Comparing Video Modeling and Graduated Guidance together and Video Modeling alone for Teaching Role Playing Skills to Children with Autism

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Abstract: Teaching play skills is important for children with autism. The purpose of the present study was to compare effectiveness and efficiency of providing video modeling and graduated guidance together and video modeling alone for teaching role playing skills to children with autism. The study was conducted with four students. The study was conducted by using adapted alternative treatments design. Four kinds of data were collected during the study: effectiveness, efficiency, social validity, and reliability. Both teaching methods were found to be effective in teaching target skills to children with autism. Results of the study were compared with the literature and some recommendations were addressed in the study.

It is known that children with autism have limitations in demonstrating play skills with their peers due to their insufficient social and communicational performances (Hine & Wolery 2006; Holmes & Willoughby, 2005; Naber et al, 2008; Terpstra, Higgins, & Pierce; 2002). There are many different types of evidence based practices used for teaching play and other necessary skills to individuals with autism reported in the literature. These practices can be listed as: errorless teaching methods (e.g. most to least prompting, least to most prompting, graduated guidance, constant time delay, etc.), naturalistic teaching strategies (e.g. incidental teaching, embedded teaching, teaching through conversations, etc.), video-modeling, peer tutoring, story-based intervention package, pivotal response treatment (Luiselli, Russo, Christian, & Wilczynski, 2008; National Standards Report, 2009).

Video modeling is being used effectively in teaching discrete and chained skills, social, communicational and other functional skills to individuals with autism (Apple, Billingsley, & Schwartz, 2005; MacDonald, Clark, Garrigan, & Vangala, 2005; MacDonald, Sacramone, Mansfield, Wiltz, & Ahearn 2009; Nikopoulos & Keenan, 2004; Palechka & MacDonald, 2010; Reagon, Higbee, & Endicott, 2006; Sancho, Sidener, Reeve, & Sidener, 2010). Video modeling is defined as, watching the records of someone doing the target behaviors and imitating the model for learning a new skill or changing a behavior. There are many studies showing the effectiveness of video modeling where peers or adults were used as models. In these studies, self-help skills, verbal and motor responses, spelling, social communication, reciprocal playing, and conversation skills were taught through video modeling (Nikopoulos & Keenan, 2007; Odom et al., 2003). Besides, in many research studies it was also found that video modeling was effective in providing acquisition, maintenance and generalization of the target skills with children with autism (Bellini & Akullian, & Hopf, 2007; Delano, 2007; Maione & Mirenda, 2006; Marcus & Wilder, 2009; Coy & Hermansen, 2007).

Although there are many research studies conducted by using video modeling in the
literature, studies which role playing was taught to children with autism via video modeling seem to be limited (Boudreau & D’Entremont, 2010; D’Ateno, Mangiapanello, & Taylor, 2003; Hine & Wolery, 2006; Kroeger, Schultz, & Newson, 2007; MacDonald et al., 2005; MacDonald et al., 2009; Reagon et al., 2006). In these studies, preparing food, shopping and tea party role playing skills (D’Ateno et al., 2003), gardener and preparing meal skills as role play (Hine & Wolery, 2006), fireman, doctor, cowboy, and teacher role playing skills (Reagon, Higbee, & Endicott, 2006), role playing in the village, on the ship and school settings (MacDonald et al., 2005), role playing skills in the airport, zoo and barbecue party scenarios (MacDonald et al., 2009) were taught through video modeling. The results of these studies revealed that video modeling was an effective way of teaching role playing and also that the participants successfully acquired the verbal and motor skills sought by the method. Through these studies, it was also seen that participants maintained and generalized the acquired skills.

As mentioned above, errorless teaching methods are known to be effective in teaching skills to children with autism in the literature. Graduated guidance is one of the errorless teaching methods. Graduated guidance is the process which teachers decide providing prompts when the target person needs, or decide to make manipulations in the type or degree of the prompt for teaching the target skills. Usually the process starts with full physical prompts and it is graduated through shadowing and independency in the participant (Tekin-Iftar & Kırcaali-Iftar, 2006; Wolery, Bailey & Sugai, 1988). Reviewing the literature, a number of research studies can be found conducted by using graduated guidance for teaching both discrete and chained skills to individuals with disabilities (Akmanoglu & Tekin-Iftar, 2011; Bryan & Gast, 2000; Cicero & Pfadt, 2002; Denny, Marchand-Martella, & Martella, 2001; Soluaqa, Leaf, Taubman, McEachin, & Leaf, 2008; Woods & Poulson, 2006). For example Bryan and Gast (2000) evaluated the effectiveness of a two-component teaching package (graduated guidance and visual activity schedules) in teaching young students with autism to increase their on-task and on-schedule behavior. A-B-A-B withdrawal design was used in the study with four students who were 7–8 years old and enrolled in a public elementary school. The results of the authors’ study revealed that participants (a) met the criterion after they were provided graduated guidance, (b) maintained the target skill with the visual activity schedules and did not maintain them without the activity schedules, and (c) generalize the target skills across new activities. In a recent study Akmanoglu and Tekin-Iftar (2011) assessed the combined effects of video modeling, graduated guidance and community-based instruction for teaching children with autism how to protect themselves from the lures of strangers. The authors also assessed the opinions of parents of children participated in the study. The study was conducted using multiple probe across participants design. Three children with autism (aged 6–11 years) who were attending both special education schools and primary schools participated in their study. Results of the study showed that video-modeling with graduated guidance and community-based instruction was effective for teaching children with autism how to protect themselves from the lures of strangers. In the study it was also seen that the participants maintained the skill over time and generalized into different settings and different trainers. Parents’ opinions about the study were positive about the aims, procedure, and results of the study.

