Effects of a Modified Repeated Reading Procedure on Reading Fluency of Severely Disabled Readers

by

Cynthia L. Carroll, Sandra McCormick, John O. Cooper

A repeated readings with word drill procedure was evaluated as a method for increasing reading fluency of 4 elementary students having severe reading disabilities and severe behavior handicaps. Students read a passage repeatedly for 1 minute per session until they could read a minimum of 100 correct words per minute with no more than three incorrect words. Repeated reading frequencies were recorded and baseline passages at the same grade level were assessed for transfer of fluent reading. Students were assigned a new passage for repeated readings after achieving fluent reading on a previous passage. Repeated readings with word drill were functionally related to an increase in the number of words read correctly per minute and a decrease in the number of words read incorrectly per minute. However, three passages read to fluency were not sufficient to produce a transfer of fluent reading skills to new passages.

Fluency, a synchronization of accuracy and rate of response, is important to reading development for a number of reasons. First, fluent reading is a necessary prerequisite to the primary goal of reading--comprehension of text. Nonfluent reading, that is, reading which reflects excessive attention to individual words, makes it difficult for readers to assimilate the general significance of ideas presented in a selection (Smith, 1982). Research has shown the interrelatedness between comprehension and the component parts of fluency: word recognition accuracy is significantly related to rate of word recognition, and rate of word recognition is highly correlated with understanding of material read (McCormick & Samuels, 1979). Second, fluency has an influence on students' interest in reading. Grob (1968), for example, found that when students' reading rate improved, interest in the content increased because their reading sounded more coherent, and, therefore, made more sense to them. Third, fluent reading is a necessity if students are to accomplish reasonable rates for work time. When Grob (1970) demonstrated time needed to complete typical school tasks by readers using average versus slow reading rate, his data showed the near impossibility of succeeding in certain reading assignments if one is hampered by excessively nonfluent reading behaviors.

Although interest in reading accuracy and rate has had a long history (e.g., Buswell, 1920; Cason, 1943; Goldstein, 1940; Tinker, 1936; Tinker, 1958), recent attention to fluency has been a result, to some extent, of the influence of automaticity theory (LaBerge & Samuels, 1974). LaBerge and Samuels used the term automaticity to describe responses necessitating little attention or conscious effort. The premise of automaticity theory is that individuals have limited attention capacity, and it is, therefore, important to develop certain lower level skills (e.g., word recognition) to the automatic stage, so there is attention capacity available for higher level processes (e.g., reading comprehension). Samuels (1985) contends that the goal of instruction should be to assist readers in moving beyond accuracy to automaticity, as reflected by speed of response. For automaticity to be achieved, practice is required.

Allington (1984), Chomsky (1976) and others have described many low-achieving students as "word by word" readers whose oral reading behaviors are painfully slow with patterns exhibited that are similar to those of younger readers. They point out that while these students usually receive instruction on accuracy of word recognition, they seldom are given instruction on rate.

One reason for children's nonfluent reading is lack of a sufficiently large sight vocabulary, indicating that attention to word accuracy is a requisite for remediation of the problem. However, this appears to be a necessary, but not sufficient, condition. Samuels, Begy and Chen (1975-76) found that skilled and more skilled readers who recognized the same words were differentiated by response latency--less skilled readers had slower speeds of response. Another reason for nonfluent reading is lack of attention to task. Often attention can be aided by setting goals and measuring outcomes. In addition, certain students with long histories of reading problems have habits of markedly slow reading which persist due to practice effects (McCormick, 1987). Because of past difficulties with word identification, they had not been expected to read fluently, but even after

attaining fluent word recognition, continue in nonfluent rates, though no longer necessary.

Fluency can be improved through instruction (e.g., Braam & Berger, 1968; Carver & Hoffman, 1981; Dahl & Samuels, 1979; Himelstein & Greenberg, 1974; McGreevy, 1983; White & Haring, 1980). Techniques employed in fluency instruction previously have included use of timed exercises available from commercial publishers, mechanical devices (Sailor & Ball, 1975), and the neurological impress method (Heckelman, 1966). Recently, there has been interest in the technique of *repeated readings* (Chomsky, 1976; Samuels, 1985). Samuels (1979) first developed his version of repeated readings after considering how musicians and athletes become proficient at tasks in their fields and concluding that repeated practice on the same skill is facilitative. His program of repeated readings consists of having students orally read and reread the same passage of material for several trials, during which accuracy and rate are measured, until they have reached a pre-established criterion. The students then repeatedly read another passage until the criterion is accomplished, and so forth. This procedure is conducted until the fluency criterion is met on the first reading of a new passage. Students with mental retardation in Samuel's (1979) research successfully increased rate and decreased word errors as a result of this program of repeated readings.

