

# Using Repeated Readings and Error Correction to Build Reading Fluency with At Risk Elementary Students\*

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A repeated readings procedure was used simultaneously with an error correction package that included modeling, prompting, and chaining procedures to increase reading fluency in three elementary students at risk for academic failure. An analysis of celerations and learning pictures common to Precision Teaching programs was used to evaluate the change of correctly and incorrectly read words across one-minute timing periods. The design was an A-B experimental design. The dependent variables included the frequency, celeration and bounce within and across conditions (i.e., passages) for both correct and incorrect performances. During baseline, students read between 55-69 correct words per minute. All participant's experienced substantial improvements in reading fluency with the introduction of the repeated readings and error correction package. Improvements sustained even when substantial breaks in instruction occurred, thereby demonstrating the robust nature of repeated readings at maintaining reading fluency. Upon introduction of the repeated readings and error correction procedure, jump-ups occurred in correctly read words per minute ranging from 9 and 25 words. Terminal performance within and across conditions varied and is discussed.

DESCRIPTORS: At-risk, Fluency, Reading Instruction, Repeated Readings, and Precision Teaching

Reading and comprehending what is read is crucial to success in school. In fact, becoming a successful reader is key to success with life. As early as fourth grade the demands of reading increase dramatically. The reason is two-fold. First, learning begins to rely more on textbooks that are expository in nature. Second, the context becomes less familiar and more specialized (Allington, 2002). Failure to remediate reading difficulties can have a substantial effect on a student's ability to learn new, more complex, information. For example, Juel (1988) found that students classified as poor readers in grade 1, without intensive remediation, are likely to remain so classified in grade 4. The Carnegie Corporation exemplifies the need for early identification and remediation in a recent report. The report surveyed students entering high school in the 35 largest cities in the U.S. Half of the students surveyed were found to read at or below the sixth grade level (Vacca, 2002).

Historically, a 95-97 percent accuracy level was viewed as sufficient for comprehension. However, with this level of accuracy, students reading a book at their "instructional reading level" may skip five words of every 100 read (Allington, 2002). Accuracy, while a necessary condition for comprehension, is not a sufficient condition. For instance, a student may read 50 words with no errors but take 5 minutes to do so. While the reader accurately read each word, such a sufficient amount of his attention was consumed with decoding tasks, that little meaning would likely be gleaned from the passage (Hempenstall, 1999). The reader may

be accurate, but not fluent. Fluency then, is another critical aspect in comprehending text.

The term "mastery" is closely related to the term "fluency". Mastery is commonly used to refer to the achievement of a certain level of performance normally expected from the best learners (Dick & Carey, 1996). While mastery implies a certain level of performance accuracy, it does not include a rate or speed dimension. When a standard temporal dimension is allotted for each performance (e.g., 1-minute) and empirically validated performance aims are used to define mastery, fluent performance is the result. A fluent skill is one that occurs automatically, without hesitation, and with a high degree of accuracy. Formally defined, fluency is the fluid combination of accuracy plus speed (Binder, 1996). Fluent reading then, is reading that occurs quickly and without hesitation with few errors (Teigen, Malanga, & Sweeney, 2001).

The ability to decode words and read fluently are prerequisite to understanding the information in a text (McCormick, 1995). Without fluent reading skills, the acquisition of a general knowledge base, such as civics, history, and science, is likely to be hindered (Teigen, Malanga, & Sweeney, 2001). A well informed citizenry requires the accumulation of "intellectual capital", or, a com-

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mon core of background knowledge to effectively communicate (Hirsch, 1996). In short, background knowledge is intellectual capital and, without fluent reading skills, the acquisition of background knowledge is severely hindered. Simply stated, students with fluent reading skills can recall what they read, which is the main point of reading (McCormick, 1995). Repeated readings is one procedure that has been shown to be effective at developing fluent reading (Samuels, 2002).

