	-	-
Playground	2	0	5	1	1	0	-	-	1	0	-	-	-	-
Penguin	2	0	-	-	1	0	-	-	1	0	3	0	-	-

Conditions	Sessions	Number of Scripted Verbalizations	Mean Number of Scripted Verbalizations per Session
Baseline (before condition exposure)	9	0	0
No Reinforcement	3	0	0
Baseline Probe Following No Reinforcement	1	0	0
Contingent Reinforcement	8	1	0.1
Baseline Probe Following Contingent Reinforcement	2	0	0

Note. Intervention conditions are written in the order they were presented to the participant.

Table 18

Number of Scripted Verbalizations Actions for Participant 4

	Conditions													
	Baseline 1		Contingent Reinforcement		Baseline 2		No Reinforcement		Baseline 3		Final: Contingent Reinforcement		Final: No Reinforcement	
Play set	Sessions	Verbalizations	Sessions	Verbalizations	Sessions	Verbalizations	Sessions	Verbalizations	Sessions	Verbalizations	Sessions	Verbalizations	Sessions	Verbalizations
Stable	2	0	-	-	1	0	3	0	1	0	-	-	-	-
Playground	2	0	-	-	1	0	-	-	1	0	3	1	-	-
Penguin	2	0	5	0	1	0	-	-	1	0	-	-	-	-

Conditions	Sessions	Number of Scripted Verbalizations	Mean Number of Scripted Verbalizations per Session
Baseline (before condition exposure)	9	0	0
No Reinforcement	3	0	0
Baseline Probe Following No Reinforcement	1	0	0
Contingent Reinforcement	8	1	0.1
Baseline Probe Following Contingent Reinforcement	2	0	0

Note. Intervention conditions are written in the order they were presented to the participant.

Table 19

Number of Unscripted Verbalizations Actions for Participant 1

	Conditions													
	Baseline 1		No Reinforcement		Baseline 2		Contingent Reinforcement		Baseline 3		Final: Contingent Reinforcement		Final: No Reinforcement	
Play set	Sessions	Verbalizations	Sessions	Verbalizations	Sessions	Verbalizations	Sessions	Verbalizations	Sessions	Verbalizations	Sessions	Verbalizations	Sessions	Verbalizations
Stable	2	16	5	15	1	13	-	-	1	19	-	-	-	-
Playground	2	15	-	-	1	0	-	-	1	10	-	-	3	45
Penguin	2	13	-	-	1	24	5	24	1	4	-	-	-	-

Conditions	Sessions	Number of Unscripted Verbalizations	Mean Number of Unscripted Verbalizations per Session
Baseline (before condition exposure)	9	78	8.7
No Reinforcement	8	60	7.5
Baseline Probe Following No Reinforcement	2	32	16
Contingent Reinforcement	5	24	4.8
Baseline Probe Following Contingent Reinforcement	1	4	4

Note. Intervention conditions are written in the order they were presented to the participant.

Table 20

Number of Unscripted Verbalizations Actions for Participant 2

	Conditions													
	Baseline 1		No Reinforcement		Baseline 2		Contingent Reinforcement		Baseline 3		Final: Contingent Reinforcement		Final: No Reinforcement	
Play set	Sessions	Verbalizations	Sessions	Verbalizations	Sessions	Verbalizations	Sessions	Verbalizations	Sessions	Verbalizations	Sessions	Verbalizations	Sessions	Verbalizations
Stable	2	12	-	-	1	10	-	-	1	7	3	10	-	-
Playground	2	15	-	-	1	7	3	16	1	4	-	-	-	-
Penguin	2	20	3	25	1	8	-	-	1	5	-	-	-	-

Conditions	Sessions	Number of Unscripted Verbalizations	Mean Number of Unscripted Verbalizations per Session
Baseline (before condition exposure)	9	71	7.9
No Reinforcement	3	25	8.3
Baseline Probe Following No Reinforcement	2	13	6.5
Contingent Reinforcement	6	26	4.3
Baseline Probe Following Contingent Reinforcement	1	4	4

Note. Intervention conditions are written in the order they were presented to the participant.

Table 21

Number of Unscripted Verbalizations Actions for Participant 3

	Conditions													
	Baseline 1		Contingent Reinforcement		Baseline 2		No Reinforcement		Baseline 3		Final: Contingent Reinforcement		Final: No Reinforcement	
Play set	Sessions	Verbalizations	Sessions	Verbalizations	Sessions	Verbalizations	Sessions	Verbalizations	Sessions	Verbalizations	Sessions	Verbalizations	Sessions	Verbalizations
Stable	2	0	-	-	1	0	3	0	1	0	-	-	-	-
Playground	2	1	5	0	1	0	-	-	1	0	-	-	-	-
Penguin	2	0	-	-	1	0	-	-	1	0	3	0	-	-

Conditions	Sessions	Number of Unscripted Verbalizations	Mean Number of Unscripted Verbalizations per Session
Baseline (before condition exposure)	9	1	0.1
No Reinforcement	3	0	0
Baseline Probe Following No Reinforcement	1	0	0
Contingent Reinforcement	8	0	0
Baseline Probe Following Contingent Reinforcement	2	0	0

Note. Intervention conditions are written in the order they were presented to the participant.

