

*EFFECTS OF CONTINGENT REWARD AND
INSTRUCTION ON ORAL READING PERFORMANCE AT
DIFFERING LEVELS OF PASSAGE DIFFICULTY*

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This study examined the effects of reinforcement contingencies designed to increase the performance of existing reading skills as well as the effects of instruction—modeling and practice—designed to increase skill level for oral reading fluency across three levels of reading materials. Results showed that a combination of contingencies, modeling, and practice was effective in producing substantial increases in reading fluency for all participants at their assigned grade levels. These results demonstrate one strategy for experimentally determining those instructional components that are required to increase oral reading rate.

DESCRIPTORS: oral reading, skill and performance, task difficulty

The analysis of functional relationships between instructional variables and oral reading rate has the potential for extending the application of behavior analysis to a high-incidence problem that is socially important. Recent work within applied behavior analysis has demonstrated the utility of analyses of antecedent instructional variables (e.g., Daly & Martens, 1994). Previous literature has also examined the effect of reinforcing consequences on academic behaviors (Pereira & Winton, 1991). Reinforced practice can contribute to developing fluency and may also increase the performance of skills that are already in the individual's repertoire. The integration of instructional events that maximize current performance and events that produce acquisition of new skills into a single analysis of oral reading fluency may contribute to a more systematic approach to instructional decision making. The current study was designed to examine a strategy for assessing the separate and com-

bined effects of contingencies and instruction on oral reading fluency.

METHOD

Participants, Setting, and Materials

Participants in this study were 3 boys (all 9 years old) enrolled in a 3-week summer program for children with a diagnosis of attention deficit hyperactivity disorder. The participants were beginning fourth-grade students who were of at least average intellectual functioning and whose parents had expressed concern regarding their reading skills. Each participant took the same medication (methylphenidate) throughout the study; however, Mike's dosage changed during the study. Sessions were conducted in the classroom with students seated away from other students.

Twenty-one reading passages at each grade level were selected randomly from *Harcourt Brace Jovanovich Treasury of Literature*, employing standard curriculum-based measurement guidelines for the selection of passages (see Shapiro, 1989). The mean Flesch-Kincaid readability index for the grade levels in-

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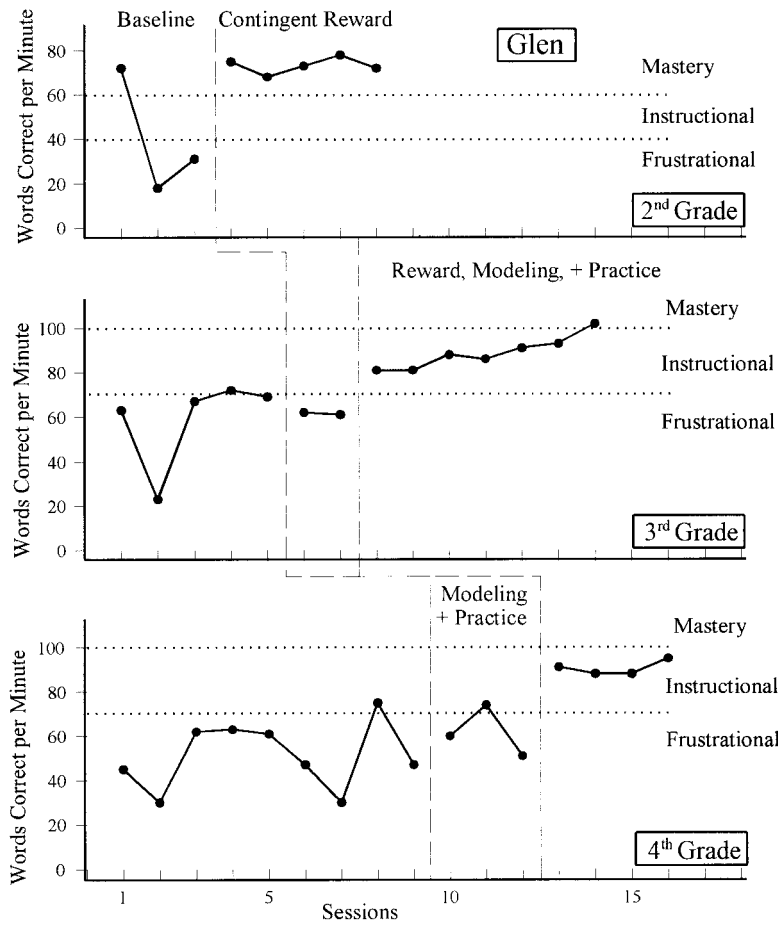


Figure 1. Median number of words read correctly graphed by session, level of reading material, and experimental phase for Glen. The mastery, instructional, and frustrational ranges on all figures are based on Fuchs and Deno (1982).

cluded in this study were second grade, 2.57 (range, 2.0 to 2.89); third grade, 3.71 (range, 3.11 to 3.94); fourth grade, 4.52 (range, 4.1 to 4.96); and fifth grade, 5.48 (range, 5.1 to 5.97). The assessment included reading material from the grade the child would attend in the fall and the two preceding grades for each participant. For Mike, fifth-grade materials were substituted for second-grade materials based on summer program records that indicated that his instructional level may have approached fourth grade. The dependent variable was the median number of words correct per minute

(WCPM) the participant read from three passages within each session. Interobserver agreement data were obtained for a randomly selected 33% of sessions for each participant and were calculated based on exact word-by-word agreement. The mean interobserver agreement was 98.3% and never fell below 95.6%.