Reviewing the literature only one study was found conducted by Akmanoglu and Tekin-Iftar (2011) which assessed the combined effects of video modeling, graduated guidance and community-based instruction for teaching children with autism how to protect themselves from the lures of strangers as mentioned before. No other studies were found which used video modeling and graduated guidance together. Although there is evidence that video modeling is an effective way of teaching various skills to children with autism, it is known that there is still need for additional teaching methods for teaching long chained play skills to children with autism (Hine & Wolery, 2006; MacDonald et al., 2005; MacDonald et al., 2009). As Lydon, Healy and Leader (2011) mentioned, there is need for more studies for examining both effectiveness and efficiency of more than one
method for teaching different skills to individuals with autism. Besides the above mentioned reasons for conducting the present study, refining the literature about effective teaching methods for individuals with autism is another reason for planning this study (Bellini, Akullian, & Hopf, 2007; Callahan, Henson, & Covian, 2008; Lydon et al, 2011; National Standards Report, 2009; Odom et al, 2003; Reed, Osborne, & Corness, 2007; Simpson, 2005; Simpson, McKee, Teeter, & Beytien, 2007).

Moving with the need for studies which use video modeling and graduated guidance together, the present study was designed. In this study, the effectiveness and efficiency of providing video modeling and graduated guidance together and video modeling alone was compared for teaching role playing skills to children with autism. Related with this general purpose, following research questions were addressed: (1) Are there any differences in the effectiveness and efficiency of providing video modeling and graduated guidance together and video modeling alone on the acquisition, maintenance, and generalization of target play skills in children with autism? (2) Are there any differences in providing video modeling and graduated guidance together and video modeling alone regarding the (a) number of sessions conducted, (b) number of trials, (c) total length of training sessions, and (d) error percentage until the criterion was met by the participants?, and (3) What were the opinions of (a) parents of the participants of the study and (b) graduate students who were taking the courses of “teaching skills and concepts to children with developmental disabilities” and “determining play-based activities for children with developmental disabilities” in the special education department about the teaching procedure which was used in the present study?

Method

Participants

Students. Participants of the study were four children with autism. Although they all were diagnosed in the public hospitals by pediatrists, their reports did not indicate any formal information about the standard tests that were used. The participant students were 4 to 6 years and 3 of them were boys whereas one of them was a girl. The prerequisite skills for being the participant of the study were: (a) maintaining a task for 4–5 minutes, (b) imitating verbal behaviors, (c) following simple directions consisting one object and one activity, and (d) watching TV for at least 2 minutes.

All the participants were attending to group education in the Unit for the Children with Developmental Disabilities in Anadolu University from 9.00 a.m. to 12.30 p.m. All the participants demonstrated similar development in gross and fine motor areas with their normally developing peers whereas they all had some difficulties in social, play and communication areas. All of the participants attended to regular preschools with their normally developing peers in the afternoons of every school day. The participants took part in another study using simultaneous prompting provided together with video modeling before the present study. Izel was the only girl participant of the study. She was 6 years old and got her diagnosis when she was 4 years from a public hospital. Besides the group education in the Unit, she was also attending to a preschool with her normally developing peers. She was able to use 3–4 words sentences independently; she could also count 1 to 100; besides, she could answer questions such as “What are the names of your friends at school?” or “What is your favorite activity at home?” etc.

Yasin was a boy with 4 years of age. He got his diagnosis when he was 3 years old from a public hospital. He could use sentences with 1–2 words and answer questions such as “Whot?”, or “What?”, etc. He could also count from 1 to 30 independently. Another participant was Saim. He was 6 years old and had his diagnosis when he was 3 years old from a university hospital. He can use 2-3 words sentences and answer questions such as “Where is your mother?” and “Would you like to play lego?”, etc. He can count from 1 to 100 independently. The last participant of the study was Ege. Ege was 5 years old and got his diagnosis when he was 3 from a public hospital. He can use 2–3 words sentences and answer questions such as “What is this?” or “How is the weather today?”, etc. He can count from 1 to 20 independently.
Video models were recorded by a normally developing male peer. Participants were not familiar with the peer. His age was 6 which was similar with the participants. Video modeling records of the target plays were prepared with the peer. Three professionals who were experienced in using video modeling with children with autism watched the video model recordings and recorded the data on the “Validity form of video modeling teaching records”.

