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THE EFFECTS OF MODEL, LEAD, AND TEST WITH REWARD TO TEACH A PRESCHOOL STUDENT WITH A DISABILITY TO IDENTIFY COLORS*

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ABSTRACT

The purpose of this study was to teach color recognition to a 2 year 5 month child with developmental delays and examine the effectiveness of active student responding and error correction when teaching colors. A multiple baseline across colors (three colors at a time) was used to evaluate the effects of the model, lead, and test (MLT) procedure and a reward. During baseline, the student scored less than 50% for all but one color and no help was given but a reward at the end of the session was given for answering and sitting. During intervention, a model, lead, and test procedure was employed with the reward. The results suggested that after several repetitions and a reinforcing learning tool (colored bears) the student was able to point to or vocalize the correct color. A return to baseline for one of the participants did not lead to a decrease in labeling or pointing to the colors trained.

Keywords: model lead, and test, direct instruction, active student responding, color identification, preschooler, multiple baseline single case design, and response generalization

INTRODUCTION

Early childhood intervention emphasizes the importance of teaching children functional goals that are learned in a natural environment (Howard, Williams, & Lepper, 2005). These functional goals progress in a hierarchal pyramid which encourages the acquisition of the simplest skills first, followed by the attainment of more complicated goals. Color recognition is an important skill for any child who will successfully interact with his/her environment. Many objects are defined and labeled by color. For children, color recognition is a complex skill, which requires processing skills on various linguistic and perceptual levels (Akande, 2000). A child must perceive that items are of different color and additionally be able to match an abstract word such as "yellow" to the physical color displayed. However, color recognition is also a prerequisite skill for further linguistic and perceptual skills such as sight word acquisition and fluent reading.

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Young children and children in elementary school with developmental disabilities respond well to Direct Instruction techniques which utilize repetition and frequent practice to master material (Cole & Dale, 1986). In addition, error correction is used to systematically inform the student of the error(s) made. Many students with developmental delays respond well to these practices because they are presented with small amounts of information at a time and are able to organize this information in logical sequences that build on each other in a hierarchal order (Hayter, Scott, Weber, & McLaughlin, 2007).

A common technique required for successful knowledge attainment in school is active academic responding (Heward, 1994). The more time students spend actively responding to learning tasks, the greater the students' acquisition and maintenance of material in and out of the classroom (Berliner, 1980; Greenwood, Delquadri, & Hall, 1984; Pratton & Hales, 1986; Barbetta, Heron, & Heward, 1993). Active student responding requires an observable behavior such as a verbal or written behavior in response to an antecedent such as a question. Another effective technique used with children is when error correction employs a model, a lead through, and a final test of the correct answer. The procedure is employed immediately after each error. This method has been shown to be effective in which sight words were repeated by the teacher immediately following an error (Nelson, Alber, & Gordy, 2004; Barbetta et al., 1993). More recent research has shown the model lead and test components (Marchand-Martella, Slocum, & Martella, 2004) can be successfully employed to teach a wide range of skills for students with a diverse disabilities (Glover, McLaughlin, Derby, & Gower, 2010; Green, McLaughlin, Derby, & Lee, 2010, Kaufman, McLaughlin, Derby, & Waco, 2011, Ruwe, McLaughlin, Derby, & Johnson, 2011). For example, Peterson, McLaughlin, Weber, and Anderson (2008) were able to teach a 13-year old student with autism various locations around the school using model, lead, and test. These procedures and prompts could be faded making their participant more independent in his school setting.

The purpose of this study was to teach color recognition to a 2 year 5 month child with developmental delays and examine the effectiveness of active student responding and error correction with model, lead, and test (MLT) when teaching colors. Color recognition was defined as recognizing colors by pointing to the colors and/or verbalizing the correct color, and the successful implementation and evaluation of MLT would provide evidence that MLT could be used with very young children. Additionally, a second purpose was to prepare the child with a skill that will be used in both the public school system as well as in her social and vocational environment.

METHOD

Participant and Setting

The participant of this case study was a student enrolled in a private non-profit special education preschool classroom (ages birth to 3). The participant was a 2-year-old girl with Congenital Herpes. This participant did not know her colors at the beginning of the study but was able to categorize like colors.

