Using Video Modeling to Teach Complex Play Sequences to a Preschooler with Autism

Patricia D'Ateno
Kathleen Mangiapanello
The Graduate Center, City University of New York and Queens College, City University of New York

Bridget A. Taylor
Alpine Learning Group

Abstract: The identification of efficient teaching procedures to address deficits in imaginative play skills, which are commonly seen in children with autism, is a challenge for professionals who are designing treatment programs. In the present study, video modeling was used to teach play skills to a preschool child with autism. Videotaped play sequences included both verbal and motor responses. A multiple-baseline procedure across three response categories (having a tea party, shopping, and baking) was implemented to demonstrate experimental control. No experimenter-implemented reinforcement or correction procedures were used during the intervention. Results indicated that the video modeling intervention led to the rapid acquisition of both verbal and motor responses for all play sequences. This procedure was shown to be an efficient technique for teaching relatively long sequences of responses in relatively few teaching sessions in the absence of chaining procedures. In addition, the complex sequences of verbal and motor responses were acquired without the use of error-correction procedures or explicit experimenter-implemented reinforcement contingencies.

Deficiencies in the domain of symbolic or imaginative play are characteristic of children who have been diagnosed with autism (American Psychiatric Association, 1994). Finding techniques to ameliorate the skill deficits commonly seen in individuals with autism is a challenge for professionals who are designing treatment programs. Play skills have been taught to children with autism using a variety of techniques. Stahmer (1995) used pivotal response training to successfully teach symbolic play skills to seven children with autism. The toy play training included child selection of materials, modeling of appropriate toy play, and verbal praise. The Speech Play Enhancement for Autistic Kids program also uses modeling as part of a procedure to teach appropriate toy play and speech to children with autism (Charlop-Christy & LeBlanc, 1999).

Video modeling is a teaching technique that incorporates modeling in the procedure. A person watches a videotaped demonstration and then imitates the behavior of the model. Video modeling has been used to teach conversational exchanges to children with autism (Charlop & Milstein, 1989) and to increase the number of play-related statements children with this disorder made toward their siblings (Taylor, Levin, & Jasper, 1999).

In Charlop and Milstein (1989), three children with autism viewed videotapes that depicted two adults engaged in scripted conversations about toys. After several viewings of the video, the children engaged in the scripted conversation with an adult. The number of viewings of the video that were required for each child to achieve the criterion level of responding varied from 3 to 20 sessions. During the training sessions, edible reinforcers were presented on a variable-interval 1-minute schedule for the behaviors of sitting well, making eye contact, and working hard. Edible reinforcers were also presented contingently for the correct completion of an entire three-line conversation during training. During generalization probe sessions, no edible reinforcers were presented. Following the video modeling training, all three children acquired all of the scripted conversational exchanges. They all also made unscripted statements during the toy play sessions.

Taylor et al. (1999) used a video modeling procedure to teach two children with autism to engage in play-related

Volume 5, Number 1, Winter 2003, pages 5–11

statements with their siblings. One child viewed a video that depicted his sibling and an adult making play-related statements. The child demonstrated acquisition of the scripted comments during play with his sibling, but he did not make any unscripted play statements. A forward-chaining procedure using the videotape was employed with the second child. The videotape was divided into segments of four statements each. Gradually, the number of segments viewed on the videotape was increased until the videotape was shown in its entirety. The results for this child indicated that both the number of scripted and unscripted play statements increased for all three activities used in the study. For both children, verbal praise and tangible reinforcers were presented for correct responses during training sessions.

The purpose of the present study was to assess the effects of video modeling alone, without experimenter-implemented contingencies or prompts, on the acquisition of motor and verbal play sequences in a preschool-age child with autism. This study extended the current literature on video modeling in several ways. First, the play sequences were longer, requiring more verbal and motor responses than have previously been required without the use of a forward-chaining procedure. Second, the type of play behavior taught was appropriate for solitary play and so increased the periods of time that the child engaged in imaginative play without reliance on the interaction of another person. Third, no experimenter-implemented reinforcement contingencies were used during any phase of the study.