Settings

All the sessions were conducted in the Unit for the Children with Developmental Disabilities in Anadolu University. All the sessions other than generalization sessions were conducted in the 1:1 teaching room of the unit. The room was 4m × 2.90m. A table with two chairs, a white board, shelves with materials and a laptop were present in the room.

Generalization sessions were conducted in the play room of the Unit. In the play room, there was a slide, legos, many cushions, toys for playing house, basketball and basket, and other toys for the children play independently.

Materials

The materials used in the study were an instruction VCD, a laptop for watching the VCD, a video camera for recording the data, the materials for the role plays (e.g. a park set with a slide, a swing, a car park, road to the car park, a car, and a doll for the “play ground play”; a breakfast set with a tray, a milk bottle, a cup, a slice of bread, a plate, and a toaster for the “breakfast play”, a cartoon base with road picture, a truck, a house, a fruit basket, a fuel pomp, and a car park for the “carrying fruits with a truck play”), reinforces for the participants (e.g. candy, chocolate, etc.) and data collection forms.

In order to prepare the data collection forms, task analyses of each target skill was developed (Table 1). Target tasks were analyzed by the first author through conducting the skills by herself and two different professionals checked the steps of the skills independently. Target skills were role playing skills which were selected by the teachers and parents of the participants from a list of plays provided by the researchers.

Trainer

Trainer of the study was the first author of the manuscript. She had her masters and doctoral degrees on teaching children with autism and had an experience of 12 years in the field both working with small groups and 1:1 training of students with autism.

General Procedure

Effectiveness and efficiency of providing video modeling and graduated guidance together and video modeling alone was compared for teaching role playing skills to children with autism. Two different role playing skills were taught to each participant. All the sessions were conducted in a 1:1 teaching arrangement and videotaped by the researchers. A 4-second response interval was used for the participant to start the task in all sessions. Probe, training, maintenance and generalization sessions were conducted in the study. A pilot study was conducted with a different student in order to see the difficulties and if any problems and also for making necessary adaptations in the procedure.

Probe sessions. Baseline probe sessions and daily probe sessions were conducted in the study. Baseline sessions were conducted before the training sessions were started. Single-opportunity method was used during all probe sessions. That is, the participants were asked to display the skill (e.g. “Play with the play ground play set.”) and recorded plus (+) for their independent correct responses within 4-seconds. Baseline probe session was completed when the participants displayed an incorrect response or no response within 4-seconds response interval. During the baseline probe sessions, correct responses and attention and cooperation of the participants were rewarded verbally and socially. Incorrect responses were ignored by the researchers. Daily probe sessions were conducted the same as the baseline probe sessions prior to every training session. During these sessions, the performance levels of participant students were recorded in order to reflect the training of the target skills. Training data on graphs of
the study are the data collected during the daily probe sessions. Data were recorded on the probe sessions data collection forms.

Training sessions. All the training sessions were conducted in 1:1 teaching procedure in the Unit for the Children with Developmental Disabilities in Anadolu University. Providing video modeling and graduated guidance together and video modeling alone were randomly appointed with the target skills of each participant. All the steps in the task analysis were taught together in each training session. The participants were rewarded with tangible and verbal reinforcers until they meet the criterion, and after they met the criterion they were rewarded by verbal praises at the end of each training session.

Target role plays of the participant students were as follows: (a) Izel: Breakfast play (video modeling / graduated guidance) and carrying fruits (video modeling alone), (b) Yasin: Carrying fruits (video modeling + graduated guidance), (c) Saim: carrying fruits (video modeling + graduated guidance) and playground play (video modeling alone), and (d) Ege: playground play (video modeling + graduated guidance) and carrying fruits (video modeling alone) (Table 2).

Providing video modeling and graduated guidance together. Teaching the target skill which was appointed randomly to be taught through providing video modeling and graduated guidance together was started after the baseline sessions were completed. During training sessions participant and the trainer sat together watching the video model on the laptop. For securing the attention of the participant, the trainer provided attentional que (e.g. “Now we are going to learn to play playground play with you. First we are going to watch a friend playing on the laptop and then we will play the same game. Are you ready?”) to the participant. Following the response of

