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A Comparison of Curriculum-Specified Reading Checkout Timings and Daily 1-Minute Timings on Student Performance in Reading Mastery

Abstract: This study gathered data on words read per minute and number of errors on curriculum-specified reading checkouts; in addition, the number of readings needed to reach criteria on these checkouts with and without the addition of a daily timing was recorded. Four second- and third-grade students with reading disabilities who received reading instruction using *Reading Mastery II or Fast Cycle* (Engelmann & Bruner, 1995) participated in this study. Comparisons were made of each student's progress across phases. Results showed no overall change in mean words read per minute, errors per minute, or number of timings to meet curriculum-specified criteria at reading checkouts for all students. These results suggest that the systematic practice and curriculum-specified reading checkouts within the *Reading Mastery* lessons provide the structure needed for students in need of reading remediation to make consistent progress in reading.

Students who begin their formal schooling with delayed development of oral language and phonological processing are at risk for school failure. Phonological (phonemic) processing is the skill of identifying, isolating, or blending individual phonemes in words and is identified as the best predictor of early reading acquisition (Liberman, Shankweiler, & Liberman, 1989; Stanovich, 1993/94; Torgeson, 1998). Children who fail to acquire reading in the primary grades frequently continue to fall farther behind their peers in reading skills as they move through their school years. Low reading skill levels in later grades are often seen as a lack of comprehension skills, and low comprehension skills are correlated with poor automatic word recall (Breznitz, 1997; Lyon, 1998). According to longitudinal studies by the National Institutes of Child Health and Human Development (Lyon, 1995) on how reading skills develop, approximately 17–20% of children have difficulty learning to read using conventional instructional methods. These children need explicit training to become competent readers, beginning with training in phonemic awareness, the skill of identifying and segmenting sounds within words, and phonics, the skill of representing sounds with letter symbols. As readers gain word recognition skills, explicit instruction needs to continue to increase fluency and comprehension (Fletcher & Lyon, 1998; Lyon, 1995).

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Students who do not develop fluent decoding skills during the beginning years of school instead develop habits of word identification that are detrimental to automaticity such as relying heavily on context cues, picture clues, or initial letter sounds. To avoid this problem researchers recommend increased intensity of instruction through structured, systematic, and explicit instructional programming, particularly for students who have the most severe weaknesses in reading skills. This population includes many of the children who are served through special education programs (Adams & Henry, 1997; Felton, 1993; Kameenui et al., 1998; Torgeson & Wagner, 1994). Increased intensity of this instruction should include a focus on (a) phonemic awareness, which includes segmentation of sounds in words, (b) the skill to encode, which is often measured by memory span tasks, and (c) the retrieval of phonological information from memory, such as rapid word-finding. Direct Instruction reading curricula, including *Reading Mastery* programs, provide this intensive instruction (Engelmann & Bruner, 1995).

Reading Mastery I and *II* and *Fast Cycle* programs (which combine *Reading Mastery I* and *II*) provide structured, systematic, and explicit instruction for naïve readers at the first- and second-grade reading levels. Lessons include explicit instruction, oral student responses, guided practice, immediate feedback and correction, and independent practice. Student outcomes include mastery of sounds and words and an increasing rate and accuracy of reading words in story context. Assessment of student mastery is conducted approximately every fifth lesson through oral reading of text from the most recent lesson; students move to the next lesson if they meet specified checkout criteria. Students are allowed up to three readings of assessment passages to achieve criteria. Checkouts in *Reading Mastery II* begin at lesson 5 (*Fast Cycle* lesson 54) and require 45 words per minute with 98% accuracy. The rate and accuracy requirements increase incrementally to the criteria of 90 words per minute by the end of *Reading Mastery II* and *Fast Cycle*. If criteria for rate and accuracy are not met, students repeat lessons until mastery is achieved before moving on to the next lesson (Engelmann & Bruner, 1995).

Reading Mastery programs have more than two decades of research demonstrating their efficacy with beginning readers. Project Follow Through, the largest federally funded study to examine instructional methods for improving academic performance, compared Direct Instruction programs, including *Reading Mastery* (DISTAR), with eight other models. Students taught through the Direct Instruction model achieved and maintained higher scores in basic skills, affective skills, and cognitive skills than students taught through any of the other models (Adams & Engelmann, 1996).

