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The Effects of Contingency Management on Reading Achievement of Institutionalized Offenders

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THE EFFECTS OF CONTINGENCY MANAGEMENT
ON READING ACHIEVEMENT OF
INSTITUTIONALIZED OFFENDERS

A Thesis
Presented to
the Graduate Faculty
Central Washington State College

In Partial Fulfillment
of the Requirements for the Degree
Master of Education

by
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APPROVED FOR THE GRADUATE FACULTY

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PROBLEM

The hypotheses to be tested in this study are concerned with the use of contingency management. In general, the theory states that behavior normally occurring at a low rate may increase when it is followed by activities which are highly desirable to the student (Premack, 1965). Also suggested in the theory is that a response does not have a zero operant level (Bijou and Baer, 1961). It was assumed, then, that institutionalized offenders enrolled in remedial reading classes have an operant level of some degree for a specific response that could be strengthened by positively reinforcing that response.

Because the usual reinforcers for academic learning frequently are not motivating for the offender, an attempt was made to determine the effects of contingency management on reading achievement of adult male felons.

Purpose

Institutionalized offenders are by definition "maladjusted" and have special educational needs because of past histories of school failure. A relationship between poor school achievement and crime and delinquency is suggested by numerous studies (Glueck and Glueck, 1950; Kvaraceus, 1960; Gath, Tennent and Pidduck, 1970). Norman and Margaret Silberman (1971) point out that a study of delinquency

demonstrates a correlation between anti-social behavior and lack of school success.

Aversion to traditional patterns of instruction is also reflected among adult inmates. The Department of Institutions of the State of Washington (1969) estimated that 97% of the residents at one adult institution were school dropouts. Further studies indicate that adult felons represent a population with which traditional methods of instruction have failed and need to be motivated by techniques that go beyond existing models (United States Department of Justice, 1967). One purpose of this study was to explore new methods as a means of improving teaching techniques within correctional institutions.

Efforts with programmed instruction within adult correctional institutions were successful in supplying the inmate an individual program with high probabilities of success. However, the intrinsic reinforcement of programmed instruction has proven insufficient in maintaining learner productivity and motivation (McKee, 1970). Therefore, the second purpose of this study was to design a motivating environment that would generate consistent learning performance among institutionalized offenders.

Application of contingency management has been effective in establishing and maintaining classroom behavior and to improve learning. Successful studies have taken place in public and institutional schools. However, the majority of research in contingency management in an educational setting is with young students or juvenile delinquents (Busse, 1969; Albertson, 1970; Slack, 1960; Schwitzgebel

and Klob, 1964). It is therefore the third purpose of this study to attempt to show how the systematic application of contingency management can improve the reading achievement of adult felons.

Review of Literature

This section was written to review the literature on contingency management and reading rate.

Contingency management. In recent years emphasis on the systematic use of reinforcement procedures in the classroom has increased (Hanley, 1970). These principles are extensions and application of earlier research in operant conditioning that primarily involved the behavior of lower animals (Skinner, 1938; Mowrer, 1950; Thorndike, 1935). The procedure involved the basic observation that behavior is strengthened or weakened depending on its consequences. When a favorable consequence results from a behavior, it is called positive reinforcement. Changes in behavior then can be observed in terms of manipulation of consequences. If we wish to increase the probability of some desired behavior, positive consequences should be arranged for that behavior.

Behavioral principles applied in the classroom indicate that academic and social behaviors are operants that are sensitive to consequent stimulus. Classroom behavior normally occurring at a low rate may increase when it is followed by activities that are highly desirable to the student (Premack, 1965). Positive consequences made contingent upon what the student is doing and upon the circumstances

under which he is doing it will have a positive effect on student motivation, social behavior, and academic productivity (Skinner, 1968).

Recently models of behavior modification using contingency management have been used to meet the demands of educating students who are emotionally disturbed (Dyer, 1968; Hewitt, 1967), culturally deprived (Staats and Butterfield, 1965), and failure-prone (Clark, Lachowicz and Wolf, 1968; Wolf, Giles and Hall, 1968). According to Hewitt (1968), behavior modification is primarily concerned with "what" the student does rather than "why" or "how." This technique concentrates on observable behavior and inadequate skills that interfere with the student's ability to learn (Englemann, 1969).

Nolen, Kunzelman, and Haring (1967) applied contingency management to eight junior high age students who exhibited serious learning and behavior disorders. Points were earned by the students for task completion and exchanged for high interest behaviors such as game activities. Significant gains were recorded in academic activities.

Smith, Brethower, and Cabot (1969) attempted to increase the task behavior of children who were retarded readers. Conditions of monetary reward contingent upon completion of assignments at a specified level of accuracy resulted in sustained rates of work behavior and increased reading achievement.

Benowitz and Busse (1970) offered material reward to one hundred fourth grade black students from a low income district for

improvement in spelling. Significantly higher scores in spelling were achieved by the students who were offered a box of crayons for accurate work.

The effect of contingency management on reading achievement of regular and special education junior high students was examined by Albertson (1970) and Busse (1969). These studies measured the effects of reinforcing an increase in reading rate with free time activities. Statistically significant gains were found in reading achievement.

A study by the Joint Commission on Correctional Manpower (1967) reported a definite lack of educational skills among institutionalized offenders in correctional institutions throughout the United States. It was pointed out that programs are needed in which the inmate must adjust to the realities of his conduct and its consequences. The report called for the establishment of educational programs that would motivate the inmate to participate.

A model for correctional educational programs by Hitt and Agostino (1968) recommended that they should (1) effect behavioral change and (2) include an equitable reward system to motivate inmates. Results of studies with juvenile delinquents that have systematically applied behavioral learning principles have indicated that an equitable contingent reward system can establish appropriate classroom behavior and improve learning.

Cohen, Filipczak, and Bis (1967) used behavioral learning principles to increase the educational behavior and achievement of delinquent boys in a federal institution. Points were earned contingent upon scores of ninety percent on programmed instructional material.

The points were exchangeable for leisure time, snacks, and items from a mail order catalog.

The California Youth Authority (1969) implemented an experimental motivational program in which institutionalized delinquents could earn money for specified academic and behavioral changes. Researchers report increased attention spans, increased interest in school work, and a decline in disciplinary problems.

Michenbaum, Bowers, and Ross (1968) found that class behavior of institutionalized female delinquents could be greatly improved through the delivery of tokens in the classroom. In this study, tokens could be earned for appropriate behavior and completion of assigned work. The tokens were exchangeable for money later in the day.

Phillips (1968) also found that the delivery of tokens was an effective system in the rehabilitation of pre-delinquent boys. Points were earned contingent upon specified behavior and redeemable for privileges such as television watching and bike riding.

In a study by Tyler and Brown (1968) low motivation appeared to be responsible for poor school performance among institutionalized delinquent boys. Contingent token reinforcement strengthened academic performance on true-false tests covering newscasts observed on television. Further studies in the application of contingency management with institutionalized delinquents indicated that academic performance could be improved (Tyler, 1967; Graubard, 1969) and behaviors modified (Burchard and Tyler, 1965; Bailey, Wolf, and Phillips, 1970).

Behavior modification techniques have received limited application in the field of adult correctional education. The use of positive reinforcement for inmates is a concept that challenges a long tradition of punishment and negative reinforcement (Watkins, 1967). The first attempt at introducing behavioral learning principles to adult correctional education was programmed learning. A study by McKee (1970) indicated that of 150 major state adult correctional institutions, 75% were using some form of programmed instruction. The remaining institutions indicated a lack of variation from the conventional methods of teaching.

A study of programmed instruction (McKee, 1970) indicated that it did not generate sustained productivity on the part of the adult institutionalized offender. An experiment in contingency management was attempted at Draper Correctional Center in Alabama to increase the rate and quality of performance of adult inmates studying programmed materials (McKee, 1968). The model of this study was derived largely from the work of Premack (1965) and Homme, et al. (1963, 1965, 1966). Inmate students could gain admission to a reinforcing event area by completing work specified by means of a written contract. Test performance improved and the students progressed through material at a rate twice that of the baseline period.

A second study at Draper Correctional Center dealt with the effects of incentive payments upon performance on tests in basic education classes (McKee, 1969). Subjects could earn up to \$10 a week in the program. Results showed that 21 of the 23 subjects increased the number of tests taken and percentage of tests passed

during the contingency period.