### TABLE 1
Example task analysis of the target skills

<table>
<thead>
<tr>
<th>Carrying fruits with a truck play</th>
<th>Playground play</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Takes the basement from the box.</td>
<td>1. Takes the play ground from the box.</td>
</tr>
<tr>
<td>2. Opens the basement and puts on the floor.</td>
<td>2. Puts the play ground on the floor.</td>
</tr>
<tr>
<td>3. Takes the gas station from the box.</td>
<td>3. Takes the road from the box.</td>
</tr>
<tr>
<td>4. Puts the gas station across the road.</td>
<td>4. Puts the road in front of the garage.</td>
</tr>
<tr>
<td>5. Takes the house from the box.</td>
<td>5. Takes the truck from the box.</td>
</tr>
<tr>
<td>6. Puts the house near the road.</td>
<td>6. Puts the truck at the beginning of the road.</td>
</tr>
<tr>
<td>7. Takes the fruit basket from the box.</td>
<td>7. Takes the baby from the box.</td>
</tr>
<tr>
<td>8. Puts the fruit basket in front of the house.</td>
<td>8. Puts the baby to the body of the truck.</td>
</tr>
<tr>
<td>9. Takes the garage from the box.</td>
<td>9. Takes the garage gate from the box.</td>
</tr>
<tr>
<td>10. Puts the garage across the house.</td>
<td>10. Puts the gate next to the garage.</td>
</tr>
<tr>
<td>11. Takes the truck from the box.</td>
<td>11. Drives the car to the garage saying “aaaamnn”.</td>
</tr>
<tr>
<td>12. Puts the truck at the start point of the road.</td>
<td>12. Parks the car into the garage.</td>
</tr>
<tr>
<td>13. Drives the truck to the fruit basket saying “diididiit”.</td>
<td>13. Takes the gate of the garage.</td>
</tr>
<tr>
<td>15. Takes the fruit basket.</td>
<td>15. Takes the baby from the truck.</td>
</tr>
<tr>
<td>16. Puts the fruit basket on the body of the truck.</td>
<td>16. Puts the baby into the playground.</td>
</tr>
<tr>
<td>17. Drives the truck to the gas station.</td>
<td>17. Walks the baby on the grass to the swing saying “runnn”.</td>
</tr>
<tr>
<td>18. Stops the truck in front of the station.</td>
<td>18. Puts the baby on the swing.</td>
</tr>
<tr>
<td>20. Puts the pomp to the gas tank of the trunk.</td>
<td>20. Takes the baby from the swing.</td>
</tr>
<tr>
<td>22. Puts the pomp back.</td>
<td>22. Walks the baby to the slide.</td>
</tr>
<tr>
<td>23. Drives the truck to the park.</td>
<td>23. Puts the baby on the slide.</td>
</tr>
<tr>
<td>24. Parks the truck to the park.</td>
<td>24. Slides the baby saying “hooop”.</td>
</tr>
</tbody>
</table>
the participant showing that s/he was ready to start, s/he was rewarded orally and the video was started. After watching the video, the participant was provided verbal praise and task direction continually (e.g. “Great job. You watched very good.”). After watching the video trainer and participant moved to the play setting and the trainer presented the task direction (“Now let’s play the game together”). Besides the trainer provided the prompt needed by the participant. During graduated guidance, although the intensity of the guidance was reduced, if needed the intensity was increased by the trainer. A three level graduation was used during the training sessions: (a) full physical + verbal prompting (trainer put her hand on the participant student’s hand and made him do the skills correctly while describing the skill verbally), (b) partial physical + verbal prompting (trainer held the participant student’s hand slightly while doing the steps of the skills together with the first two/three letters of the verbal prompts) and (c) shadowing + verbal prompting (trainer held her hand behind the elbow of the student while providing only the first letter of the verbal prompt). Depending on the performance of the participant, graduation was decided by the trainer momentarily.

Providing video modeling alone. Teaching the target skill which was appointed randomly to be taught through providing video modeling was started after the baseline sessions were completed. During training sessions, steps were conducted the same as the “video modeling and graduated guidance together” training sessions until providing the task direction to the participant. If the participant completes the task s/he will be rewarded, but if s/he cannot complete the task independently, the session will be finished and the participant will be rewarded for his attention and cooperation.

Maintenance and Generalization Sessions. Maintenance sessions were conducted 1, 2, and 4 weeks after the training sessions were completed. The reinforcers were faded during the maintenance sessions. Attention and cooperation of the participants were rewarded orally (e.g. “Great job!”) and if the participant responds correctly during all the trials, s/he was reinforced at the end of the session. Except the reinforcing schedule, the process was conducted the same as the probe sessions.

Generalization sessions were conducted after the participants met the criterion for the target behaviors. These sessions were conducted the same as the maintenance sessions in different settings (e.g. group-play room of the unit).

Experimental Design

In order to compare the effectiveness and efficiency of providing video modeling and graduated guidance together and video modeling alone for teaching role playing skills to children with autism, adapted alternative treatment design was used in the study. Adapted alternative treatment design is one of the single-subject designs which was used for comparing the effectiveness of two or more independent variables on two or more nonreversible dependent variables (Tekin-Iftar & Kircaali-Iftar, 2006; Wolery, Bailey, & Sugai, 1988). The dependent variable was the percentage of correct responses on the steps of the task analyses of the target skills for each participant, and the independent variables were video modeling and graduated guidance together and video modeling alone.