Table 22

Number of Unscripted Verbalizations Actions for Participant 4

	Conditions													
	Baseline 1		Contingent Reinforcement		Baseline 2		No Reinforcement		Baseline 3		Final: Contingent Reinforcement		Final: No Reinforcement	
Play set	Sessions	Verbalizations	Sessions	Verbalizations	Sessions	Verbalizations	Sessions	Verbalizations	Sessions	Verbalizations	Sessions	Verbalizations	Sessions	Verbalizations
Stable	2	3	-	-	1	2	3	0	1	0	-	-	-	-
Playground	2	2	-	-	1	2	-	-	1	0	3	3	-	-
Penguin	2	4	5	6	1	0	-	-	1	0	-	-	-	-

Conditions	Sessions	Number of Unscripted Verbalizations	Mean Number of Unscripted Verbalizations per Session
Baseline (before condition exposure)	9	13	1.4
No Reinforcement	3	0	0
Baseline Probe Following No Reinforcement	1	0	0
Contingent Reinforcement	8	9	1.1
Baseline Probe Following Contingent Reinforcement	2	0	0

Note. Intervention conditions are written in the order they were presented to the participant.

Table 23

Number of Consecutive Steps Completed in the Task Analysis for Participant 1.

	Conditions													
	Baseline 1		No Reinforcement		Baseline 2		Contingent Reinforcement		Baseline 3		Final: Contingent Reinforcement		Final: No Reinforcement	
Play set	Sessions	Steps	Sessions	Steps	Sessions	Steps	Sessions	Steps	Sessions	Steps	Sessions	Steps	Sessions	Steps
Stable	2	0	5	0	1	0	-	-	1	0	-	-	-	-
Playground	2	0	-	-	1	0	-	-	1	0	-	-	3	2
Penguin	2	0	-	-	1	0	5	0	1	0	-	-	-	-

Conditions	Sessions	Number of consecutive steps	Mean Number of consecutive steps per Session
Baseline (before condition exposure)	9	0	0
No Reinforcement	8	2	0.3
Baseline Probe Following No Reinforcement	2	0	0
Contingent Reinforcement	5	0	0
Baseline Probe Following Contingent Reinforcement	1	0	0

Note. Intervention conditions are written in the order they were presented to the participant.

Table 24

Number of Consecutive Steps Completed in the Task Analysis for Participant 2.

	Conditions													
	Baseline 1		No Reinforcement		Baseline 2		Contingent Reinforcement		Baseline 3		Final			
											Contingent Reinforcement		No Reinforcement	
Play set	Sessions	Steps	Sessions	Steps	Sessions	Steps	Sessions	Steps	Sessions	Steps	Sessions	Steps	Sessions	Steps
Stable	2	0	-	-	1	0	-	-	1	0	3	6	-	-
Playground	2	0	-	-	1	0	3	5	1	1	-	-	-	-
Penguin	2	0	3	5	1	1	-	-	1	3	-	-	-	-

Conditions	Sessions	Number of consecutive steps	Mean Number of consecutive steps per Session
Baseline (before condition exposure)	9	0	0
No Reinforcement	3	5	1.7
Baseline Probe Following No Reinforcement	2	4	2
Contingent Reinforcement	6	11	1.8
Baseline Probe Following Contingent Reinforcement	1	1	1

Note. Intervention conditions are written in the order they were presented to the participant.

Table 25

Number of Consecutive Steps Completed in the Task Analysis for Participant 3.

	Conditions													
	Baseline 1		Contingent Reinforcement		Baseline 2		No Reinforcement		Baseline 3		Final			
											Contingent Reinforcement		No Reinforcement	
Play set	Sessions	Steps	Sessions	Steps	Sessions	Steps	Sessions	Steps	Sessions	Steps	Sessions	Steps	Sessions	Steps
Stable	2	0	-	-	1	0	3	0	1	0	-	-	-	-
Playground	2	0	5	0	1	0	-	-	1	0	-	-	-	-
Penguin	2	0	-	-	1	0	-	-	1	0	3	0	-	-

Conditions	Sessions	Number of consecutive steps	Mean Number of consecutive steps per Session
Baseline (before condition exposure)	9	0	0
No Reinforcement	3	0	0
Baseline Probe Following No Reinforcement	1	0	0
Contingent Reinforcement	8	0	0
Baseline Probe Following Contingent	2	0	0

Note. Intervention conditions are written in the order they were presented to the participant.

Table 26

Number of Consecutive Steps Completed in the Task Analysis for Participant 4.