Repeated readings is a procedure that requires readers to read and reread a passage multiple times to develop fluent reading performance (Samuels, 2002). A number of studies have validated the efficacy of the repeated readings procedure on the acquisition of fluent reading performance (Bolich & Sweeney, 1996; Brosovich-McGurr, 1991; Carroll, McCormick, & Cooper, 1991; Herman, 1985; O'Shea, Sindelar, & O'Shea, 1985; Polk & Miller, 1994; Teigen, et al., 2001). Repeated readings, combined with Precision Teaching daily charting of performance, has been shown to be an effective means of establishing fluent reading within a relatively short period of time. Precision teaching is a process of direct observational measurement that combines daily assessment probes and charting to monitor student performance.

Precision Teaching is guided by two primary assumptions: a) for students to remember, transfer, and generalize a skill across settings, they must be fluent, and b) need for a standardized system of monitoring, displaying, and making decisions about student performance (Witt & Beck, 1999). Charting data on a standard chart is an easy and convenient way to formatively assess student progress and provides an accurate method of comparing within and across student performances.

Teigen, et al., (2001) assessed the effect of repeated readings, an error correction package and daily charting on the acquisition of fluent reading performance with a fourth grade special needs student. At the beginning of each reading episode, the passage to be read was previewed and difficult words reviewed prior to the initial one-minute timing. Subsequent to the initial timing, additional instruction was provided for difficult portions of the text via modeling, prompting, paired reading, chaining, and the neurological impress method. Three additional timings were conducted with the best performance charted. Results showed immediate and substantial improvement in reading fluency. The number of correctly read words improved by 140 words per minute with only 36 minutes of instruction. While the instructional package provided a convincing demonstration of the effectiveness of repeated readings, limitations

exist.

One of the limitations of the Teigen, et al., study was the sheer number of corrective procedures included in the error correction package (5). It is unknown whether all components or only some components are necessary to produce the substantive gains demonstrated by Teigen, et al. Could fewer components produce just as effective results? The current study was designed to answer this question. The study examined the effects of repeated readings on the acquisition of fluent oral reading performance with three at risk elementary students. The study systematically replicated the Teigen, et al., study using only three components of their error correction package: modeling, prompting, and chaining.

## METHOD

After initially previewing the passage with the instructor to correct any initial reading problems, the participants were told that it was time for their repeated readings. To complete the repeated readings procedure, the instructor told the students to read as much of the passage as possible in a minute. The students were told to skip words they could not pronounce. The text chosen was determined to be challenging based on each student's baseline performance.

The repeated readings procedure involved five steps: a) previewing the text for difficult words and reviewing those words prior to the reading episode, b) directing the learner to read as much as they can in 1-minute, c) subsequent to the timing, providing remediation as necessary in the form of modeling, prompting, and chaining, and d) conducting two follow-up 1-minute assessments.

After previewing the passage, the experimenter stated, "Read as much of the passage as you can in a minute. Ready, begin". A timer on a Casio wrist watch (Model W-71) was used for all timings. At the conclusion of each 1-minute timing, the number of correct and incorrectly read words was counted. The procedure was repeated twice and the best performance was charted.

### *Subjects*

Three second grade students identified as at risk for failure were referred by their teachers for additional reading instruction. In one student's case, placing him at risk for formal referral to special education. Substantial reading and comprehension deficits of grade level texts were identified as the primary factor impeding their development through the scope and sequence of the curriculum.

### *Setting*

All instructional sessions took place in a room reserved for IEP and other formal meetings. The room contained a circular table and three chairs. A full room divider separated the instructional setting from the other half of the room, which was occasionally used concurrently for instruction with other students.

### *Independent and Dependent Variables*

The independent variable was the repeated readings and error correction package. The dependent variable was oral reading, specifically, the number of correctly and incorrectly read words per minute. An incorrect is defined as an omission, substitution, mispronunciation, or self-correction. A correct is defined as one-to-one correspondence between the word read and the printed word.

### *Materials*

The passages were selected from future stories from the grade level anthologies. Since the class had not yet read the passages, these were selected to enhance the likelihood of generalization and success in the classroom. The scope and sequence of the curriculum dictated the sequence in which the stories were introduced. The specific stories used were Emma's Dragon Hunt (O'Connor & Hamanaka, 1990), Molly the Brave (Rylant & Gammell, 1993), and The Relatives Came (Stock, 1987).