Experimental Design, Procedures, and Reliability

Each participant's reading was evaluated using a multiple baseline design across three levels of reading materials. Contingent re-

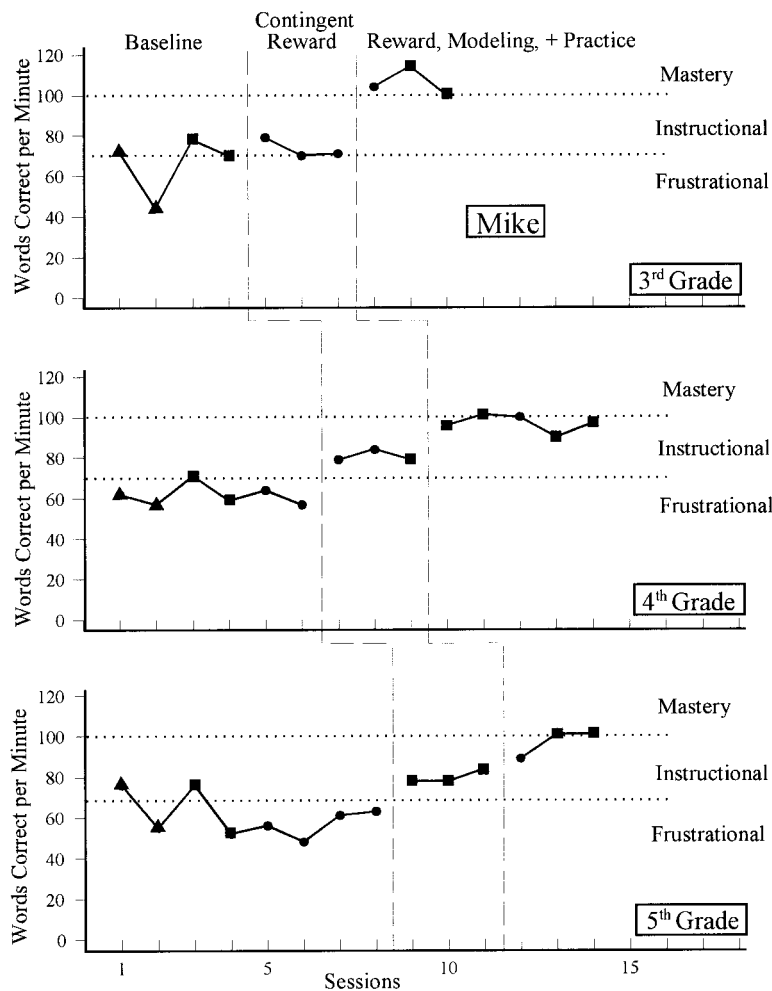


Figure 2. Median number of words read correctly graphed by session, level of reading material, and experimental phase for Mike. Round data points correspond to placebo sessions, triangular data points indicate 0.3 mg/kg of methylphenidate, and square data points indicate 0.6 mg/kg of methylphenidate.

ward was applied first, followed by reward, modeling, and practice if WCPM was not in the mastery range. If contingent reward was ineffective but reward, modeling, and practice were effective, then modeling and practice alone were applied at the next grade level. This modification was used to test for the possibility that modeling and practice without reward provided an effective treatment. Each session consisted of the participant reading three different randomly selected passages from one grade level. Using

a checklist (available from the first author), an observer measured treatment integrity for 33% of sessions that were randomly selected from all phases for all participants. The mean treatment integrity was 98.4%.

Baseline. Participants were asked to do their best to read the passage aloud and to attempt each word. If a participant did not complete a word within 3 s, the experimenter told the participant the word and marked it as incorrect. No programmed consequences were provided for reading perfor-