Research also supports repeated reading as an effective supplement to a developmental reading program to increase fluency for students at risk for school failure who have basic word identification skills (Breznitz, 1997; Dowhower, 1989). In a typical model using repeated reading, students practice a text of 50–300 words assisted with modeled reading (e.g., tape-recorded story) or by independent practice. Students then read and reread the passages for a brief predetermined timed interval until proficiency is reached. An increase in words per minute of 30% for subsequent readings is the general guideline. For example, if a student initially reads 40 words per minute (wpm) the criterion is set at 52 wpm. The resulting increase in fluency has been reported to correlate with reading comprehension (Dowhower, 1987; Samuels, 1997), which is the ultimate goal of reading. Research investigations have not examined whether adding a repeated reading component to *Reading Mastery* programs might improve students' reading outcomes.

The purpose of this study was to examine the effects of adding a repeated reading component to the *Reading Mastery* programs for students who typically need two or three repetitions of a checkout to meet criteria set by the curriculum. Timings were conducted on a passage in a new lesson each day rather than repeated reading of the same text because *Reading Mastery* provides sequential introduction of sounds and repetition of vocabulary from one lesson to the next. The specific research questions in this study were: (a) How does the addition of a 1-min timing after guided practice of every lesson affect the number of words read and errors on curriculum-specific reading checkouts? and (b) How does the addition of a 1-min timing after every lesson affect the number of readings needed to meet criteria at curriculum-specific reading checkouts?

Method

Participants

Two second- and two third-grade students participated in the study ($n = 4$). All participants attended a public elementary school in a large urban district in the Pacific Northwest. The elementary school had a total enrollment of 630 students from kindergarten through sixth grade.

The students were selected because of their eligibility for special education services in reading, ongoing placement in a Direct Instruction reading group, and expected availability for reading instruction through the duration of the study. All students received reading instruction in a special education

Table 1

Student Profiles

Student	Gender	Grade	Age (yr. & mo.)	Verbal IQ (WISC-R), Label	SpEd services	Program	Lesson started
1	F	2	8 yr. 4 mo.	102 LD	reading	RM *Fast Cycle*	67
2	F	2	8 yr. 4 mo.	not known HI	reading, math	RM *Fast Cycle*	67
3	M	3	8 yr. 8 mo.	91 LD	reading, speech, and oral language	RM II	30
4	F	3	9 yr. 5 mo.	67 LD	reading, math, written language, oral language	RM II	30

Note. LD = Learning Disability; HI = Health Impairment, RM = *Reading Mastery*

resource room. Characteristics of each participant who completed the study are presented in Table 1.

The second-grade students in the study demonstrated readiness to move to the *Fast Cycle* program based on results from the curriculum placement test prior to the beginning of the study. Both of the third-grade students had demonstrated considerable difficulty in meeting the criteria at reading checkouts and frequently repeated lessons over the months of instruction because of lack of mastery at these checkouts. These students needed two or three repetitions of a checkout to meet the curriculum-specified criteria.

Setting

Reading instruction took place in a special education resource room. Instructional sessions were conducted for approximately 45 min per day, five days a week, over a period of 16 weeks. During instructional sessions other students were in the room working with other adults.

Materials

Two curricula were used during the study—*Reading Mastery II*, which includes 160 lessons, and *Reading Mastery Fast Cycle*, which includes 170 lessons (Engelmann & Bruner, 1995). Lessons for the second-grade students were in *Reading Mastery Fast Cycle*, and lessons for the third-grade students were in *Reading Mastery II*. Each of these students was originally placed in *Reading Mastery I* and had progressed to *Reading Mastery II* or *Fast Cycle*. Instruction was provided in small groups of two or three students. Teacher presentation books and student textbooks provided the basis for the lessons. A teacher's notebook for each group included numbered stories for timed readings and charts and graphs for recording number of words read and errors.

Procedure

Two phases were used to assess the effects of adding a 1-min timing after every lesson on the number of words read, errors, and number of readings necessary to meet the curriculum-specified criteria for each student. This design gave a clear comparison between curriculum-only criteria (C) and curriculum with one added component—daily timings (C + T). Repetition of the phases (C, C + T, C, C + T) increased the number of comparisons for each student.