### *Design*

The experimental design used was an analysis of celerations and learning pictures common to Precision Teaching programs. The primary dependent variable dimensions analyzed were frequency level and celeration changes within and across condition (i.e., passages) for both correct and incorrect performances. This design incorporates a trend analysis model which is designed to identify repeated patterns of behavior (e.g., acquisition rates, level changes, bounce) under given circumstances.

### *Conditions*

*Baseline:* During baseline, the storyline of the passages was discussed, the passage was previewed, and a 1-minute timing was conducted. While only one datum constitutes the baseline, any additional timings would have constituted a form of practice and would have been considered an instance of repeated reading. The student's initial performance is the truest measure of baseline for this type of procedure.

*Repeated Readings:* The repeated readings

procedure was implemented using the procedure outlined above with modeling and chaining as error strategies used as necessary. Modeling consisted of the experimenter reading the word correctly and requiring the learner to re-read the word properly. Chaining consisted of the experimenter modeling the difficult passage once while the learner followed along then requiring the learner to re-read the passage until it could be read at least once without hesitation.

*15" Sprint:* Due to the maintaining trend in Merrit's performance when reading Emma's Dragon Hunt (Stock, 1987) a 15" sprint condition was instituted. A section of the passage was functioning as a fluency blocker in that Merrit was experiencing difficulty decoding some of the words. Modeling and one 15" sprint was used to mitigate the difficulty Merrit was experiencing with this section of the passage. The repeated reading procedure immediately followed the 15" sprint.

*Untimed Reading:* For one student, Cory, an untimed reading condition was incorporated as a result of consecutive days of flat performance. During untimed readings, Cory read the passage once with prompting and error correction strategies being used as necessary. Subsequent to the untimed reading, the repeated reading procedure was used and the best performance was charted.

## RESULTS

All students improved their reading performance when repeated readings was instituted. In Merrit's case, he literally improved his performance with each minute of practice.