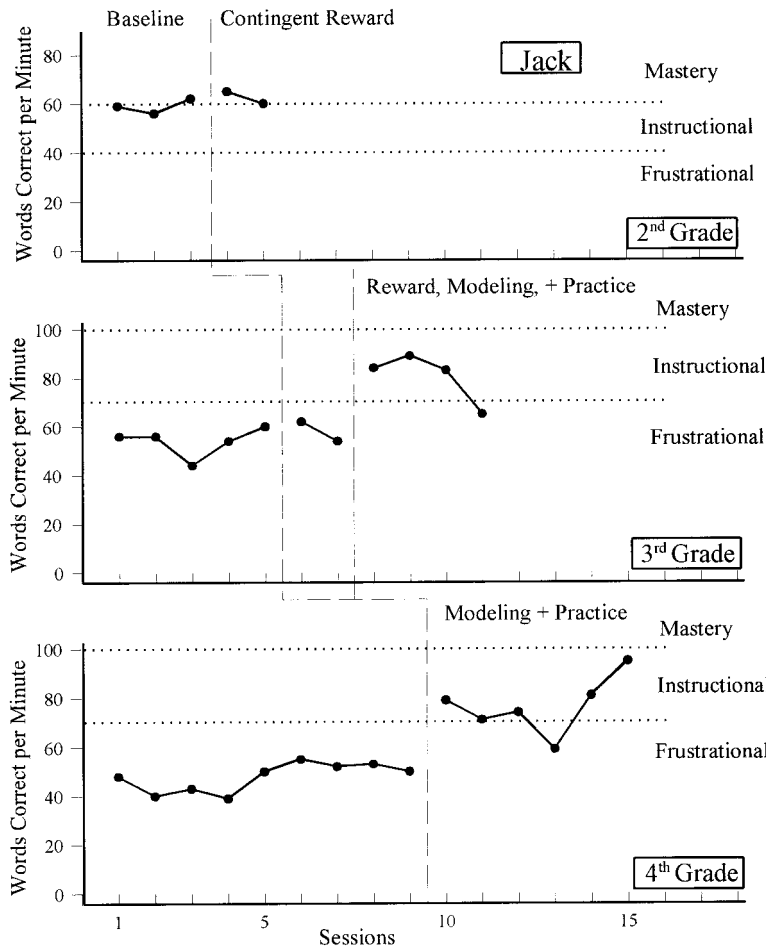


Figure 3. Median number of words read correctly graphed by session, level of reading material, and experimental phase for Jack.

mance, and no feedback was provided to participants.

Contingent reward. The participant was provided with a token coupon if his median WCPM exceeded his median WCPM from the previous session with no increase in errors. Token coupons had previously been identified as effective reinforcers for mathematics responding for each participant and could be exchanged for rewards available in the summer program. Glen (at Session 10) and Mike (at Session 11) were given the option of selecting 50 cents in lieu of a coupon because of concerns regarding possible sati-

ation based on the large number of token coupons they received in other activities in the summer program.

Modeling and practice. Modeling and practice sessions began with the experimenter reading the passage to the student (listening passage preview, Daly & Martens, 1994) to a point 20% beyond the participant's median score from the previous session. After the student practiced reading the passage once with the experimenter correcting any errors, a timed reading of that passage was obtained. This sequence was repeated for all three passages in a session.

Reward, modeling, and practice. This phase combined the contingent reward, modeling, and practice procedures as described in the preceding two conditions.

RESULTS AND DISCUSSION

Glen's second-grade level WCPM (Figure 1) increased under contingent reward, and contingent reward therefore was applied to third-grade materials. No increase in reading was observed, so modeling and practice were added to the treatment, and third-grade WCPM increased. These data suggested the relative importance of modeling and practice, so modeling and practice alone were applied to fourth-grade materials. Reward was added to modeling and practice when they were found to be ineffective. Contingent reward was ineffective for Mike (Figure 2) in third-grade materials and was only moderately effective for fourth- and fifth-grade materials. The addition of modeling and practice to each level was followed by increased WCPM. Jack's reading rate (Figure 3) did not increase when contingent reward was applied to second- or third-grade materials. Additional instruction was not applied to second-grade materials because Jack's responding fell within the mastery range. The increase in WCPM following the addition of modeling and practice to third-grade materials indicated the relative importance of these treatment components. Based on these results, modeling and practice alone were applied to fourth-grade materials and resulted in increased WCPM.

The analyses conducted in this study identified procedures that resulted in an increase in mean reading rate of 59% or greater between baseline and the final treatment

phase in the assigned grade level for all participants. Glen and Mike demonstrated the greatest increase in reading fluency when reward, modeling, and practice were combined, but only modeling and practice appeared to be critical for Jack.

A number of limitations of this preliminary study can be addressed by future research. First, the multiple baseline design may not be sufficiently flexible to be an optimal approach to this type of assessment. For example, the decision to introduce modeling and instruction alone in two data series precluded direct replication of the preceding data series. Second, using reading materials with a wider range of difficulty may have resulted in greater differentiation among treatments. Third, the potential importance of sequence effects is unknown. Fourth, the exposure to the same passage in two to three sessions over the 3 weeks may have resulted in some passage-specific learning that was not the focus of the analysis.

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- Received January 12, 1998*
Initial editorial decision March 4, 1998
Final acceptance June 23, 1998
Action Editor, Brian K. Martens