To make large amounts of connected text available to subjects in her study (as opposed to focus on individual words), Chomsky (1976) had third-grade disabled readers repeatedly read while listening to the stories on cassette tapes until they could read the story unassisted and with fluency. Other researchers also have had positive results in using repeated readings to attain an acceptable standard of fluency with elementary school children in regular classrooms (Dowhower, 1987) and with high school students (Carver & Hoffman, 1981).

In the report of the Commission on Reading, *Becoming A Nation of Readers,* Anderson, Hiebert, Scott, and Wilkinson (1985), said: "Repeated reading deserves consideration as an alternative to the conventional practice of having children read aloud new material every day. No one would expect a novice pianist to sight read a new selection every day, but that is exactly what is expected of the beginning reader."

In the present study the repeated readings technique accompanied by word card practice was used to increase the reading fluency (accuracy and rate) of sixth-and seventh-grade students with severe behavior handicaps who also had severe reading disabilities.

Method

Participants.

Four male students from an elementary classroom for learners with severe behavior handicaps served as participants. Selection of students was based on students' individual need for improvement in reading fluency and sight reading as reflected by test scores from the Woodcock Reading Mastery Test (Woodcock, 1973). This test was administered to each student upon admission to the school. Grade level scores of the present subjects on the Woodcock ranged from 2.0 to 3.0 with a mean of 2.6. The students ranged from 11 years 1 months to 12 years 5 months in age. Range of IQ scores for students was between 73 and 111 on the full scale Wechsler Intelligence Scale for Children-Revised (Wechsler, 1974). Each student had been in at least three previous residential placements, ranging from treatment foster homes to psychiatric hospitals. Specific data on each student are shown in Table 1.

Table 1

Characteristics of Participants[a]

Student	Age (Yr/Mos)	Academic Level I.Q.	(Grade/Reading)	# of Residential Placements
1	11/1	92	5/2.6	7
2	12/5	87	6/3.0	5
3	11/8	73	5/2.0	3
4	11/11	111	5/2.8	4

[a]All participants were labeled as Severe Behavior Handicapped.

Setting.

All conditions of the study were conducted in the art room of the participants' residential facility for emotionally disturbed children. The first author, a graduate student in special education who served as the teacher, tutored each student individually. The art room was 14 by 20 meters with a

rectangular table and stools. Shelves lined one wall of the room, and the other wall had a sink and a pottery kiln. The setting was chosen because the art room was not used in the morning, and there was little distracting noise.

Response Definition and Data Collection.
The unit of analysis for the dependent variable was number of correct and incorrect words read orally on a previously unread passage from the Science Research Associates (SRA) Reading Series (Parker & Scannell, 1973). Choice of reading levels for the passages used was based on the assessment from the Woodcock Reading Mastery Test, sometimes modified by the classroom teacher's current reading level recommendation.

Each school day each student was given a passage card from the SRA Reading Series and asked to begin reading orally as the teacher simultaneously activated a stopwatch and audio tape recorder. As the student read, the teacher recorded correct and incorrect words on a copy of the passage. At the end of one minute, the teacher said "Stop reading" and simultaneously stopped the stopwatch. Then the teacher scored the passage by recording the number of correct and incorrect words. If a student self-corrected a word initially read incorrectly, the word was scored as correct.

The following is an illustration of the recording procedure:

will
"The boy and girl ~~walked~~ to the l store
to buy some (bread) and milk."

The score from the illustration above would be 12 correctly read words and two incorrectly read words. "Walked" was not read correctly, so it was crossed out and the incorrectly substituted word written above it. Parentheses around a word, such as with "(bread)," indicated that the student did not attempt the word (i.e., the word was omitted). The slash mark between words indicated a pause in oral reading of more than one second that interrupted fluency. Pauses were recorded to indicate gaps in fluency but were not reported as incorrect responses.

Experimental Design.
A multiple probe design (Horner & Baer, 1978) across same-grade-level typed passage cards was used to assess the effects of repeated readings with word drill on increased reading fluency. In multiple probe designs, a number of responses are identified and intermittently measured, or probed, over time to provide baselines for analyzing behavior change prior to the introduction of the independent variable. The independent variable was applied after baseline, first to one passage, then to a second passage, and then to a third.

Procedures.
Baseline. The student orally read different SRA passage cards from the same grade level; the number of correctly and incorrectly read words was then recorded for each. Each passage card from the SRA Reading Series was read only once during baseline. At each baseline session, the experimenter handed the student a passage card. The student was told that the experimenter would tell him when to start and stop reading and that an audiotape and stopwatch would be started when he began reading and stopped when he ended reading. No specific verbal feedback on performance or response prompts was provided during baseline. After the student stopped reading, the experimenter gave nonspecific verbal praise such as "nice job," "very clear reading," "you were trying very hard." The experimenter did not correct any incorrect words or let the student finish reading the passage after the one minute of timed reading. The baseline conditions occurred for a minimum of five sessions or until steady responding occurred or a trend of decreasing fluency was established.