The preceding review of literature indicates that the systematic application of contingency management is effective with students who are emotionally disturbed, culturally deprived, and failure prone. Successes obtained in modifying social and academic behaviors of such students indicates that contingency management could be effectively applied to adult institutionalized offenders.

Reading Rate

In this study, focus was on oral reading rate. Increase in rate was reinforced and results made known by means of progress charts and records.

Studies by Barbe (1955), Tuckey (1960), Harris (1968), and Englehart (1965) show that an increase in reading rate does not injure comprehension. Also, Bond and Tinker (1967) report that a review of most reading programs to improve rate indicate that comprehension was maintained at an adequate level.

Rankin (1963) feels that improvement in rate should be stressed when both speed and comprehension are weak. He found that reading improvement emphasizing rate resulted in faster reading with no significant loss in comprehension. According to Harris (1970), lack of practice and motivation are among the major causes of slow reading. A program in remedial reading should include incentives to motivate the student to practice and improve his reading ability. Harris believes that comprehension among slow readers may suffer because the rate of reading is too slow. He feels that in the upper grades improvement of

rate should be a definite part of a developmental reading program.

Staats (1970) found that a reinforcement system was an effective incentive in producing improved attention, work habits, and reading achievement among thirty-two black ghetto children.

Hertzman (1968) conducted a six-week summer reading session for migrant primary school children. Plastic tokens were awarded to a treatment group contingent upon learning specific skills and were exchangeable for toys, candy, and assorted sundries. Results of post-testing indicated that the treatment group attained significantly higher gains on achievement tests than the control group.

Busse (1969) applied contingency management to a reading program for junior high special education students. Increase in rate was reinforced with free time activities. Although concentration was on improvement in rate with no other reading instruction, significant gains were recorded in total reading achievement. Studies by Staats and Butterfield (1965), Raygor, Wark, and Warran (1966), Whitlock and Bushell (1967), and Staats, Finely, Minke, Wolf and Brooks (1964) also found that contingent reinforcement systems are effective in motivating the student to improve reading skills.

Students enrolled in remedial reading classes usually have experienced a high degree of failure in school because of their inability to read effectively. It is essential that a developmental reading program offer the student a chance to succeed. Reading rate is a skill in which considerable improvement can be expected in most cases (Harris, 1970; Bond and Tinker, 1967). Braam and Berger (1968) feel that improvement in rate can usually be accomplished in a short

amount of time.

Bond and Tinker (1967) and Criscuolo (1966) recommend that gains in reading ability be made known to the student by means of daily record of results. Knowledge of results provides continuous measurement and can also act as an incentive to the student to improve.

Definition of Terms

Institutionalized offender: person eighteen years or older who has been convicted of a felony and committed to an adult correctional institution; also referred to as resident, inmate, and prisoner.

Free time: time earned for increased oral reading rate and used for record listening or activity of own choice.

Baseline: rate of behavior before reinforcement takes place.

Reading rate: number of words read correctly per minute orally.

Time-out: time during which student is removed from opportunity for reinforcement.

Hypotheses

It was hypothesized that, using free time as reinforcement of correctly read words per minute:

1. The experimental group would make greater gains in vocabulary development than the control group.
2. The experimental group would make greater gains in comprehension than the control group.

3. The experimental group would make greater gains in speed than the control group.

4. The experimental group would make greater gains in accuracy than the control group.

The above hypotheses were measured by the Gates-MacGinitie Reading Test, D Form 1 as the pretest and D Form 2 as the posttest, and analyzed by means of the t test.

It was hypothesized also that:

5. Under reinforcement conditions, each subject in the experimental group would make measurable gain in oral reading rate over his baseline rate, as determined by the Fisher Exact Probability Formula.

METHOD

Subjects

Students were selected from Garrett Heyns High School located within the Washington Corrections Center in Shelton, Washington. The Center is a maximum-security institution for adult felons who have been convicted of their first offense. No attempt was made to select subjects according to age, length of incarceration, or amount of education. Residents involved in the study represented those students enrolled in remedial reading classes at the time of the study. Attendance in remedial reading classes is recommended upon the results of diagnostic testing that indicate severe reading difficulties.

The experimental group, the morning session of remedial reading, consisted of eleven students whose chronological age ranged from 18 to 23 years. The control group, the afternoon session of remedial reading classes, consisted of eleven students whose chronological age ranged from 18 to 22, one 30, and one 42 years.

Material and Apparatus

The basic reading material used by the experimental group during the study was Reading by Sullivan (1967). The series consists of twenty programmed workbooks in which the student checks his answers and receives immediate feedback as to the correctness of his response. The program is based on phonics and simple vocabulary that increases

in difficulty as the student progresses through the workbooks.

Additional material used in the experimental group included Word Clues by Taylor (1962) for advanced vocabulary development, Spelling Action by Benner (1969), and Reading, Spelling, Vocabulary, and Pronunciation by Lewis (1967).

Material used by the experimental group for oral reading rate consisted of graded stories from Readers by Sullivan (1967), Discovery Books by Dell Publishing Company (1968), and Adventures for Americans by Derrick, Schranz, and Spiegler (1969).

The control group used a variety of materials that included Reading by Sullivan (1967), Dimension in Reading by Science Research Association (1966), and an assortment of vocabulary and spelling exercises.

The experimental and control groups were located in two separate classrooms. The classroom environment for the experimental group included a teacher station, student stations, and a reinforcing event area. The teacher's desk served as the station from which student folders were issued, general instructions given, and observation took place. The students' desks served as stations at which all oral and written responses were completed.

The reinforcement area was a large table located at the back of the room, surrounded by contemporary art posters on the wall. A record player, two sets of headphones, and an assortment of current record albums were made available to the students.

The teacher used a stopwatch to determine oral reading rate of students in the experimental classroom. Graphs were used to record

daily individual student oral reading rate. Individual charts were also kept to record reading rate averages and free time.

The environment of the control group was similar to that of the experimental classroom with student and teacher stations. However, oral reading rate was not determined and no reinforcement area was provided.

The Gates-MacGinitie Reading Test, Survey D, was used as a measuring device in this study. Equivalent forms of the test, D Form 1 and 2, were used. D Form 1 was administered to both groups at the beginning of the baseline period. D Form 2 was administered at the end of the six-week reinforcement period.

Procedure

A control and experimental group was used to determine the effects of reinforcing oral reading rate. Individual graphs were used to record each student's daily oral reading rate in the experimental group. This allowed continuous evaluation of the effect of reinforcement on the rate of oral words read per minute.

The method of instruction in the control group during the investigation remained constant with procedures already established and did not include measurement or reinforcement of oral reading rate.

The two phases of the design consisted of a two-week baseline and a six-week reinforcement period.

Response specification. One type of response from each student in the experimental group was measured. Each student was required to

read orally for one minute each day. Oral response was defined as words read correctly per minute. While taking reading rate, three seconds were allowed on difficult words before the teacher assisted the student.

Baseline. During the first two weeks of the study each student in the experimental group was assigned one story daily from which to read. Oral responses were made under conditions of no reinforcement, and served as a baseline from which to compare behavior change during the reinforcement period.

Reinforcement period. The six-week reinforcement period was initiated by telling the students that the rate of words being read correctly was being recorded. Each student was given a graph that indicated his oral responses during the baseline period. In addition, each student was given a chart to average weekly oral reading rate and record free time. The teacher kept a duplicate of all information in student folders.

Each student was told that by increasing reading rate, free time could be earned. Free time could be used to listen to contemporary music albums or engage in any activity approved by the instructor. Free time could be earned according to the schedule in Table I and could be accumulated to a maximum of fifty minutes or used whenever the student requested.

Table I

Free Time Chart

Rate Schedule	Free Time
1. Achieves at previous weeks' average	3 min.
2. Achieves 1 to 5 words above previous weeks' average	6 min.
3. Achieves 6 to 10 words above previous weeks' average	9 min.
4. Achieves 11+ words above previous weeks' average	12 min.

Time out. It is established procedure at the Washington Corrections Center that any resident causing a disturbance in a classroom is removed by the school officer. Students were reminded of this time out procedure at the beginning of the reinforcement period, with the understanding that removal from the classroom would mean no opportunity to earn or use free time that day.

RESULTS

An analysis of the data disclosed measurable gains in all of the areas compared.

The first hypothesis of greater gain by the experimental group in vocabulary development, as measured by the Gates-MacGinitie Reading Test at the beginning and end of the study, was not rejected. The t test analysis of the data on vocabulary development shows measurable difference at the .10 level of probability, as can be observed in Table 2.