Method

PARTICIPANT

Rachel, a girl with autism, was 3 years 8 months at the beginning of the study. She was enrolled at the Alpine Learning Group, a center-based education program for children with autism. Standardized tests conducted at 2 years 11 months of age showed that Rachel performed at the 2 years 8 months age level (standard score = 98) on the *Peabody Picture Vocabulary Test* (3rd ed.; Dunn & Dunn, 1997). She obtained a partial composite score of 51 based on three area scores (verbal reasoning, abstract reasoning, and short-term memory) of the fourth edition of the *Stanford-Binet Intelligence Scale.* The play activities for Rachel often involved repetitive manipulation of toys and self-stimulation. She also rarely verbalized during these activities.

SETTING

The study was conducted at the Alpine Learning Group facility, a specialized educational program using the principles of applied behavior analysis. Baseline and intervention sessions were conducted in a large conference room. The room contained chairs and tables that were arranged in a U shape. Video viewing took place in either the previously described room or a 2 m × 2 m room containing a television monitor, videocassette recorder, and two chairs.

MATERIALS

A Betty Crocker© baking set, a toy shopping cart with plastic play food, and a tea party set with a table and dishes were used for the baking, shopping, and tea party play sequences, respectively. A doll was used in all of the play sequences. Three separate video vignettes using an adult model were taped for each of the play sequences. During all of the videotaped play sequences, the adult spoke to the doll by reading a script and manipulated the stimulus materials according to the script. With one exception, each of the scripted statements ranged between three and five words in length. The number of scripted verbal statements and motor responses varied from 10 to 12 statements across the three play sequences.

DEPENDENT MEASURES

The number of scripted and unscripted verbal statements and the number of modeled and not-modeled motor responses served as dependent measures. A *scripted verbal statement* was defined as a verbal statement that matched the statement of the video model while allowing for the omission or substitution of one word. For example, for the scripted statement "Come on, drink some tea" a response of "Come on, drink tea" or "Come on, drink the tea" would be scored as a correct scripted verbal response. *Unscripted verbal statements* were defined as verbal statements that did not meet the definition of a scripted verbal statement but that were contextual with respect to both the object and the situation (e.g., "I love to lick frosting"). Repetitions of the same statement were scored only the first time that the statement was made. Statements were considered different if the wording was changed with respect to more than just articles of speech or the object label. For example, "These cookies are delicious" and "These cupcakes taste great" would be scored as two separate statements. "These cookies are delicious" and "This cupcake is delicious" would be scored as one response. The second statement would be considered a repetition of the first statement. Unscripted statements were also required to be at least three words in length.

Modeled motor responses were defined as motor responses that matched the motor sequence as it pertained to a change in the environment and had been performed by the model from start to completion. In other words, a correct response had the same outcome on the environment as the model's response. For example, if the model picked up two plates at the same time and placed them on the table and Rachel picked up and placed the two plates on the table one at a time, the response would be scored as correct. A *not-modeled motor response* was defined as a motor response that did not meet the definition of a modeled motor response but that was contextual with respect to both the object and the situation. For example, pretending to lick the frosting on the cupcake would be contextually appropriate, whereas throwing a cookie across the room would not be appropriate. Corrective actions, such as picking up a dropped item, would not be scored as a not-modeled motor response. Repetitions of the same response would be scored only for the first occurrence. For example, the first novel food item placed in the shopping cart would be scored as a not-modeled motor response; however, additional novel items placed in the cart would not be scored as correct responses.

EXPERIMENTAL DESIGN

A multiple-baseline procedure across response categories was used to demonstrate experimental control. The randomly determined order of the intervention was tea party, shopping, and baking play sequences. The criteria for introducing the next treatment condition were eight verbal and eight motor responses (either modeled or not-modeled verbal and motor responses) per session across two consecutive experimental intervention sessions.

PROCEDURE

During baseline sessions, Rachel was presented with the toys and verbally instructed to "Play ______ [tea party / shopping / baking]." The duration of each baseline session was a maximum of 5 minutes. A baseline session was terminated prior to the 5 minutes if Rachel left the play area for more than 15 seconds.

During the video modeling intervention, Rachel viewed the video depicting one play sequence in a room isolated from the play materials. After a minimum delay of 1 hour, Rachel was given access to the play materials that corresponded to the play sequence depicted in the video. The duration of each experimental session was 5 minutes or until Rachel left the play area for more than 15 seconds. No experimenter-implemented reinforcement, prompting, or correction procedures were used.

