

# The Effects of Reading Racetracks on the Sight Word Fluency and Acquisition for Two Elementary Students with Disabilities: A Further Replication and Analysis

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**Abstract:** The purpose of this research was to determine the effectiveness of reading racetracks on the sight word acquisition and fluency of two elementary students who qualified for special education services. An ABABA' reversal, single subject design provided data on the number of words the participants read correctly during a 1-minute timing as well as his or her error rate during that same 1-minute timing. The overall outcomes indicated an increase in the acquisition and fluency of sight words and a decrease in errors. Maintenance of treatment gains were noted for both corrects and errors during the post-testing of each participant. Very small declines in corrects were noted as were small increases in errors.

## INTRODUCTION

The importance of educational attainment in today's world cannot be over stressed. Also, it has been suggested that students who read well typically achieve in school [1, 2], students who have difficulty in literacy have a greater probability of dropping out of school and have less success in work and other life skills [3-7].

Unfortunately, many educators continue to disagree as to how to improve reading skills so all the students will be able to read when they exit school [7-12]. Many of these differences emerge because there are children who learn to read regardless of the method or type of curriculum [1]. As the National Reading Panel [6] has clearly pointed out, based on the empirical evidence, we now know there are effective ways to teach reading in today's schools. These procedures include the systematic instruction in letter sound correspondence, direct instruction with sight words, and comprehension, and increased practice with reading materials that have been shown to procedure fluency [4-6]. Many reading programs fail to teach such skills in any systematic manner and do not have the empirical evidence to support their use in teaching reading to students at risk for school failure or who have disabilities [6].

Again, we employed the "reading racetrack" procedure [8, 9, 11, 12] and Precision Teaching techniques [13] to improve the accuracy and fluency that students read words from the Dolch List. Another purpose was to replicate and extend the findings of Alexander, McLaughlin, Derby, & Cartmell [14], Anthony *et al.*, [8] Rinaldi and McLaughlin [11] and Rinaldi *et al.*, [12]. We wanted to determine the effects of the reading racetrack procedure on the sight word

fluency and acquisition of two students in a high income school enrolled in an elementary resource room classroom setting. The final purpose was to employ follow up measures to assess maintenance of treatment gains over time.

## METHOD

### Participants and Setting

The participants in this study were two elementary students attending a K-6 resource room. Angie was a female sixth grader who met the state and federal criteria for a learning disability. She received services in reading and writing. Matthew was a fifth-grade male who was diagnosed with mild mental retardation. He received special education services in reading, writing, and mathematics. Both students were chosen for this study because they had deficits in their reading.

The setting was in a resource room program for reading, writing, and mathematics at a public elementary school in the Pacific Northwest. A certified teacher and a paraprofessional staffed the resource room and the classroom was usually contained three other students. This classroom has been employed in two of our other reports [15, 16]. The first author conducted the procedures five times per week per student usually during a designated reading block in the afternoon.

## MATERIALS

A variety of materials were used: lists of Dolch Sight Word sets 3-4 were used, a stop watch, graph paper, pens, and data collection sheets that were created for the experiment. The reading racetracks were drill sheets designed to resemble an automotive racetrack.

The Dolch lists are high use words that students will need to be able to identify and use in their reading. The words on

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the reading racetracks were taken from the Dolch Sight Words lists 3 and 4 that were commonly used in the classroom. The words placed on the racetrack were carefully selected to avoid having any words on a particular track that were either visually or auditorily similar.

Two different types of reading racetracks were used. Both types of tracks contained 28 cells. The first type of racetrack consisted of seven sight words that were repeated in random order. The random order was used to avoid occurrence of patterns which may have interfered with the students learning the words and instead focusing on and learning the pattern in which they appeared on the racetrack. For Angie, every fifth racetrack was a review racetrack containing the accumulation of the 28 different words that were introduced in the four previous racetracks. For Matthew, every third racetrack was a review of the previous 14 different words that were introduced in the previous two lessons.

### Dependent Variables and Measurement Procedures

Two dependent measures were taken in this study. The first was the number of words read accurately from the reading racetrack during a 1-minute timing. The second was the frequency of errors during the same 1-minute timing. An error was defined as a word that is read incorrectly, an omission or addition of a word, or any word that was read out of order. If the participant made a self-correction before going on to the next word, an error was not counted.

### Experimental Conditions

An ABABA' single subject reversal design [17] was employed across participants to evaluate the effects of the reading racetrack procedure.

#### Baseline 1

During both baselines the participants read orally a word list made up of Dolch Sight Words. No instruction was provided during this phase. The researcher recorded whether or not the students read each word correctly during a 1-minute timing. The participants were given the lists of words and told to read them as fast and as accurately as they could. The participants were informed that they were going to be timed, and they proceeded to read the word list when the researcher cued them to begin. At the end of the 1-minute timing, the researcher instructed the participants to stop, gave praise for their work, and recorded the data. Baseline consisted of five 1-minute timings for both participants and they were tested once per day.