The study took place in a preschool special education classroom. The classroom contained one certified teacher, one paraprofessional, one speech-language pathologist, one occupational therapist, one physical therapist, a volunteer, and a student teacher. The participant attended the 10:30 a.m. to 1:00 p.m. session of preschool which contained about 10 students. The number of students was variable because once a child turned 3 years, the child had to leave the school and attend public school.

Data were collected at the end of the morning during "centers." This was a time when the children split into two groups, each at a different table working on a different project such as matching or an art project involving colors. The groups contained three to four children, and the groups rotated about every 10 minutes or when the children had individually completed the activity. At this time, individual children were sometimes pulled from the table to go to physical, occupational, or speech therapy. The participant was never pulled from the table in the middle of a teaching session. The data were also collected during gym time which occurred after centers. All of the children in the class

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were present for gym time and each child was free to choose an activity during gym time. Gym time lasted about 15 minutes. For both of these settings the participant was able to gain access to bouncing on the ball which was a preferred activity. Each lesson lasted anywhere from 5-10 minutes. The participant's data were gathered based on either an oral response or pointing at the correct color.

Dependent Variable

The dependent variable was the number of colors identified correctly. The participant identified the colors correctly either by pointing to the color that the teacher asked her to identify or by verbalizing the color and pointing to the correct colored bear in the teacher's hand.

Before each color was identified, the teacher would give a verbal prompt, for example, "find the purple bear." Again, a correct answer was one in which the child either pointed to the correct color bear or vocalized the color and pointed to the bear. An incorrect answer included a repeat (of the color without pointing, the word "color," or any other repeatable word), no answer, or pointing to the incorrect color or to both colors. All of these options were included in the data sheet but all were considered incorrect.

Experimental Design and Conditions

A multiple baseline design (Kazdin, 2010) across colors (three colors at a time) was used to evaluate the effects of the model, lead, and test procedure and a reward.

Baseline 1. The participant was presented with two different colored bears at a time. The researcher then gave the participant a verbal prompt, for example, "find the purple bear." The participant selected a single bear. At this time, if the participant selected the incorrect or correct bear, the model, lead, and test procedure was not implemented. However, as long as the student picked an answer for every verbal prompt, the student was allowed to bounce on the ball at the end of the session. Baseline was conducted for three sessions for orange, purple, and green and for two sessions for red, yellow, and blue.

Model, lead, and test (MLT). During this phase, the student would again be presented with two bears of differing colors. The researcher would then give the student the verbal prompt "where is the purple bear?" If the child vocalized purple and/or pointed to the correct color the researcher would praise the child and allow the child to hold the bear for about ten seconds. The researcher would again hold up two colored bears and ask the student to "find the orange bear." If the student answered incorrectly, the teacher would implement the model, lead, and test procedure. For this procedure, the teacher would hold up the orange bear, for example, and say "this is the orange bear." She would then say "where is the orange bear?" and guide the students hand to the orange bear. Then, in order to test the student, the teacher would hold two bears up again and say "find the orange bear." If the child correctly picked the correct colored bear, the child would receive the bear and the researcher would move onto a new color. However, if the child chose the incorrect bear then the researcher would do the model, lead, and test procedure again. At the end of the session, the child was able to bounce on the ball with teacher assistance. This phase lasted for five sessions for orange, purple, and green and for six sessions for red, yellow, and blue.

Baseline 2. The same procedure was implemented for baseline 2 as was done during baseline 1. Baseline 2 occurred for eight sessions for green, orange and purple. However, baseline 2 was not conducted for red, yellow, and blue because the child was absent many days of school at the end of the study. The student was asked to pick the correct color but the model, lead, and test was not implemented for the colors in baseline 2 but the reward of bouncing on the ball was still in place. At this time, other new colors were introduced to the model, lead, and test procedure.