Procedures common to all phases. The first author was the special education teacher and also a graduate student in special education at a local university who had received training in *Reading Mastery* and research design. She presented the lessons and conducted the daily timings and checkouts. Lessons were presented according to the scripted text except during story reading. During story reading students read each story at least twice. First, they read sentences or paragraphs in turn and/or read in unison with the teacher who interspersed comprehension questions. Second, students reread the story a minimum of one more time, reading aloud individually to an adult or a peer or reading silently.

Throughout all phases, reading checkout timings were conducted after the story was practiced a minimum of two times. In these checkouts, each student read the passage aloud to the teacher while the other group members worked independently. The student's number of words read per minute and the number of errors per minute were recorded. Each word, including errors, was counted, but repeated words were counted only the first time. Errors were scored for words read incorrectly, self-corrected words, omitted words, or teacher-supplied words (after 3 s of hesitation by the student). Repeated words and "sound out" followed by a correct reading of the word were not counted as errors. The student's number of words read per minute

and number of errors per minute were recorded on a chart and graphed. Number of words read correctly and specific errors were reviewed with each student by the teacher immediately following each timing.

If a second checkout timing was needed to meet the curriculum-specified criteria for number of words read and errors, the student was given an opportunity to practice the same passage at home or at school before being timed again. This opportunity was repeated if a third timing was required before moving on to the next lesson.

Curriculum-Specified Reading Checkouts (C)

In the first phase, students read the passage at approximately every fifth lesson as prescribed by the curriculum (a range of two to nine lessons in *Fast Cycle* and every fifth lesson in *Reading Mastery II*). Students read for up to the allotted time, from 2 to 3.5 min, although only the first minute was charted and graphed. Recording only the first minute provided consistency for determining number of words read and errors during timed readings throughout the study.

Curriculum-Specified Reading Checkouts and Daily Timings (C + T)

During the second phase, 1-min daily timed readings were added. At the conclusion of the group lesson, including group reading of the accompanying story, each student read from the beginning of the story in the student text without interruption for 1 min. Number of words read and errors were charted and discussed with the student; curriculum-specified checkouts followed the same procedure as in the first phase.

Interobserver Agreement

The special education teacher was the primary observer and instructor. Another graduate student in special education served as a secondary observer. Interobserver agreement was obtained for two timings, once for each phase, for each student. Observers independently recorded the number of words read per minute and errors per minute. Interobserver agreement was obtained by calculating the smaller number of words read per minute obtained by one observer and dividing by the larger number of words read per minute obtained by the second observer times 100. Interobserver agreement was 100% for words read per minute for all students. Agreement on errors per minute was also recorded and scored the same as words per minute (smaller number of errors divided by larger number of errors times 100). Seven out of eight observations of errors resulted in 100% agreement. During one timing one observer recorded one error and the other observer recorded two errors for a student, resulting in 50% interobserver agreement. Thus, the mean interobserver agreement for errors was 93.75%.

Results

Figures 1 through 4 show the number of words read per minute and errors per minute for each student in each phase of the study. Each student's words read per minute gradually increased and met the curriculum-specified reading checkout criteria within three checkouts in all phases. The number of errors per minute remained relatively consistent throughout the study (range 0–3). The addition of a 1-min timing after guided practice of every lesson did not appear to affect the number of words read and errors at checkouts substantially. Only Student 3 showed a slight increase in words read per minute with the addition of daily timings.

Table 2 shows the mean words per minute above criteria for each student and combined students in each phase. The mean words per minute above criteria represent the average number of words above criterion each student read in each phase. If adding daily timings had a positive effect on number of words read per

minute and errors per minute, then the mean number of words per minute above criterion would be higher in C + T phases compared with C phases. Student 3 demonstrated the highest mean words per minute above criteria (7.25 words) for C + T phases. The mean for Students 1, 2, and 4 were .62 fewer, 3.66 words more, and 2.12 words more, respectively.

