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# *USING VIDEO MODELING AND REINFORCEMENT TO TEACH PERSPECTIVE-TAKING SKILLS TO CHILDREN WITH AUTISM*

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We evaluated video modeling and reinforcement for teaching perspective-taking skills to 3 children with autism using a multiple baseline design. Video modeling and reinforcement were effective; however, only 2 children were able to pass an untrained task, indicating limited generalization. The findings suggest that video modeling may be an effective technology for teaching perspective taking if researchers can continue to develop strategies for enhancing the generalization of these new skills.

DESCRIPTORS: autism, perspective taking, video modeling, theory of mind

Video modeling involves showing a videotape of a person providing an exact version of a behavior for a child to imitate. Video modeling has been combined with other strategies (e.g., reinforcement) to teach conversational and self-care skills to children with autism, and may result in faster acquisition and better generalization than in vivo modeling (e.g., Charlop-Christy, Le, & Freeman, 2001). Charlop-Christy et al. suggest that video modeling may be effective because television is an engaging medium (i.e., results in longer sustained attention) that does not require social interaction during learning. Video also permits accentuation of certain stimulus features and minimization of distracting or irrelevant features to help combat the problem of stimulus overselectivity (e.g., Spradlin & Brady, 1999). These advantages may also be valuable for teaching complex social behavior such as perspective taking.

*Perspective taking* has been defined as understanding that another person's beliefs about events may be different from reality and that those beliefs will guide future behavior (Sigman & Capps, 1997). This phenomenon is illustrated by the classic Sally-Anne false-belief task (Baron-Cohen, Leslie, & Frith, 1985) in which a child predicts the search behavior of a puppet that has seen an object hidden in one location but has not seen that it was later moved. To demonstrate perspective taking, the child answers that the puppet will search in the original location, behaving based on its own directly observed information even though it is false. Perspective taking appears to serve an integral function in social behaviors such as sharing, turn taking, and empathy, which involve taking

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another's perspective. From a more behavior-analytic viewpoint, perspective taking involves (a) observing the behaviors of another individual in a given situation and (b) predicting the individual's subsequent behavior (e.g., "He's going to look where the ball was hidden before he left") or responding in accordance with the private thoughts or emotions another individual might typically experience in that situation (e.g., making consoling remarks, such as "better luck next time," after the observed individual lost a tennis match).

Children diagnosed with autism often have difficulty with false-belief tasks and also do not develop related social behaviors such as sharing, turn taking, empathy, and verbal initiations (Shabani et al., 2002; Spradlin & Brady, 1999). The current study evaluated the effectiveness of video modeling and reinforcement for teaching perspective taking to children with autism and examined generalization among novel tasks.

## METHOD

### *Participants*

Three boys, aged 7 to 13 years, who had been diagnosed with autism, participated. Timmy was 7 years 3 months of age with a verbal mental age of 4 years 10 months. He produced simple complete sentences when prompted, but rarely initiated speech. Bobby was 7 years old with a verbal mental age of 6 years 6 months. He held simple conversations about his preferred topic, trains. David was 13 years of age with a verbal mental age of 15 years. He read and wrote in complete sentences and constructed brief paragraphs about a variety of topics. All children were primarily served in special education and were included in general education classrooms at least part of every day. Timmy received additional services at a specialized afterschool program.

### *Setting*

Timmy's sessions were conducted at his afterschool program with testing in one small room and training in another. For Bobby and David, the study was conducted in their respective special education classrooms. Testing occurred at a table in one corner of the classroom, and video modeling sessions were held in another corner. Children were seen two to three times weekly. Sessions were videotaped for Timmy and Bobby but not David per parental request.

### *Task Descriptions*

A staff member administered three common measures of perspective taking while he or she sat directly across from the participant at a small table. The experimenter prompted and praised attentiveness (e.g., eye contact and looking at stimuli) and in-seat behavior throughout each task. No feedback was ever provided during any testing session. Complete scripts of all tasks and all instructional videos are available from the first author upon request.

*Sally-Anne.* The Sally-Anne task included common animal puppets (e.g., Barney, Cookie Monster, Tigger, Franklin) presented in dyads. Initially, both puppets were present, and the participant saw one of them place an object under a bowl. One puppet left, and the child saw the other puppet place the object under a box. The observing child was asked where the departed puppet would look for his object. The correct answer was "under the bowl" or pointing at the bowl. This task was administered once as a pretest before any baseline or training occurred and once as a posttest after testing and training occurred for the other tasks.