Immediately following each timed reading, the teacher charted the students' number of correctly and incorrectly read words while simultaneously explaining and demonstrating the graphing procedure. Following three sessions of demonstrations, the teacher instructed students to graph their own data which they continued to do in the intervention phase of the study.

Intervention (repeated readings with flash cards). Repeated readings of the SRA passages were used to develop fluency in reading. The same passage was read twice per session until the number of correctly read words increased, and the number of incorrectly read words decreased to meet the specified fluency criterion of 100 correct words with three or less incorrect words per minute. The fluency criterion was selected by timing oral reading of an individual who was judged to be a highly proficient reader. He read 123 words correctly in one minute with no errors. The fluency criterion of one hundred correct words with three or less incorrect words read per minute was set at 20 words less than that of a proficient reader and is consistent with fluency levels recommended by others (e.g., Koorland, Keel, &

Ueberhorst, 1990; Mercer & Mercer, 1985).
Along with the repeated readings of a passage, one additional instructional technique was used to teach individual words. After the first reading, the words read incorrectly were written on 7.6 cm by 12.7 cm cards. The teacher held up each card for three seconds and then went on to the next card. If a student missed a word, the teacher prompted by saying the initial sound of the word. If this response prompt was ineffective, the teacher pronounced the entire word and asked the student to repeat it orally; the card was then placed in a separate pile of words to be read again at the end of the session. These cards were practiced before each timed reading. After the card exercises, timed reading and self-recording occurred.

Transfer measure. To determine if any improved reading fluency would transfer to previously unread (independent, untrained) passages at equivalent reading levels, each student's oral reading fluency was analyzed (a) before repeated readings, (b) during repeated readings, and (c) following repeated readings instruction. When students read fluently with the intervention of repeated readings with word card drill, but fluency did not transfer to new passages, then a new passage was read repeatedly until fluency was achieved.

Accuracy and Interobserver Agreement of Measurement.

Accuracy. Audio tapes of students' reading were used to check the accuracy of measurement (Johnston & Pennypacker, 1980), for the number of correct and incorrect words per minute. Correct and incorrect words for each reading were independently measured twice. Accuracy was assessed by the first author who listened to the tape, recorded correct and incorrect words on a copy of the story, and compared this second measurement with the measurement taken during the session with the student. Accuracy of measurement was assessed for all sessions. Accuracy agreements from baseline verifications and intervention verifications were 100%.

Interobserver agreement. Audio tapes of the students' reading also were used to assess interobserver agreement on the durations of time students read. Durations of the taped readings were recorded with a stopwatch by a second observer to verify that the student read for exactly 60 seconds. These attempts at verification occurred for each passage read. Overall, interobserver agreement between the second observer and the first author on the durations of students' readings was 93%, with 100% agreement that students read for exactly 60 seconds on 151 of the 162 passages read.

Integrity of the Independent Variable.

To ensure the integrity of the independent variable, audio tapes from each session were monitored for adherence to and deviations from the prescribed baseline and repeated readings with word drill procedures. Integrity of the independent variable was monitored with the following procedures:

1. Checklists were developed from an outline of the baseline and repeated readings procedures.
2. An independent observer listened to the audio taped sessions and used the procedural checklist to verify consistency of implementation of the independent variable. Nine complete baseline sessions and nine complete sessions from the repeated readings/card phase were audio taped. The audio tapes included the teacher's directions, the card sessions, and the students' readings. Mean baseline percentage of procedural adherence was 91% (range = 78% to 100%), while mean repeated readings/flash card agreement was 97% (range = 85% to 100%).

Social Validity.

Repeated reading activities were assessed to determine if they were socially valid (Wolf, 1979) in developing oral reading fluency. Social validation was accomplished by examining the goals of the study, the social appropriateness of repeated reading, and the social importance of the results.

Appropriateness of repeated reading. Three of the four students who participated in the study were interviewed at the conclusion of the study to determine whether each student enjoyed reading orally, enjoyed the repeated readings, participated more because of charting the number of words read correctly and incorrectly and use of the 1-minute timings, thought the stories were too easy or too difficult, was ever bored with the reading program?

Importance of results. Four teachers were interviewed to determine what importance and relevance this study would have in daily classroom planning. During the interview, conducted by the first author, the teachers were asked to respond to the following: (a) Is oral reading skill important? (b) Is fluent reading rate important? (c) Is repeated readings an appropriate instructional technique to

improve reading fluency? (d) Will teachers, in general, teach for fluency and not just for acquisition? (e) Are one-minute timings to assess skill development helpful for students?