### *Merrit*

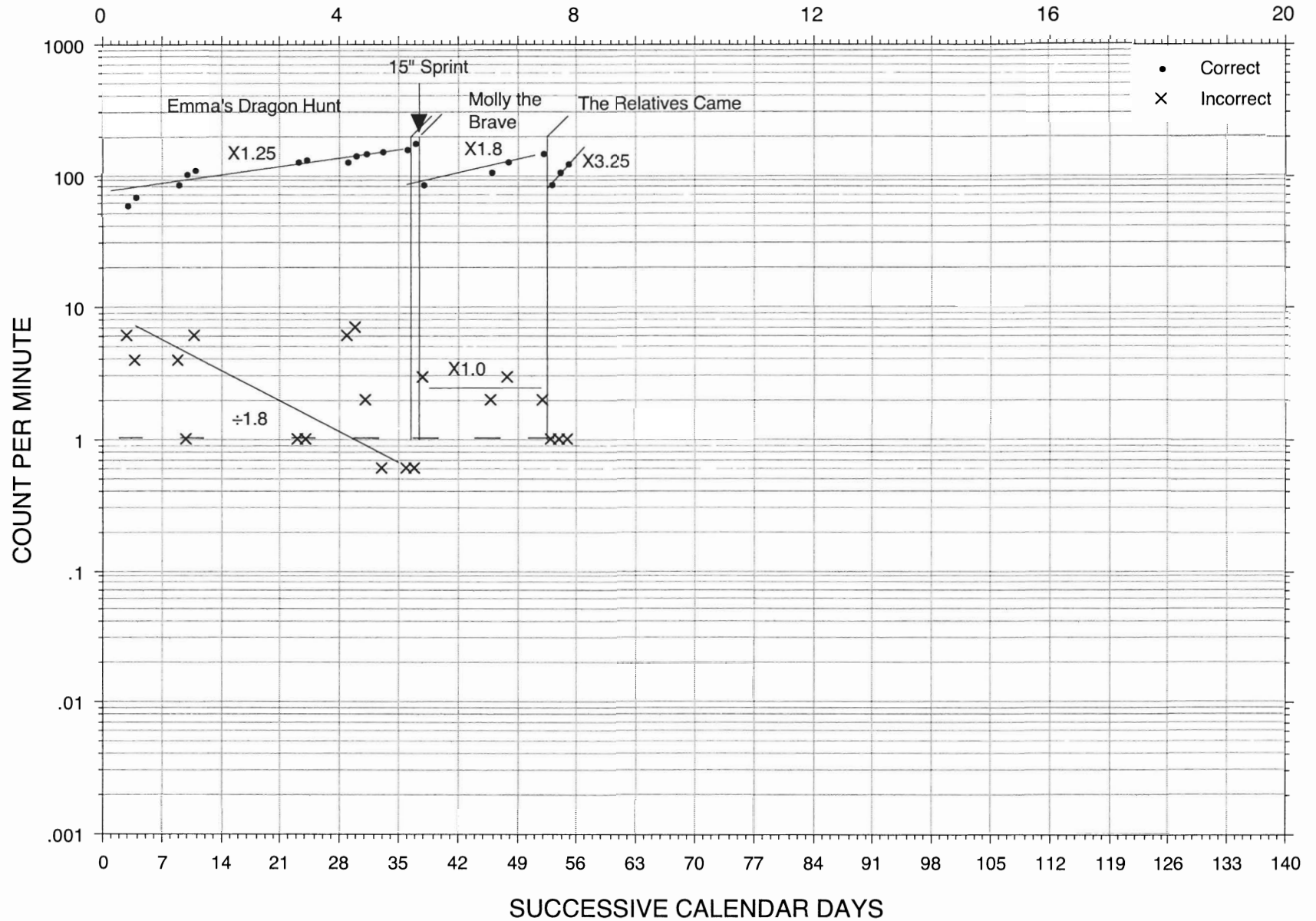
During baseline, Merrit correctly read 59 wpm with six errors. Overall, while reading Emma's Dragon Hunt (Stock, 1987) Merrit's performance shows an accelerating trend for correctly read words and a maintaining trend for incorrectly read words. Specifically, Merrit's overall celeration of the number of correctly read words was X1.25. Merrit's frequency of correctly read words improved from 59/6 to 179/0 across 12 sessions, representing a frequency jump of X3.

For the passage Molly the Brave (O'Connor, et al., 1990), across 12 minutes of instruction and practice the number of correctly read words accelerated by X1.8 while Merrit's learning opportunities remained stable at X1. Merrit's performance improved with each minute he practiced.

The introduction of The Relatives Came (Rylant, et al., 1993) produced a jump-down-turn-up in the number of correctly read words with a

CALENDAR WEEKS

Figure 1: Merrit's Correct and Incorrect Oral Reading Performance



Carolyn	x	Dr. M.	Merrit	x	2nd Grade
SUPERVISOR	ADVISER	MANAGER	BEHAVER	AGE	LABEL
Dr. M.	Sioux Falls Public	Dr. M.	Dr. M & Merritt	Dr. M & Merritt	Oral Reading
DEPOSITOR	AGENCY	TIMER	COUNTER	CHARTER	COUNTED

no-jump-no-turn in learning opportunities. Merrit's correctly read word performance accelerated by X3.25 while Merrit's learning opportunities remained stable at X1.

### *Chris*

During baseline, Chris correctly read 69 wpm with four errors. Overall, while reading Emma's Dragon Hunt (Stock, 1987) Chris's performance shows an accelerating trend for correctly read words and a slight decreasing trend for incorrectly read words. Specifically, Chris's overall celeration of correctly read words was X1.4. Maintenance is clearly evident in the number of correctly read words. Chris correctly read 22 more words after a twelve day break. Furthermore, during the final seven days of repeated readings, Chris evidenced a Jaws learning picture with corrects accelerating by X1.5 while his learning opportunities divided by approximately  $\div 2.25$ . Overall, for the passage Emma's Dragon Hunt, Chris's frequency of correctly read words improved from 69/4 to 184/0 across 9 sessions. That represents approximately a tripling (X2.7) of correct performance.