*M&Ms®.* This task was based on the "Smarties" task using a substitute candy (M&Ms; Perner, Frith, Leslie, & Leekam, 1989). The participant was shown an oversized box of candy and was asked what he

thought was inside. Then, the box was opened to show that there was really a pencil inside rather than candy. The participant was asked to predict what another person, who was not present, would think the box contained. The correct answer was "M&Ms."

*Hide and seek.* Two experimenters and the child were present and saw that a puppet left footprints when it walked (Chandler, Fritz, & Hala, 1989). Those footprints were erased and the second experimenter left the room before the puppet walked, again leaving footprints, to place treasure in a chest marked "1." The puppet then moved the treasure to a nearby box marked "2" but left no footprints. The second experimenter returned and the child was asked to predict where this person would look for the treasure. The correct answer was "1" or pointing to Chest 1.

*Stimulus variations.* Each variation involved a stimulus change in the task, and several required a response not observed in the video. The variations were tested but not trained and were used to evaluate generalization and to determine whether the child was imitating a rote response from the video or using the strategy in the video. At least two variations for each task were used with each child.

Three variations were developed for the hide-and-seek task. Variant 1 (V1) had footprints leading to a red cup with the coins moved to a white cup. Variant 2 (V2) had the footprints leading to Chest 1 with the coins moved to the experimenter's pocket. Variant 3 (V3) had the footprints leading to Chest 2 and the coins moved to Chest 1. V1 and V3 required a response not observed in the training video.

Five variations were developed for the M&M task. Variant 1 (V1) had pennies in the candy box. Variant 2 (V2) had a crayon in the box. Variant 3 (V3) had a pencil in a Cheetos® canister. Variant 4 (V4) had a pencil in a cereal box, and Variant 5 (V5) had a toy in a cereal box. V3 through V5 required the child to give a response different than the trained response.

### *Data Collection and Interobserver Agreement*

The participant's response was scored as pass or fail. A second trained observer scored a 100% of sessions for Timmy, 34% of sessions for Bobby, and 100% of sessions for David. Agreements were divided by agreements plus disagreements and multiplied by 100%. Mean interobserver agreement was 100% for all participants.

### *Research Design*

We used a multiple baseline design across two tasks (M&M and hide and seek) for each participant. In addition, the Sally-Anne task, which was never trained, served as pre- and posttests. Baseline with the two training tasks began immediately following the pretest. The order of task training was counterbalanced across subjects. Each session in baseline, intervention, and follow-up lasted approximately 4 to 10 min.

*Pretest, posttest, and baseline.* The experimenter provided no feedback on performance. After completion of session, the child was praised for effort and given a self-nominated preferred item (e.g., sticker, small candy) for participating regardless of his performance.

*Video modeling and reinforcement.* Testing sessions continued as in baseline. Prior to testing, the child viewed a video of an adult correctly completing the task. The video focused on relevant visual cues (e.g., zoom-in on the footprints), and the model explained the strategy (e.g., "he looks in 1 because the footprints lead to 1—it's a clue"). The experimenter paused the video to have the child respond to perspective-taking questions immediately after the correct response was modeled. Correct answers resulted in praise and preferred edible items or stickers. Incorrect responses resulted in a replay of the

