A Comparison of Video Modeling and Graduated Guidance

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Abstract

Research has shown that both graduated guidance and video modeling are effective teaching procedures. These methods have been utilized to teach individuals a variety of skills including play skills, social skills, and academic skills. The purpose of this study was to replicate Fink’s thesis by comparing graduated guidance and video modeling as teaching methodologies in instructing two participants to complete Lego construction tasks. One individual learned the Lego task in fewer trials with graduated guidance as the teaching procedure and video modeling was a slightly more effective procedure for the other individual. These results echo Fink’s: both procedures are effective, however further research is necessary to determine why a person might respond better to one procedure over the other.
Several teaching methods are used to teach individuals with autism, among them are prompting, reinforcement, modeling and imitation.

Prompting and Reinforcement

Two forms of prompting, physical guidance and graduated guidance are often used to facilitate response acquisition. In physical guidance, the teacher or therapist physically touches the individual then guides that individual to perform the correct response. For example, Whitman, Zakaras, and Chardos (1971), used physical guidance and reinforcement to teach children with severe mental retardation to follow instructions. The two children were given a direction and then physically prompted to follow the direction. Once the direction was followed, the children were given edible reinforcers. The prompting was then faded over subsequent trials until they were following the instructions independently.

According to Cooper, Heron, and Heward (2007, p. 402), physical guidance, while effective, is an intrusive procedure since the teacher or therapist physically touches the individual in order to prompt. Additionally, they mention that it is difficult to assess the level of progress made by the student if the student is not allowed to emit the behavior without prompting. Another drawback to physical guidance is that some individuals resist being touched. As result, the individual may engage in aggressive or disruptive behaviors in order to escape or avoid contact. Graduated guidance is a less intrusive prompting procedure in which the teacher or behavior analyst shadows the learner closely and prompts only when needed. Cooper et al. writes “Graduated guidance begins with the applied behavior analyst following the participant’s movements closely with her hands, but not touching the participant”. (2007, p. 404) Cooper et
al. also emphasize that during graduated guidance the teacher only provides physical guidance when needed and that guidance is faded as soon as possible.

Graduated guidance has been successfully used to increase many behaviors, among them the on-task time for children with autism. For example, Macduff, Krantz, and McClannahan (1993) used the prompting method to teach four boys to use a photographic activity schedule for homework and leisure tasks. The researchers gave the participants a schedule with one picture on each page. They stood behind the participants and physically guided them through the steps of the activity schedule if the step was not being completed. On-task and on-schedule behavior increased with all four individuals. In addition, the boys were able to generalize this skill to novel pictures and activities.

Graduated guidance, when paired with verbal prompting, has also been used to increase independent and social play in adults. Singh and Millichamp (1987) used a multiple baseline across subjects design to evaluate the effects of verbal prompts and graduated guidance on independent play and social play. The participants, who were eight adults with profound mental retardation, were taught to play independently. The researchers gave the adults a verbal direction to play; if the direction was not followed they then used graduated guidance to help the adults play with the toys (peg boards, jack-in-the box, paper and crayons etc). The results showed that inappropriate play decreased and independent play increased. The researchers taught the same individuals to participate in social play by teaching them to cooperatively build constructs out of Legos, Tinker toys, or blocks with another person. These individuals were also given a verbal direction and if the direction was not followed then the researchers used graduated guidance to help them build together with the toys. Social interaction increased after the intervention of verbal prompting and graduated guidance was implemented.
Modeling and Imitation

Like graduated guidance, modeling and imitation have proven to be effective teaching procedures. According to Cooper, Heron, and Heward, imitation involves three distinct parts (2007, P.366). In the first component, a model is presented. The presentation of the model is the discriminative stimulus that indicates to the learner a response is expected. In the second component, the learner emits a response, which is expected to be identical to the model. This response must be emitted within a predetermined amount of time before it can be considered to be imitative. And, finally, the learner’s response is reinforced. Imitation is important because it is a fundamental skill and may be a prerequisite for social interactions upon which other responses may be built. Schoen and Sivil (1989) compared three types of methods, observational learning (modeling and imitation), time delay, and increased assistance to teach self-help skills to preschool age children with developmental delays. They found that simply observational learning was sufficient for learning to occur.