For the passage Molly the Brave (O'Connor, et al., 1990), across 9 minutes of instruction and practice the number of correctly read words accelerated by X1.5 while Chris's learning opportunities remained stable. The passage change produced a jump-down-turn-up in Chris's corrects and a no-jump-no-turn in errors. Chris's learning opportunities decelerated by  $\div 1.8$ . The number of correctly read words per minute improved from 75/1 to 135/2, representing a X1.8 improvement in correctly read words. Chris's performance improved substantially across long periods of time without formal repeated reading practice. For instance, a week passed between each repeated reading session, yet the number of correctly read words improved by 28 and 32 words, respectively.

With the introduction of The Relatives Came (Rylant, et al., 1993) Chris's performance evidenced a bottoms-up-steeper-slope with a celeration in corrects of X3.0. Chris's learning opportunities decelerated by  $\div 6$ . In nine minutes of instruction and practice, the frequency of correctly read words improved from 97/2 to 128/0, representing slightly better than a X1.3 frequency change.

### *Cory*

During baseline, Cory correctly read 55 wpm with one error. Overall, while reading Emma's Dragon Hunt (Stock, 1987) Cory's performance shows an accelerating trend for correctly

read words and a slight decreasing trend for incorrectly read words. Specifically, Cory's overall celeration of correctly read words was X1.25 while learning opportunities maintained at approximately X1. Maintenance is clearly evident in the number of correctly read words. Cory correctly read 6 more words after a twelve day break. However, since Cory's correct performance was flat for three consecutive practice sessions, an untimed reading procedure was used in an attempt to improve Cory's performance. This program change resulted in a jump-up-no-turn in Cory's correct performance. A frequency jump in correctly read words occurred with the introduction of the untimed reading procedure. Cory's correct performance improved from 108/1 to 134/3. Overall, for the passage Emma's Dragon Hunt, Cory's frequency of correctly read words improved from 55/1 to a high of 154/0, a frequency change of X2.8.