	Conditions													
	Baseline 1		Contingent Reinforcement		Baseline 2		No Reinforcement		Baseline 3		Final			
											Contingent Reinforcement		No Reinforcement	
Play set	Sessions	Steps	Sessions	Steps	Sessions	Steps	Sessions	Steps	Sessions	Steps	Sessions	Steps	Sessions	Steps
Stable	2	0	-	-	1	0	3	0	1	0	-	-	-	-
Playground	2	0	-	-	1	0	-	-	1	0	3	0	-	-
Penguin	2	0	5	0	1	0	-	-	1	0	-	-	-	-

Conditions	Sessions	Number of consecutive steps	Mean Number of consecutive steps per Session
Baseline (before condition exposure)	9	0	0
No Reinforcement	3	0	0
Baseline Probe Following No Reinforcement	1	0	0
Contingent Reinforcement	8	0	0
Baseline Probe Following Contingent	2	0	0

Note. Intervention conditions are written in the order they were presented to the participant.

Table 27

Number of Appropriate Play Intervals for Participant 1.

	Conditions													
	Baseline 1		No Reinforcement		Baseline 2		Contingent Reinforcement		Baseline 3		Final			
											No Reinforcement		Contingent Reinforcement	
Play set	Sessions	Intervals	Sessions	Intervals	Sessions	Intervals	Sessions	Intervals	Sessions	Intervals	Sessions	Intervals	Sessions	Intervals
Stable	2	84	5	152	1	25	-	-	1	39	-	-	-	-
Playground	2	92	-	-	1	47	-	-	1	43	3	135	-	-
Penguin	2	93	-	-	1	48	5	206	1	46	-	-	-	-

Conditions	Sessions	Number of Intervals	Mean Number of Appropriate Play Intervals per Session	Mean Number of Unmodeled Actions per Session	Mean Number of Unscripted Verbalizations per Session	Mean Percentage of Appropriate Play Intervals per Session
Baseline (Prior to Video Modeling Exposure)	9	407	45.2	10.1	9.5	94.2%
No Reinforcement	8	287	35.9	7.4	7.5	74.8%
Baseline Probe Following No Reinforcement	2	64	32	10	16	66.7%
Contingent Reinforcement	5	206	41.2	12.8	4.8	85.8%
Baseline Probe Following Contingent Reinforcement	1	39	39	15	4	81.3%

Note. Intervention conditions are written in the order they were presented to the participant.

Table 28

Number of Appropriate Play Intervals for Participant 2.

	Conditions													
	Baseline 1		No Reinforcement		Baseline 2		Contingent Reinforcement		Baseline 3		Final			
											No Reinforcement		Contingent Reinforcement	
Play set	Sessions	Intervals	Sessions	Intervals	Sessions	Intervals	Sessions	Intervals	Sessions	Intervals	Sessions	Intervals	Sessions	Intervals
Stable	2	88	-	-	1	48			1	45	-	-	3	121
Playground	2	93	-	-	1	48	3	143	1	44	-	-	-	-
Penguin	2	77	3	137	1	46			1	44	-	-	-	-

Conditions	Sessions	Number of Intervals	Mean Number of Appropriate Play Intervals per Session	Mean Number of Unmodeled Actions per Session	Mean Number of Unscripted Verbalizations per Session	Mean Percentage of Appropriate Play Intervals per Session
Baseline (Prior to Video Modeling Exposure)	9	399	44.3	7.9	7.9	92.4%
No Reinforcement	3	137	45.7	12	8.3	95.2%
Baseline Probe Following No Reinforcement	2	90	45	16	6.5	93.8%
Contingent Reinforcement	6	264	44	9.3	4.3	91.7%
Baseline Probe Following Contingent Reinforcement	1	44	44	5	4	91.7%

Note. Intervention conditions are written in the order they were presented to the participant.

Table 29

Number of Appropriate Play Intervals for Participant 3.

	Conditions													
	Baseline 1		Contingent Reinforcement		Baseline 2		No Reinforcement		Baseline 3		Final			
											No Reinforcement		Contingent Reinforcement	
Play set	Sessions	Intervals	Sessions	Intervals	Sessions	Intervals	Sessions	Intervals	Sessions	Intervals	Sessions	Intervals	Sessions	Intervals
Stable	2	92	-	-	1	48	3	105	1	44	-	-	-	-
Playground	2	95	5	240	1	47	-	-	1	48	-	-	-	-
Penguin	2	96	-	-	1	48	-	-	1	48	-	-	3	143

Conditions	Sessions	Number of Intervals	Mean Number of Appropriate Play Intervals per Session	Mean Number of Unmodeled Actions per Session	Mean Number of Unscripted Verbalizations per Session	Mean Percentage of Appropriate Play Intervals per Session
Baseline (Prior to Video Modeling Exposure)	9	427	47.4	6	0.1	98.8%
No Reinforcement	3	105	35	10	0	72.9%
Baseline Probe Following No Reinforcement	1	44	44	10	0	91.7%
Contingent Reinforcement	8	383	47.9	5.8	0	99.8%
Baseline Probe Following Contingent Reinforcement	2	95	47.5	8	0	99.0%

Note. Intervention conditions are written in the order they were presented to the participant.

Table 30

Number of Appropriate Play Intervals for Participant 4.