The second hypothesis of greater gain by the experimental group in comprehension, as measured by the Gates-MacGinitie Reading Test at the beginning and end of the study, was not rejected. The t test analysis of the data on comprehension shows measurable difference at the .0005 level of probability, as can be observed in Table 3.

The third hypothesis of greater gain by the experimental group in speed, as measured by the Gates-MacGinitie Reading Test at the beginning and end of the study, was not rejected. The t test analysis of the data on speed shows measurable difference at the .10 level of probability, as can be observed in Table 4.

The fourth hypothesis of greater gain by the experimental group in accuracy, as measured by the Gates-MacGinitie Reading Test

Table 2

MEAN DIFFERENCE ON VOCABULARY
 SUBTEST DURING BASELINE AND
 REINFORCEMENT PERIODS

N=11

Group	Mean Grade Level	S.D.	Mean Difference	t
		<u>Baseline</u>		
Control	4.463	2.483		
Experimental	4.481	2.764		
		<u>Reinforcement</u>		
Control	4.400	2.124	-.063	
Experimental	5.027	2.449	+.546	

1.513*

*Significant at the .10 level with 20 df.

Table 4

MEAN DIFFERENCE ON SPEED SUBTEST DURING
 BASELINE AND REINFORCEMENT PERIODS
 N=11

Group	Mean Grade Level	S.D.	Mean Difference	t
<u>Baseline</u>				
Control	4.318	1.351		
Experimental	4.509	1.463		
<u>Reinforcement</u>				
Control	4.536	1.904	+.218	
Experimental	5.345	2.529	+.836	

1.460*

*Significant at the .10 level with 20 df.

at the beginning and end of the study, was not rejected. The t test analysis of the data on accuracy shows measurable difference at the .05 level of probability, as can be observed in Table 5.

The fifth hypothesis of measurable gain within the experimental group in oral reading rate as indicated on individual graphs, kept during baseline and reinforcement periods, was not rejected. The Fisher Exact Probability Formula analysis of the data indicated measurable difference for all but subject C at the .05 level of probability, as can be observed in Table 6.

Table 5

MEAN DIFFERENCE ON ACCURACY SUBTEST DURING
 BASELINE AND REINFORCEMENT PERIODS

Group	Mean Grade Level	S.D.	Mean Difference	t
<u>Baseline</u>				
Control	4.318	1.447		
Experimental	4.518	1.568		
<u>Reinforcement</u>				
Control	4.418	2.337	+.100	
Experimental	5.409	2.650	+.891	

1.820*

*Significant at the .05 level with 20 df.

Table 6

DAILY READING RATE DURING BASELINE
AND REINFORCEMENT PERIODS

Subject	Baseline Median	Reinforcement Median	Significance
A	72	93	.04
B	140	196	.000036
C	76	80	.25*
D	86	104	.04
E	140	200	.000035
F	100	136	.00000097
G	96	118	.027
H	50	63	.00024
I	59	72	.017
J	120	140	.01
K	103	118	.01

*Not significant at the .05 level.

DISCUSSION

In this study an attempt was made to determine the effects of contingency management on reading achievement, comparing an experimental and control group of institutionalized offenders. It was hypothesized that the experimental group would achieve greater gains than the control group in reading achievement under conditions of reinforcing increases in oral reading rate.

Equivalent forms of the Gates-MacGinitie Reading Test were administered to both groups at the beginning and end of the study. Results showed greater gains by the experimental than the control group in all areas. The probability of finding the difference that occurred is reported for vocabulary, comprehension, speed, and accuracy.

Also indicated is measurable gain in reading rate for all but one subject in the experimental group during a two-week baseline and six-week reinforcement period. Such results indicate that gains in oral reading rate can be made without significant loss in comprehension, vocabulary, or accuracy.

Observations

Many interesting observations were made by the teacher during this investigation. It was noted in the experimental classroom that

the teacher was made aware daily of the progress or regression of students. Continuous evaluation of oral reading rate provided the teacher with information for adjustments in assignment of reading material.

Another observation in the experimental group was that student motivation to improve reading rate was high because of the opportunity to earn free time privileges. Sustained productivity was generated in improving oral reading rate, as can be observed on individual graphs in the Appendix.

It was also noted that students using free time did not abuse the privilege. Care always was exercised in handling and operation of the records and record player. Self-regulation was allowed in time spent in the reinforcing event area. Periodic observation by the teacher indicated that students were not staying longer than time earned.

Satisfaction with the application of contingency management for adult felons resulted in extension of the program beyond the completion of the study. Conditions of free time reinforcement for improvement of oral reading rate are to continue and will be extended to include other areas of reading achievement. An example was the establishment of a reinforcement schedule for an individual to increase his level of productivity on reading assignments.

Although students were instructed that they could use free time to engage in any activity approved by the teacher, record listening remained the only activity selected. Many requests were made for additions to the record collection.

Implications for Education

This investigation indicates that contingency management is an effective technique for improving reading achievement among institutionalized offenders. Observation indicated that requiring inmate students to achieve specific goals to earn free time privileges motivated and achieved consistent learner performance.

As was pointed out in the review of literature, traditional methods of education have proven ineffective for the majority of institutionalized offenders (United States Department of Justice, 1967; McKee, 1970; Joint Committee on Correctional Manpower, 1967). The application of contingency management provides a predictable learning environment for the inmate in which the consequences of academic performance can be observed and reinforced.

It is recommended that further research be done in the use of positive reinforcement in educational programs within correctional institutions.

Limitations of the Investigation

The investigation was conducted within an adult correctional institution and was subject to certain restrictions and limitations. Students were limited to those enrolled in remedial reading at the time of the study; therefore, no attempt was made to match the control and experimental groups according to age, amount of education, or length of incarceration. The standardized tests used in the study are not perfectly reliable and the established norms do not include populations found within adult correctional institutions.

The opportunity for institutionalized offenders to earn privileges is very limited. Listening to current record albums was the only free time activity made available to the students. Offering a variety of high interest privileges would reduce the chance of satiation with one activity.

A delay in beginning the investigation limited the study to eight weeks. Although this is a relatively short time to observe changes in reading behavior, measurable difference did occur. A longer period of study would allow further evaluation of the effects of reinforcement.

Additional comparison of oral reading rate could be achieved by recording individual rate at the beginning and end of the study within the control group.

SUMMARY

In this study the effects of reinforcing gains in reading rate were compared between an experimental and control group. The study was conducted at Garrett Heyns High School located within the Washington Corrections Center, Shelton, Washington. Each group consisted of eleven students enrolled in remedial reading classes.

Equivalent forms of the Gates-MacGinitie Reading Test were used as measuring devices. D Form 1 was administered at the beginning of a two-week baseline period. D Form 2 was administered at the end of a six-week reinforcement period. Daily oral reading rate, indicated on individual graphs, also was evaluated within the experimental group.

Comparison of the effects of reinforcement disclosed that the experimental group made greater gains than the control group in vocabulary, comprehension, speed, and accuracy. It was found also that reading rate within the experimental group improved measurably under conditions of reinforcement.

The application of contingency management to reading achievement of institutionalized offenders is shown, in this study, to be a highly effective teaching technique that goes beyond existing models of correctional education.