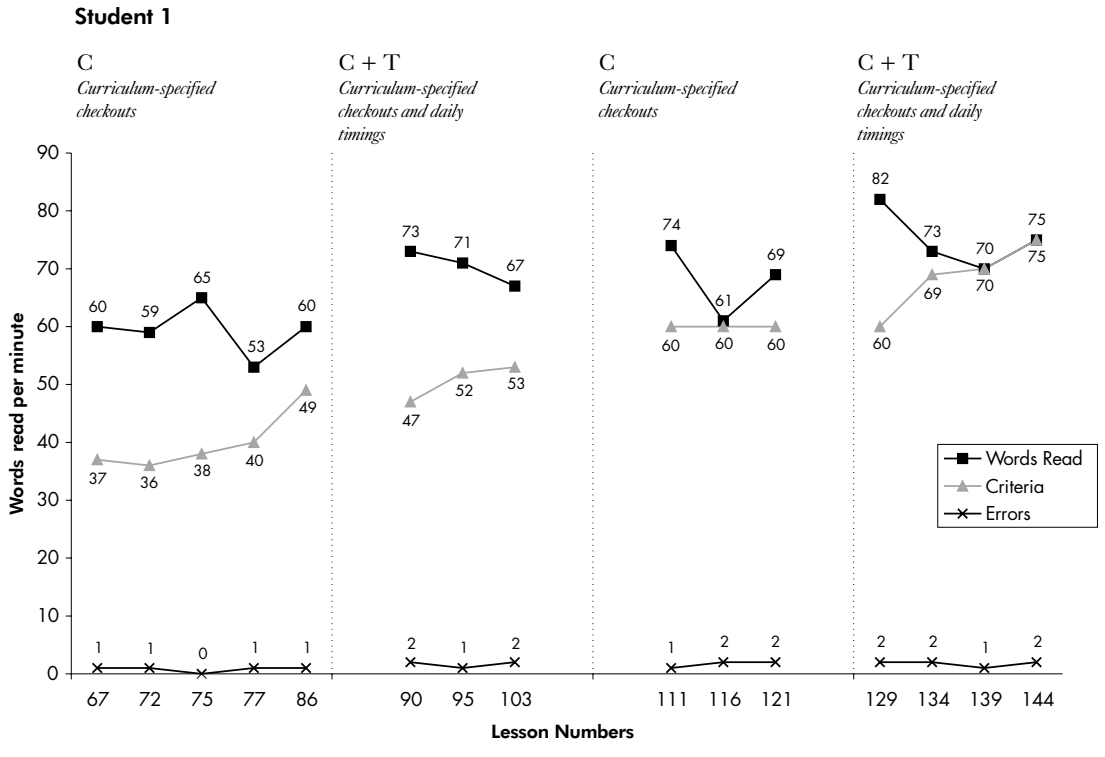
The number of timings required to meet curriculum-specified criteria for each student across phases is presented in Figure 5. Table 3 shows the mean timings to reach criteria for each student and all students combined in all phases. The addition of a 1-min timing did not substantially reduce the number of readings needed to meet criteria at curriculum-specified reading checkouts. Students 1, 2, and 3 needed an average of .13, .13, and .33 fewer timings, and Student 4 needed .17 more timings on average to meet criteria at checkouts in the C + T phases.

Discussion

This study examined the effects of adding a 1-min timing after every *Reading Mastery* lesson on words read, errors, and number of readings needed to meet criteria at curriculum-specified reading checkouts for four students with reading disabilities in the primary grades. For each of the four students, the