	Conditions													
	Baseline 1		Contingent Reinforcement		Baseline 2		No Reinforcement		Baseline 3		Final: No Reinforcement		Final: Contingent Reinforcement	
Play set	Sessions	Intervals	Sessions	Intervals	Sessions	Intervals	Sessions	Intervals	Sessions	Intervals	Sessions	Intervals	Sessions	Intervals
Stable	2	51	-	-	1	36	3	57	1	24	-	-	-	-
Playground	2	79	-	-	1	32	-	-	1	28	-	-	3	122
Penguin	2	57	5	169	1	31	-	-	1	24	-	-	-	-

Conditions	Sessions	Number of Intervals	Mean Number of Appropriate Play Intervals per Session	Mean Number of Unmodeled Actions per Session	Mean Number of Unscripted Verbalizations per Session	Mean Percentage of Appropriate Play Intervals per Session
Baseline (Prior to Video Modeling Exposure)	9	283	31.4	8.6	1.4	65.5%
No Reinforcement	3	57	19	7	0	39.6%
Baseline Probe Following No Reinforcement	1	24	24	6	0	50.0%
Contingent Reinforcement	8	291	36.4	13.1	1.1	75.8%
Baseline Probe Following Contingent Reinforcement	2	55	27.5	13	0	57.3%

Note. Intervention conditions are written in the order they were presented to the participant.

Table 31

Number of Inappropriate Play Intervals for Participant 1.

	Conditions													
	Baseline 1		No Reinforcement		Baseline 2		Contingent Reinforcement		Baseline 3		Final: No Reinforcement		Final: Contingent Reinforcement	
Play set	Sessions	Intervals	Sessions	Intervals	Sessions	Intervals	Sessions	Intervals	Sessions	Intervals	Sessions	Intervals	Sessions	Intervals
Stable	2	8	5	46	1	23	-	-	1	7	-	-	-	-
Playground	2	1	-	-	1	0	-	-	1	3	3	16	-	-
Penguin	2	0	-	-	1	4	5	36	1	2	-	-	-	-

Conditions	Sessions	Number of Intervals	Mean Number of Inappropriate Play Intervals per Session	Mean Number of Unmodeled Actions per Session	Mean Number of Unscripted Verbalizations per Session	Mean Percentage of Inappropriate Play Intervals per Session
Baseline (Prior to Video Modeling Exposure)	9	16	1.8	10.1	9.5	3.7%
No Reinforcement	8	62	7.8	7.4	7.5	16.2%
Baseline Probe Following No Reinforcement	2	30	15	10	16	31.3%
Contingent Reinforcement	5	36	7.2	12.8	4.8	15%
Baseline Probe Following Contingent Reinforcement	1	2	2	15	4	4.2%

Note. Intervention conditions are written in the order they were presented to the participant.

Table 32

Number of Inappropriate Play Intervals for Participant 2.

	Conditions													
	Baseline 1		No Reinforcement		Baseline 2		Contingent Reinforcement		Baseline 3		Final			
											No Reinforcement		Contingent Reinforcement	
Play set	Sessions	Intervals	Sessions	Intervals	Sessions	Intervals	Sessions	Intervals	Sessions	Intervals	Sessions	Intervals	Sessions	Intervals
Stable	2	0	-	-	1	0	-	-	1	0	-	-	3	1
Playground	2	1	-	-	1	0	3	0	1	0	-	-	-	-
Penguin	2	0	3	0	1	2	-	-	1	0	-	-	-	-

Conditions	Sessions	Number of Intervals	Mean Number of Inappropriate Play Intervals per Session	Mean Number of Unmodeled Actions per Session	Mean Number of Unscripted Verbalizations per Session	Mean Percentage of Inappropriate Play Intervals per Session
Baseline (Prior to Video Modeling Exposure)	9	1	0.1	7.9	7.9	0.2%
No Reinforcement	3	0	0	12	8.3	0%
Baseline Probe Following No Reinforcement	2	2	1	16	6.5	2.1%
Contingent Reinforcement	6	1	0.2	9.3	4.3	0.4%
Baseline Probe Following Contingent Reinforcement	1	0	0	5	4	0%

Note. Intervention conditions are written in the order they were presented to the participant.

Table 33

Number of Inappropriate Play Intervals for Participant 3.

	Conditions													
	Baseline 1		Contingent Reinforcement		Baseline 2		No Reinforcement		Baseline 3		Final			
											No Reinforcement		Contingent Reinforcement	
Play set	Sessions	Intervals	Sessions	Intervals	Sessions	Intervals	Sessions	Intervals	Sessions	Intervals	Sessions	Intervals	Sessions	Intervals
Stable	2	0	-	-	1	0	3	7	1	7	-	-	-	-
Playground	2	0	5	1	1	0	-	-	1	0	-	-	-	-
Penguin	2	0	-	-	1	0	-	-	1	0	-	-	3	0

Conditions	Sessions	Number of Intervals	Mean Number of Inappropriate Play Intervals per Session	Mean Number of Unmodeled Actions per Session	Mean Number of Unscripted Verbalizations per Session	Mean Percentage of Inappropriate Play Intervals per Session
Baseline (Prior to Video Modeling Exposure)	9	0	0	6	0.1	0%
No Reinforcement	3	7	2.3	10	0	4.9%
Baseline Probe Following No Reinforcement	1	7	7	10	0	14.6%
Contingent Reinforcement	8	1	0.1	5.8	0	0.3%
Baseline Probe Following Contingent Reinforcement	2	0	0	8	0	0%

Note. Intervention conditions are written in the order they were presented to the participant.

