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THE EFFECTS OF USING READING RACETRACKS COMBINED WITH DIRECT INSTRUCTION PRECISION TEACHING AND A TOKEN ECONOMY TO IMPROVE THE READING PERFORMANCE FOR A 12-YEAR-OLD STUDENT WITH LEARNING DISABILITIES*

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ABSTRACT

We used "reading racetrack," a token economy procedure combined with direct instruction, and precision teaching techniques to increase the accuracy and fluency of a sixth-grade student with learning disabilities. Our participant was reading at the second grade level. After baseline, he was taught to read Grade Two Priority Words in Isolation using flashcards, a token program, and model, lead, and test error correction. The participant improved his accuracy and fluency in reading sight words. Pairing the token economy with a baseline phase indicated the reading racetrack and precision teaching procedures were responsible for his increased performance. These differences were statistically significant. The effective use of reading racetracks provides an additional replication of the reading racetracks procedure. The applicability of employing reading racetracks as a practice procedure and consequences for students with academic deficits was discussed.

Keywords: reading racetracks, token rewards, learning disabilities, fluency, precision teaching, charting

INTRODUCTION

Children who read well usually perform well in school (Slavin, 1996; Slavin, Madden, Dolan, Wasik, Ross, & Smith, 1994). Almost 10% of children in the American school system have significant difficulty developing reading skills (Shaywitz & Shaywitz, 1994, 2008). Children who do not read well have a greater probability of being labeled with a disability, dropping out of school, or later having less success in work and other life skills (Hansen & Eaton, 1978; Greenwood, 1990, 1996; Howard, McLaughlin, & Vacha, 1996; Vacha & McLaughlin, 1992). Unfortunately, educators continue to disagree as to how to improve their reading skills so all the students will be literate when leaving school (Kameenui, 1993, 1998; Pearson, 2004; Slavin, 1996; National Institute of Child Health and Human Development, 2000).

According to the research literature, there are several effective and efficient teaching strategies to improve reading fluency and sight word acquisition. These strategies include skill-based programs such as Direct Instruction (DI) (Carnine, Silbert, & Kamenui, 1997). Precision teaching that allows students to actively practice skills and monitor daily performance (Kunzelmann, Cohen, Hutten, Martin, & Mingo, 1970; Lindsley, 1991) are part of these teaching and assessment strategies. Teacher- and student-managed drill and practice methods such as response cards, guided notes, repeated reading (Herberg, Herberg, McLaughlin, Derby, & Weber, 2012), and DI flashcards (Barbetta, Heron, & Heward, 1993; Barbetta, Heward, & Bradley, 1993; Kaufman, McLaughlin, Derby, & Waco, 2011; Ruwe, McLaughlin, Derby, & Johnson, 2011; Shapiro, 2011) have been validated for their effectiveness. The use of classwide peer tutoring (Greenwood, Delquadri, & Hall, 1989; Greenwood, Dinwiddie, Bailey, *et al.,* 1987; Greenwood, Dinwiddie, & Terry, *et al.,* 1984; Greenwood, Hart,

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Walker, & Risley, 1994) has improved classroom academic and social behaviors across a wide range of behaviors and student groups.

Improvements in sight word skills and fluency has also been documented with a drill and practice procedure called reading racetracks (McLaughlin, Weber, Derby, Hyde, Violette, Barton ….Arkoosh, 2009, 2011). Reading racetracks employ timing, error correction, peer or teacher feedback, and plotting of student performance (Rinaldi, Sells, & McLaughlin, 1997). A racetrack is composed of 24 squares or cells arranged in an oval like a racetrack. Two drawings of Ford Mustangs appear at the top and bottom of the track. The teacher can place in these pictures a listing of which word group or set is on this track (Rinaldi *et al.,* 1997). The student is typically taught by the instructor with flashcards first, then is allowed to practice independently using the track. Next, the teacher times the student for one or two minutes to see how fast he can orally read the sight words around the track. Care is taken not to place two words next to one another which are phonetically similar or are homonyms. The student and teacher count the number of correct or errors and plot this performance on traditional or standard celeration graph paper (Lindsley, 1991). After the first four racetracks, a review track is made to provide additional practice and maintenance of treatment effects over time (McLaughlin *et al.,* 2009, 2011; Rinaldi *et al.,* 1997).