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APPENDIX

Appendix A

INDIVIDUAL GRADE LEVEL SCORES ON VOCABULARY
 SUBTEST DURING BASELINE AND
 REINFORCEMENT PERIODS

Control Subject	Pre- Test	Post- Test	Diff.	Experimental Subject	Pre- Test	Post- Test	Diff.
A	3.5	2.0	-1.5	A	3.7	3.1	-0.6
B	3.1	2.4	-0.7	B	9.5	8.4	-1.1
C	3.2	4.0	+0.8	C	2.7	2.7	0.0
D	2.1	2.6	+0.5	D	2.9	3.9	+1.0
E	5.8	6.2	+0.4	E	8.0	8.4	+0.4
F	8.8	6.0	-2.4	F	3.5	4.8	+1.3
G	5.0	5.0	0.0	G	4.8	8.0	+3.2
H	7.6	8.8	+1.2	H	2.0	2.1	+0.1
I	4.5	4.2	-0.3	I	6.2	5.8	-0.4
J	0.0	2.0	+2.0	J	0.0	2.6	+2.6
K	5.5	5.2	-0.3	K	6.0	5.5	-0.5

Appendix B

INDIVIDUAL GRADE LEVEL SCORES ON COMPREHENSION
SUBTEST DURING BASELINE AND
REINFORCEMENT PERIODS

Control Subject	Pre-Test	Post-Test	Diff.	Experimental Subject	Pre-Test	Post-Test	Diff.
A	2.7	2.4	-0.3	A	0.0	3.2	+3.2
B	3.2	3.4	+0.2	B	8.8	10.6	+1.8
C	4.0	2.8	-1.2	C	2.9	3.0	+0.1
D	3.3	3.1	-0.2	D	4.4	4.5	+0.1
E	7.6	8.1	+0.5	E	8.8	11.5	+3.1
F	8.8	8.1	-0.7	F	6.1	8.1	+2.0
G	6.8	4.8	-2.0	G	10.6	10.6	0.0
H	11.6	11.6	0.0	H	2.6	2.8	+0.2
I	2.8	3.0	+0.2	I	6.5	6.5	0.0
J	2.3	2.3	0.0	J	2.3	2.8	+0.5
K	4.7	5.8	+1.1	K	7.1	8.1	+1.0

Appendix C

INDIVIDUAL GRADE LEVEL SCORES ON SPEED
 SUBTEST DURING BASELINE AND
 REINFORCEMENT PERIODS

Control Subject	Pre-Test	Post-Test	Diff.	Experimental Subject	Pre-Test	Post-Test	Diff.
A	4.3	4.0	-0.3	A	4.0	4.3	+0.3
B	5.1	3.8	-1.3	B	5.5	5.8	+0.3
C	4.8	7.0	+2.2	C	4.0	4.6	+0.6
D	2.4	2.1	-0.3	D	4.0	4.8	+0.8
E	3.8	4.0	+0.2	E	6.3	6.3	0.0
F	6.3	5.8	-0.5	F	4.3	4.6	+0.3
G	4.8	2.6	-2.2	G	5.1	6.3	+1.2
H	5.8	6.6	+0.8	H	2.4	2.9	+0.5
I	2.9	4.1	+1.2	I	7.0	12.0	+5.0
J	2.2	2.4	+0.2	J	2.2	2.4	+0.2
K	5.1	7.5	+2.4	K	4.8	4.8	0.0

Appendix D

INDIVIDUAL GRADE LEVEL SCORES ON ACCURACY
 SUBTEST DURING BASELINE AND
 REINFORCEMENT PERIODS

Control Subject	Pre- Test	Post- Test	Diff.	Experimental Subject	Pre- Test	Post- Test	Diff.
A	3.5	3.5	0.0	A	3.5	3.8	+0.3
B	3.5	3.8	+0.3	B	5.9	6.3	+0.4
C	4.9	5.9	+1.0	C	3.3	3.5	+0.2
D	2.6	2.6	0.0	D	4.1	4.9	+0.8
E	4.1	4.4	+0.3	E	6.8	6.8	0.0
F	6.8	5.9	-0.9	F	4.4	4.9	+0.5
G	4.6	3.0	-1.6	G	5.2	6.8	+1.6
H	6.3	7.5	+1.2	H	2.4	2.9	+0.5
I	3.3	3.8	+0.5	I	6.8	12.0	+5.2
J	2.4	0.0	-2.4	J	2.4	2.4	0.0
K	5.5	8.2	+2.7	K	4.9	5.2	+0.3

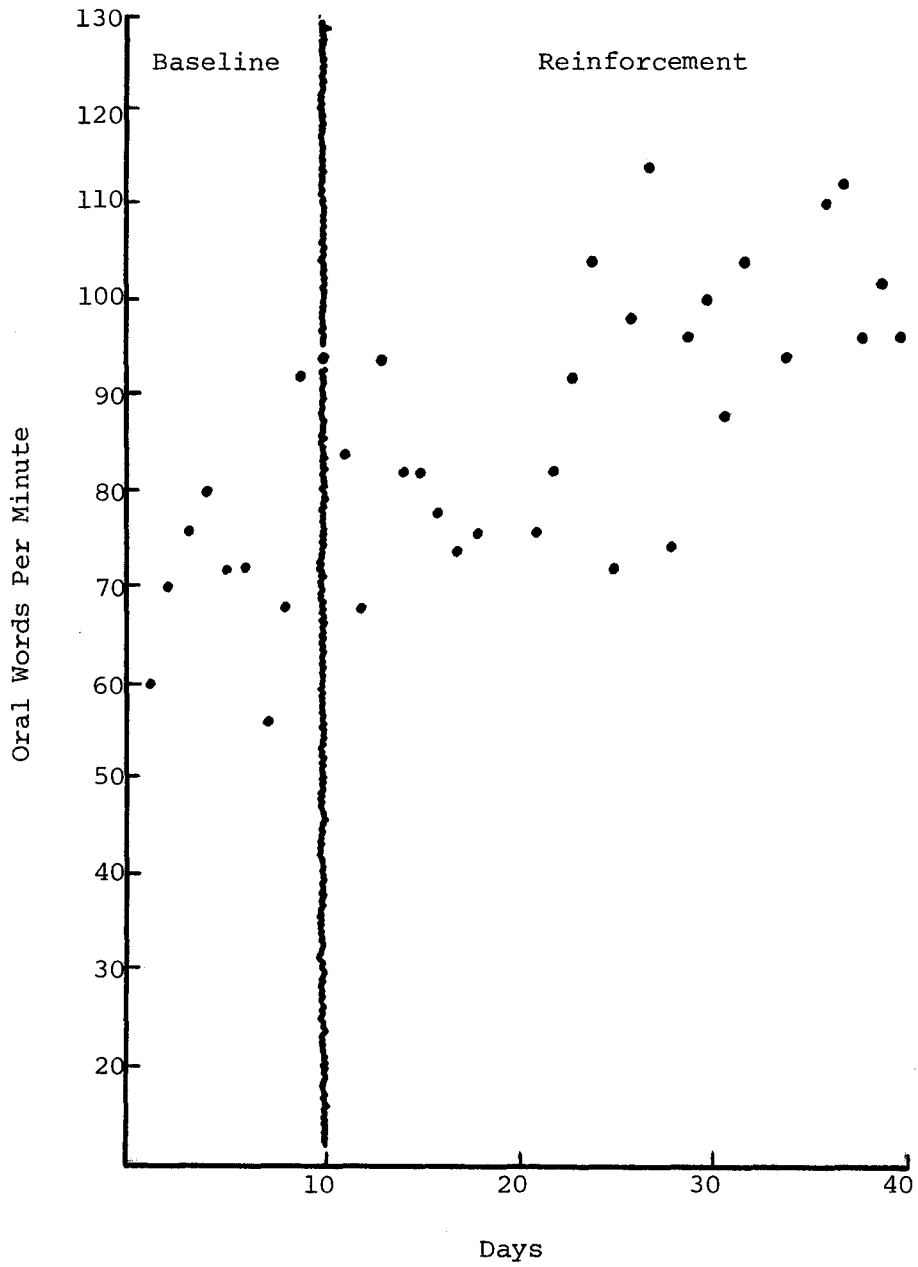


Figure 1. Oral Reading Rate of Subject A.