Reliability of Measurement and Implementation of the Independent Variables

Reliability data for the dependent variables were collected 1/3rd of the sessions for the participant. The researcher verbally prompted the student to pick the correct colored bear, administered the reward, and recorded the responses of the participant. Additionally, the student teacher's master teacher was present for 1/3 of the sessions and also recorded the responses of the participant on a

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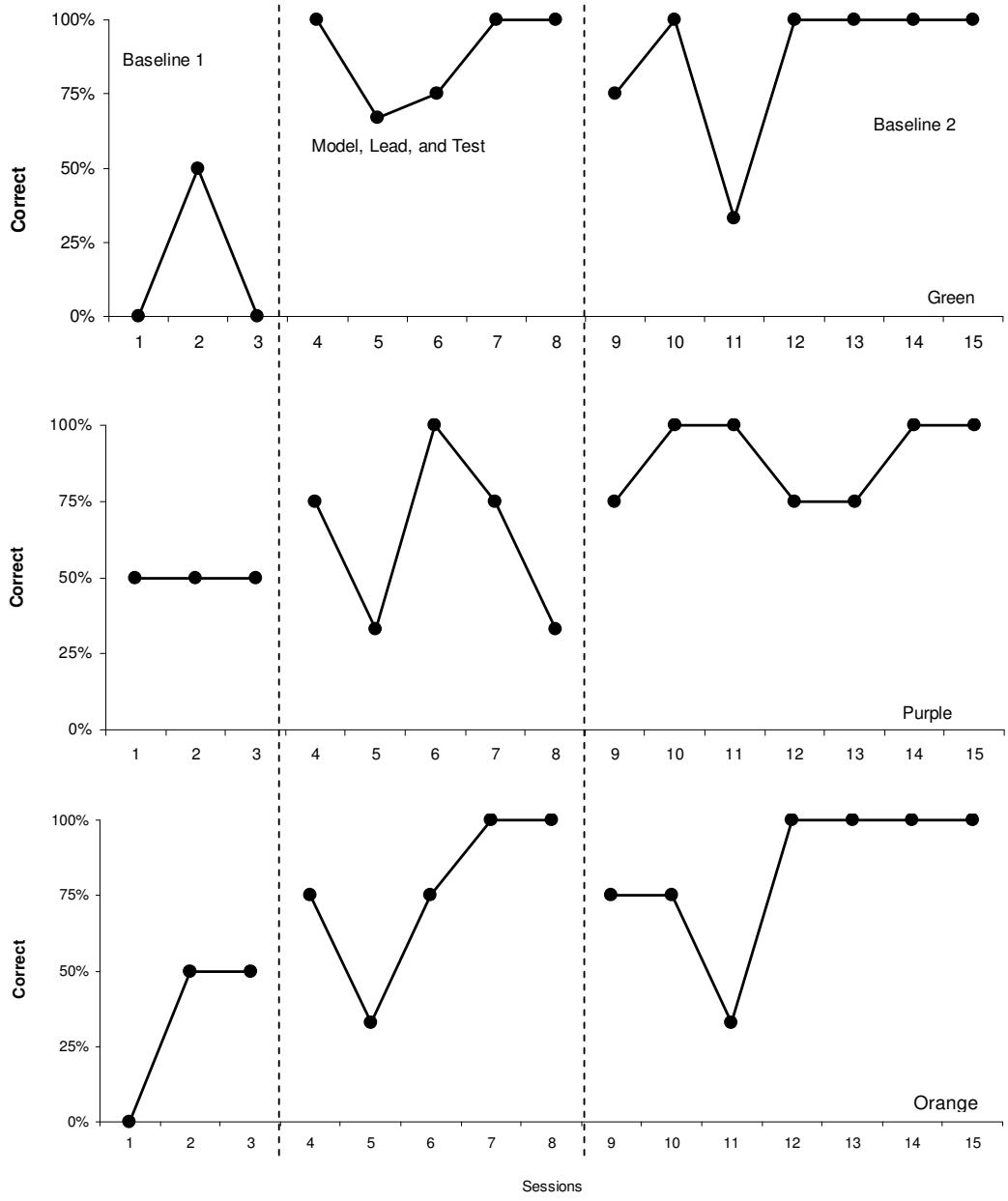
separate data sheet. The number of agreements were divided by the number of disagreements and agreements and then multiplied by 100. The overall reliability rate was 92%.