Table 34

Number of Inappropriate Play Intervals for Participant 4.

	Conditions													
	Baseline 1		Contingent Reinforcement		Baseline 2		No Reinforcement		Baseline 3		Final: No Reinforcement		Final: Contingent Reinforcement	
Play set	Sessions	Intervals	Sessions	Intervals	Sessions	Intervals	Sessions	Intervals	Sessions	Intervals	Sessions	Intervals	Sessions	Intervals
Stable	2	18	-	-	1	14	3	24	1	21	-	-	-	-
Playground	2	4	-	-	1	11	-	-	1	2	-	-	3	5
Penguin	2	14	5	62	1	6	-	-	1	18	-	-	-	-

Conditions	Sessions	Number of Intervals	Mean Number of Inappropriate Play Intervals per Session	Mean Number of Unmodeled Actions per Session	Mean Number of Unscripted Verbalizations per Session	Mean Percentage of Inappropriate Play Intervals per Session
Baseline Prior to Video Modeling exposure)	9	63	7	8.6	1.4	14.6%
No Reinforcement	3	24	8	7	0	16.7%
Baseline Probe Following No Reinforcement	1	21	21	6	0	43.8%
Contingent Reinforcement	8	67	8.4	13.1	1.1	17.5%
Baseline Probe Following Contingent Reinforcement	2	24	12	13	0	25.0%

Note. Intervention conditions are written in the order they were presented to the participant.

Table 35

Number of Prompted and Unprompted Steps Completed in the Task Analysis for Participant 3.

	Stable Set					Playground Set					Penguin Set				
Sessions	Delay (sec)	Prompted	Unprompted	% Prompted	% Unprompted	Delay (sec)	Prompted	Unprompted	% Prompted	% Unprompted	Delay (sec)	Prompted	Unprompted	% Prompted	% Unprompted
1	0	10	0	100	0	0	10	0	100	0	0	10	0	100	0
2	0	10	0	100	0	0	10	0	100	0	0	10	0	100	0
3	2	6	4	60	40	2	8	2	80	20	2	8	2	80	20
4	2	9	1	90	10	2	9	1	90	10	2	9	1	90	10
5	2	7	3	70	30	2	6	4	60	40	2	7	3	70	30
6	4	7	3	70	30	4	5	5	50	50	4	6	4	60	40
7	4	9	1	90	10	4	7	3	70	30	4	6	4	60	40
8	4	7	3	70	30	4	4	6	40	60	4	1	9	10	90
9	4	1	9	10	90	4	2	8	20	80	4	0	10	0	100
10	4	3	7	30	70	4	4	6	40	60	-	-	-	-	-
11	4	3	7	30	70	6	1	9	10	90	-	-	-	-	-
12	6	2	8	20	80	6	0	10	0	100	-	-	-	-	-
13	6	0	10	0	100	-	-	-	-	-	-	-	-	-	-

Note. Play sets are written in the order they were presented to the participant. Three sessions were conducted each day consecutively for each play set.

Table 36

Number of Prompted and Unprompted Steps Completed in the Task Analysis for Participant 4.

	Stable Set					Playground Set					Penguin Set				
Sessions	Delay (sec)	Prompted	Unprompted	% Prompted	% Unprompted	Delay (sec)	Prompted	Unprompted	% Prompted	% Unprompted	Delay (sec)	Prompted	Unprompted	% Prompted	% Unprompted
1	0	10	0	100	0	0	10	0	100	0	0	10	0	100	0
2	0	10	0	100	0	0	10	0	100	0	0	10	0	100	0
3	2	10	0	100	0	2	9	1	90	10	2	9	1	90	10
4	2	10	0	100	0	2	10	0	100	0	2	10	0	100	0
5	2	9	1	90	10	2	9	1	90	10	2	10	0	100	0
6	4	8	2	80	20	4	8	2	80	20	4	9	1	90	10
7	4	10	0	100	0	4	9	1	90	10	4	8	2	80	20
8	4	7	3	70	30	4	8	2	80	20	4	8	2	80	20
9	4	6	4	60	40	4	9	1	90	10	4	7	3	70	30
10	4	9	1	90	10	4	9	1	90	10	4	8	2	80	20
11	4	8	2	80	20	4	8	2	80	20	4	8	2	80	20
12	4	7	3	70	30	4	8	2	80	20	4	8	2	80	20
13	4	8	2	80	20	4	8	2	80	20	4	8	2	80	20
14	4	8	2	80	20	4	7	3	70	30	4	8	2	80	20
15	4	7	3	70	30	4	6	4	60	40	4	8	2	80	20

Note. Play sets are written in the order they were presented to the participant. Three sessions were conducted each day consecutively for each play set.