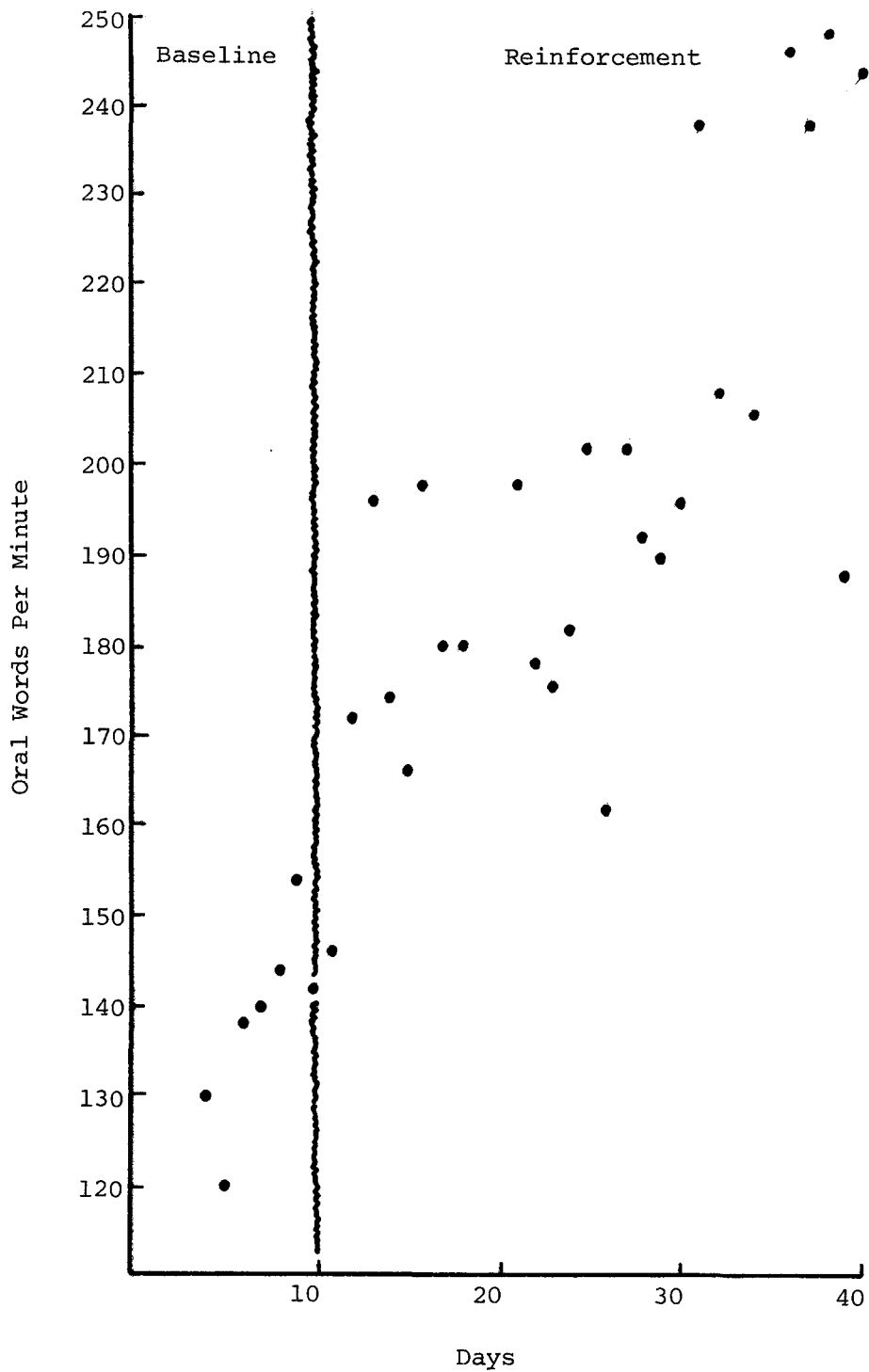


Figure 2. Oral Reading Rate of Subject B.

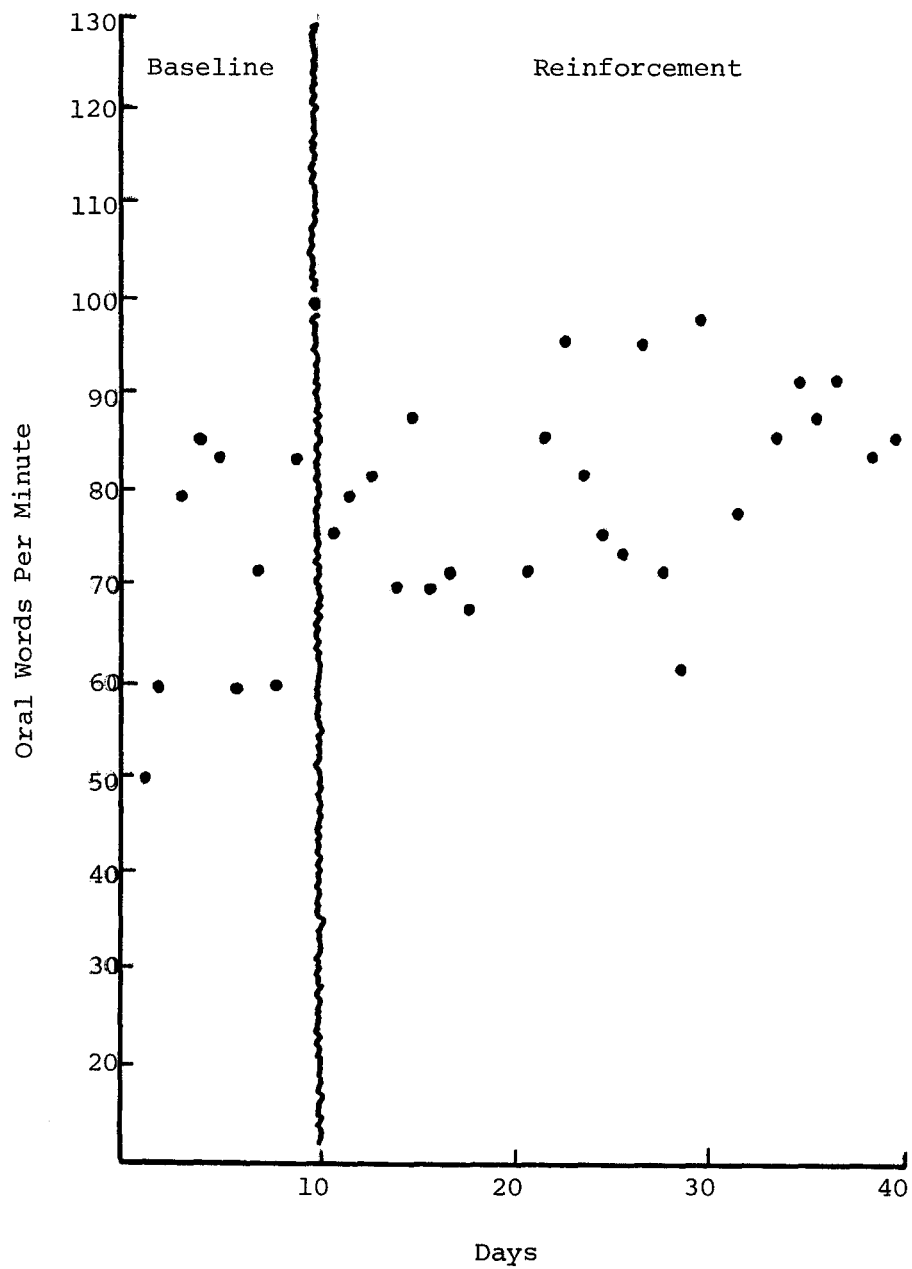


Figure 3. Oral Reading Rate of Subject C.