The following methods were incorporated in this case report, but contained a novel extension of several of these data-based procedures. We employed the "model, lead, test, and retest" found in Direct Instruction procedures. The precision teaching techniques (Kunzelmann *et al.,* 1970; Lindsley, 1991) of timed readings, fluency building, probe sheets, and student self-charting of performance were also employed. The use of drill and practice procedures similar to Barbetta *et al.,* (1993), were also employed. Finally, a token reinforcement program (Alberto & Troutman, 2010; McLaughlin & Williams, 1988) was implemented and evaluated. We used a "reading racetrack" procedure (Erbey, McLaughlin, Derby, & Everson, 2011; Falk, Band, & McLaughlin, 2003; Green *et al.,* 2010; Kaufman, *et al.,* 2011; Printz, Band, & McLaughlin, 2006; Rinaldi & McLaughlin, 1996; Rinaldi, Sells, & McLaughlin, 1997) and precision teaching techniques to improve the accuracy and fluency that students read Grade Two Priority Words in isolation. The racetracks (see Figure 1) that were employed conformed to the direct instruction principle of not introducing words which are auditorily and visually similar in the same lesson (Carnine *et al.,* 1997).

The purpose of this study was to evaluate the effectiveness of using Reading racetracks to increase the reading of sight words found on the K-2 list core words employed in the school district (Second Grade Priority Word List, 1996). A token economy was also implemented as additional motivation for the child. The participant was a 12-year-old male who read at the 2.0 grade level at the beginning of the study. The student's site reading rate was low and his error rate was high. However, the student displayed good comprehension and recall skills. During a one-minute timing of oral reading, correct words and errors were measured.

METHOD

Participant and Setting

The participant of this study was a 12-year-old male diagnosed with a specific learning disability. Results of the *Wechsler Intelligence Scale for Children-III* (Wechsler, 1992) were Verbal 98, Performance 108, and Full Scale 103 (falling within the average range of intelligence). The school psychologist administered the test three years before data collection began. Data from his Individualized Education Plan (IEP) revealed a reading grade level equivalency of just 2.0. The student attended his general education sixth grade class with 90 minutes of pullout resource room services per day.

The study took place in the resource room of a public elementary school in an urban area of the Pacific Northwest. The special education teacher, the instructional assistant, and the first author staffed the resource room. The authors chose the participant due to his significantly below grade level reading performance and his willingness to participate in the case report. These data were provided as part of the graduation requirements of the first author from Gonzaga University and the Office of the

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Superintendent of Public Instruction for the State of Washington (McLaughlin, Williams, Williams, Peck, Derby, Bjordahl, & Weber, 1999).

Materials

Materials needed for this study were three reading racetracks, standard celeration graph paper, a timer, data collection sheet, red and green pens, grade two sight words, and teacher-made flashcards. A typical model for a reading racetrack can be seen in Figure 1 below.

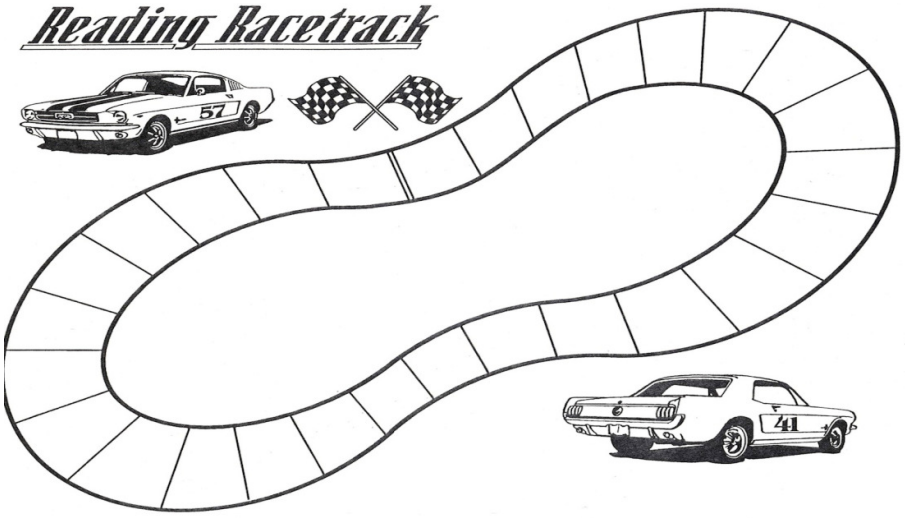

Figure 1. A sample racetrack

Dependent Variables and Measurement Procedures

The dependent variables were the number of words the student read correctly or in error. The first author recorded the number of correct and incorrect words read for a one-minute timing. Before each timing, the student was allowed two minutes to practice the track independently. The student was timed once per day and allotted points toward a token economy for a certain number of correct answers. The number of corrects needed to receive points increased overtime as the intervention itself became more rewarding.