As mentioned above, the first aspect of imitation involves the presentation of a model. Cooper et al. define a model as “any antecedent stimulus that is topographically identical to the behavior the trainer wants imitated” (2007, p. 366). Cooper et. al discuss the important characteristics of the model. The first important characteristic is model similarity. The more similar the model is to the learner, the more likely the learner is going to imitate the model. For example, if one is attempting to teach a child how to dress him or herself via imitation, a model of the same age, sex, and visual appearance would be a better model than an adult of a different sex and hair color. The second important characteristic is prestige. If the model is associated
with prestige, the learner may be more likely to imitate the behavior than if the model lacks prestige. For example, a sports enthusiast may be more likely to imitate a famous baseball player than his or her teacher. The third important characteristic is the emphasis given to the model stimuli. Putting emphasis on the model stimuli helps ensure that the learner focuses on the model and not various other things going on in their environment. The fourth important characteristic is the instructions that accompany the modeled behavior. Instructions enhance the probability that the imitative behavior will be emitted by the learner.

Research has shown that imitation is an effective way to teach a number of different skills. For instance, Gena, Krantz, McClannahan, and Poulson (1996) showed that modeling successfully taught four youths contextually appropriate affective behavior. Additionally, the participants generalized the affective behavior to novel scenarios, therapists, and settings and maintained the skills over time.

Video modeling is an alternative to in vivo modeling. LeBlanc et al. (2003) define video modeling as videotaping a model doing something and then showing the video tape to the learner. The goal of video modeling is for the learner to emit the exact behavior of the model. The imitations may involve actions, verbalizations, or both (p. 253). When making the video model, one must make sure that all behaviors seen and heard on the video tape are behaviors that the learner is to emit.

There are several reasons why teachers, researchers, parents, or therapists may prefer to use video modeling as a teaching method (Cole, 1996). Firstly, it is an engaging medium that can interest children in learning new skills. If a teacher is teaching with a medium which is already interesting and exciting to the child then there is a greater possibility of success from the very beginning. Additionally, many children can relate to television and choose to watch it of their
own accord. If watching television is already a high probability behavior, it may be easier to get
the child interested in learning.

A second reason to use video modeling as a teaching method is that it requires little to no
social interaction. Classrooms are very busy environments and a teacher’s time is a valuable
resource. If a video model rather than a teacher provided model is used to teach some students,
the teacher may have more time to work one-on-one with another student.

A third benefit to using video modeling is that distractions can be minimized. Children
with autism often have difficulty with busy, distracting environments. They also tend to over-
selectively focus on a part of a stimulus that might not be critical for learning a task.

A fourth benefit of video modeling is that it makes it easy to embed other skills into
teaching, which is very time and cost efficient. For example, Bidewell and Rehfeldt (2004)
showed that video modeling could be used to successfully teach multiple skills simultaneously.
They simultaneously taught the participants to learn both making coffee (domestic skill) and
serving coffee to and sitting down beside a peer (social skill). All of the training was conducted
in a classroom in the participants' day treatment setting. In the training the participants watched a
video of an adult with a developmental disability making coffee and also initiating a social
interaction with a peer. Additionally, the video also showed the model receiving verbal praise
for each step correctly completed. All three of the participants mastered the two tasks and
generalized them across settings, stimuli, and people. Two participants showed maintenance of
the skills over time; however, the third one needed one booster session before she met
maintenance criteria.

Children have successfully learned play skills through video modeling. D’ateno,
Mangiapanello, and Taylor (2003) used video modeling to teach complex play sequences to a
preschool age child with autism. They used a multiple baseline design across three response
categories to evaluate their procedures. These categories involved different play scenarios;
having a tea party, shopping, and baking. Each of these play scenarios were acted out with a
different play set. The child watched the video depicting a script with one of the sets. After a
minimum delay of an hour, the child was brought into another room and given access to the play
materials. The child learned the complex play sequences with video modeling alone—without the
aid of forward chaining procedures, reinforcement, prompting etc. The main limitation with the
study is that generalization of the learned behavior or novel play action did not occur.