Figure 1

Number of words read and errors for Student 1

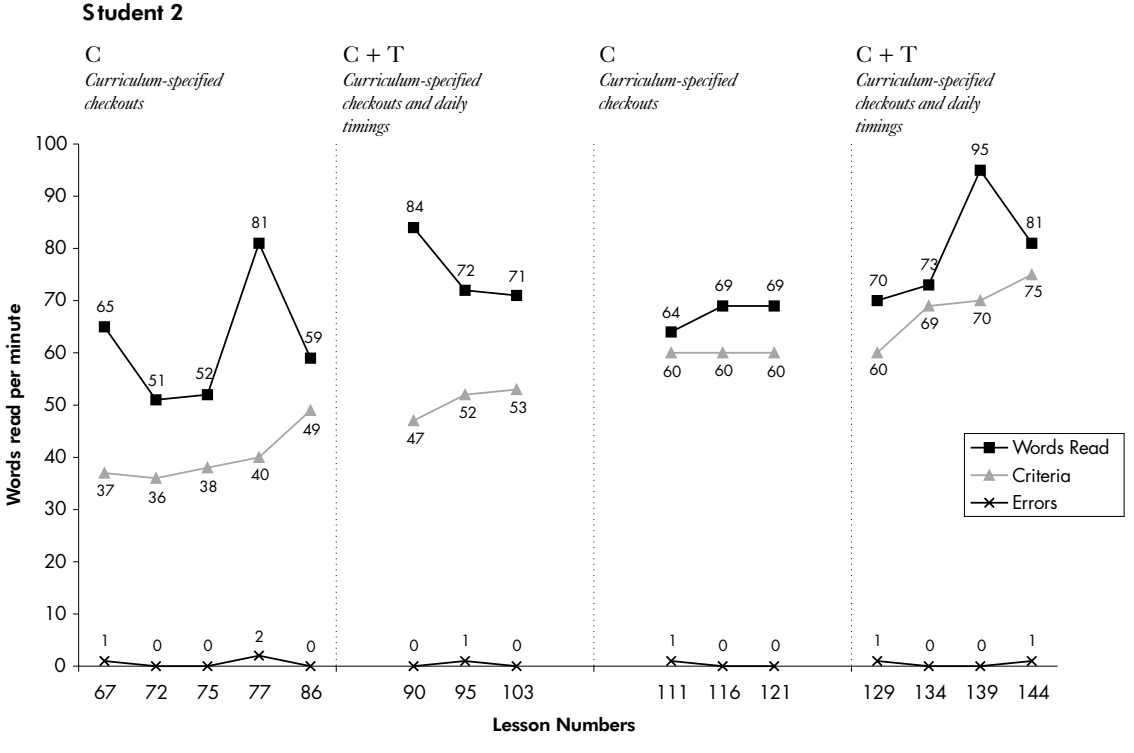


words read per minute, errors per minute, and number of readings needed to reach criteria at curriculum-specified reading checkouts were unchanged or minimally affected by adding a daily timing. This general lack of change from C to C + T phases suggests that the structured, systematic, and explicit instruction provided within the *Reading Mastery* curricula results in consistent reading improvement as measured at curriculum-specified checkouts. Therefore, adding a repeated reading component did not result in a substantial increase in words read per minute or errors per minute or decrease in the number of timings needed to achieve mastery at curriculum-specified checkouts.

One exception to the general results was the words read per minute read by Student 3 who read 7.25 more words above criterion on average in the C + T (daily 1-min timing) phases than in the C phases. Although this mean score gain in words read above criteria was minimal, the student's interest in reading appeared to increase. During the first C + T phase, Student 3 often requested feedback regarding his number of words read and errors on daily timings. During the second C phase he often requested to be timed while reading. In addition he asked to read orally both in small groups and in his general education class. Student 4, also a third grade student, did not show greater gains during C + T phases compared with C phases; howev-