Experimental Design and Conditions

An AB single case design Kazdin, (2010) was used to assess the effectiveness of the reading racetracks paired with direct instruction, precision teaching and an individual token economy.

Baseline

Baseline consisted of presenting a list of core words and asking the student to read the list orally for a one-minute timing. The author made a check on a sheet of paper for each incorrect response and marked the total number of responses. A correct response was defined as pronouncing the word correctly (including self-corrections); an incorrect response was defined as pronouncing a word incorrectly, omitting a word, or reading another word. Baseline data was taken for three days, with a new list presented each day. During this time reading racetracks, direct instruction and the token economy were not implemented.

Reading racetracks with direct instruction + precision teaching and a token economy

The first author selected seven words from lists of K-6 core words for each reading racetrack, taking care not to include two words that were visually or auditorily similar. At the beginning of the intervention, the author chose more words from the primary lists, verifying that the student had prior reading experience with 60 percent of the vocabulary. Later in the intervention, as the student experienced more success, a greater number of immediate words were used. At the beginning of each session, the participant was given two minutes to practice the reading racetrack independently. If the student asked for assistance in decoding a word, the author gave assistance. After two minutes of

practice, the participant was timed for one minute. A correct response was defined as pronouncing the word in each cell correctly or self-correcting. An incorrect response was defined as omitting a word, pronouncing a word incorrectly, or reading a word from another cell. At the end of the one-minute timing, the participant aided the author in calculating the number of correct and incorrect responses, as well as recording the data. After the number of correct responses was calculated, a number of points were given to the student (e.g. 1 point for every five correct reading responses and then gradually increased during the intervention to 1 point for every 20 correct responses). Immediately following data collection, the author used the direct instruction procedure of model, lead, test, and retest for any missed words during the timing. At the end of the session, the student traded his points for a back-up consequence, such as computer time, sign language instruction, candy, or a pencil. When the student completed a racetrack with 100 percent accuracy, a new racetrack was implemented on the following school day. Data were collected approximately four times per week for a total of five weeks.

Reliability of measurement

Inter observer reliability was taken once during baseline and twice during intervention. The first author and supervisor recorded a correct or incorrect mark each time a word was read orally, independently throughout the one-minute timing. The percent of inter observer agreement was calculated by dividing the number of agreements by the number of agreements plus disagreements and multiplying that number by 100. An agreement was defined as both the author and the supervisor having the same answer recorded for each word read orally. A disagreement was defined as the author and supervisor having a different answer for a word read orally. Mean reliability for oral reading was 99% (range: 98%-100%). Data regarding the implementation of the independent variable was taken by examining the data recording sheets and forms submitted by the first author as well as during supervision by the second author.

RESULTS

Descriptive Statistics

During baseline, the average number of correct words read during the timed readings was 7.67 (*SD* = 2.082; range 6 to 10). The average number of incorrect words read was 8.667 (*SD* = 2.309; range 6 to 10). With the implementation of *Reading racetracks*, Precision Teaching, Direct Instruction, and the token program, there was an increase in the number of words read correctly (*M* = 44.8; *SD* = 14.457; range 18 to 77). During the intervention, the mean number of words read incorrectly decreased with an average of 1.35 errors (*SD* = 2.084; range of 0 to 7). Finally, the student completed 12 Racetracks with 100 percent accuracy in a five-week period.