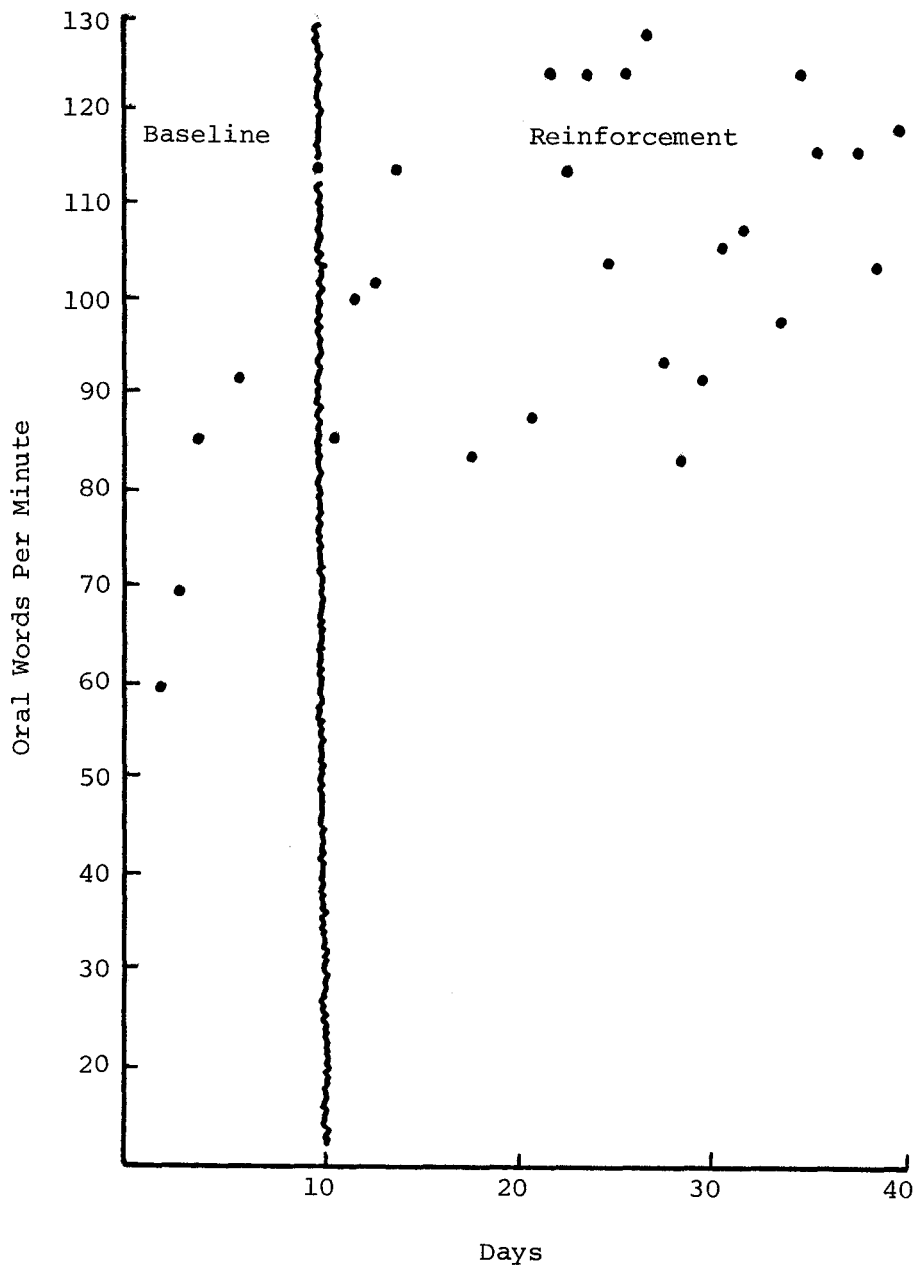


Figure 4. Oral Reading Rate of Subject D.

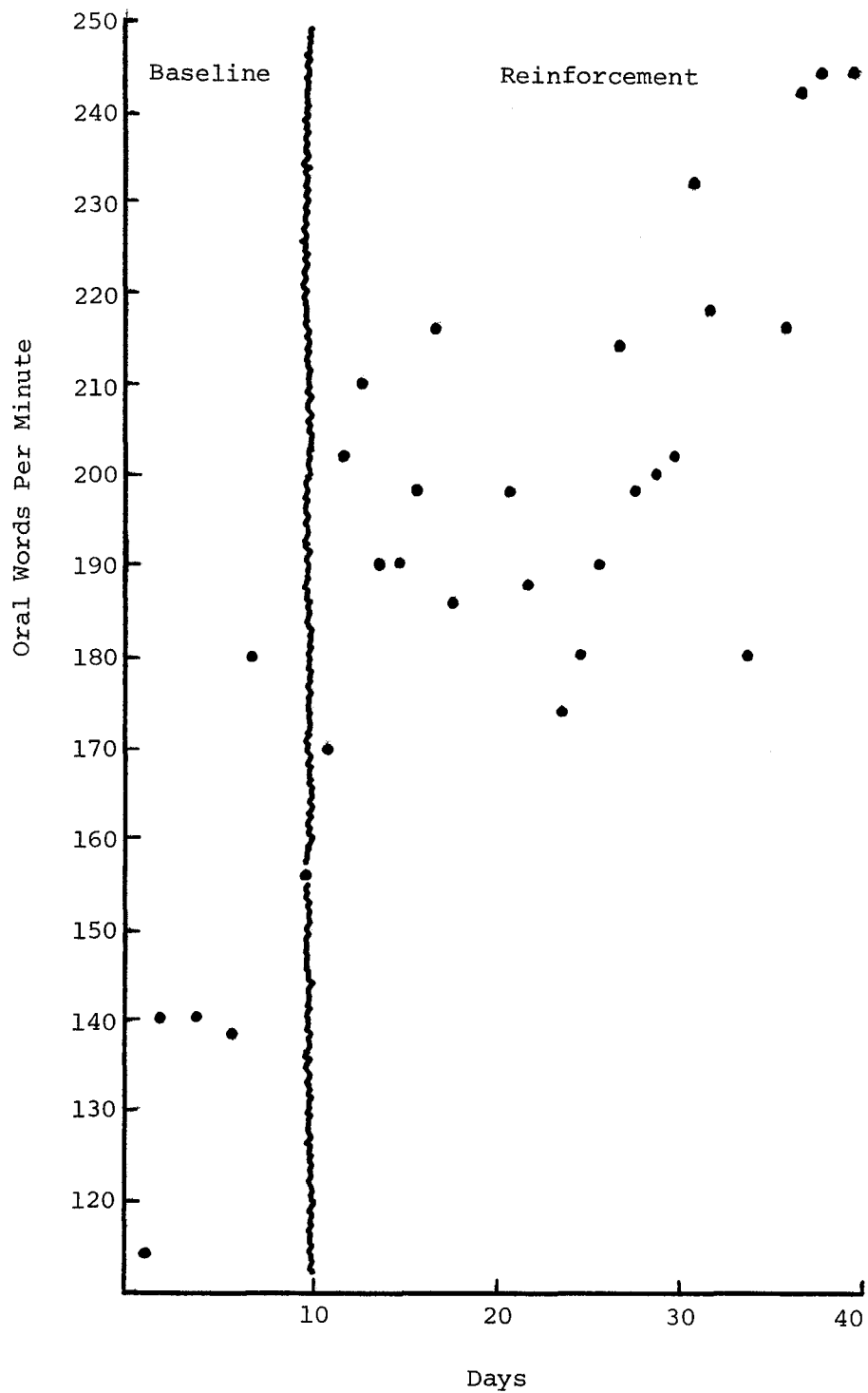


Figure 5. Oral Reading Rate of Subject E.

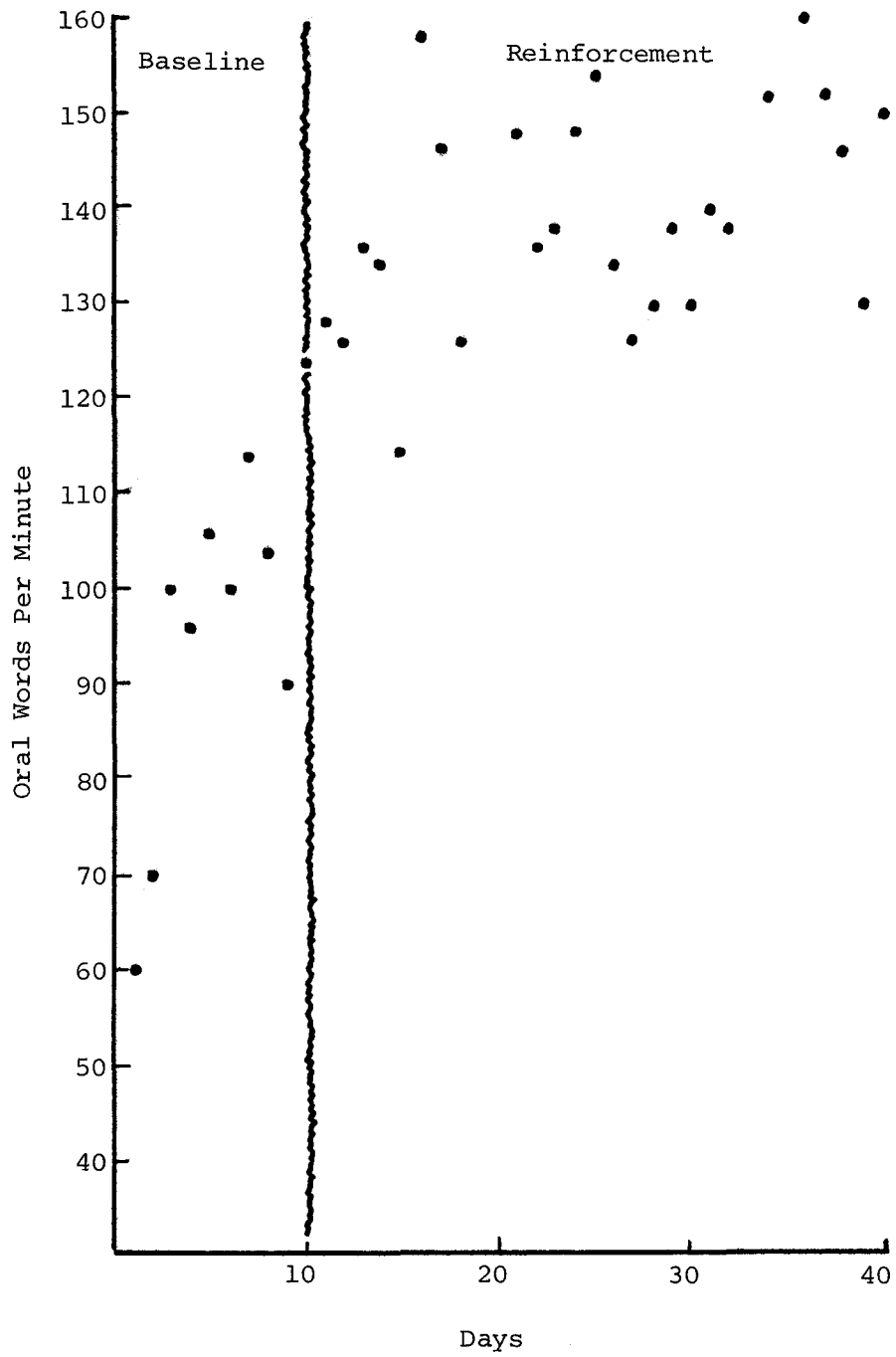


Figure 6. Oral Reading Rate of Subject F.