INTEROBSERVER AGREEMENT

Interobserver agreement measures were calculated for 50% of baseline and intervention sessions for all play sequences. Interobserver agreement was calculated separately for modeled and not-modeled responses by dividing the number of agreements by the number of agreements plus disagreements and multiplying by 100. For motor responses, mean agreement was 99.7% (range = 90%–100%) and 95% (range = 66%–100%) for modeled and not-modeled responses, respectively. For verbal responses, mean agreement was 99.7% (range = 90%–100%) and 99.2% (range = 60%–100%) for scripted and unscripted responses, respectively. There were a few low interobserver agreement measures obtained for not-modeled and unscripted responses that were a result of the very few responses that were made in any one session.

Results

Figure 1 displays the data for modeled and not-modeled motor responses across all three play sequences for Rachel. Data from the tea party sequence are depicted in the first leg of Figure 1. Following the introduction of the video modeling intervention, the number of modeled motor responses systematically increased from a stable baseline measure of 2.0 responses per session (range = 2–2) to an average of 9.8 responses (range = 3–11) per session. The mean number of not-modeled motor responses was 1.5 (range = 0–2) and 0.9 (range = 0–4) during the baseline and intervention sessions, respectively.

The second leg of Figure 1 depicts the number of motor responses from the shopping sequence. Following the introduction of the video modeling intervention, the number of modeled motor responses systematically increased from an average of 4.2 responses (range = 1–7) per baseline session to an average of 9.8 responses (range = 7–11) per session. The number of not-modeled motor responses averaged 1.1 (range = 0–3) per baseline session and 0.9 (range = 0–2) per intervention session.

The third leg of Figure 1 displays the number of motor responses for the baking sequence. Following the introduction of the video modeling intervention, the number of modeled motor responses systematically increased from an average of 0.5 responses (range = 0–2) per baseline session to an average of 4.4 responses (range = 0–7) per session. The mean number of not-modeled motor responses was 1.2 (range = 0–3) and 3 (range = 1–5) per session during the baseline and intervention sessions, respectively.

Data for verbal responses are displayed in Figure 2. The first leg of Figure 2 depicts the number of verbal responses for the tea party sequence. Following the introduction of the video modeling intervention, the number of scripted verbal responses systematically increased from 0 responses per baseline session to an average of 7.6 responses (range = 1–10) per session. The mean number of novel verbal responses was 0 and .5 (range = 0–3) per session during the baseline and intervention sessions, respectively.

The second leg of Figure 2 depicts the number of verbal responses for the shopping sequence. Following the introduction of the video modeling intervention, the number of scripted verbal responses systematically increased from no responses per baseline session to an average of 6.1