Results

Sample data obtained during baseline and repeated readings with word card drill conditions are presented as the number of words correctly and incorrectly read per minute in Charts 1 and 2. The number of correct and incorrect words per minute followed similar trends with session to session patterns of variability for all participants during each condition of the experiment. The baseline conditions, which included self-charting, were in steady state responding or showed a decreasing trend prior to the addition of repeated readings plus word card drill. Since self-charting was not associated with improved fluency, the treatment package was considered only repeated readings plus word card drill. Following introduction of the treatment package, all students, for each passage read, demonstrated a rapidly increasing trend in the number of correct words read per minute, and all showed a decrease in the number of incorrect words read. In addition, all students had either one or two untreated baselines for the duration of the experiment. Those untreated baselines maintained a steady state responding, or a slightly decreasing trend with the exception of Student 2; his last eight untreated baseline sessions were higher in correct words read per minute than his first six sessions. (See Chart 3.)

Table 2 presents the participants' low scores, high scores, and median scores by experimental condition for number of correctly and incorrectly read words per minute from each passage.

Transfer measure. Each student's oral reading rate was analyzed (a) before instruction, (b) during repeated readings, and (c) following repeated reading instruction. For the participant group as a whole, correct reading fluency on previously unread passages during assessment of transfer effects decreased by a mean of four words per minute. The number of words read incorrectly remained virtually the same. These data indicate that fluent reading generated with repeated readings did not transfer to previously unread passages, since overall correct reading rates decreased slightly. Reading up to three passages (i.e., training three exemplars of the skill) at a fluency criterion of 100 correct words per minute with three or less incorrect words per minute was not sufficient to produce a transfer effect.