Appendix B

Figures

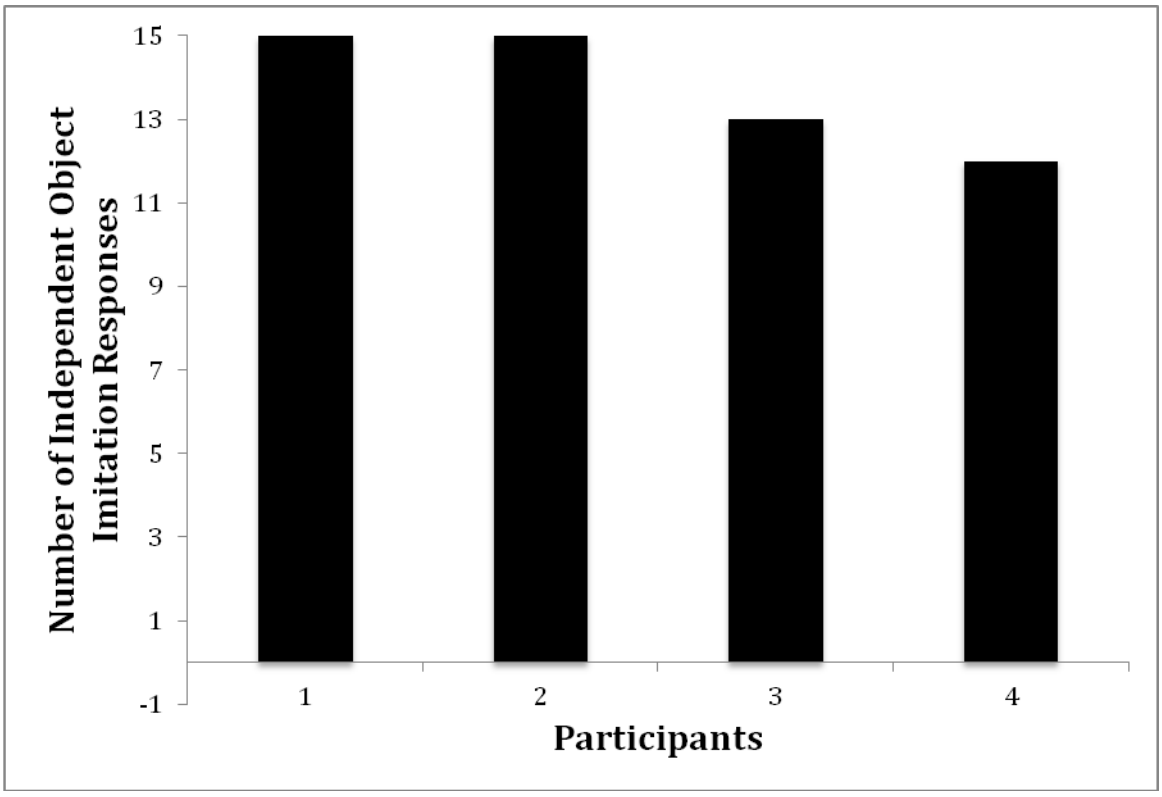

Figure 1. Number of Independent Object Imitation Responses for All Four Participants.