Video modeling has also been used to teach academic skills. Kinney, Vedora, and
Stromer (2003) used video models to teach a child with Autism Spectrum Disorder generative
spelling. The researchers used video models and video rewards to teach the child how to spell
new words based on combining word endings and beginnings that had been previously learned.

In addition to play and academic skills, video modeling has been used to teach social
social initiations with adults and to play appropriately via video modeling. During baseline, the
three participants did not engage in reciprocal play and they did not make any social initiations
with the adult in the room. The researchers measured total time of reciprocal play and latency to
social initiations. The intervention consisted of having the children watch a 35 second video that
depicted reciprocal play and social initiations. After watching the video, they were brought into a
room with the experimenter and toys. One of the children needed a simplified video before he
showed a significant improvement from baseline. After the simplified video was put into place,
the child’s behavior increased markedly from baseline. The latency between when the children
entered the room and when they initiated a social interaction decreased and the time that they were engaged in reciprocal play increased.

Charlop and Milstein (1989) used video modeling to teach individuals conversational speech. The participants were three boys diagnosed with autism who attended an after-school program at a school for children with autism. Five scripts were written for each boy. The scripts varied across the boys because they each had different interests. During baseline, the experimenters attempted to engage the boys in the scripted conversations and then assessed how they each performed on the task. The results showed that the participants did not ask the experimenters very many questions or answer more than a few of the questions asked of them. During the intervention, the boys watched videotapes of two individuals having scripted conversations about toys. The boys’ conversational speech was then assessed in the following conditions: new toys, novel people, siblings, autistic peers, and other settings. The results showed that the boys learned conversational speech through watching the video model. They were also able to generalize these skills and maintain them over a 15 month period. Sherer et al. (2001) also showed that individuals with autism can learn conversational speech through a video model. In their study, they compared self modeling versus peer modeling. They found that three children were able to answer conversation questions that were taught through video modeling. However, there was no difference in the rate of acquisition in the two conditions.

Video modeling has also been used to teach individuals social skills, such as giving compliments. Apple, Billingsley, and Schwartz (2005) assessed compliment giving in two five-year-old boys diagnosed with Autism Spectrum Disorder who attended an integrated preschool. The researchers assessed the types of compliments given in a typical preschool setting and identified three different types that varied with respect to sentence structure. The first type of
compliment was to encompass comments like “cool picture” or “neat shoes”. The second type of compliment involved an individual saying that he “liked __________”. And the third type of compliment was worded “you have a cool__________”. The three types of compliments were all positive statements about someone else and differed only in sentence structure. Four videos were made to teach the children these compliments. Three videos were designated for response type compliments, one video for each type of compliment. The fourth video focused on initiating compliments. The results showed that both students gave compliments in response to others compliments after the video modeling. When reinforcement and a verbal contract were added, the two boys also initiated compliments. However, only one of the boys maintained initiating compliments after the removal of the reinforcer. Both boys maintained giving compliments as a response to compliments received from others. The second experiment added self-management to the video modeling component and removed the reinforcement. Self-management increased compliment giving initiations for all three of the participants. This research showed that while video modeling produced response type compliments, an additional component of self-management was required to generate initiated compliments.

Wert and Neisworth (2003), on the other hand, showed that video modeling alone was enough to teach the skill of spontaneous requesting in children with autism. In this study, researchers used videos with self-models. The videos depicted the models spontaneously making requests. In the videos, the experimenters prompted the models to make requests. The results showed that all four participants increased their spontaneous requests after viewing videos of themselves. In addition to the video model, this study also included reinforcement; however it was the natural reinforcement that normally would occur when an item or activity was requested.
Video modeling has been used to teach individuals daily living activities or self-help skills. These activities are very important to an individual’s life in that they can greatly increase the individual’s independence. Shipley-Benamou, Lutzker, and Taubman (2002) used video modeling to teach three children daily living skills. A multiple probe design across tasks replicated it with other participants and was used to evaluate intervention effectiveness. The three children, who were diagnosed with autism, were taught to make juice, prepare a letter to mail and put it in a mailbox, feed and water a pet, clean a fishbowl, and set a table. All three participants learned these tasks and maintained them throughout the no-video phase and a one-month follow up. The researchers mentioned that while the intervention was a success, preparing the video was a lengthy process. They also attribute a portion of the success to the fact that the three children were able to imitate prior to the video modeling intervention, as well as attend to a preferred activity for up to five minutes.