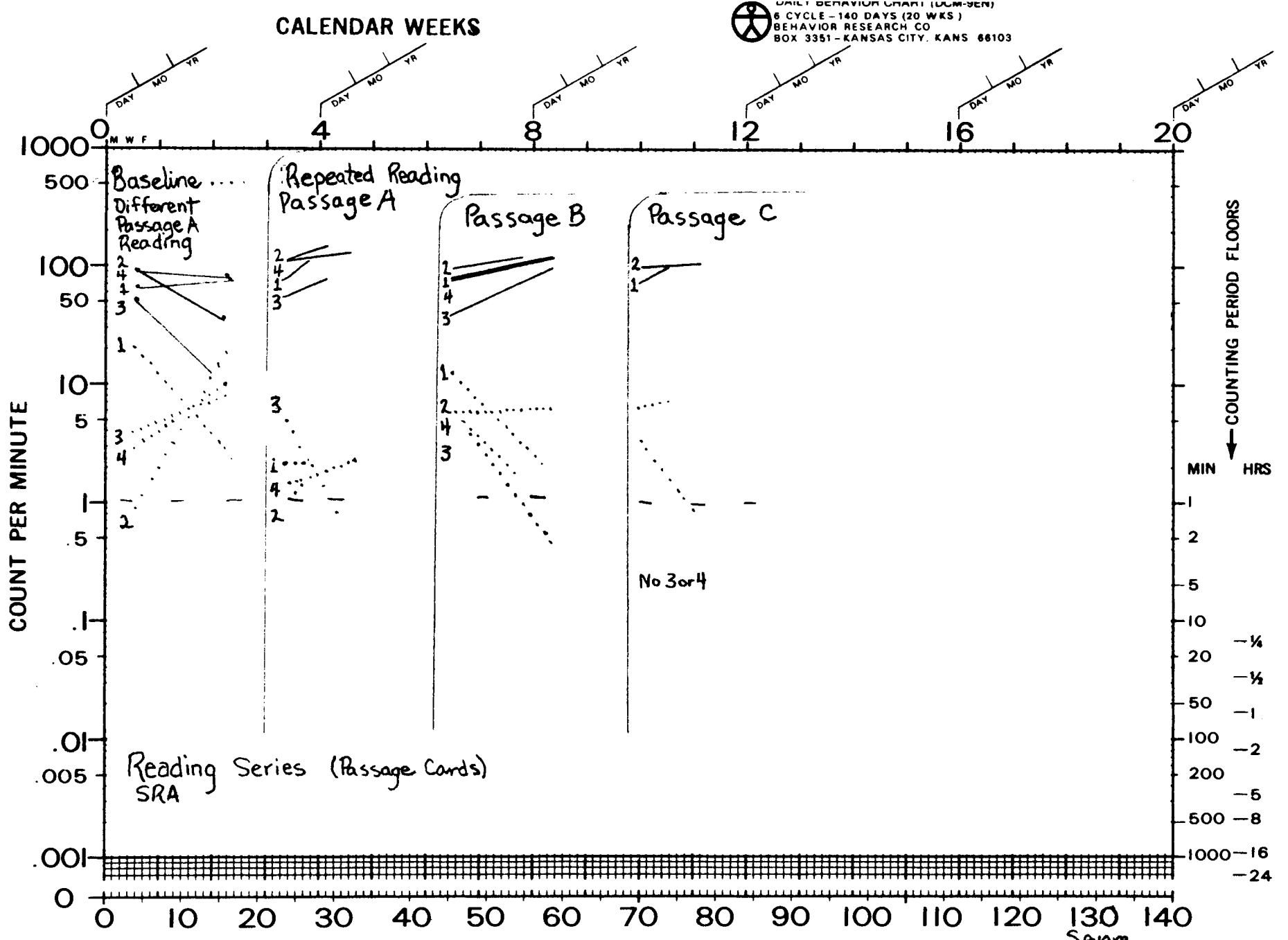
Table 2

Low, High, and Median Correct Words Per Minute by Experimental Conditions

	Baseline			Intervention		
Passages	Low	High	Median	Low	High	Median
			Participant 1			
A	47	73	68	70	105	90
B	64	87	70	76	104	91
C	59	87	71	65	95	88
D	55	75	64	---	---	---
			Participant 2			
A	39	91	55	94	123	110
B	45	83	70	80	115	101
C	58	95	74	77	115	95
D	39	96	82.5	---	---	---
			Participant 3			
A	12	40	32	21	75	64
B	13	33	26	39	74	58
C	14	41	27	---	---	---
D	15	43	32	---	---	---
			Participant 4			
A	57	91	78	89	117	104
B	53	83	69	66	104	87
C	39	89	73	---	---	---
D	57	87	74	---	---	---

Social validity. The results of the participants' interview used to gather social validity data indicated that one participant enjoyed reading orally in all settings and the other two students did not mind reading orally with the experimenter, but did not like oral reading in school. They both stated that oral reading in front of classmates was embarrassing and made them nervous. All three students liked engaging in the repeated reading activity with the experimenter and said it helped them to understand the story better. The charting of number of words read correctly and incorrectly and the the one-minute timed readings were important activities for participants. Students stated that they were eager to "beat their score" from the session before. All three students said that these procedures helped their reading skills on other passages and improved their sight word vocabulary. Two of the three students said that some of the passages were too difficult for them, but all three agreed that a majority of the stories were at an appropriate level. One student said the

DAILY BEHAVIOR CHART (DCM-9EN)
6 CYCLE – 140 DAYS (20 WKS)
BEHAVIOR RESEARCH CO
BOX 3351 – KANSAS CITY, KANS 66103



SUPERVISOR	McCormick ADVISER	Cooper MANAGER		Students 1-4 BEHAVER	11 to 12 AGE	Severe Behavior Handicap LABEL	Say Word COUNTED
DEPOSITOR	Hannah Neil Center AGENCY		TIMER	Carroll COUNTER	Cooper/Neely CHARTER		