The target skills of each participant were selected to be similar in difficulty and have almost equal number of steps in their task analysis. The implementation of the independent variables to the target skills was counterbalanced for each participant randomly. In other words, video modeling and graduated guidance together was implemented with one student for teaching the first target skill, and at least one hour later video modeling alone was implemented to teach the second target skill with the same student. The differential effectiveness of the procedures is demonstrated when the dependent variable assigned to one intervention is acquired faster than the dependent variable assigned to the other intervention regardless of the sequence of the applications of intervention (Kurt & Tekin-Iftar, 2008; Tekin-Iftar & Kircaali-Iftar, 2006).

Data Collection

Four types of data were collected during the study: (a) effectiveness, (b) efficiency, (c) so-
cial validity, and (d) reliability data. During collecting the data, number of correct and incorrect responses, percentage of correct and incorrect responses, number of sessions until the criterion was met, and time spent for training until the criterion was met were considered.

For collecting the effectiveness data, all sessions were recorded by a video camera. Correct and incorrect responses of the participants were recorded during the probe sessions. Percentage of correct responses of the participant students’ were transformed to the graphs of the study. Percentage of correct responses was calculated with the formula of number of correct responses multiplied by 100 and divided by total number of steps in the task analyses.

For comparing the efficiency of the two teaching methods we used data of: (a) number of sessions until the criterion was met, (b) number of trials until the criterion was met, (c) number of incorrect responses, and (d) total time spent for training until the criterion was met were recorded.

Two different data collection forms were developed by the researchers for collecting the social validity data of the study. One of the forms was developed for the graduate students of special education department (Professional Opinions about Social Validity of the Study Form) and the other was developed for the parents of the participants (Parent Opinions about Social Validity of the Study Form). Six closed end questions (Yes/No) and an open ended question were asked to the parents and Likert type scale (Totally agree/ Partly agree/ Neutral/ Partly disagree/ Totally disagree) was conducted with the graduate students. Questions were related with the satisfaction of the parents about the study and the importance of the target behaviors selected for the participants of the study. Four parents and nine graduate students were asked to watch the video modeling videos and short clips from the training and probe sessions conducted with the participants. Afterwards, they were asked to answer the social validity questions in their forms. The forms were given to the students and parents by the researchers and asked to be answered and given back to the researchers in closed envelopes which were provided by the researchers in advance. The analyses of the collected data were analyzed in two ways: parents’ opinions were analyzed inductively and graduate students’ opinions were analyzed descriptively.

During the study, besides the data mentioned above, also two kinds of reliability data were collected: dependent and independent variable reliabilities. Both reliability data were collected from the same sessions selected randomly. Dependent variable (inter observer) reliability data were calculated by number of agreements divided by number of agreements plus disagreements multiplied by 100 (Tawney & Gast, 1984; Tekin & Kurcaali-Iftar, 2006). Independent variable (procedural) reliability was calculated by dividing number of trainer behaviors observed by number of teacher behaviors planned multiplied by 100 (Billingsley, White, & Munson, 1980; Tekin & Kurcaali-Iftar, 2006). Trainer behaviors observed during providing video modeling and graduated guidance together training sessions were as follows: (a) controlling materials, (b) securing attention, (c) making the participant watch the video, (d) delivering task direction, (e) waiting for the 4 s response intervals, (f) providing controlling prompt, (g) giving appropriate responses for the participants’ responses, and (h) rewarding attention and cooperation. During providing video modeling alone training sessions, only “providing controlling prompt” was not observed, and during probe sessions “making the participant watch the video” and “providing controlling prompt” steps were not observed.

Results

Effectiveness Results

Figures showing the data regarding the effectiveness of providing video modeling and graduated guidance together and video modeling alone for teaching role playing skills to children with autism are given below (Figures 1 and 2). In the figures, baseline, training, maintenance and generalization data can be seen regarding the percentage of correct responses of the participants during the sessions. The performances of the participants during the implementation of both procedures are summarized below.
Figure 1. Percentage of correct responses for Izel and Yasin baseline, intervention, maintenance and generalization probe sessions.
Effects of Providing Video Modeling and Graduated Guidance together and Video Modeling alone for Izel

Izel displayed an average of 12% correct responses during “breakfast play” taught through video modeling and graduated guidance together, whereas she displayed an average of 18.6% correct responses during “carrying fruits with a truck play” taught through video modeling alone baseline sessions. She had an increase in both procedures during the training sessions and met the criterion in both target skills with a percentage of 100% correct responses within two training sessions for the “breakfast play” and four training sessions in the “carrying fruits with a truck play”. One, two and four weeks after the training sessions were completed, follow-up data were collected. Also during the maintenance sessions, it was observed that she maintained both target skills with a percentage of 100% accuracy. As can be seen on Figure 1, during the generalization pre-test sessions, Izel displayed 12% correct responses for the “breakfast play” and 4% correct responses for the “carrying fruits with a truck play”. During the post-test generalization sessions she displayed both target skills with 100% accuracy.

