# INCREASING OBSERVATIONAL LEARNING OF CHILDREN WITH AUTISM: A PRELIMINARY ANALYSIS

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We evaluated the effects of monitoring responses on the acquisition of sight words with 3 children with autism. In the training condition, we taught participants a vocal imitation and matching response related to a peer's reading response. In another condition, participants were exposed only to a peer's reading responses. Participants read the words more accurately during test sessions when the monitoring response was required. Results and discussion highlight the importance of identifying component responses of observational learning and the need for additional research in this area.

*Key words*: observational learning, autism, monitoring response

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*Observational learning* has been defined as learning that results from observing the responding of others and the consequences of such responding (Catania, 2007). Research has demonstrated that children with autism do not readily learn by observing others (Varni, Lovaas, Koegel, & Everett, 1979), and they show deficits in skills that may be associated with observational learning, such as attending (Patten & Watson, 2011) and imitating (Williams, Whiten, & Singh, 2004). Despite these deficits, only a few studies have attempted to assess or teach children with autism to learn through observation (e.g., Charlop, Schreibman, & Tyron, 1983; Rehfeldt, Latimore, & Stromer, 2003; Werts, Caldwell, & Wolery, 1996), and only one has focused directly on training observational learning repertoires (Pereira-Delgado & Greer, 2009).

Engaging in monitoring responses, such as attending to and imitating the behavior of the model, and engaging in responses that indicate attention to relevant instructional stimuli could potentially facilitate observational learning (Taylor & DeQuinzio, 2012). To date, research has not successfully isolated or assessed the effects of monitoring responses on observational learning.

In this preliminary investigation, we sought to determine if teaching three children with autism to monitor their peers' reading responses would lead to the acquisition of sight words. Monitoring consisted of imitating the peer's response and attending to the instructional materials as demonstrated by a matching response. In one condition, the participant observed a peer reading words presented by a teacher while the teacher prompted the monitoring responses. In another condition, we assessed the acquisition of a different set of sight words when participants were exposed to the instructional interaction between the teacher and the peer but the teacher did not prompt monitoring responses.

## METHOD

### Participants and Setting

Three children with autism participated: Jack, 4 years 5 months, Eric, 4 years 8 months, and Rebecca, 3 years 8 months. Their age-equivalent scores on the on the Peabody Picture Vocabulary Test were <1.9 years, 2 years, and <1.9 years, respectively. Participants could follow two-step instructions, match words, imitate vocal responses, and label pictures of nouns, and they all had experience with token economies. Two children with autism, aged 4 and 7 years, served as peer models and could read words with clear articulation. All sessions took place in a classroom and were implement-

ed by the third author and several classroom teachers who had been trained in the procedures.

## Materials

Ten words on index cards, with a font size of 48, were randomly assigned to one of two conditions. All words were identical in letter length and started with a different letter. We created three different word-matching boards (8 in. by 11 in.) that contained the five words from the training condition, randomly positioned on the board. Each word had an adhesive dot below it for a plastic chip to be affixed by the participant for the matching response. We randomly presented one of the three versions of the matching boards during each training condition. Individualized motivational systems in the form of token boards were available to participants and peers during both conditions.

## Dependent Measure

The dependent measure was the percentage of words read correctly during test sessions. During training, correct monitoring responses also were recorded and expressed as a percentage of trials. Correct monitoring responses included the participant imitating the reading response of the peer when the teacher asked, "What did he say?" and placing a plastic chip below the corresponding word on the matching board. Only independent imitation and matching responses were scored as correct.

## Design

We used a multielement design to evaluate the effects of monitoring responses on the acquisition of sight words during two alternating conditions: a training condition in which the monitoring responses were trained, and an exposure condition in which monitoring responses were not trained. Training and exposure sessions were counterbalanced across the morning and afternoon, with at least 60 min between each session. Each session consisted of 15 trials of each word randomly presented three times. We conducted test sessions of the sight words 10 min after each training or exposure session.

## Procedure

*Pretest.* For each participant, we identified 10 words that the peers could read and the participants could not. We presented each word randomly three times. If participants failed to read the word correctly on all three trials, we considered it unknown and randomly assigned it to either the training or exposure condition. Training words were *spot, find, each, grab,* and *rest* for Jack and Eric, and *star, bike, hair, camp,* and *milk* for Rebecca. Exposure words were *also, into, made, turn,* and *love* for Jack and Eric, and *meal, bath, cake, home,* and *step* for Rebecca.

*Training condition.* The participant and peer sat next to each other at a table, and the teacher sat across from them. The matching board was placed in front of the participant. The teacher held a word between the two and said "read" to the peer. After the peer read the word, the teacher provided praise and a token to the peer. To control for the number of times the participant was exposed to the label, the teacher never stated the word when giving the instruction or when providing the praise statement. The teacher then removed the word from view and asked the participant, "What did he say?" If the participant said the word stated by the peer, the teacher provided praise. The teacher then re-presented the word to the participant for the matching response. If he or she placed the chip under the corresponding word on the matching board, the teacher provided praise and a token. A correct vocal imitation plus the matching response resulted in token reinforcement. The teacher also provided token reinforcement on a fixed-interval (FI) 30-s schedule to participants for sitting quietly, with hands down, throughout each session.