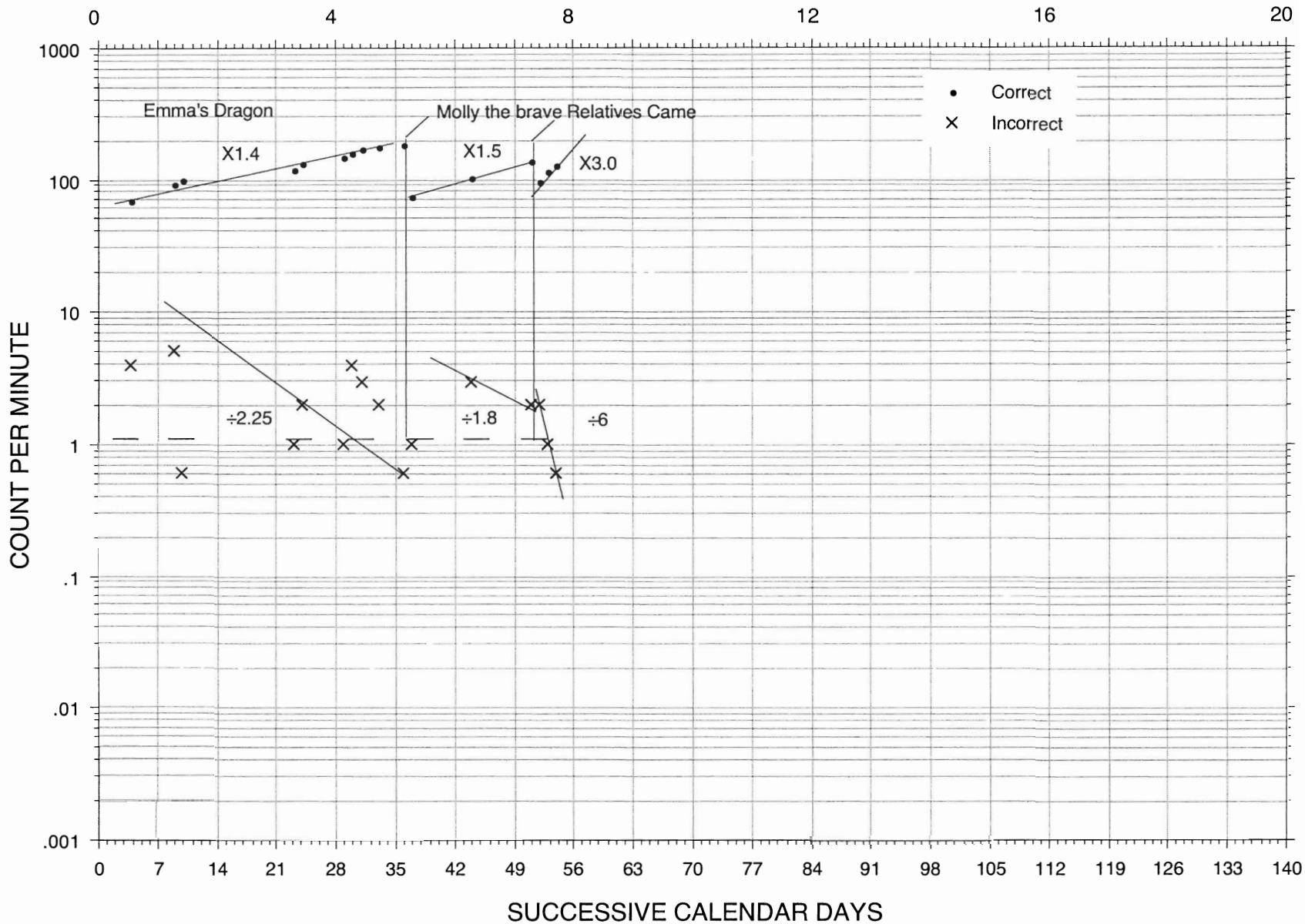
With the introduction of The Relatives Came (Rylant, et al., 1993) Cory's performance evidenced a jump-down-turn up in celeration. Cory's celeration of correctly read words was X6.0 while his learning opportunities decelerated by  $\div 5.5$ . In twelve minutes of instruction and practice, the frequency of Cory's correctly read words improved from 53/4 to 107/2. This represents a X2.0 frequency change.

## DISCUSSION

The current study's data are consistent with the existing repeated reading database (O'Shea, et al., 1985; Polk, et al., 1994; Samuals, 2002; Teigen, et al., 2001). All participant's improved their oral reading performance to varying degrees. The standard acceptable oral reading fluency criterion within the Precision Teaching literature is 180-200 correctly read words per minute. The combination of the passage selection criterion and naturally occurring scheduling changes common to a public school setting precluded reaching this level of fluency for all participants on a consistent basis. Passages were selected deliberately to include yet-to-be-read passages in the classroom as defined by the curriculum scope and sequence. This imposed temporal limitations for ongoing instruction for each passage. Furthermore, participant absences and professional exigencies precluded more consistent data collection. This said, when an extended duration of time passed between repeated reading sessions, all participant's either maintained or improved their reading performance. The only exception being the final repeated reading session for Cory during the untimed reading condition. While inconsistency in instruction may have mitigated the magnitude