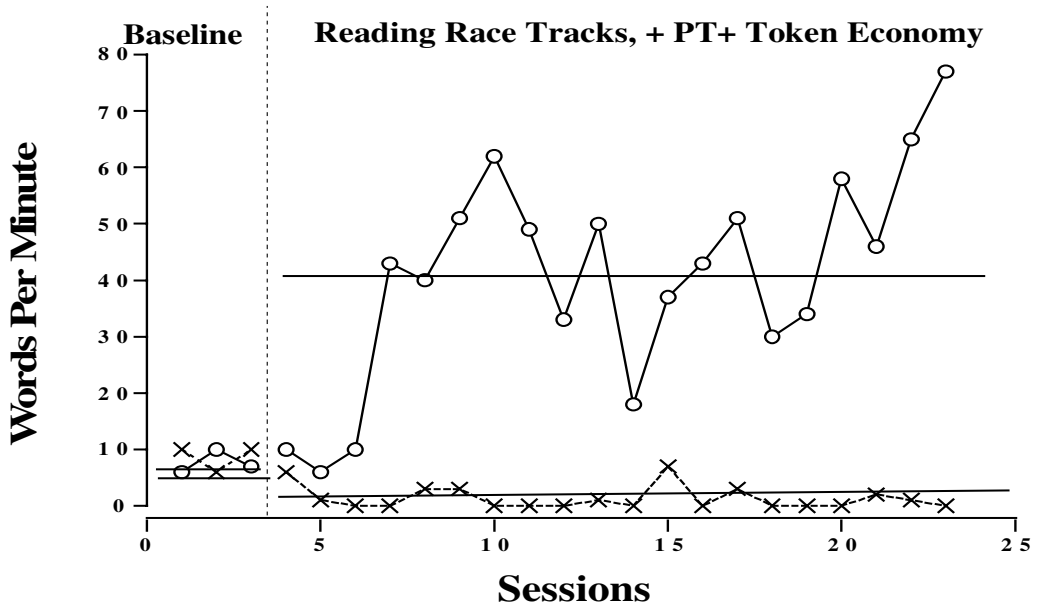

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Figure 1. The number of correct and errors during baseline and reading racetracks, precision teaching, and token economy. Solid horizontal lines are condition means

Inferential Statistical Test

These data were also examined using a paired t-test. These outcomes indicated there was a significant difference for corrects (t = -28.67; p = .0404) and errors (t = 6.333; df = 2 p = .0381) between the two conditions.

DISCUSSION

These data showed that reading racetracks using Direct Instruction, precision teaching, and a token economy was an effective method for improving the participant's reading skills. The participant's error rate decreased while his correct rate increased. One data session was particularly low, possibly attributed to discipline problems prior to the session and poor motivation. Three days of data collection were missed during the five-week intervention due to student absence. The student stated that he liked the reading racetrack procedure, sometimes mimicking race car sounds and requesting to see his data. We have reported elsewhere that students enjoy racetrack procedures once they are old enough to understand the mechanics of the track and what is represents (Erbey *et al.,* 2011; McLaughlin *et al.,* 2009, 2011). The token economy, individual attention and verbal praise appeared to be very reinforcing for the student. He often requested to read a racetrack upon entering the resource room.

The use of precision teaching methods of data collection allowed the first author and the participant to track the participant's progress with ease. Raw data were plotted daily on the graph, which provided a simple visual representation of the intervention and academic performance. The participant thought that it was very important to record his progress each day. The outcomes also replicate and extend that of our previous research dealing with reading racetracks (Falk *et al.,* 2002; Green *et al.,* 2010; McGrath *et al.,* 2012; McLaughlin *et al.,* 2009, 2011; Printz *et al.,* 2006; Rinaldi & McLaughlin, 1995; Rinaldi *et al.,* 1997; Romjue, McLaughlin, & Derby, 2011).

The reading racetrack and direct instruction intervention was quite easy to implement. It took a minimal amount of time each day and motivated the student to complete other classroom work in order to be timed on the racetrack. The study was cost effective; back-up consequences such as computer time and sign language instruction were of no cost. The use of candy was a small cost for the first author. The intervention did require five minutes of one-on-one time with the participant, which was not a problem because only one other student received resource room services at the time of day of the procedure. The first author requested that the classroom resource room instructor continue the procedure after the study was completed.

There were limitations in the present case report. First, the use of an AB design did not allow for a functional relationship between baseline and the intervention to be determined. The data collection time frame was short and there were times when the student missed school for health reasons. Finally, the separate contributions of the reading racetracks and the various other procedures, which were implemented at the same time, cannot be determined. Therefore, it appears appropriate that additional research examining these issues appears warranted.

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