RESULTS

During baseline 1 for the color green, the student scored an average of 25% with a range of 0% to 50%. During the model, lead, and test procedure, she scored an average of 88.4% with a range of 67% to 100%. During baseline 2, she scored an average of 88.5% with a range of 33% to 100%. For the color purple, the student scored a 50% during baseline with all data points at 50% and during the model, lead, and test procedure she scored an average of 78.2% with a range of 33% to 100%. During baseline 2 for purple, she scored an average of 90.6% with a range of 75% to 100%. For the color orange, the student scored an average of 33% during baseline 1 with a range of 0% to 50%. During the model, lead, and test procedure, the student scored an average of 76.6% with a range of 33% to

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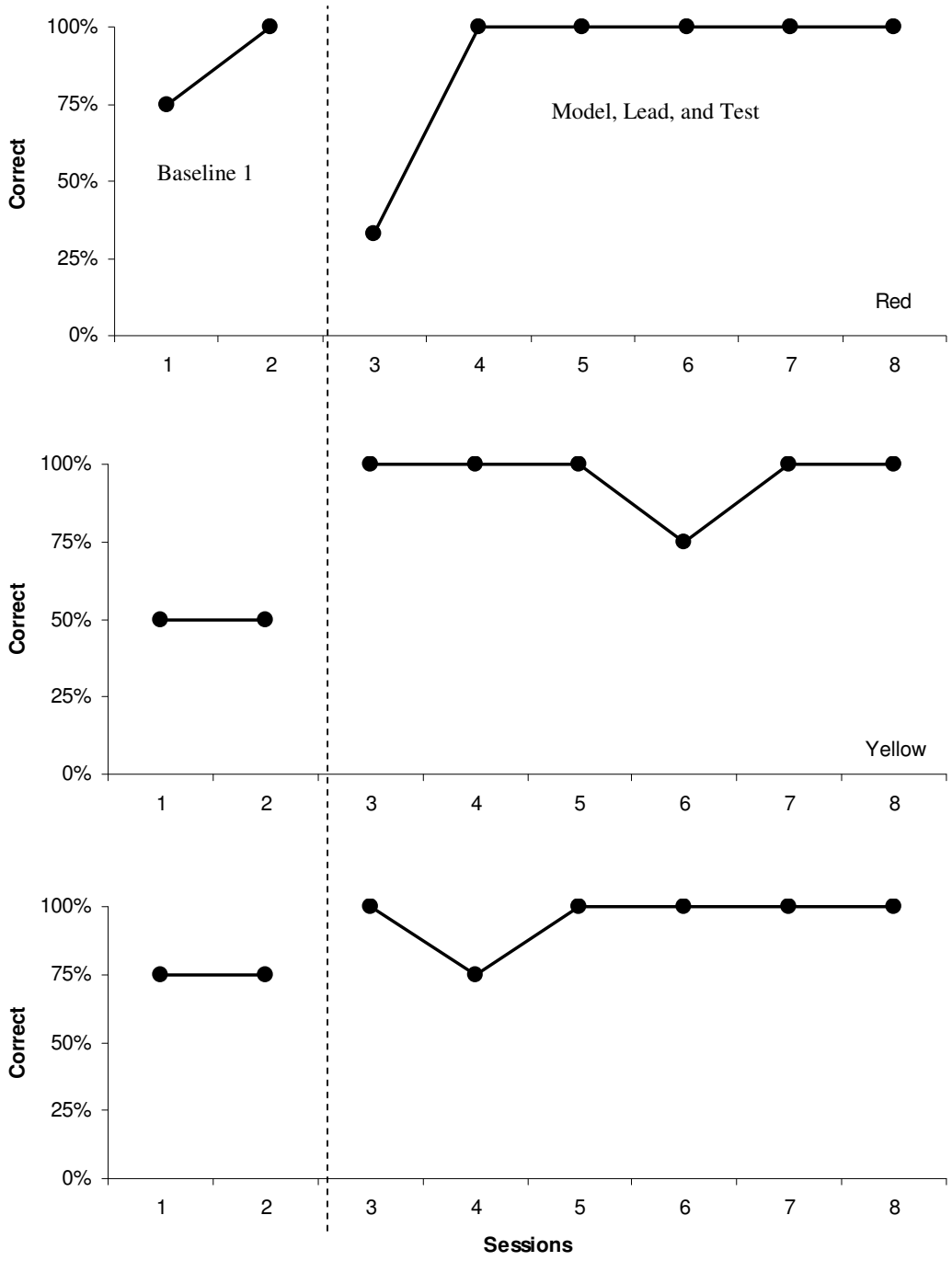