Rehfeldt, Dahman, Young, Cherry, and Davis (2003) used video modeling to teach three adults with moderate to severe mental retardation how to prepare a peanut butter and jelly sandwich. The participants had IQ’s that ranged from 24 to 32. They all could feed themselves and some were able to complete activities of daily living such as dressing, bathing, and toileting. The video showed an individual with developmental disabilities making a peanut butter and jelly sandwich. After each step of the meal preparation was performed correctly, the individual on the video received verbal praise. All three participants mastered the task and generalized the skill across settings. Additionally, all individuals maintained the skills in a follow up one month after training.

Video modeling has also been used to teach community skills. Haring, Kennedy, Adams, &Pitts-Conway, (2007) taught youths with autism to purchase items in their classroom and their
school cafeteria. Although results showed that the participants were able to purchase items in their training environment, these skills did not generalize to novel stores, etc. When the researchers used video modeling to train the participants to purchase items in different environments all three of the participants learned the skill, which they maintained several weeks later.

Video modeling has been used in vocational settings with limited success. Morgan and Salzberg (1992) taught individuals with severe mental retardation to fix problems in the workplace and to request their supervisor’s assistance any time that they encountered a problem. After video modeling alone, two of the three participants did not generalize the behavior to the work environment. However, after rehearsing one or two relevant scenarios, the participants were able respond to new situations in the environment. During the sixty day follow-up, however, only one of the participants maintained the skill.

The present study replicates Fink (2006). Fink taught four children diagnosed with either pervasive developmental disorder or autism how to build four different Lego constructs. The children were between the ages of 4 and 5 and had the prerequisite skills of generalized motor imitation, attention to a 2 minute video, and generalized picture-to-object matching. The materials in this study included four sets of Duplo Blocks (Legos) with 10 blocks in each set, a video model on a DVD and a portable DVD player. An alternating treatments design was used to compare the teaching effectiveness of graduated guidance (least-to-most prompting) and video modeling.

In Fink, two participants learned how to build all four of the constructs (two with video modeling and two with graduated guidance). One participant was able to build two of the constructs and one participant did not have success in completing any of the constructs. While
one participant appeared to learn equally well with either graduating guidance or video modeling as the teaching procedure, video modeling was more effective in teaching one participant, but graduated guidance was more effective for the other participant.

The purpose of this study is to replicate Fink by comparing graduated guidance and video modeling as teaching methodologies in instructing two participants to complete Lego construction tasks. While Fink used least-to-most prompting during the graduated guidance trials, this study uses most-to least prompting.

Method

Participants

The participants were two girls who were diagnosed with autism. They both attended a school program five days a week and had an additional ABA home program. Both girls possessed the prerequisite skills necessary to perform the tasks required in this study; they could match objects to pictures and attend to a video for a minimum of two minutes. The participants had some prior experience with graduated guidance and video modeling. Social praise was also reinforcing to them.

Sam was a four year-old girl who communicated in short sentences to request items and comment about things in her environment. She spent her mornings in a typical preschool accompanied by a 1:1 inclusion paraprofessional. Sam possessed moderately developed social skills and age appropriate play skills. She also had limited experience with building bridges with Legos.

Dharma was a seven year-old girl who communicated primarily through one or two word requests. She had limited social skills. Dharma’s play skills consisted of playing with electronic
toys for short durations, scripting while playing with stuffed animals, and engaging in gross
motor play (bouncing on a ball etc.). When given the opportunity to play with Legos, Dharma
would place one Lego on top of another. She continued to stack them up until all of the available
Legos were used.