#### Reading Racetracks 1

The procedures used during this phase were similar to those during baseline. However, instead using the Dolch Sight Word lists, reading racetracks were used. At the beginning of each reading session, the students were given the racetrack that he or she was working. The participants were instructed to study the words and practice and then inform the first author when he or she was ready to begin the timing. The researcher would cue the student to begin by saying, "Get Ready, Go!" The researcher kept track of the number of words read by placing a dash on the track each time the participant completed a full circle. At the end of the timed read-

ing, the researcher would say "stop" and the put a star on the word that was last read. Upon completion of each 1-minute timing, the participant counted the amount of words that he or she read and self recorded the data on graph paper. The teacher counted the number of errors, which the student would also graph by placing an "x" on the graph paper to represent his or her errors. These data were then collected and recorded by the researcher on the data collection sheet. After the 1-minute timing was complete the researcher used a "model, lead, test, retest" Direct Instruction procedure to teach or review the words that the participant read incorrectly. This procedure consisted of modeling the correct pronunciation of the word, saying the word with the participant, then the participant said the word, and finally, the participant reread the word several more times. This procedure took approximately 1 minute. The participant remained on the same track until they could reach 90 words per minute without errors, or until they had completed a timing on a specific track five times.

#### Baseline 2

This was a replication of Baseline 1 and was in effect for three sessions for each of the participants.

#### Reading Racetracks 2

This was a reapplication of the reading racetracks procedure. It was in effect for 5 to 8 sessions.

#### Posttest

On the last two days of research, the first author retested the participants on the Dolch Sight word list that was used during baseline.

### RELIABILITY OF MEASUREMENT

Reliability of measurement for Angie and Matthew were taken during 85% of the sessions. The experimenter and the observer sat on each side of the participant with a copy of the current racetrack and a pen during the participant's 1-minute timed reading. If the student read a word correctly, no mark was made next to the word. However, if the student made an error, an "x" was marked by the mispronounced word. An agreement was defined when both observers recorded no mark or both observers recorded an "x" by the words. A disagreement occurred if one observer recorded an "x" by a word, and one observer did not. The overall percentage of interobserver agreement for total words read was 99% (range 98 to 100%).

### RESULTS

The overall results revealed an increase in the acquisition and fluency of sight words and a decrease in errors for both of our participants (See Figs. 1 and 2).

The mean number of words read correctly during baseline was 32 (range 29 to 38) for Angie and 20.25 (range 16 to 23) for Matthew. The average number of errors in baseline was 9.25 (range 9 to 10) for Angie and 6.25 words (range 5 to 8) for Matthew.

For Angie, the implementation of reading racetracks, the overall mean of words read correctly increased to 91.875

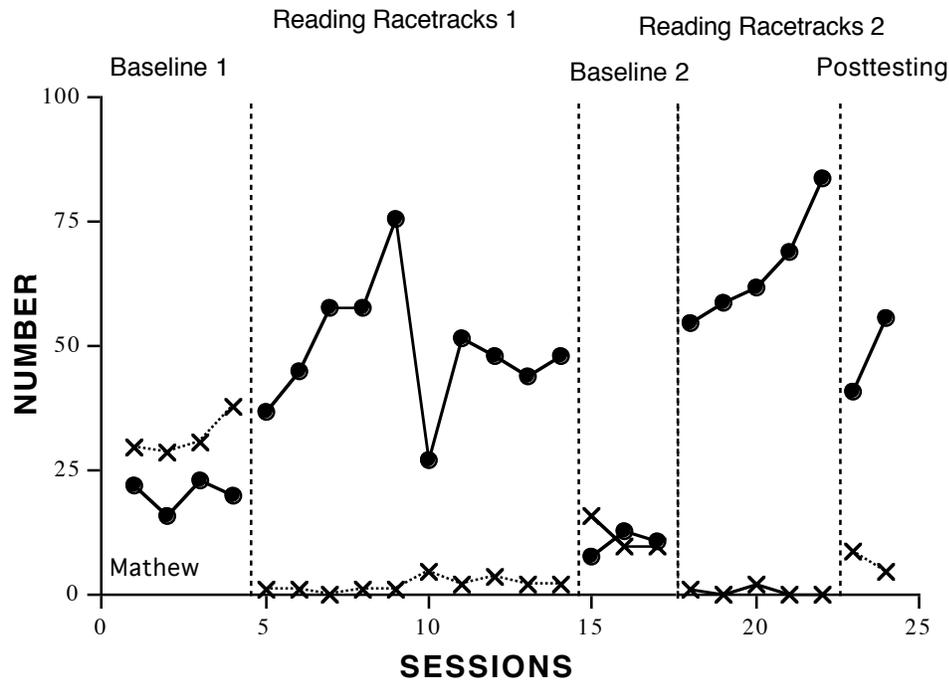


Fig. (1). The number of correct and error words for the two baselines and reading racetrack phases and posttesting for Mathew.

(range 84 to 96). These outcomes were replicated for Mathew. He had an overall mean of 49.3 (range 27 to 76). The mean number of errors during reading racetracks for Angie decreased to 0.625 (range 0 to 4) and at the same time, the mean number or errors for Mathew decreased to 1.9 (range 0 to 5).