Effects of Providing Video Modeling and Graduated Guidance together and Video Modeling alone for Yasin

During the baseline session Yasin had no correct responses at all for his two target skills. As can be seen in Figure 1, he acquired “carrying fruits with a truck play” skills with 100% accuracy within five training sessions through video modeling and graduated guidance together whereas, “play ground play” skills within seven training sessions through video modeling alone procedure. One, two and four weeks after the training sessions were completed, follow-up data were collected. During these sessions, Yasin displayed both target skills with an accuracy of 100%. As also can be seen on Figure 2, Saim had no correct responses for the target behaviors during the pre-test generalization sessions whereas he displayed 100% accuracy for the “carrying fruits with a truck play” skills and 92% accuracy for “play ground play” skills during the post-test generalization sessions across different settings.

Effects of Providing Video Modeling and Graduated Guidance together and Video Modeling alone for Saim

Saim displayed no correct responses for neither of the target behaviors during the baseline sessions. As can be seen in Figure 2, he acquired “carrying fruits with a truck play” skills with 100% accuracy within six training sessions through video modeling and graduated guidance together whereas, “play ground play” skills with 100% within 10 training sessions through video modeling alone procedure. One, two and four weeks after the training sessions were completed, follow-up data were collected. During these sessions, Saim displayed both target skills with an accuracy of 98.6% (range = 96%-100%). As also can be seen on Figure 2, Saim had no correct responses for the target behaviors during the pre-test generalization sessions whereas he displayed 100% accuracy for the “carrying fruits with a truck play” skills and 92% accuracy for “play ground play” skills during the post-test generalization sessions across different settings.

Effects of Providing Video Modeling and Graduated Guidance together and Video Modeling alone for Ege

Ege displayed no correct responses for either of the target behaviors during the baseline sessions. As can be seen in Figure 2, he acquired “play ground play” skills with 100% accuracy within eight training sessions through video modeling and graduated guidance together whereas, Ege acquired “carrying fruits with truck play” skills with a 42% (range = 0–60%) of accuracy within 12 training sessions through video modeling alone procedure. Since there was a big difference between the skill acquiring time length of the participants, researchers decided to provide ethical equivalence for the “carrying fruits with a truck play” by training the participant through video modeling and graduated guidance together procedure for four more training sessions. As a result, Ege met the criterion for “carrying fruits with a truck play” with a total of 16 training sessions. After Ege met the criterion for both of his target behaviors through ethical equivalence, one, two and
Figure 2. Percentage of correct responses for Saim and Ege baseline, intervention, maintenance and generalization probe sessions.
four weeks after the training sessions were completed, follow-up data of video modeling and graduated guidance together procedure were collected. During these sessions, Ege displayed both target skills with an accuracy of 100%. As can be seen on Figure 2, Ege had no correct responses for the target behaviors during the pre-test generalization sessions whereas he displayed 100% accuracy for both of his target skills during the post-test generalization sessions across different settings.

### Efficiency Results

For comparing the efficiency of the two teaching methods used data of: (a) number of sessions until the criterion was met, (b) number of trials until the criterion was met, (c) number of incorrect responses, and (d) total time spent for training until the criterion was met were recorded. Table 2 shows the results of all participants regarding the variables mentioned.

Data for video modeling and graduated guidance together implementations for four participants can be summarized as follows: (a) total number of training sessions was 21, (b) total length of training sessions was 1 hour 23 min and 20 s, and (c) number of incorrect responses was 0. Data for video modeling alone implementations for four participants can also be summarized as follows: (a) total number of training sessions was 33, (b) total length of training sessions was 2 hour 01 min and 04 s, and (c) number of incorrect responses was 318. On Table 2 efficiency results regarding the use of video modeling and graduated guidance together and video modeling alone can be seen separately.

### Social Validity Results

Parents’ opinions about the social validity of the study. All parents thought that teaching the selected target behaviors was important for their children in both social and also emotional ways. They also mentioned that their children needed to learn more play skills in their daily lives. Besides, parents pointed that teaching the target play skills through video modeling by watching another child was an effective way of teaching play skills for their children. Parents were also asked if there were any points that they did not like about the study. They told that there was not any point to be mentioned negatively about the study. Parents also mentioned that they bought similar toy sets for their children and started to play with their children as they watched on the video modeling videos.