Setting and Materials

Sessions took place in the participants’ homes. Sam completed the Lego constructs in
her 8 m x 6.2 m basement. The basement contained couches, a table, a chair, and a television.
Dharma built the Lego constructs in her 3.1 m x 4.2 m bedroom. Her bedroom contained a small
desk with chair attached, two dressers, a bed, a toy chest, and a bookshelf.

The materials included 4 sets of 10 Legos (see Appendix A). Each Lego construct was
of the same approximate level of difficulty. The constructs included a base that was the same
shape, size, and color of the first piece that the participant was to place on it. It was painted on
the exact place that the first piece belonged. In addition to the Legos, the materials included a
video that depicted a close up of an adult model’s hands completing the Lego constructs. The
video was played in a portable DVD player during the video modeling sessions.

Independent Variables

The independent variables were graduated guidance and video modeling. When
graduated guidance was used, the experimenter stood behind the participant and shadowed the
participant’s movements with her hands. If the participant began to pick up a wrong Lego or put
a Lego in an incorrect place, the experimenter provided most-to-least physical prompting to help
the participant pick up the correct Lego and put it in the correct position. The experimenter
provided this physical prompting by placing her hand over the participant’s hand and gently
guiding it.
During video modeling, the experimenter showed the participant a video model that depicted an adult’s hands building a Lego construct. The video showed only the adult’s hands, Legos, and table. After the video ended, the experimenter put the DVD player on the floor and placed the Legos depicted on the video onto the table. The participant was then given 2 minutes to complete the construct.

**Dependent Variable**

Successful building of Lego constructs was assessed by the number of sessions it took the participant to meet criterion for each construct task. Mastery criterion was two consecutive sessions with and without the video at 100% accuracy whereas mastery criterion for graduated guidance was 100% independent accuracy for two consecutive sessions.

**Design**

An alternating treatments design was used to assess the effects of the dependent variables. Each child was taught how to build 4 Lego constructs. Two of the constructs were taught using graduated guidance, and two were taught using video modeling.

**Procedure**

**Assessments.** Prior to the beginning of the study, several assessments were completed to determine if the participants had the necessary skills to be included in the study. In the first assessment, potential reinforcers were introduced to the girls to see if they would approach them (Pace, Ivancic, Edwards, Iwata, and Page, 1985). Fifteen different stimuli were presented one at a time. If the participant approached a stimulus, it was considered more preferred than the one that was not approached. The seven most preferred stimuli were then used in a multiple-stimulus without replacement assessment (DeLeon & Iwata, 1996). During the multiple-stimulus
without replacement assessment (MSWO), seven items were presented simultaneously to the participant. After the participant chose an item, the remaining items were rotated counter clockwise. This was repeated for three trials. During the study, the three most frequently chosen stimuli were as reinforcers for completing the Lego tasks.

When preference assessments were complete, the potential participants were tested to determine if they could imitate gross motor response and match pictures to objects. Following these tests, the experimenter stood in front of the participant and said, “do this” and modeled a motor movement. The experimenter modeled the following actions; clap hands, arms up, stomp feet, shake head, wave, tap legs, stand up, nod head, sit down, and touch shoulders. If the participant completed an action, the experimenter marked a plus (+) on the data sheet. If the action was not completed or it was executed incorrectly, the experimenter marked a minus (-) on the data sheet.

During the picture-to-object matching task, three objects were placed in front of the participant; she was given a picture that corresponded to one of those objects. The participant was then to place the picture on top of the object that corresponded with the picture. These pictures and objects were common household objects; that is, a book, shoe, paper bag, toothbrush, comb, spoon, video tape, toothpaste, cup, and hairbrush.

The final prerequisite skill that was tested was attention to a 2 minute video. While the child sat at her desk, the experimenter placed a DVD player with a Hannah Montana video preloaded in front of her and pushed play. The duration that the participant sat in the chair was recorded. Both participants sat in the chair watching the video for 2 minutes.
Baseline. Each child was brought to the table, given the Legos, and told “it’s time to build Legos” or “it’s time to play Legos”. The child was then allowed 1 minute to build with the Legos. Two of these trials were conducted for each construct for a total of eight baseline trials.