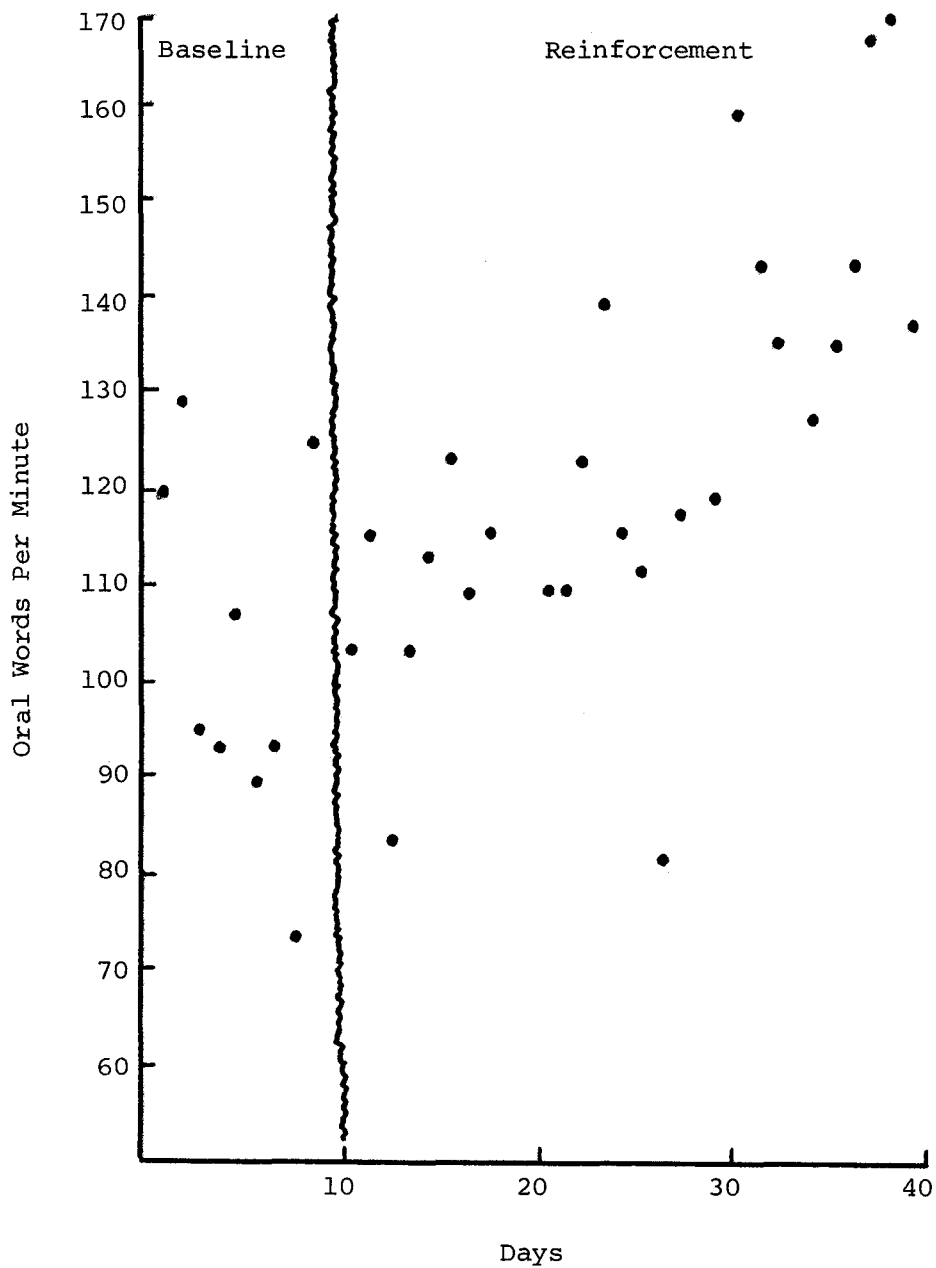


Figure 7. Oral Reading Rate of Subject G.

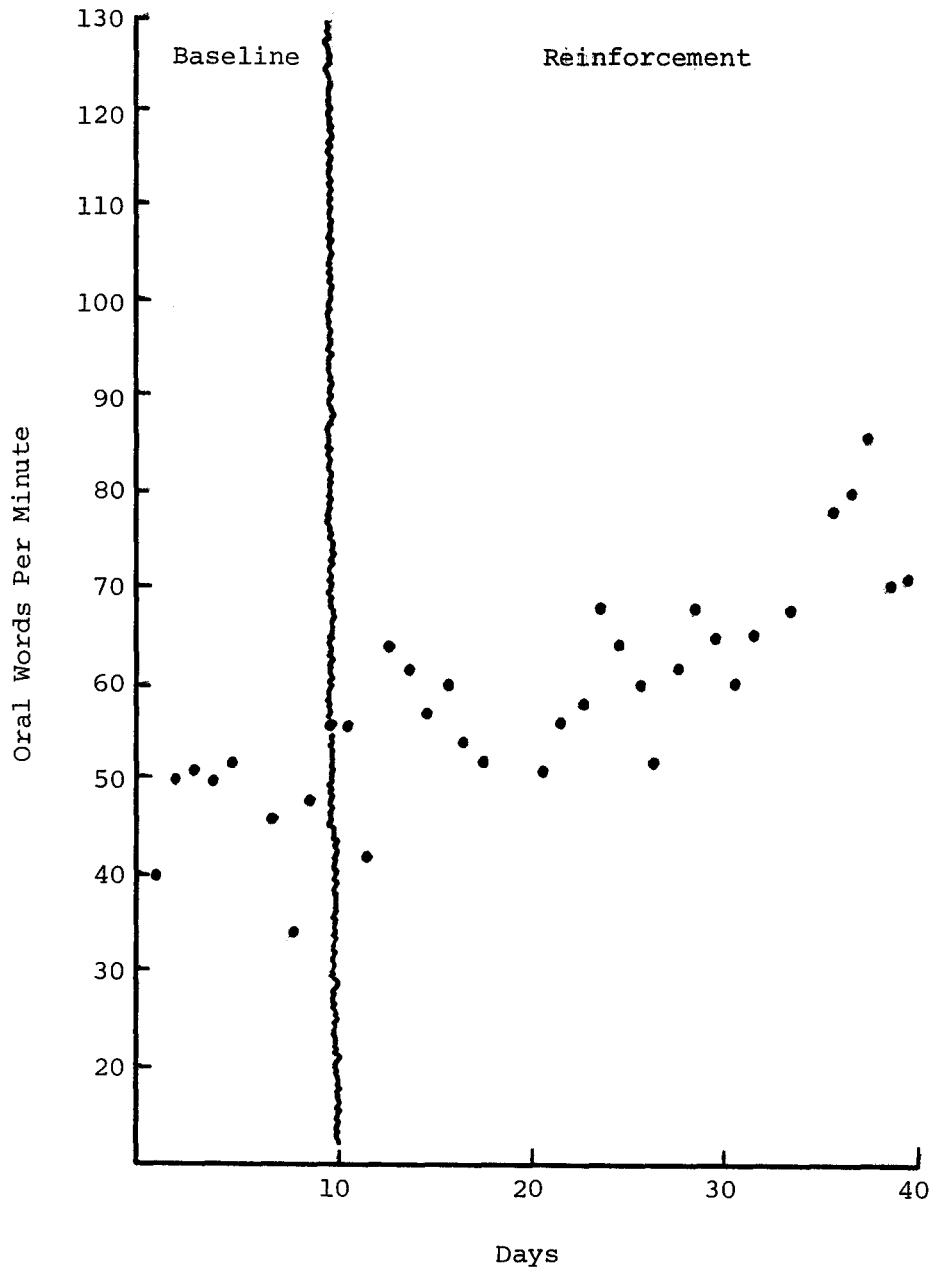


Figure 8. Oral Reading Rate of Subject H.