Graduate students’ opinions about the social validity of the study. Major findings about the social validity results of the study collected from the graduate students can be seen in this part. The frequency of the opinions of graduate students is presented in parenthesis. All the graduate students mentioned that it was important to teach role play skills to children with developmental disabilities (9). Also that, conducting research studies on teaching role

<table>
<thead>
<tr>
<th>Participants</th>
<th>Implementation/skill</th>
<th>No of sessions</th>
<th>No of trials</th>
<th>Number and percentage of incorrect responses</th>
<th>Time min:sec.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Izel</td>
<td>VM+GG-B</td>
<td>2</td>
<td>2</td>
<td>0–%0</td>
<td>07:25</td>
</tr>
<tr>
<td></td>
<td>VM-CF</td>
<td>4</td>
<td>4</td>
<td>11–%10,5</td>
<td>17:10</td>
</tr>
<tr>
<td>Yasin</td>
<td>VM+GG-CF</td>
<td>5</td>
<td>5</td>
<td>0–%0</td>
<td>21:16</td>
</tr>
<tr>
<td></td>
<td>VM-PG</td>
<td>7</td>
<td>7</td>
<td>52–%28,5</td>
<td>27:48</td>
</tr>
<tr>
<td>Saim</td>
<td>VM+GG-CF</td>
<td>6</td>
<td>6</td>
<td>0–%0</td>
<td>25:33</td>
</tr>
<tr>
<td></td>
<td>VM-PG</td>
<td>10</td>
<td>10</td>
<td>72–%27</td>
<td>26:22</td>
</tr>
<tr>
<td>Ege</td>
<td>VM+GG-PG</td>
<td>8</td>
<td>8</td>
<td>0–%0</td>
<td>29:06</td>
</tr>
<tr>
<td></td>
<td>VM-CF</td>
<td>12</td>
<td>12</td>
<td>183–%44,8</td>
<td>49:44</td>
</tr>
</tbody>
</table>

**B:** Breakfast play  **CF:** Carrying fruits  **PG:** Play ground play

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TABLE 2

Efficiency results regarding the use of video modeling and graduated guidance together (VM+GG) and video modeling (VM) alone

<table>
<thead>
<tr>
<th>Participants</th>
<th>Implementation/skill</th>
<th>No of sessions</th>
<th>No of trials</th>
<th>Number and percentage of incorrect responses</th>
<th>Time min:sec.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Izel</td>
<td>VM+GG-B</td>
<td>2</td>
<td>2</td>
<td>0–%0</td>
<td>07:25</td>
</tr>
<tr>
<td></td>
<td>VM-CF</td>
<td>4</td>
<td>4</td>
<td>11–%10,5</td>
<td>17:10</td>
</tr>
<tr>
<td>Yasin</td>
<td>VM+GG-CF</td>
<td>5</td>
<td>5</td>
<td>0–%0</td>
<td>21:16</td>
</tr>
<tr>
<td></td>
<td>VM-PG</td>
<td>7</td>
<td>7</td>
<td>52–%28,5</td>
<td>27:48</td>
</tr>
<tr>
<td>Saim</td>
<td>VM+GG-CF</td>
<td>6</td>
<td>6</td>
<td>0–%0</td>
<td>25:33</td>
</tr>
<tr>
<td></td>
<td>VM-PG</td>
<td>10</td>
<td>10</td>
<td>72–%27</td>
<td>26:22</td>
</tr>
<tr>
<td>Ege</td>
<td>VM+GG-PG</td>
<td>8</td>
<td>8</td>
<td>0–%0</td>
<td>29:06</td>
</tr>
<tr>
<td></td>
<td>VM-CF</td>
<td>12</td>
<td>12</td>
<td>183–%44,8</td>
<td>49:44</td>
</tr>
</tbody>
</table>

**B:** Breakfast play  **CF:** Carrying fruits  **PG:** Play ground play

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Role Playing Skills  /  27
play skills to children with developmental disabilities was important for these children (9). Implementation of video modeling and graduated guidance together seemed to be easy to implement for teaching various target skills to those children (6). Some of the graduate students reported that they thought that both teaching techniques were quite effective for teaching the skills to children with developmental disabilities (5). Students were also asked about the point they most liked about the study as open-ended questions. The students mentioned that the target plays were very enjoyable and the toy sets selected for teaching the target plays were very suitable for the plays. One of the graduate students also mentioned that having different functioning levels of children with autism was the most interesting part of the present study.

**Discussion**

Effectiveness and efficiency of providing video modeling and graduated guidance together and video modeling alone was compared for teaching role playing skills to children with autism. Besides the opinions of the parents of the participants and the graduate students in the special education department were examined as the social validity results of the study.