CALENDAR WEEKS

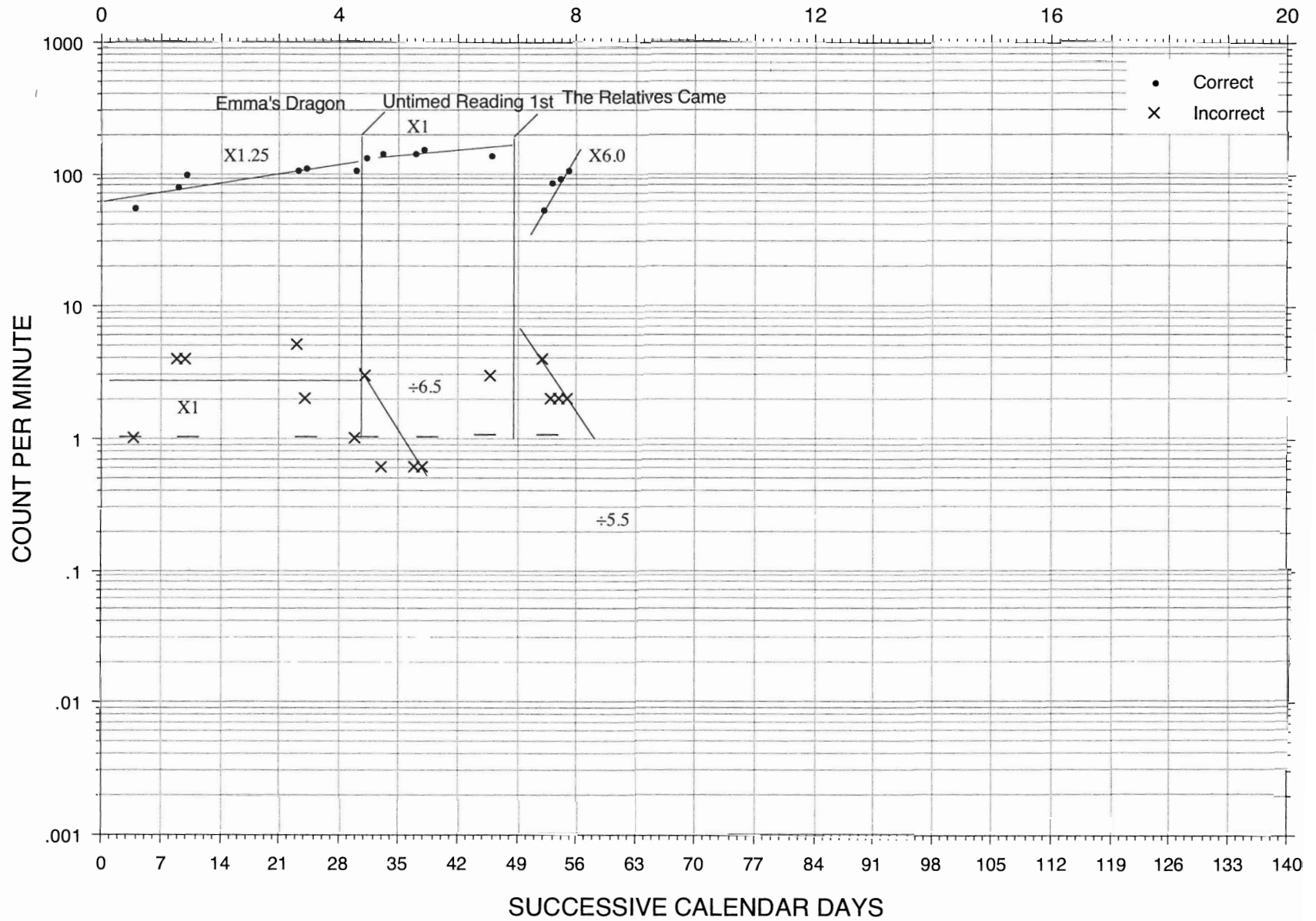
Figure 2: Chris's Correct and Incorrect Oral Reading Performance



Carolyn	x	Dr. M.	Chris	x	2nd Grade
SUPERVISOR	ADVISER	MANAGER	BEHAVIOR	AGE	LABEL
Dr. M.	Sioux FallsPublic	Cory	Dr. M./Chris	Dr. M./Chris	Oral Reading
		TIMER	COUNTER	CHARTER	COUNTED

CALENDAR WEEKS

Figure 3: Cory's Correct and Incorrect Oral Reading Performance



Carolyn	x	Dr. M.	Cory	x	2nd Grade
SUPERVISOR	ADVISER	MANAGER	BEHAVER	AGE	LABEL
Dr. M.	Sioux FallsPublic	Chris	Dr. M./Cory	Dr. M./Cory	Oral Reading
DEPOSITOR	AGENCY	TIMER	COUNTER	CHARTER	COUNTED

of effects of the repeated reading procedure, it also provided maintenance probes within a naturally occurring context. Limitations, however, need to be addressed.