100%. During baseline 2, the student scored an average of 85.4% with a range of 33% to 100% for orange. For the color red, the student scored an average of 87.5% during baseline 1 with a range of 75% to 100%. During the model, lead, and test procedure, the student scored an average of 88.9% with a range of 33% to 100% for red. During baseline 1 for the color yellow, the student scored an average of 50% with all data points at 50% while the student scored an average of 95.8% with a range of 75% to 100% during the model, lead, and test procedure. During baseline 1 for the color blue the student scored an average of 75% with all data points at 75% while she scored an average of 95.8% with a range of 75% to 100% during the model, lead, and test procedure.

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DISCUSSION

Overall, the results of this study indicate that the combination of model, lead, and test and a reward is an effective tool to teach color recognition. Although the data were varied in the beginning of the study, by the end of the study the student was able to correctly identify every color almost 100% of the time. This was due to the fact that the child needed additional practice and repetition. Another factor may have been motivation. As a two-year old who has not had the opportunity to be around other children due to her medical diagnosis, this child was eager to interact with other students and explore her environment through gross motor activities such as pushing a wagon or climbing a ladder. This was why the reward of bouncing on the ball was particularly reinforcing for the child. However, throughout the session, our participant sometimes became distracted by other objects or people in the room. It was therefore important for the teacher to stay animated and allow the student to hold and play with the bears briefly throughout the session.

The present outcomes add to the growing body of literature as to the efficacy of specific evidence-based procedures that employ a model, lead, and test error correction procedure. These outcomes also replicate our prior research (Brasch et al., 2008; Glover et al., 2010; Green et al., 2010; Kaufman et al., 2011; Peterson et al., 2008; Ruwe et al., 2011) and that of others (Barbetta et al., 1999; Heward, 1994; Greenwood et al., 1984). Model lead and test is also part of error correction of cover, copy, and compare (Carter, McLaughlin, Derby, Schuler, & Everman, 2010).

Strengths of the study included the convenience of the study. All that was needed was a tub of colored bears and a large bouncy ball. This made the study extremely inexpensive was that all of these items were already owned by the school. The only materials produced by the student were the data sheets. Additionally, because of the strengths mentioned above, this study was successfully implemented in the classroom and the same study could be applied to other students in the classroom. This study was developmentally appropriate for the student as she was beginning to be able to group items of the same color together at the beginning of the study. As mentioned before, color recognition is a prerequisite skill for further linguistic and perceptual skills such as sight word acquisition and fluent reading (Howard et al., 2005). Finally, the first author was able to observe the student in other classroom activities such as coloring with crayons and putting different colored stickers on a piece of paper. The knowledge that was learned during the study transferred to regular classroom activities as the child was able to vocalize different colors that she wanted and was able to differentiate colors when asked by the researcher.

The limitations of this study included the consistency of the intervention. The student was often absent from school and because school was only three days a week to begin with, this may have slowed the progress of the student. However, towards the end when the student had enough repetition, the child was able to retain the knowledge of colors learned with the model, lead, and test procedure. Another limitation was that only one student was evaluated using the model, lead, and test procedure. A larger group of students would have increased the strength of the results of the study and might have motivated the student selected to stay on task and pick the colors for a longer period of time. The last limitation was the number of trials per session. An increased number of trials would have created a greater and more accurate sample size. However, with the child's attention span at table top activities this was not possible.

The purpose of this study was to teach color recognition either through pointing or vocalization using a model, lead, and test procedure. The data indicates that the student improved her ability to correctly identify colors and was able to transfer this skill into other activities in the classroom as observed by the researcher. Future research should examine the use of model, lead, and test procedures other skills taught in preschool.

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