Training

Preference assessment. An abbreviated preference assessment was conducted prior to each training session. The three edibles the participant selected most frequently during the MSWO were placed on a paper plate in front of her. She was then asked to “pick one”, given the opportunity to choose one of the edibles and consume it. An additional piece of the chosen type of edible was delivered at the end of each trial.

Graduated guidance. During the graduated guidance condition, the participant was brought to a table and the Legos were placed on the table. She was then told, “It’s time to build Legos” or “it’s time to play Legos.” The experimenter stood behind the participant and shadowed the participant’s hand movements. If the participant picked up the correct Lego and put it in the correct place, the experimenter did nothing. If she moved to pick up the wrong Lego or picked up the correct Lego, but started to put it in an incorrect place, the experimenter placed her hands over the participant’s hands and gently guided them to pick up the correct Lego and put it in the correct place. While guiding the participant’s hands, the experimenter started with her hands over the participant’s hands and moved her hands up the participant’s arm.

Video modeling. During the video modeling condition, the participant was brought to a table that held a portable DVD player with the demonstration video. The experimenter then pressed play on the DVD player and said; “It’s time to watch the video”. After the video was finished, the experimenter put the DVD player on the floor and placed the same Legos that appeared in the video onto the table. The experimenter then said; “It’s time to build Legos” or
“It’s time to play Legos”. The participant had 2 minutes to complete the Lego construct. As in the graduated guidance condition, the experimenter stood behind the participant, but close enough to physically prompt the child. However, unlike in the graduated guidance condition, the experimenter did not provide any prompts. The edible that was previously identified in the mini-preference assessment was provided simultaneously with the verbal praise; “That’s building Legos, nice job.” This occurred when the participant completed the correct construct in less than 2 minutes, used all of the pieces but did not correctly assemble the structure, or verbally indicated that she was “all done.”

Interobserver Agreement

Interobserver agreement (IOA) was conducted in vivo during 50% of sessions. Two observers simultaneously and independently recorded data using a data sheet and pencil. IOA was calculated by dividing the agreements by the agreements plus disagreements and multiplying by 100.

Results

Assessments

During the MSWO the participants’ three most preferred stimulus were identified. For Sam these stimuli were chocolate covered cashews, raisins, and small pieces of banana. Dharma’s three most preferred stimuli were pretzels, chips, and popcorn. These edibles were provided as consequence during training. Both children achieved 100% accuracy on gross motor imitation and picture-to-object matching tests.

Figure 1 shows the number of independent steps that Sam completed for Constructs C and D. For both these constructs, Sam did not complete any steps independently in baseline. For
Construct C, which was taught using video modeling, she met criteria after six trials. She met criteria with Construct D, which was taught using graduated guidance after seven trials. There was a slight decrease in number of steps on the fifth trial with Construct D (13th trial overall). Both data paths show a sharp increasing trend.

The number of consecutive independent steps that Sam completed for construct C and D were depicted on Figure 2. During baseline, Sam did not complete any consecutive steps independently with either construct. The data trends in Figure 2 are very similar to the trends in Figure 1. In Figure 2 the decrease observed on trial number 13 (Construct D) is larger than that shown in Figure 1. Sam completed all of the steps to the Construct C independently (using video modeling) and in the correct order in 6 trials. She met criteria for number of consecutive independent steps with Construct D in 7 days. Figure 3 depicts the number of independent steps for Constructs A and B. During baseline, Sam completed 0/10 steps independent for both constructs. Construct A (video modeling) and B (graduated guidance) both show sharp increasing trends. Construct A was completed with 10/10 independent steps on the third trial (7th overall). She completed the construct with 10/10 independent steps without the video on the 5th and 6th trial (13th and 14th overall). The data for Construct B was on an increasing trend until trial 12 during which Sam completed 10/10 steps correctly. On trial 15, she completed 7/10 steps independently. On the 16th and 17th trials the number if independent steps increased to 10/10. Figure 4 depicts the number of consecutive independent steps for Constructs A and B. The data path for Construct A’s shows a steep increasing trend. Sam met criteria with construct A in 6 trials (12th trial overall). She met criteria with Construct B in 7 trials (16th overall).
Figure 5 depicts the number of independent steps it took Dharma to complete constructs A and B. Graduated guidance was the teaching method used for Construct A and video modeling was used for Construct B. During baseline, Dharma did not complete any steps for either construct. She showed an overall increasing trend in independent steps for Construct A, however, she exhibited unstable responding. The trials that were completed on either the same day or days in the same week showed an increasing trend. After a break of 4 days or more, Dharma’s independent responses decreased. For Construct A, she emitted seven independent steps on trails 8 and 9. She met criteria with construct A in 12 trials. Construct B showed an unstable data path up until the 9th trial (21st trial overall). The number of independent steps reached 6/10 and at 2 different data points plummeted to 0/10. Trial 22 started a sharply increasing trend. Dharma met criteria with construct B in 25 trials (on the 41st trial overall).