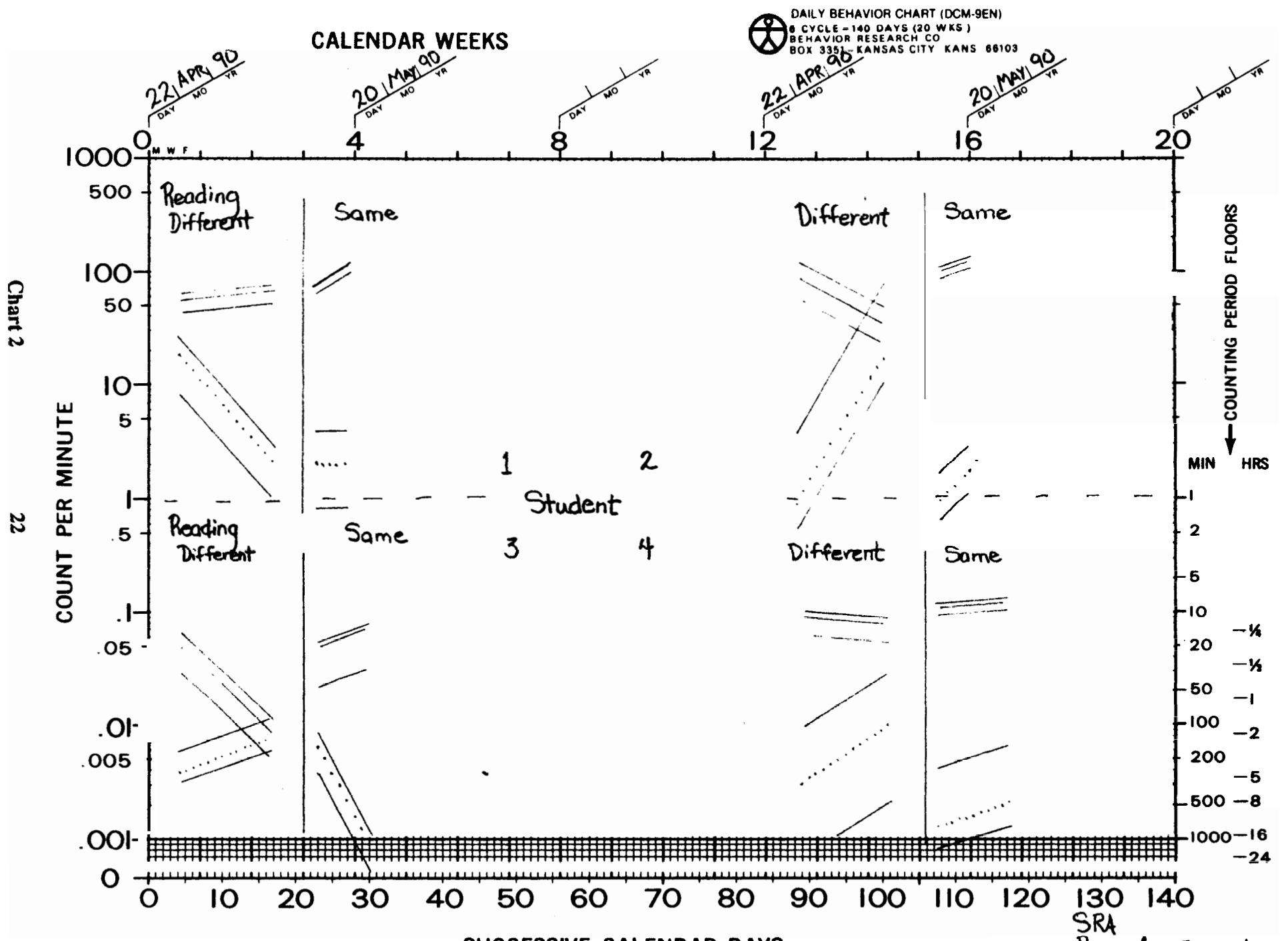


Chart 2

22

McCormick — SUPERVISOR
Cooper — ADVISER
MANAGER

Carroll — BEHAVER
11-12 — AGE
SRA Passage A — LABEL
Says Word — COUNTED

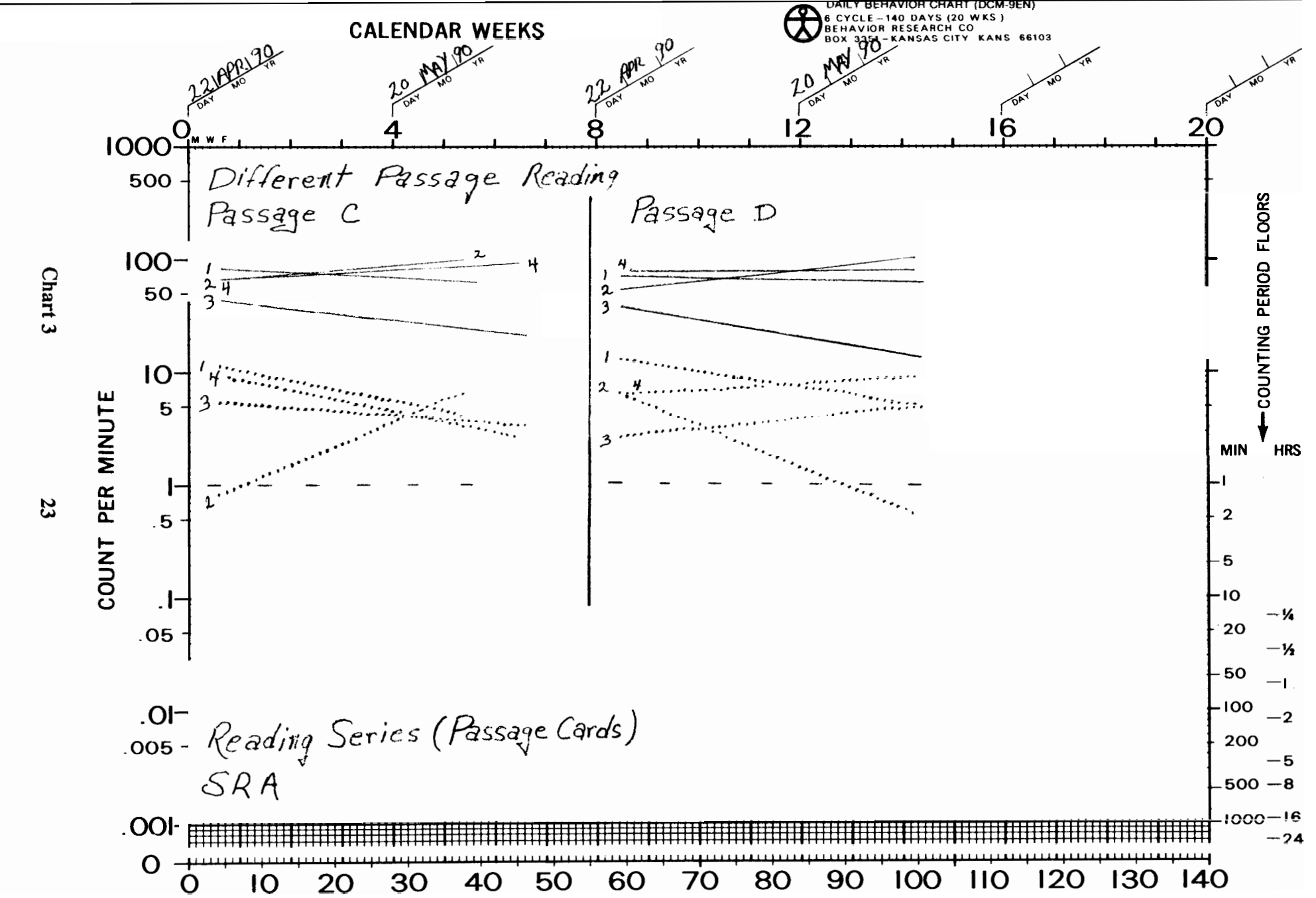


Chart 3

23

S.M Cormick — SUPERVISOR
J.O. Cooper — ADVISER
MANAGER
Hannah — DEPOSITOR
Neil Center — AGENCY
C. Carroll — TIMER
COUNTER
Pupils — BEHAVER
11 to 12 — AGE
SRD — SBH — LABEL
Says Word — COUNTED
J.O. Cooper — CHARTER
M D. Neely

repeated readings were boring at times. The other two participants believed the procedure was exciting and were never really bored.

During their interviews, the teachers all stated that oral reading is an important skill for students to acquire because there are times in school and in the community when individuals are asked to read aloud. In addition, all four teachers believed that an efficient reading rate was essential for reading comprehension. The teachers agreed that repeated readings with word card drill was a useful way to improve fluency and also believed that this would produce a collateral development in reading comprehension. Two teachers said they teach for fluency after a student has acquired a skill. The other two believed that a number of teachers cease instruction after the acquisition phase of learning. All of the teachers had used timed learning trials on some skills, and all stated that timed trials help students become proficient. Three of the teachers believed that charting results from timed probes "motivate" students to compete against themselves and to become more fluent.

Discussion

A functional relationship between reading fluency (i.e., accuracy and the number of words read correctly per minute) and repeated readings with drills was demonstrated. The number of words read correctly per minute steadily increased during repeated readings, with the number of words read incorrectly per minute maintained at low frequencies during all phases of the study. These results support the increasing professional literature base that recommends repeated readings as an important instructional method for improving oral reading fluency (e.g., Anderson, 1981; Chomsky, 1978; Samuels, 1979; Scott, Wolking, Stoutimore, & Harris, 1990).

Chomsky (1978) and Kann (1982) reported that initially their participants disliked reading and avoided reading whenever possible; however, after the use of repeated readings, the participants enjoyed reading more and increased the amount of free time with personal reading. During the exit interview used in the social validity assessment, the statements of our students indicated similar outcomes as those reported by Chomsky and Kann. For instance, when we asked the students how they felt about