If the participant did not respond correctly to the question, "What did he say?" the teacher presented the word to the peer to read again, and then asked the participant, "What did he say?" If the participant still did not answer

correctly, the matching response was not required and the teacher moved on to the next trial. If the participant answered correctly, the teacher provided praise and re-presented the word for the matching response. If the participant did not demonstrate the matching response, the teacher used least-to-most physical guidance to prompt the response, did not provide token reinforcement, and moved on to the next trial.

*Exposure condition.* We arranged the exposure sessions the same way as the training sessions except the monitoring responses were not required and the matching board was not present.

*Test sessions and maintenance probes.* Ten minutes after each training or exposure session, the teacher tested the words presented in that session by randomly presenting five words three times each. During each trial, the teacher sat across from the participant, held a word in view, and said "read." The teacher did not provide reinforcement or prompts and moved on to the next trial regardless of the participant's response. The teacher provided token reinforcement on an FI 30-s schedule for sitting quietly with hands down. The same procedures were used during maintenance probes.

*Interobserver Agreement and Treatment Integrity*

Interobserver agreement was calculated for the number of words read correctly during both the training and exposure test sessions. An agreement was counted if both the teacher and a second observer independently scored a response as correct or incorrect in the same trial. Interobserver agreement was calculated on a trial-by-trial basis by dividing the number of agreements by the number of agreements plus disagreements and converting the result to a percentage. Interobserver agreement was collected in at least 40% of the training and exposure test sessions and was at or above 90%.

An independent observer used a checklist that contained all of the procedures described above (e.g., environmental arrangement; use of verbal instructions, manual guidance, reinforce-

ment schedules, and error correction) to score whether or not the teacher correctly implemented each step of the procedure during both training and exposure sessions. The percentage of steps correctly implemented was calculated by dividing the number of steps correctly implemented by the total number of steps. Treatment integrity was collected for at least 30% of the training and exposure sessions and was at or above 96%.

## RESULTS AND DISCUSSION

Figure 1 displays the percentage of words read correctly during test sessions for Jack, Eric, and Rebecca, as well as the percentage of trials during the training sessions with correct monitoring responses. For Jack (top), the percentage of words read correctly during training test sessions was initially high and continued to increase until it reached 100%. Responding during exposure test sessions was low until Session 11, after which performance also increased to 100%. At a 2-week maintenance probe, the words remained at criterion levels. However, after 2 months, performance with the training words remained at 100% but performance with the exposure-only words decreased to 50%. The percentage of trials with independent monitoring was 0% during the first training session and increased to a mean of 85%. On Session 16, we removed the word *also* from the exposure set for Jack because he was not able to read the word with clear articulation. We then recalculated his data using four words instead of five for all exposure sessions.