Figure 6 depicts the number of consecutive independent steps to complete constructs A and B. Construct A had a mostly increasing trend. There were a couple of dips in number of consecutive independent steps (trials 11 and 19). Dharma met criteria with construct A in 12 trials (on trial 27 overall). Construct B shows a variable trend up until the 21st trial. From the 22nd trial to the 32nd trial there was an increasing trend. After the 32nd trial the data was variable until the 38th trial. Dharma met criteria with this construct in 25 trials (41st trial overall).

Figure 7 depicts the number of independent steps it took Dharma to complete Constructs C and D. Construct C was completed using graduated guidance as a teaching method and construct D was completed using video modeling. During baseline, Dharma did not complete any steps with either construct. For Construct C, her responses show a sharply increasing trend for the first 4 trials. Although, the data become a little variable for the next few trials, there is an
overall increasing trend. Dharma met criteria with this construct in 10 trials (at the 24th trial overall). The data for Construct D show an increasing trend that is more variable and gradual than the one shown for Construct C. Dharma met criteria with construct D in 19 trials (at the 32nd trial overall). Figure 8 depicts the number of consecutive independent steps to complete constructs C and D. Construct C had a mostly increasing although variable trend. There were a couple of dips in number of consecutive independent steps. Dharma met criteria with construct C in 10 trials. Construct D shows an increasing trend for the first few trials then it dipped and stayed there for 6 trials. The trend gets more variable from there and eventually shows an increasing trend. Dharma met criteria with this construct in 21 trials.

Inter-Observer Agreement (IOA)

Sam’s IOA for Constructs A, C and D was 100%, whereas the mean IOA for her Construct B was 97.5% with a range of 90%-100%. Mean IOA for Dharma’s Construct A was 93.8% with a range of 80%-100%. The mean IOA for her Construct B was 94.3 with a range of 90%-100%. For her Construct C, the mean IOA was 97.1% with a range of 90%-100%. The mean IOA for Dharma’s Construct D was 96.45 with a range of 80%-100%.

Discussion

The results indicate that both graduated guidance and video modeling are effective teaching methods for teaching building with Legos. Each participant learned more effectively with a different procedure from the other participant. For Sam, video modeling was a slightly more effective procedure than graduated guidance. She learned both Construct A and C, which
was taught using video modeling, in six trials. However, she required more trials to learn constructs B and D, which were taught by graduated guidance.

For Dharma, graduated guidance was a more effective teaching method than video modeling. She met criteria with Constructs A and C, which were taught using graduated guidance, in twelve and ten trials, respectively. She met criteria with Constructs B and D, which were taught using video modeling, in twenty-five and twenty trials, respectively. One problem that surfaced during Dharma’s trials was when Dharma made a mistake with the construct during video modeling she would often keep making the same mistake over and over in subsequent trials. She appeared to get “stuck” on one spot in the design. This might be the result of a poor video model, a more difficult step in the design, or simply that Dharma “learned” how to do it and then didn’t pay attention to the video model as much as she was building from memory.