Figure 2

Number of words read and errors for Student 2



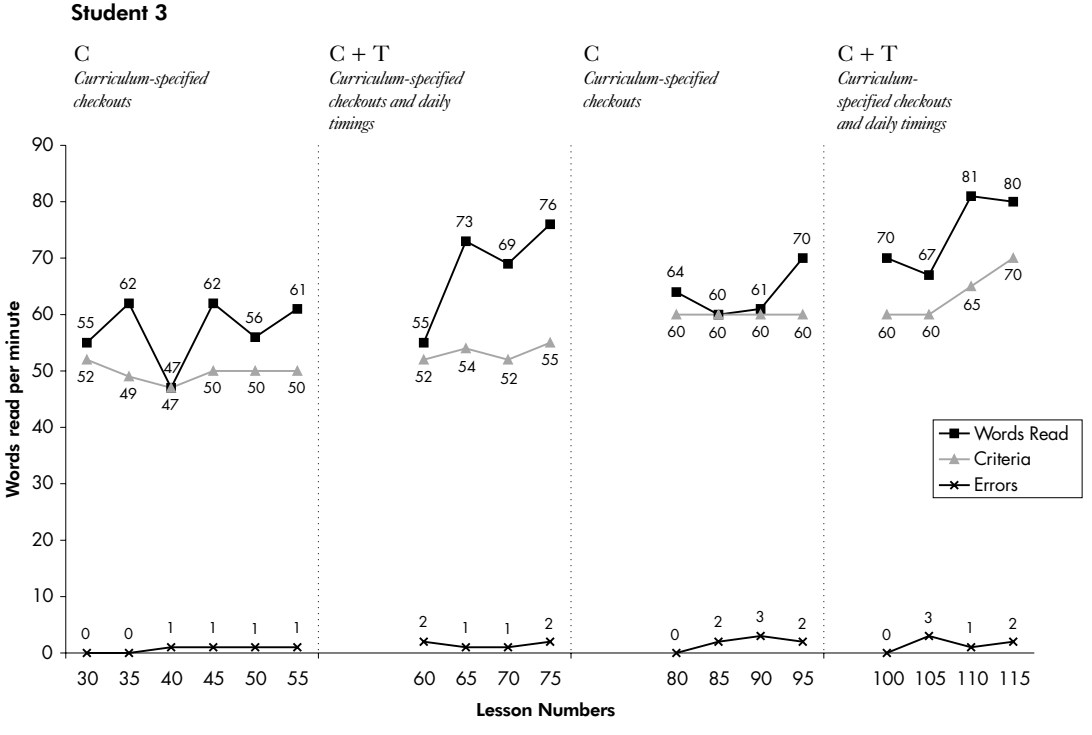
er, she also expressed a desire to be timed, to read more words than the previous day, and to read aloud in the reading group. These were positive behaviors that had not been previously observed. The structure of daily timings with a chart and graph to show performance and discussion of number of words read and errors may have provided motivation for these students, who at 9 years of age and in the third grade, had experienced considerable failure as readers. Positive student responses to verbal feedback and progress charting is consistent with studies that report greater interest in reading after a structured repeated reading component was implemented in classrooms (Ihnot, 1995; Samuels, 1997).

Student 4 continued to need up to three repetitions of readings at checkouts to meet curriculum-specified criteria. The need for repetitions is consistent with the curricular guidelines that some students may need added practice to reach mastery (Engelmann & Bruner, 1995). Student 4's low verbal skills (67 verbal IQ, based on the Wechsler Intelligence Scale for Children-Revised) may indicate she needed more repetition to improve skills than the other students whose verbal skills appeared to be or were within the average to above average range for their chronological ages.

Although there were several interesting findings in this investigation, there were several limita-

Figure 3

Number of words read and errors for Student 3



tions and possible implications for future research. First, the results cannot be generalized across all second- and third-grade students with reading disabilities because there were only four participants. Second, this study lacked experimental control as evidenced primarily by the lack of change between phases. Each of the four students continued growth in reading more words when the component of daily timings was added or removed. The impact of other variables within the general education setting or outside of the school setting also may have affected reading skill acquisition.

The implementation of the teaching procedures was not measured in this study. However, all lessons were conducted at the same time each day in the same setting for each group by the researcher/teacher who was trained in Direct Instruction, timed passages were taken from *Reading Mastery* lessons, and mastery checkouts were conducted as designated by the curriculum. There were times when the instruction may have varied from the script. Future studies should include measurement of the implementation of interventions.

Based on teacher observation, some of the students requested additional feedback on their reading skills and more opportunities to read aloud in groups. These requests might be an important outcome that warrants further inves-