the instruction, all said they viewed the instruction with repeated readings favorably, stating they felt more confident about their oral reading skills. They identified the timing of reading and the self-charting of correct and incorrect words read particularly enjoyable. Participants also believed that the fluency instruction not only improved their oral reading, but improved their sight word vocabulary and comprehension of the passages as well. It is suggested that future research analyze a number of variables to determine those functionally related to the transfer of fluent reading for this population. For example, study could focus on the effects of: (a) increasing number of sessions of fluent reading on a specific passage; (b) extending number of passages trained to the fluency criterion; (c) increasing criterion level or aim (i.e., frequency correct); and (d) varying level of passage difficulty. In addition, word drill accompanied standard repeated readings procedure in the present study; therefore, an analysis of word drill effects alone on the development of fluency is in order.

The present study reflects a growing interest in the role of Precision Teaching in the overall curriculum in regular and special education. Use of repeated readings for producing fluent reading is gaining wide acceptance in the educational community and is supported by this research. However, many questions related to the effects of repeated readings need to be resolved. Specifically crucial is the question of transfer of fluent reading to new passages. Nevertheless, even with many unanswered questions, the repeated readings technique appears to be an appropriate method for the development of fluency. Use of repeated readings has produced positive results in previous studies. The present data indicate this technique is a useful one with students often viewed as particularly difficult to teach--children, not only having severe reading disabilities, but severe behavior handicaps as well.

References

Allington, R. L. (1984). Oral reading. In P. D. Pearson (Ed.), *Handbook of reading research (pp. 829-864)*. New York: Longman.

Anderson, B. (1981). The missing ingredient: Fluent oral reading. *The Elementary School Journal, 81*, 173-177.

Anderson, R. C., Hiebert, E. H., Scott, J. A., & Wilkinson, I. A. G. (1985). *Becoming a nation of readers*. Washington, DC: The National Institute of Education.

Braam, L. S., & Berger, A. (1968). Effectiveness of four methods of increasing frequency, comprehension, and flexibility. *Journal of Reading, 11*, 346-352.

Buswell, G. T. (1920). An experimental study of eye-voice span in reading. *Supplemental educational monographs, No. 17.* Chicago: University of Chicago.