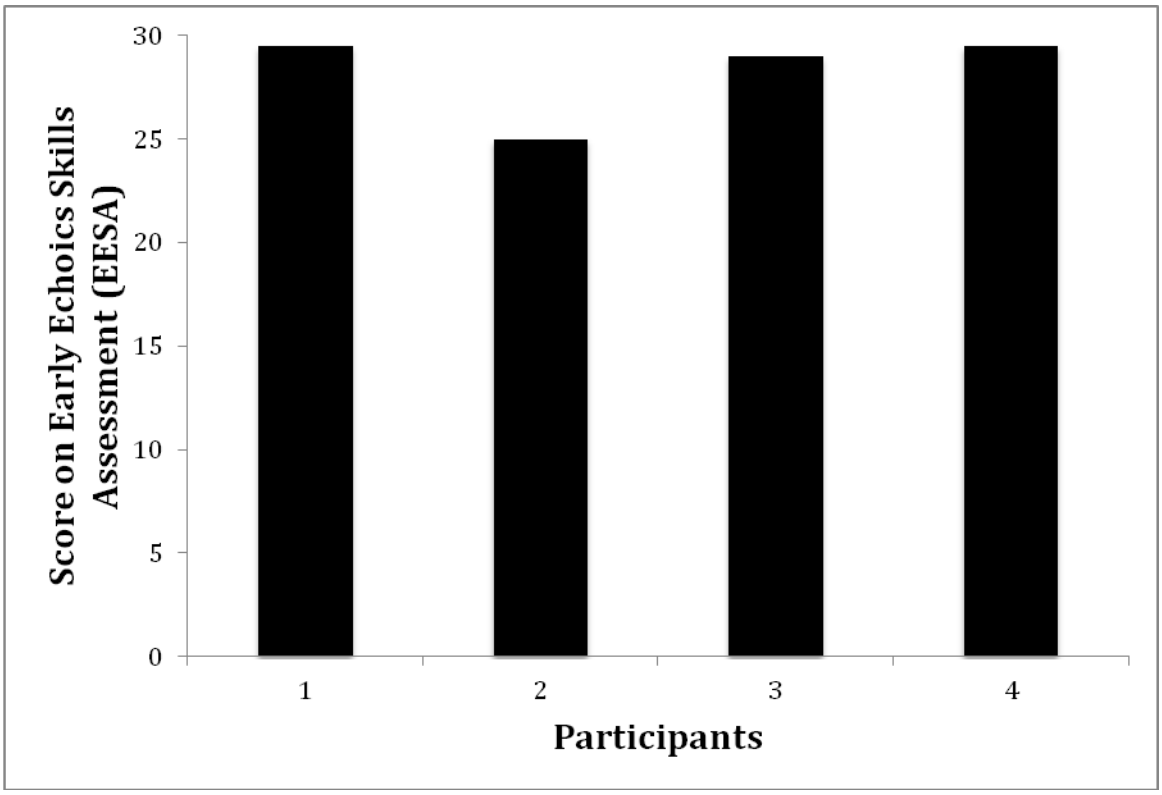

Figure 2. Score on the Early Echoics Skills Assessment for All Four Participants.

Appendix C

Assessments and Play Set Data Sheets

Item 1: Motor Imitation Using Objects Assessment

Motor Imitation Using Objects Assessment				
Participant:			**Date:**	
Exemplars		Independent	Error	Comments
1.	Tap drum with stick			
2.	Rub stick on table			
3.	Wave stick up and down			
4.	Wave stick side-to-side			
5.	Stack block on another block			
6.	Put block in a container			
7.	Place block on a book			
8.	Tap block on a table			
9.	Push block with finger			
10.	Put pencil in cup			
11.	Roll the pencil			
12.	Draw a line with a pencil			
13.	Roll car back and forth			
14.	Jump a car			
15.	Crash car into blocks			
** record a checkmark (✓) for independent responses or errors following each trial.				
Criterion: At least 10 actions with at least two different actions for each object.				

Item 2: Early Echoic Skills Assessment

Early Echoic Skills Assessment (EESA) – 3 syllable combinations				
Participant:			**Date:**	
Exemplars		Score	Error	Comments
1.	Tubby toy			
2.	Banana			
3.	Fee fi foe			
4.	Yummy Food			
5.	Giddy up			
6.	In a boat			
7.	Potato			
8.	Go bye bye			
9.	Fat doggy			
10.	Goofy goat			
11.	Hey me too			
12.	My big toe			
13.	Do high five			
14.	Oh foo-ey			
15.	Binky boo			
16.	One cookie			
17.	Open up			
18.	Peanut hat			
19.	Tiny pan			
20.	Peek a boo			
21.	Teddy bear			
22.	Doggy bone			
23.	Funny king			
24.	A hiccup			
25.	How many			
26.	Potty time			
27.	Giddy up			
28.	Wet mitten			
29.	Teepee boat			
30.	Puppet game			
Total Score:				
** record a one (1) if the participant says the exact three-syllable combination.				
** record a point five (.5) if the participant says a recognizable response with incorrect or missing consonants or extra syllable.				
** record a zero (0) if the participant does not respond, says an incorrect vowels, or is missing a syllable.				
****** a score of at least 25 is required for continued participation.				

Item 3: Red Stable Play Set Script

Red Stable Play Set Script	**Date:**				
Condition: BL, NR, CR **Session:_____ ; Participant _____**	**Scripted Verbalizations and Modeled Actions**		**Task Analysis**	**Unscripted Verbalizations and Unmodeled Actions**	
Play Set Script	**Scripted Verbalizations: (Y/N)**	**Modeled Actions: (Y/N)**	**Steps Completed (Y/N)**	**Description of Unscripted Verbalizations**	**Description of Unmodeled Actions**
1. Take horse 1 out of the stable; say, "I'm thirsty"	Y N	Y N	Y N		
2. Bring horse 1 to the water trough and put his head in.		Y N	Y N		
3. Say "Glug glug glug."	Y N		Y N		
4. Walk horse 1 to the obstacle course; say, "Time to exercise!"	Y N	Y N	Y N		
5. Make horse 1 weave through the 3 racing barrels.		Y N	Y N		
6. Make horse 1 jump over the jump; say, "I did it!"	Y N	Y N	Y N		
7. Walk horse 1 to horse 2, horse 2 says, "You're fast!"	Y N	Y N	Y N		
8. Horse 1 says, "Thank you!"	Y N		Y N		
9. Walk horse 1 in the stable; say, "I'm tired!"	Y N	Y N	Y N		
10. Put horse 1 on his side and say, "good night!"	Y N	Y N	Y N		
TOTAL	%	%	%	Number:	Number:

Partial Interval Recording for appropriate play and Inappropriate play:	5 s	10 s	15 s	20 s	25 s	30 s	35 s	40 s	45 s	50 s	55 s	60 s	Total intervals
Appropriate play: Yes: A No: X	5 s	10 s	15 s	20 s	25 s	30 s	35 s	40 s	45 s	50 s	55 s	60 s	
Inappropriate play: Yes: I No: X	5 s	10 s	15 s	20 s	25 s	30 s	35 s	40 s	45 s	50 s	55 s	60 s	Percentage (%)
	5 s	10 s	15 s	20 s	25 s	30 s	35 s	40 s	45 s	50 s	55 s	60 s	