Figure 4

Number of words read and errors for Student 4

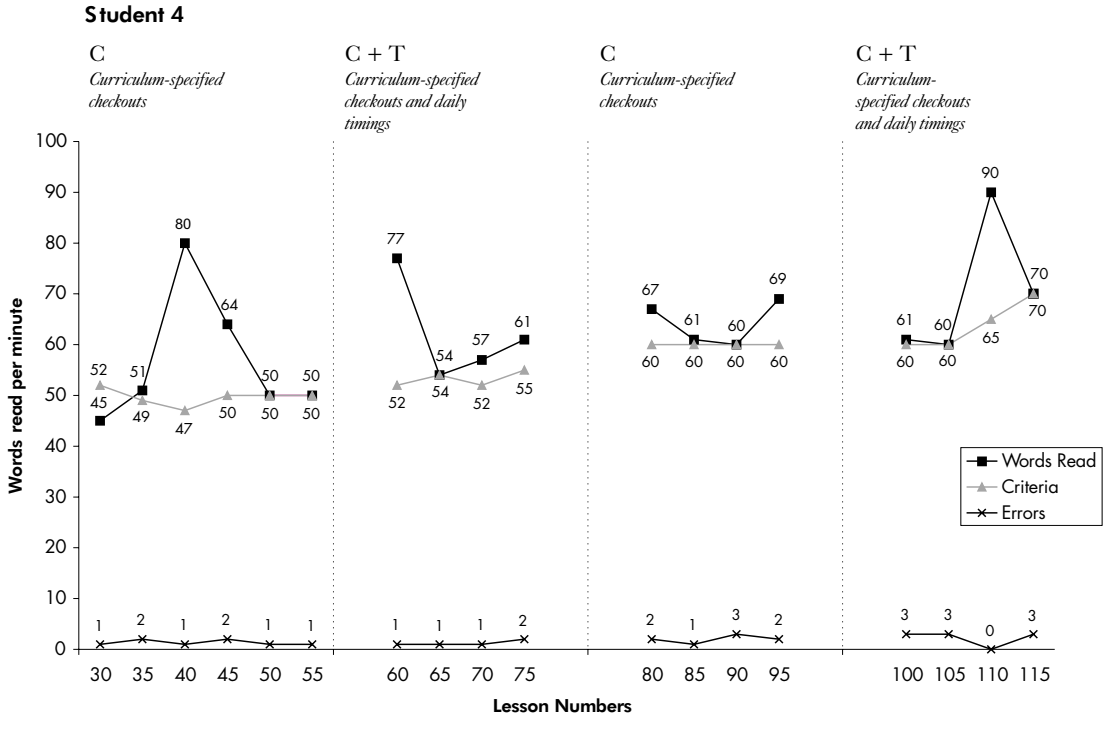


Table 2

Mean words read per minute above criteria

Student(s)	Program	C	C + T	C	C + T	C, C	C + T, C + T	Diff.
1	RMFC	19.40	19.67	8.00	6.50	13.70	13.08	-0.62
2	RMFC	21.60	25.00	7.33	11.25	14.47	18.13	+3.66
3	RMII	7.50	15.00	3.75	10.75	5.63	12.88	+7.25
4	RMII	7.00	9.00	4.25	6.50	5.63	7.75	+2.12
1 & 2	RMFC	20.50	22.33	7.67	8.88	14.08	15.60	+1.52
3 & 4	RMII	7.25	12.00	4.00	8.63	5.63	10.31	+4.68

Note. RMFC = *Reading Mastery Fast Cycle;* RMII = *Reading Mastery II;*
C = Curriculum-Specified Reading Checkouts;
C + T = Curriculum-Specified Reading Checkouts and Daily Timings.

tigation. Perhaps the repeated readings were a factor in motivating students to practice their reading skills. This study did not include any measure of motivation or desire to read. Additional research studies might examine the effect of daily timings on student motivation for reading.

Future research might also address adding a daily timing component to *Reading Mastery* curricula over a longer period of time with a larger number of participants using an experimental group design. An experimental group design might rule out extraneous variables that may have occurred by repeating phases for each participant.

This study addressed the effects of adding a daily timed reading component to *Reading Mastery* curricula. Results showed little change overall in mean words read per minute, mean words read above criteria, errors per minute, or number of timings to meet curriculum-specified criteria at reading checkouts for all students. These results suggest that the systematic practice and curriculum-specified reading checkouts within the *Reading Mastery* program provide the structure needed for students in need of reading remediation to make consistent progress in reading.