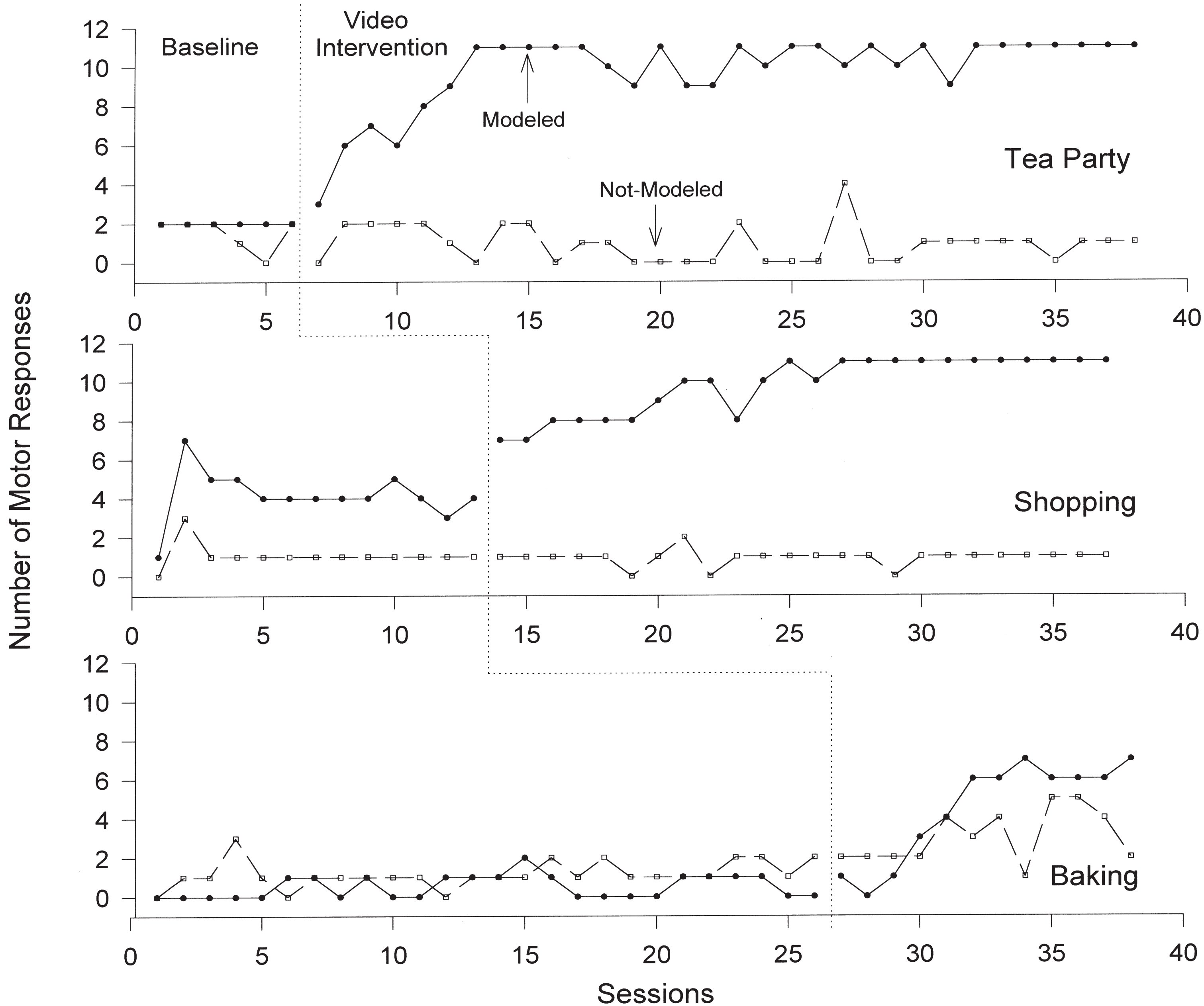

Figure 1. The number of modeled and not-modeled motor responses during the baseline and intervention sessions across all play sequences.