As in the Fink study, the present research showed that some individuals learn how to build a Lego construct more quickly when taught using graduated guidance while others learn more quickly when taught using video modeling. One individual learned how to build when taught with graduated guidance with only slightly fewer trials than with video modeling. The second individual learned how to build with graduated guidance with less than half of the trials than it took her to build when taught with video modeling. Sam and Dharma both have a history of learning by using both graduated guidance and video modeling. Sam’s programs were usually made up of video modeling or modeling in vivo and prompting and then fading the model and prompt until she was independent with the skill. She typically learned new skills quickly if they were motivating for her and she hadn’t been working on the same type of skill building program for a long time. Usually motivation decreased as number of days working on the same skill increased. The factors of a long history of learning through modeling and imitation as well as
the novelty of a program that involved building with Legos may be good indicators as to why Sam learned both tasks quickly (motivation) and why she learned slightly faster with video modeling (learning history). Sam had less experience with graduated guidance than Dharma. Dharma, on the other hand had much more experience with graduated guidance than with video modeling. She had a history of learning many skills through task analysis and graduated guidance. She also, however, had strong imitation skills and would often imitate behaviors or words without being cued to do so. Although Dharma had a history of learning some tasks with video modeling or in vivo modeling if the imitation involved a series of multiple steps she usually needed some form of physical prompting to either stay on task or to prevent her from making a mistake. Dharma’s longer history with graduated guidance may be an indicator as to why she learned much more quickly than with video modeling. She was also not able to make a mistake and therefore it wasn’t able to be repeated.

Both participants learned how to build the four Lego constructs; however, generalization to novel materials and environments was not examined. The questions remains as to whether the children could build the same Lego constructs in other environments and around other people. Maintenance of these skills was also not considered. As a result, further research is necessary to determine if graduated guidance or video modeling promotes better generalization and/or maintenance. In addition to the questions regarding generalization and maintenance, the present study also did not evaluate whether there are intrinsic reinforcing properties associated with either guidance or video modeling. Would children be more likely to choose to play with Legos based on the procedures used to teach them that play skill?

The present study also did not address the effectiveness of combining video modeling with graduated guidance. In such an examination, the video model would be shown, the Legos
placed on the desk, the instruction delivered, and the experimenter would shadow the participants hands, providing hand over hand assistance if the participant was began to make a mistake. This procedure provided the individual with the video mode but has the added benefit of the errorless learning provided by the graduated guidance. Dharma may have learned more quickly if she had been provided graduated guidance during her video modeling constructs.

Future research is necessary to determine whether some individuals always learn better with graduated guidance and others with video modeling. What would the results be with other play or daily living skills? Are there indicators that would show whether someone would learn faster with one technique over another? Also, if a student learns better with graduated guidance would they learn tasks even faster if both video modeling and graduated guidance were utilized?
References


Appendix

Construct A

Construct B

Construct C

Construct D
Figure Captions

Figure 1. Comparing the total number of steps Sam independently completed on Construct C (VM) and Construct D (GG)

Figure 2. Comparing the total number of consecutive steps Sam independently completed on Construct C (VM) and Construct D (GG)

Figure 3. Comparing the total number of steps Sam independently completed on Construct A (VM) and Construct B (GG)

Figure 4. Comparing the total number of consecutive steps Sam independently completed on Construct A (VM) and Construct B (GG)

Figure 5. Comparing the total number of steps Dharma independently completed on Construct B (VM) and Construct A (GG)

Figure 6. Comparing the total number of consecutive steps Dharma independently completed on Construct B (VM) and Construct A (GG)

Figure 7. Comparing the total number of steps Dharma independently completed on Construct D (VM) and Construct C (GG)

Figure 8. Comparing the total number of consecutive steps Dharma independently completed on Construct D (VM) and Construct C (GG)
Figure 1

Trials vs. Number of Independent Steps

- VM-Construct C
- GG-Construct D
Trials

Number of Independent Steps

Figure 5
Figure 6

Trials

Number of Consecutive Independent Steps

VM-ConstructB

GG-Construct A