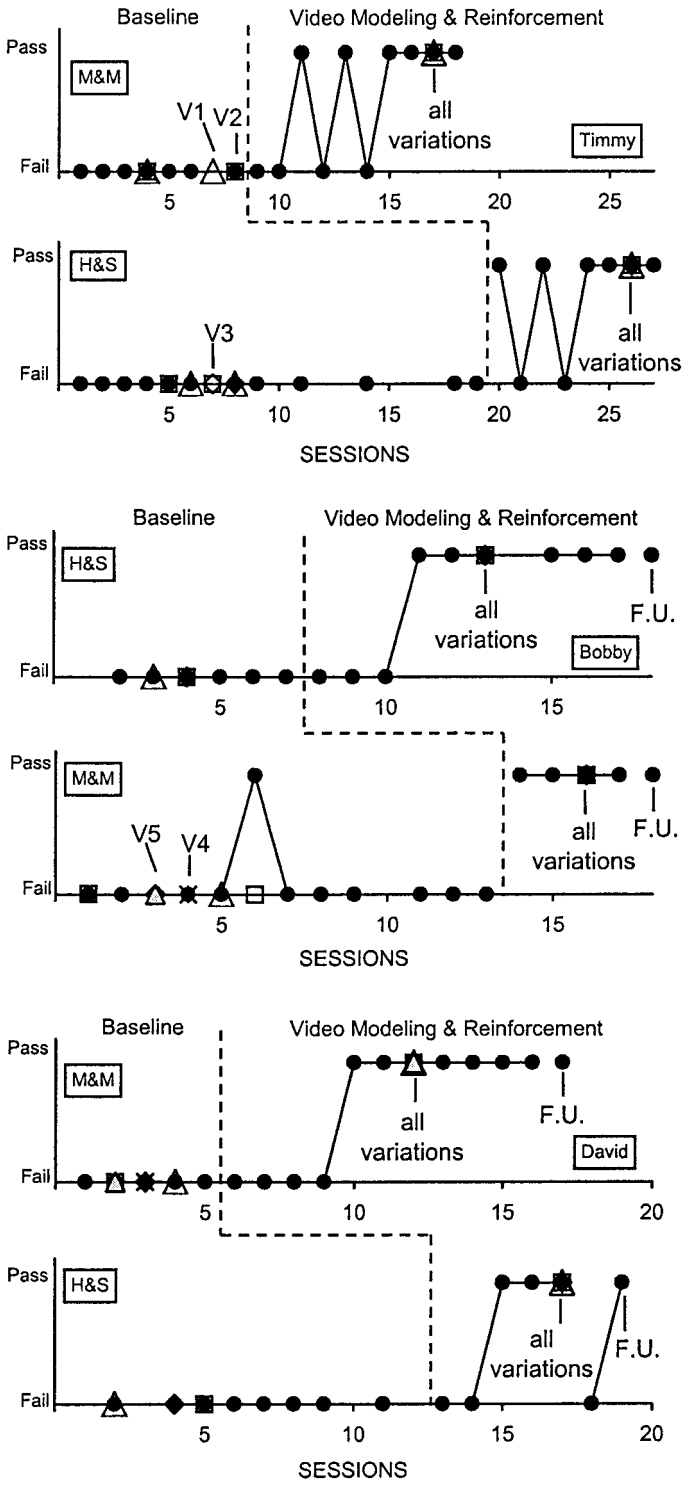


Figure 1. Performance during testing sessions for Timmy, Bobby, and David. Original tasks are depicted as closed circles, and additional task variations are depicted as open circles, squares, triangles, and closed squares.

video and a prompt to pay attention until correct imitation occurred. The training session was complete at three consecutive correct responses to the video. The range of viewings per modeling session was three to eight. The training phase continued until a child responded correctly in the testing session on three consecutive trials. Then, all exemplars for that task were tested. It should be noted that a child could consistently pass in the training session and then fail in testing. Follow-up was conducted 1 month after the final training session. No video was used prior to maintenance sessions. If a child failed a question at follow-up, a booster video modeling session was conducted and the child was retested.

## RESULTS AND DISCUSSION

The results are depicted in Figure 1. Video modeling with reinforcement was an effective teaching procedure for these perspective-taking tasks. All children consistently failed the primary tasks and variants in baseline. All children eventually mastered the tasks and passed variants even when novel vocal or motor responses were required. Follow-up evaluations were successful for Bobby and David (one booster session required). All participants failed the Sally-Anne pretest; however, 2 of the 3 participants (Timmy and Bobby) passed the task after intervention for the other two tasks, suggesting generalization (data not shown in the figure). Interestingly, Knoll and Charman (2000) demonstrated the same pattern of responding and skill transfer with typically developing 3-year-olds, indicating that this stimulus control problem is not unique to children with autism.

One limitation of the current investigation is that we taught perspective taking but did not directly address a behavioral explanation for the target response. Additional research should focus on behavioral explanations such as stimulus control and the role of equivalence relations (Spradlin & Brady, 1999). Finally, future studies might evaluate strategies for increasing perspective-taking skills in natural social situations.

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