Procedural modifications needed to be made for Cory and Merrit. For each, relatively flat data paths dictated the need for an instructional change to improve their performance. For Merrit, the 15" sprint was used to mitigate the effect of a difficult portion of the passage while for Cory, the untimed reading procedure was used to improve overall performance. Both instructional modifications achieved their intended objective.

Due to temporal constraints imposed by the scope and sequence of instruction, standard fluency ranges for oral reading (180-200 wpm) could not be established consistently for each passage. It is very likely that had reading performance been achieved within this fluency range, improved acquisition and generalization of reading performance would have been realized for all learners. This may have been a particularly crucial variable for Cory. Cory attained performance levels noticeably lower compared with Merrit and Chris. For instance, Cory's highest performance for Emma's Dragon Hunt was 154/0 while Merrit and Chris achieved high performances of 179/0 and 184/0 respectively. Further, due to scheduling conflicts, Cory did not experience the repeated readings procedure for "Molly the Brave". This precludes a direct comparison with Chris and Merrit's performance on this passage. However, a celeration analysis reveals some interesting comparisons across participants.

Celeration values for "Emma's Dragon Hunt" were relatively comparable across students. Merrit and Cory's baseline performance were comparable, 59/6 and 55/1 respectively. Both made comparable progress with celerations of X1.25. Comparatively, Chris's baseline performance was 69/4 and evidenced steeper slopes, X1.5, compared to Merrit and Cory. An interesting distinction arose with the introduction of "The Relatives Came". While Merrit and Chris evidenced higher overall performance levels, Cory's celeration of correctly read words was virtually twice that of Merrit's and Chris's. With the elimination of temporal constraints, it is possible that Cory's performance could have reached that comparable to Chris's and Merrit's. Comparing total instruction time within each passage provides an additional dimension of analysis of performances.

For "Emma's Dragon", Cory and Merrit's performances were comparable after ten sessions or 30 minutes of repeated reading instruction, 154/0 and 155/0 respectively. Chris received 9 sessions or 27 minutes of instruction and practice but

achieved overall higher performance rates. Comparatively, for "The Relatives Came" passage, Merrit's oral reading rate after 9 minutes of instruction and practice was 124/0 while Chris's was 128/0. Cory's performance, after 3 additional minutes of repeated reading instruction and practice was 107/2. While analyzing individual performances is a static rather than dynamic analysis, it may be useful to correlate, within the overall context of frequency, celeration, and bounce change analyses, performance levels with actual practice time. When compared with other students at the same age and grade level, this may provide a useful curriculum-based normative assessment of student performances and may provide a more direct measure of identifying students who are potentially at risk for reading failure.

One of the goals of the current study, and the basis for passage selection, was to increase the likelihood of transfer from the repeated readings sessions to the regular education classroom. From a social validity perspective, both Merrit's and Cory and Chris's teacher reported improved reading performance during language arts instruction. Both teachers reported more fluid levels of reading indicated by less hesitations and fewer errors. Merrit's teacher reported improved fluency and an increased frequency of volunteering to read in class, something he was previously unwilling to do.

Future repeated readings research might focus on investigating the relationship between amount of practice time and performance levels achieved when compared with peers. For instance, what is the performance difference among students already receiving Title 1 services (i.e., already identified as at risk for a reading disability) with students not receiving such services and identified as average readers? To what extent do comparable performances across passages differ among students in different educational demographics such as Title 1, Mild Mental Retardation, Learning Disabilities and regular education? Could curriculum-based comparisons such as those displayed on the Standard Celeration Chart provide predictive utility for student's who may be at risk for future failure and provide a reliable indicator for early intervention? Answers to these questions may provide educators with a quick, reliable assessment tool by which to make accurate educational decisions for early intervention that may obviate the need for special education services.

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