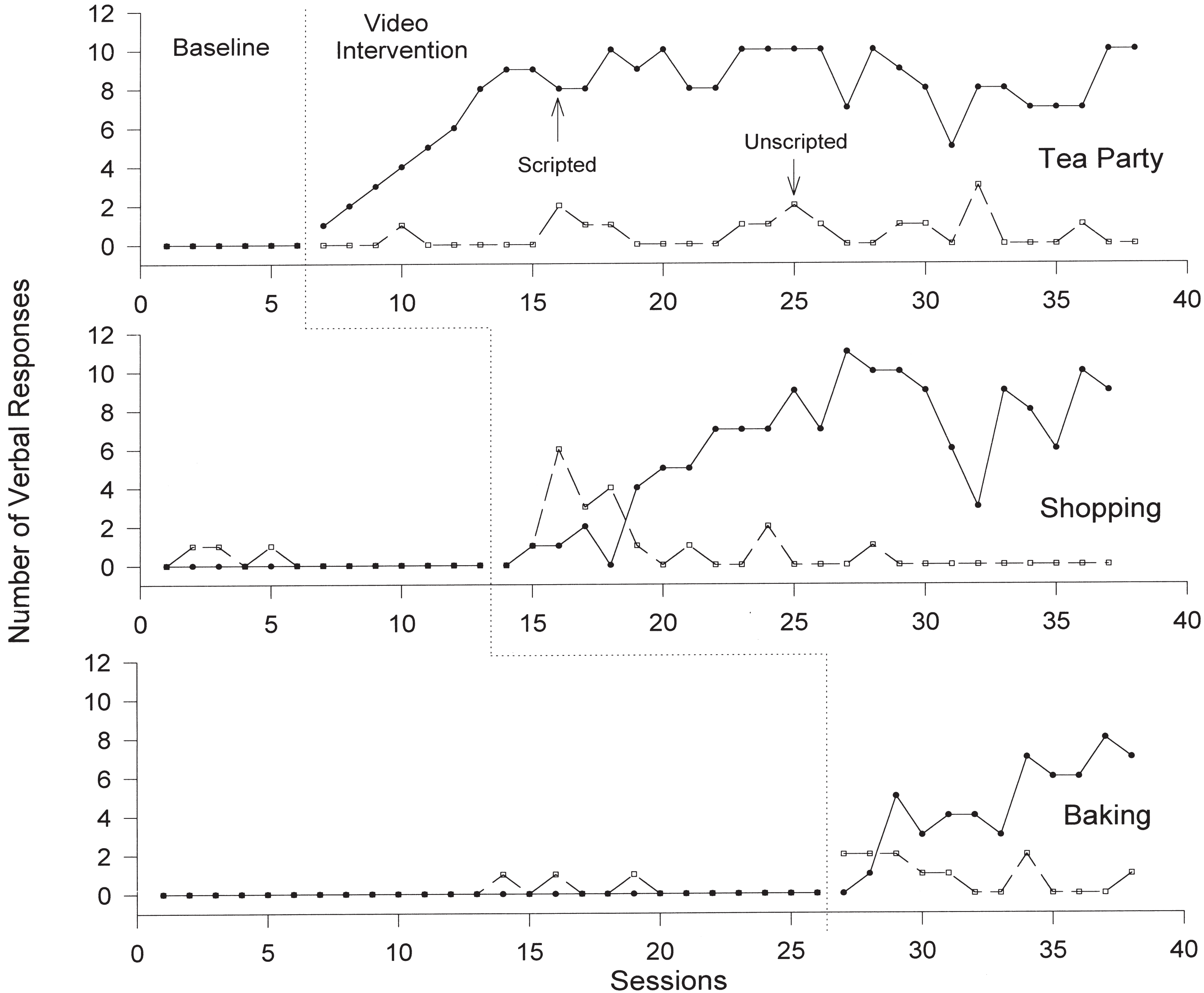

Figure 2. The number of scripted and unscripted verbal responses during the baseline and intervention sessions across all play sequences.

responses (range = 0–11) per session. The number of novel verbal responses averaged 0.2 (range = 0–1) per baseline session and 0.8 (range = 0–4) per intervention session.

The third leg of Figure 2 displays the number of verbal responses for the baking sequence. Following the introduction of the video modeling intervention, the number of scripted verbal responses systematically increased from no responses per baseline session to an average of 4.5 responses (range = 0–8) per session. The mean number of novel verbal responses was 0.1 (range = 0–1) and 0.9 (range = 0–2) per the baseline and intervention sessions, respectively.

Discussion

We found that the introduction of the video modeling intervention led to an increase in the number of both verbal and motor play responses; however, experimental control was not achieved for novel and not-modeled responses. The number of novel and not-modeled verbal and motor responses remained low through both the baseline and intervention sessions. We concluded that video modeling was an effective intervention to promote comparatively long sequences of play behavior in this child without prompting, correction, or reinforcement from adults.

It is also noteworthy that each video vignette depicted many verbal and motor responses. Rachel viewed the video vignette in its entirety in the intervention sessions. Despite the presentation of many verbal and motor responses at one time, she acquired most of the modeled responses. Moreover, this acquisition took place over a brief number of model presentations relative to the number of responses acquired. For example, during the intervention for the tea party sequence, Rachel acquired a total of 18 motor and verbal scripted responses over baseline levels following 16 video presentations. The acquisition of the motor and verbal responses following the viewing of the entire video extends the findings of Taylor et al. (1999), who used a forward-chaining procedure for teaching a long sequence of responses.

We found little novel responding in this study. One possible explanation for this may be the use of only one video vignette for each play sequence. In other words, a sufficient number of exemplars may not have been included in the teaching procedure. Stokes and Baer (1977) pointed to the training of a sufficient number of exemplars as an important factor in response and stimulus generalization. The presentation for each play sequence of multiple video vignettes that depicted several responses as well as different types of stimuli might have enhanced generalization. Another possible explanation for the lack of novel responding may be the rather stringent definitions for novel responses used in the present study compared to response definitions used in previous research. For example, to be scored as correct, an unscripted verbal response had to be at least three words in length and differ from a scripted response by more than one word. Due to these rather conservative response definitions, some novel or unscripted responses made by Rachel in this study were not scored as correct novel responses.