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Figure 5

Number of timings to meet curriculum-specified reading check-out criteria

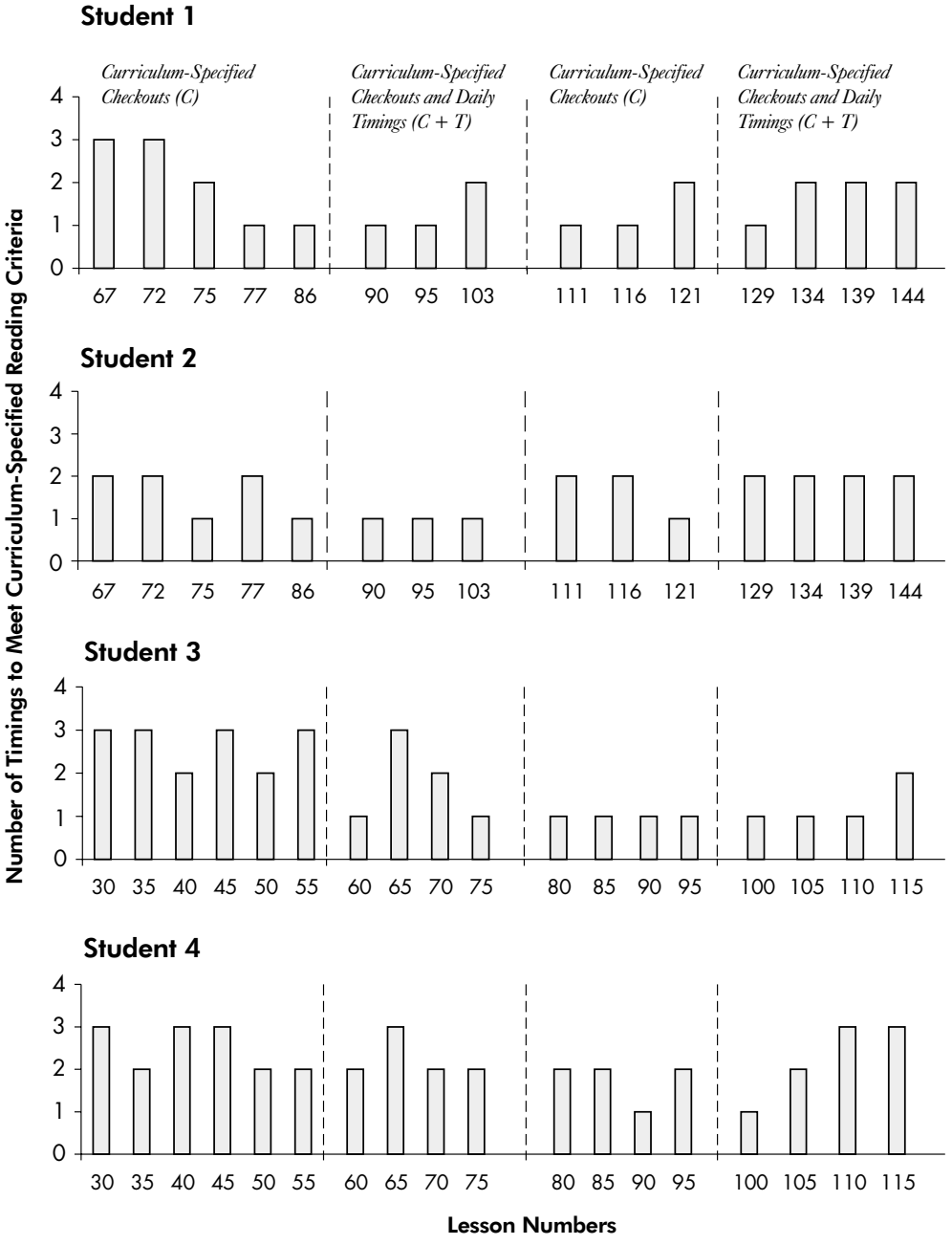

Table 3

Mean number of timings to reach criteria

Student(s)	Program	C	C + T	C	C + T	C, C	C + T, C + T	Diff.
1	RMFC	2.00	1.33	1.33	1.75	1.67	1.54	0.13
2	RMFC	1.60	1.00	1.67	2.00	1.63	1.50	0.13
3	RMII	2.67	1.75	1.00	1.25	1.83	1.50	0.33
4	RMII	2.50	2.25	1.67	2.25	2.08	2.25	-0.17
1 & 2	RMFC	1.80	1.17	1.50	1.88	1.65	1.52	0.13
3 & 4	RMII	2.58	2.00	1.33	1.75	1.96	1.88	0.08

Note. RMFC = *Reading Mastery Fast Cycle;* RMII = *Reading Mastery II;*
C = Curriculum-Specified Reading Checkouts;
C + T = Curriculum-Specified Reading Checkouts and Daily Timings.

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