A replication of the reading racetracks procedures results in an increase in corrects and a decrease in errors. For Angie, corrects increased to a mean of 87.88 (range 66 to 104). For

Mathew, his corrects improved (M = 65.8; range 55 to 84). Errors for Angie decreased to an average of .8 (range 0 to 6). Mathew's errors decreased also (M = .6; range 0 to 2).

The mean number of words read correctly for Angie in posttest was 86 (range 82 to 90), and the mean number of words read correctly for Mathew in the posttest was 48.5 (range 41 to 56). Errors increased for each participant. Angie's errors averaged 1.0 and Mathew's were 7.0 (range 5 to 9). These data indicate that the use of reading racetracks with

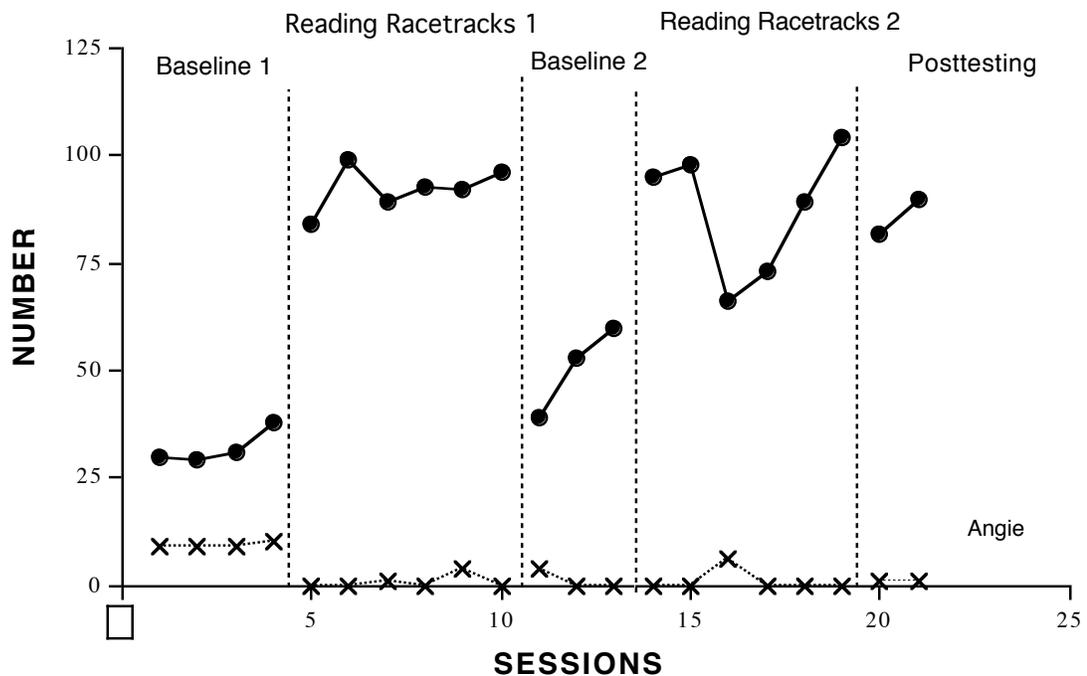


Fig. (2). The number of words correct for the two baselines and reading racetrack phases and posttesting for Angie.

error correction allowed for some maintenance of treatment gains for both students.

## DISCUSSION

This experiment showed that the reading racetrack procedure was effective with students who have disabilities. The improved reading fluency and reduced error rate was a direct result of the reading racetrack procedure.

An additional outcome of the reading racetrack procedure was that both students made comments about how they felt they had become better readers. Angie's improved self-confidence in her reading was clear, she said, "I can read fast!" Matthew also made comments such as "I finally got it!"

Reading racetracks, besides being effective, were also practical in terms of time, money and effort. To prepare for the session, the experimenter took about two minutes creating a new racetrack if needed, and then made two copies, and the actual session was carried out in less than five minutes. There was no cost to the experimenter unless copies had to be made outside of the school. The procedure was easy to implement in the classroom and could easily be implemented in the home or other setting.

The present outcomes replicate and extend our previous work with a racetrack procedure in reading [8, 9, 11, 12, 14], and our recent findings in math with racetracks [18]. Finally, these data indicate that the use of reading racetracks with error correction allowed for maintenance of treatment gains for both students. This is the first time since Rinaldi *et al.*, [12] where maintenance of treatment gains were measured and evaluated. This adds to the literature regarding programming for generalization that was clearly outlined by Stokes and Baer [19]. Additional research will have to be carried out to see if generalization of treatment effects would take place with different words rather than the words that were targeted and trained.

There were several limitations in the present research. First we only employed two participants. Therefore, making generalizations to a wider population should be tempered. Another limitation involved the use of the Dolch words. Additional research should be completed using reading racetracks and precision teaching with other lists or with individual words lists determined through some type of pretesting. Finally, a longer period of time should be employed when maintenance of treatment effects are examined [19].

The special education classroom teacher involved in the research, plans to continue implementing reading racetracks with Matthew. Angie has now mastered most of the Dolch Word Lists and her fluency has reached the standard for see to say sight words.

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