Carver, R., & Hoffman, J. (1981). The effect of practice through repeated reading on gain in reading ability using a computer-based instructional system. *Reading Research Quarterly, 16,* 374-390.

Cason, E. B. (1943). Mechanical methods for increasing the speed of reading. *Contributions to Education, No. 878.* New York: Teachers College, Columbia University.

Chomsky, C. (1976). After decoding: What? *Language Arts,* 53, 288-296; 314.

Dahl, P. R., & Samuels, S. J. (1979). An experimental program for teaching high speed word recognition and comprehension skills. In J. E. Button, T. C. Lovitt, & T. D. Rowland (Eds.), *Communications research in learning disabilities and mental retardation* (pp. 304-314). Baltimore: University Park Press.

Dowhower, S. L. (1987). Effects of repeated reading on second-grade transitional readers' fluency and comprehension. *Reading Research Quarterly, 22,* 389-406.

Goldstein, H. (1940). Reading and listening comprehension at various controlled frequencies. *Contributions to Education, No. 821.* New York: Teachers College, Columbia University.

Grob, J. A. (1968). Forced speed in oral reading. *Journal of Reading, 11,* 621-624.

Grob, J. A. (1970). Reading frequency and study-time demands on secondary students. *Journal of Reading, 13,* 285-288; 316.

Heckelman, R. G. (1966). Using the neurological impress remedial technique. *Academic Therapy Quarterly, 1,* 235-239.

Horner, R. D., & Baer, D. M. (1978). Multiple-probe technique: A variation on the multiple baseline design. *Journal of Applied Behavior Analysis, 11,* 189-196.

Johnston, J. M., & Pennypacker, H. S. (1980). *Strategies and tactics for human behavioral research,* Hillsdale, NJ: Lawrence Erlbaum.

Kann, R. (1982). The method of repeated readings: Expanding the neurological impress method for use with disabled readers. *Journal of Learning Disabilities, 16,* 90-92.

Koorland, M. A., Keel, M. C., & Ueberhorst, P. (1990). Setting aims for precision learning. *Teaching Exceptional Children,* 22, 64-66.

LaBerge, D., & Samuels, S. J. (1974). Toward a theory of automatic information processing in reading. *Cognitive Psychology, 6,* 293-323.

McCormick, C., & Samuels, S. J. (1979). Word recognition by second graders: The unit of perception and interrelationships among accuracy, latency, and comprehension. *Journal of Reading Behavior, 11,* 107-118.

McCormick, S. (1987). *Remedial and clinical reading instruction.* Columbus, OH: Merrill.

McGreevy, P. (1983). *Teaching and learning in plain English* (2nd ed.). Sarasota, FL: Precision Teaching Materials.

Mercer, C. D., & Mercer, A. R. (1985). *Teaching students with learning problems* (2nd ed.). Columbus, OH: Merrill.

Parker, D. H., & Scannell, G. (1973). *Individualized learning through the reading laboratory series.* Chicago: Science Research Associates.

Sailor, A. L., & Ball, S. E. (1975). Peripheral vision training in reading speed and comprehension. *Perceptual and Motor Skills, 41,* 761-792.

Samuels, S. J. (1979). The method of repeated readings. *The Reading Teacher, 32,* 403-408.

Samuels, S. J. (1985). Automaticity and repeated reading. In J. Olson, P. Wilson, & R. Anderson (Eds.), *Reading education: Foundations for literate America* (pp. 215-230). Washington, DC: D. C. Heath.

Samuels, S. J., Begy, G., & Chen, C. C. (1975-76). Comparison of word recognition speed and strategies of less skilled and more highly skilled readers. *Reading Research Quarterly, 11,* 72-86.

Scott, J., Wolking, B., Stoutimore, J., & Harris, C. (1990). Challenging reading for students with mild handicaps. *Teaching Exceptional Children, 22,* 32-35.

Smith, F. (1982). *Understanding reading* (3rd ed.). New York: Holt, Rinehart & Winston.

Tinker, M. A. (1936). Eye movements in reading. *Journal of Educational Research, 30,* 241-277.

Tinker, M. A. (1958). Recent studies in eye movements in reading. *Psychological Bulletin, 54*, 215-231.

Wechsler, D. (1974). *Wechsler intelligence scale for children* (revised). New York: The Psychological Corporation.

White, O. R. & Haring, N. G. (1980). *Exceptional teaching*. Columbus, OH: Merrill.

Wolf, M. M. (1978). Social validity: The case for subjective measurement or how applied behavior analysis is finding its heart. *Journal of Applied Behavior Analysis, 11*, 203-214.

Portions of this research were completed in partial fullfillment of the requirements for the degree of Master of Arts for Cynthia L. Carroll. Dr. Sandra McCormick is Professor of Educational Theory and Practice at The Ohio State University. Reprints may be obtained from Dr. John O. Cooper, who is Professor of Special Education, 356 Arps Hall, The Ohio State University, 1945 N. High Street, Columbus, Ohio 43210.