The response definitions used in the present study may have also masked a possible negative outcome. Repetitive patterns of speech and motor behavior are characteristic of children with autism. Because the response definitions for both motor and verbal responses specified that repetitions of responses were not to be scored as correct, the data collection procedures were not sensitive to detecting repetitive patterns of behavior. Future research should design data collection procedures that would be sensitive to this possibility. Although repetitive behavior data are not available for the present study, anecdotal reports of Rachel's behavior do not indicate that the acquired scripted verbal and modeled motor responses were used in either a noncontextual or a repetitive fashion.

It is important to note that although no external reinforcement contingencies were implemented in any phase of the study, increases in both verbal and motor responses were obtained across all play sequences. Previous studies have used reinforcement contingencies during the treatment phase (Charlop & Milstein, 1989; Taylor et al., 1999) The finding in the present study that the number of imitated responses increased following the video modeling intervention suggests that there may have been reinforcement contingencies in effect. The exact nature of these reinforcement contingencies remains unclear because the experimenters did not explicitly control those contingencies.

The effectiveness of video modeling as a treatment procedure to increase play skills was demonstrated. Both scripted verbal responses and modeled motor responses were acquired in the absence of explicit experimenter-implemented reinforcement contingencies. Moreover, no error correction procedures were implemented at any point during intervention. In addition, acquisition of relatively long sequences of verbal and motor responses occurred following the viewing of the entire complex sequence. The present findings indicate that video modeling can be an effective and efficient teaching medium.

ABOUT THE AUTHORS

Patricia D'Ateno, *MA, is currently pursuing her PhD in psychology at the Graduate Center, City University of New York. Her interests include behavioral intervention for children with developmental disabilities, college-level teaching, and basic research in the area of human time perception.* ***Kathleen Mangiapanello,*** *BA, is currently pursuing her PhD in psychology at the Graduate Center, City University of New York. Her interests include college-level teaching and basic research in the area of human time perception.* ***Bridget A. Tay-***

***lor,** PsyD, BCBA, is cofounder and director of the Alpine Learning Group. Her research interests include increasing the social and verbal behavior of individuals with autism. Address: Patricia D'Ateno, Queens College, Department of Psychology, 65-30 Kissena Blvd., Flushing, NY 11367.*

REFERENCES

American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders* (4th ed.). Washington, DC: Author.

Charlop, M. H., & Milstein, J. P. (1989). Teaching autistic children conversational speech using video modeling. *Journal of Applied Behavior Analysis, 23,* 275–285.

Charlop-Christy, M. H., & LeBlanc, L. A. (1999). Naturalistic teaching strategies for acquisition, generalization, and maintenance of speech in children with autism. In P. M. Ghezzi, W. L. Williams, & J. E. Carr (Eds.), *Autism: Behavior analytic perspectives* (pp. 167–183). Reno, NV: Context Press.

Dunn, L., & Dunn, M. (1997). *Peabody picture vocabulary test* (3rd ed.). Circle Pines, MN: American Guidance Service.

Stahmer, A. C. (1995). Teaching symbolic play skills to children with autism using pivotal response training. *Journal of Autism and Developmental Disabilities, 25,* 123–141.

Stokes, T. F., & Baer, D. M. (1977). An implicit technology of generalization. *Journal of Applied Behavior Analysis, 10,* 349–367.

Taylor, B. M., Levin, L., & Jasper, S. (1999). Increasing play-related statements in children with autism toward their siblings: Effects of video modeling. *Journal of Developmental and Physical Disabilities, 11,* 253–264.

Action Editor: Robert L. Koegel

Notice

Call for Nominations and/or Applications

The National Council for the Social Studies annually honors the outstanding performance of teachers, researchers, and other worthy individuals and programs and encourages unique and innovative social studies education projects through its award and grant programs. Founded in 1921, the National Council for the Social Studies has grown to be the largest association in the country devoted solely to social studies education. NCSS serves as an umbrella organization for elementary, secondary, and college teachers of social studies; teacher educators; researchers; curriculum designers; and curriculum specialists. The council engages and supports educators in strengthening and advocating social studies.

Detailed NCSS award and grant guidelines and criteria are available at http://www.socialstudies.org/awards. To request hard copies of guidelines, contact Information Services at 800/296-7840, ext. 106. For specific questions, contact Ana C. Post, Manager of Recognition Programs and Special Projects at NCSS, 8555 Sixteenth St., Ste. 500, Silver Spring, MD 20910; 800/296-7840, ext. 114; apost@ncss.org.