Results of the study showed that both teaching methods seemed to be equally effective in teaching role playing skills for three participants (Izel, Yasin, and Saim) of the study. Whereas for the fourth participant (Ege), the criterion for the target role playing skill which was taught through video modeling and graduated guidance together was met. But Ege could not meet the criterion for the target role playing skill which was taught through video modeling alone. Therefore it can be said that for Ege only providing video modeling and graduated guidance together was effective in teaching the target role playing skill. Effectiveness, maintenance and generalization results of the present study seemed to be parallel with the results of Akmanoglu and Tekin-Iftar (2011) and Alacantra (1994). Hence it can be said that when video modeling is provided with graduated guidance, it can be effective in teaching various skills (e.g. shopping skills, and protecting themselves from the lures of strangers) to children with autism.

Although the effectiveness results of the present study seem to be positive, there are some points to be considered while reading the study. First, as it was mentioned before, three participants acquired both of the target skills as determined in the criterion whereas Ege could not meet the criterion in one of his target behaviors which was taught through providing video modeling alone. Therefore, in order to teach to play the truck game, and for ethical equivalence, Ege was provided video modeling and graduated guidance together until he met the criterion in his second role playing skill. A number of causes might be the reason of Ege’s being unsuccessful in his second target behavior: Although the difficulty levels of the target role playing skills were tried to be equal, Ege’s target behaviors might not be equally difficult for him. Another reason might be the difficulty that Ege has in understanding the visual-spatial relationships; in other words, he might not understand that he would play the same play that he watched on the lap-top with the same toy sets.

Second, when the efficiency of the two teaching procedures are compared in general, providing video modeling and graduated guidance seems to be more efficient regarding the number of training sessions and trials, and the number of correct and incorrect responses during training and probe sessions. When the percentage of incorrect responses are examined, it can be seen that for two of the participants, providing video modeling and graduated guidance together is more efficient than providing video modeling alone whereas for the other two participants the opposite is the current situation. When the total time spent for training is examined for efficiency, it is seen that providing video modeling and graduated guidance together is more efficient than the other teaching procedure for all participants.

Thirdly, reviewing the literature, no other studies could be found comparing the efficiency of providing video modeling and graduated guidance together and providing video modeling alone. Therefore, it is thought that the results of the present study will extend the literature in this way.

The fourth point to be mentioned was
about the social validity results of the study. Social validity data collected from the parents of the participants are parallel with the studies which were conducted by providing video modeling and graduated guidance together or by providing video modeling alone teaching procedures separately (Akmanoglu & Tekin-Iftar, 2011; Bellini & Akullian, 2007; Ergenekon, Tekin-Iftar, Kapan, & Akmanoglu, 2010; Genc, 2010; Sancho et al., 2010). Although the social validity data are positive about the study, there is another important data which was shared by the parents of the participants orally after the authors collected the social validity in written forms. After completing the social validity forms, two mothers and one father mentioned that their children started to play functional plays with their own toys at home, moreover, they started to play symbolic plays with real objects at home. This is very important for generalization of the target behaviors of the present study into real environments of the participants. Another important point to be mentioned about the social validity data of the present study is the data collected from the graduate students of special education department. It is thought that collecting social validity data from people other than the teachers, trainers or parents of the participants, but who have enough knowledge about the teaching procedures used in the study, will extend the literature about video modeling.

There are some limitations to be considered while reading this study: First is that the present study was conducted with four children with autism and only two role playing skills were taught to these children. Therefore the generalization of the collected data can only be in this frame. Second limitation is the setting of the study. The present study was conducted in the Unit for the Children with Developmental Disabilities in Anadolu University. This Unit is a segregated environment and both training and generalization sessions were conducted in the Unit. This could be a limitation for the participants of the study, but as the readers will remember, the parents of the study mentioned that their children started to play with their own toys at home functionally. Therefore it can be said that the participants have overcome the mentioned limitation of the study. Third is that this study was conducted by using adapted alternative treatment design in order to compare the effectiveness and efficiency of providing video modeling and graduated guidance together and video modeling alone for teaching role playing skills to children with autism. In this model, two different target behaviors were aimed to be taught. The role play skills which were determined to be the target skills of the participants were tried to be equally difficult. Although the authors tried to make the number of steps and required behaviors in the task analysis equal, this is only an assumption, because there is no systematic way to look for the equivalence of the two target role plays of each participant.

Some recommendations can be provided regarding the results of the study: As can be seen in the results, there are some differences in the effectiveness and efficiency of the two teaching procedures used in the study. Therefore, teachers may decide to use one of the teaching procedures depending on the characteristics and needs of their students and target behaviors they will teach. For the future studies, it might be recommended to conduct similar studies in different settings (e.g. inclusion environments, home of participants), with different trainers (e.g. teachers, and parents of participants). This study was conducted in a 1:1 environment. Therefore it might be recommended to conduct a similar study in a small group condition. Another recommendation might be about the generalization of the study. Since this study was conducted by using the same video model recordings in all the training sessions, future researchers might use different video recordings using different people playing the same games in different settings.

References


Nikopoulos, C. K., & Keenan, M. (2007). Using video modeling to teach complex social se-


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