Eric's results (Figure 1, middle) were similar to Jack's, with a higher level of correct responding in the training test sessions and a slower increase in responding in the exposure test sessions. At a 3-week maintenance probe, both sets of words remained at criterion levels. The percentage of trials in which Eric engaged in independent monitoring was 47% during the
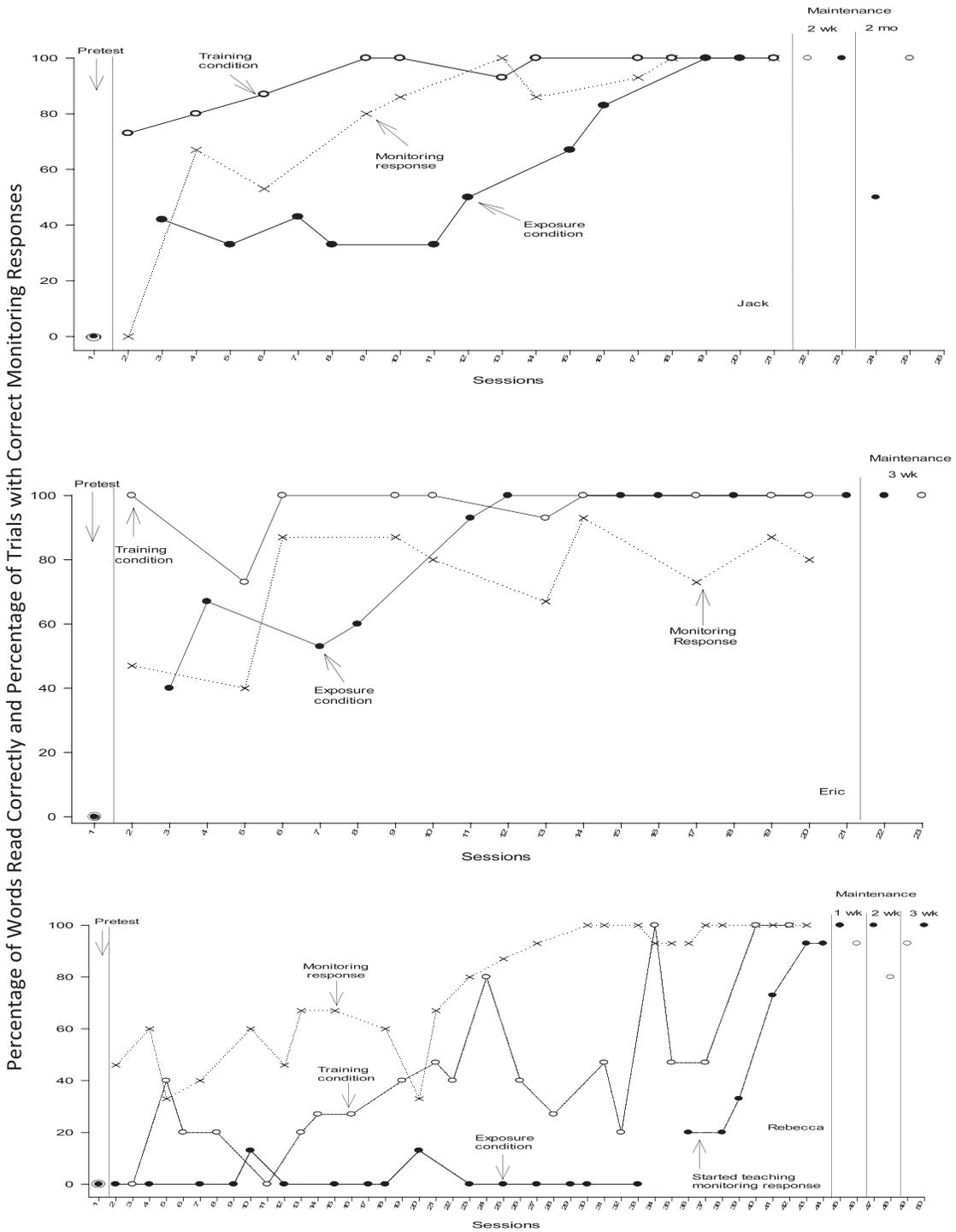
Figure 1.    The percentage of correct responses during exposure and training test sessions and the percentage of trials during training sessions with correct monitoring responses for Jack, Eric, and Rebecca.

first training session and increased to a mean of 77%.

For Rebecca (Figure 1, bottom), responding during training test sessions was initially low and slowly increased across the phase. Responding during exposure test sessions remained near zero over the course of the training. At Session 35, we introduced the monitoring responses in the exposure sessions, and accuracy of responding increased to criterion levels. At 1-, 2-, and 3-week maintenance probes, responding during both training and exposure test sessions remained at criterion. The percentage of trials in which Rebecca engaged in independent monitoring was 46% during the first training session and increased to a mean of 71%. When training of the monitoring responses was introduced in the exposure condition, she engaged in the monitoring responses during a mean of 99% of trials.

For all participants, prompts and reinforcement led to an increase in monitoring responses (i.e., vocal imitation and matching). In addition, all participants initially read a greater percentage of the training words correctly compared to the exposure words. Although results are preliminary, they seem to suggest that monitoring responses affected acquisition of the unknown words during the training condition. Furthermore, Jack's and Eric's responding eventually increased in the exposure condition. This suggests that learning to attend to the responses of the peer and the instructional stimuli in the training condition led to better attention to the peer's responses and the instructional stimuli in the exposure condition. For Rebecca, on the other hand, accuracy did not increase for the words associated with the exposure condition until she was taught the monitoring responses in these sessions.

Caution is warranted when drawing conclusions about the responses taught in this study and their implications for observational learning. For instance, it is not possible to determine which monitoring response (the vocal imitation or the matching response) facilitated learning.

Future studies may isolate the effects of these two responses by assessing each on the learning of novel operants. An additional limitation is that we did not measure the monitoring responses during the exposure conditions. Therefore, we cannot determine if the convergence of the data paths across both conditions for Jack and Eric was a result of learning to monitor the peer's responses or repeated exposure to the words. Replication with additional subjects and extensions of this study using a stronger experimental design (e.g., a multiple baseline design across participants) might further clarify the relation between monitoring responses and observational learning.

It goes without saying that observational learning is much more complex than the responses taught in this study. For example, the discrimination of differential consequences applied to the responses of a model is a key aspect of observational learning that was not examined. Additional research is needed in the area of observational learning to fully understand the behavioral repertoires required to learn by observing others and to identify effective procedures for teaching these responses to those with severe social and learning challenges such as autism.

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