Condition: BL = Baseline, NR = No Reinforcement, CR = Contingent Reinforcment

Scripted Verbalizations, Modeled Actions and Task Analysis: Circle Y if the behavior occurred, Circle N if the behavior did not occur

Item 4: Activity Playground Play Set Script

Activity Playground Play Set Script			Date:		
Condition: BL, NR, CR **Session:_____ ; Participant _____**	**Scripted Verbalizations and Modeled Actions**		**Task Analysis**	**Unscripted Verbalizations and Unmodeled Actions**	
Play Set Script	**Scripted Verbalizations: (Y/N)**	**Modeled Actions: (Y/N)**	**Steps Completed (Y/N)**	**Description of Unscripted Verbalizations**	**Description of Unmodeled Actions**
1. Put woman in chair; say, "Go play!"	Y N	Y N	Y N		
2. Walk boy to climbing wall and walk him up.		Y N	Y N		
3. Say, "I made it!" (Once he is at the top)	Y N		Y N		
4. Walk boy back down walk and towards the carousel; say "Time to spin."	Y N	Y N	Y N		
5. Make boy stand on carousel and spin it around.		Y N	Y N		
6. Take boy off the carousel; say, "That was fun!"	Y N	Y N	Y N		
7. Walk boy to woman, woman says, "Last one!"	Y N	Y N	Y N		
8. Boy say, "Okay"	Y N		Y N		
9. Walk boy up the climbing net; say, "Here we go"	Y N	Y N	Y N		
10. Put boy on zip line, slide him down and say, "Weee."	Y N	Y N	Y N		
TOTAL	%	%	%	Number:	Number:

Partial Interval Recording for appropriate play and Inappropriate play:	5 s	10 s	15 s	20 s	25 s	30 s	35 s	40 s	45 s	50 s	55 s	60 s	Total intervals
Appropriate play: Yes: A No: X	5 s	10 s	15 s	20 s	25 s	30 s	35 s	40 s	45 s	50 s	55 s	60 s	
Inappropriate play: Yes: I No: X	5 s	10 s	15 s	20 s	25 s	30 s	35 s	40 s	45 s	50 s	55 s	60 s	Percentage (%)
	5 s	10 s	15 s	20 s	25 s	30 s	35 s	40 s	45 s	50 s	55 s	60 s	

Condition: BL = Baseline, NR = No Reinforcement, CR = Contingent Reinforcement

Scripted Verbalizations, Modeled Actions and Task Analysis: Circle Y if the behavior occurred, Circle N if the behavior did not occur

Item 5: Penguin Habitat Play Set Script

Penguin Habitat Play Set Script													Date:	
Condition: BL, NR, CR **Session:_____ ; Participant _____**													**Scripted Verbalizations and Modeled Actions**	**Task Analysis**	**Unscripted Verbalizations and Unmodeled Actions**	
Play Set Script													**Scripted Verbalizations: (Y/N)**	**Modeled Actions: (Y/N)**	**Steps Completed (Y/N)**	**Description of Unscripted Verbalizations**	**Description of Unmodeled Actions**
1. Walk penguin up the steps; say, "I'm hungry"													Y N	Y N	Y N		
2. Make lady drop bucket with fish in front of penguin.														Y N	Y N		
3. Put penguin's beak to fish; says "Mmm, fish."													Y N	Y N	Y N		
4. Walk penguin down steps to the nest and says, "Eggs are safe."													Y N	Y N	Y N		
5. Walk penguin up steps to slide and move him down into pool.														Y N	Y N		
6. Penguin says, "Yahoo!"													Y N		Y N		
7. Walk penguin up steps to lady, lady asks, "Was that fun?"													Y N	Y N	Y N		
8. Penguin says "Yes it was."													Y N		Y N		
9. Penguin walks inside second nest and says, "time to rest"													Y N	Y N	Y N		
10. Put penguin on side and say, "That's better!"													Y N	Y N	Y N		
TOTAL													%	%	%	Number:	Number:
Partial Interval Recording for appropriate play and Inappropriate play:	5 s	10 s	15 s	20 s	25 s	30 s	35 s	40 s	45 s	50 s	55 s	60 s	Total intervals				
Appropriate play: Yes: A No: X	5 s	10 s	15 s	20 s	25 s	30 s	35 s	40 s	45 s	50 s	55 s	60 s					
Inappropriate play: Yes: I No: X	5 s	10 s	15 s	20 s	25 s	30 s	35 s	40 s	45 s	50 s	55 s	60 s	Percentage (%)				
	5 s	10 s	15 s	20 s	25 s	30 s	35 s	40 s	45 s	50 s	55 s	60 s					
Condition: BL = Baseline, NR = No Reinforcement, CR = Contingent Reinforcement																	
Scripted Verbalizations, Modeled Actions and Task Analysis: Circle Y if the behavior occurred, Circle N if the behavior did not occur																	