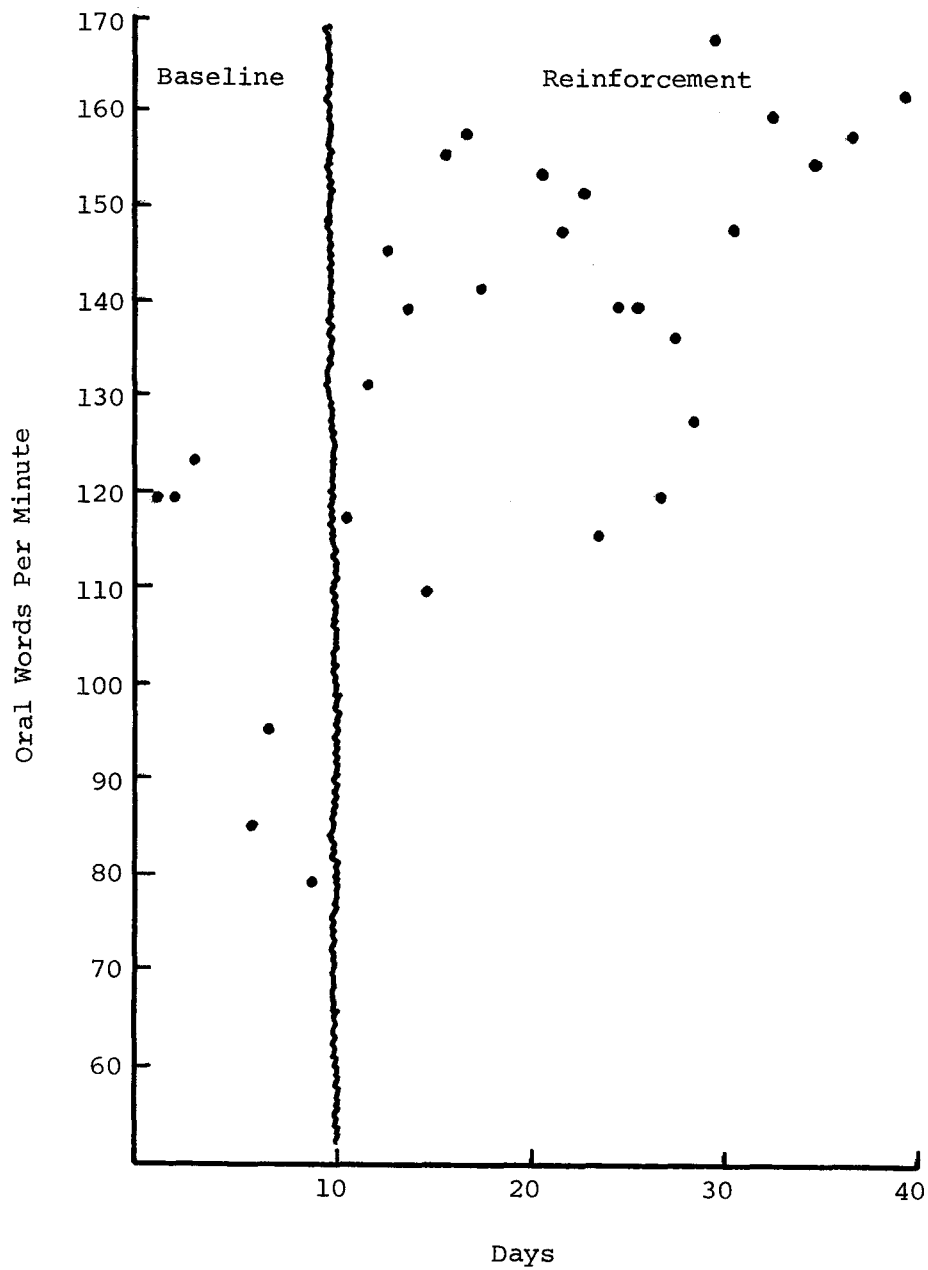


Figure 9. Oral Reading Rate of Subject I.

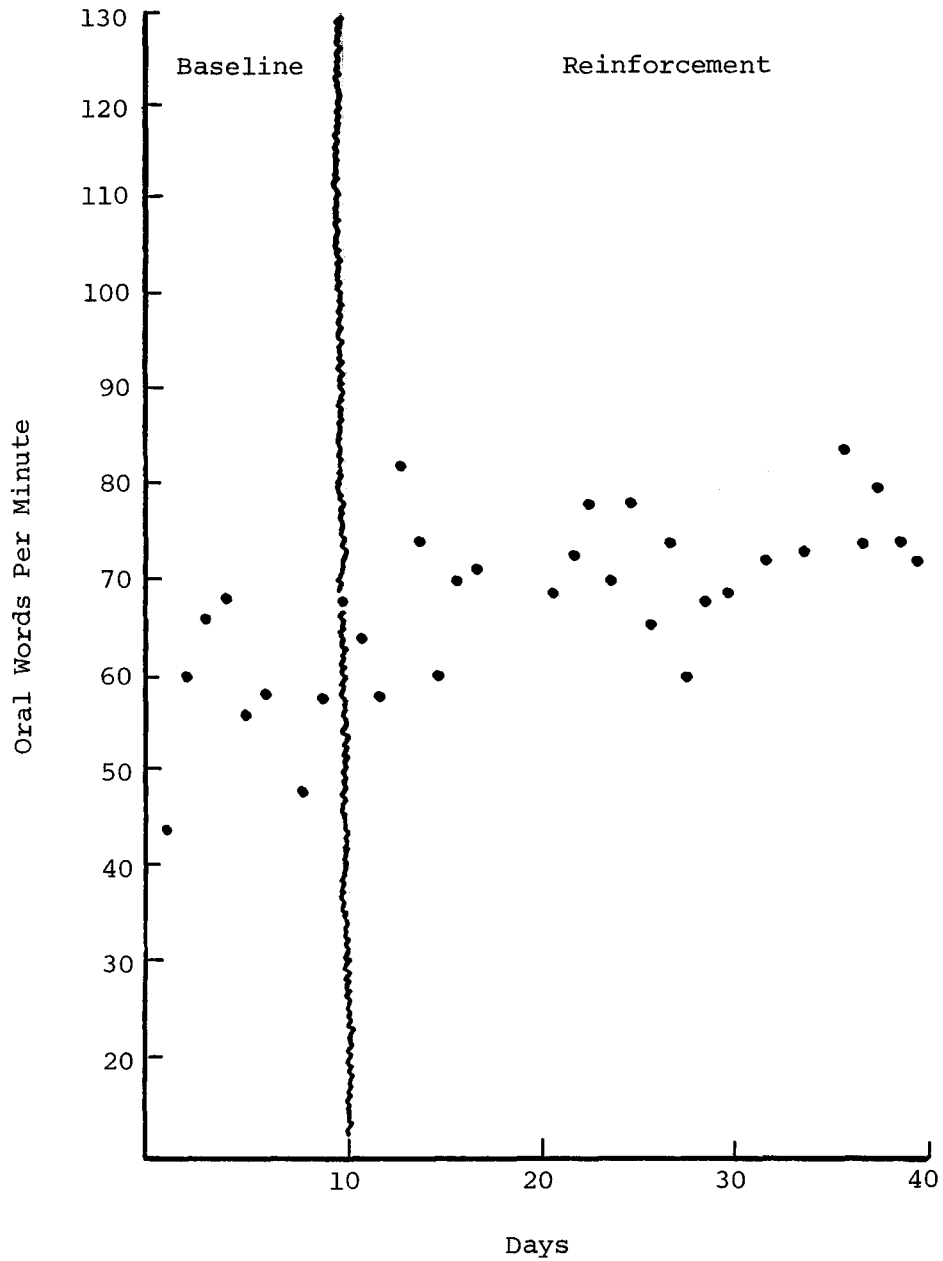


Figure 10. Oral Reading Rate of Subject J.

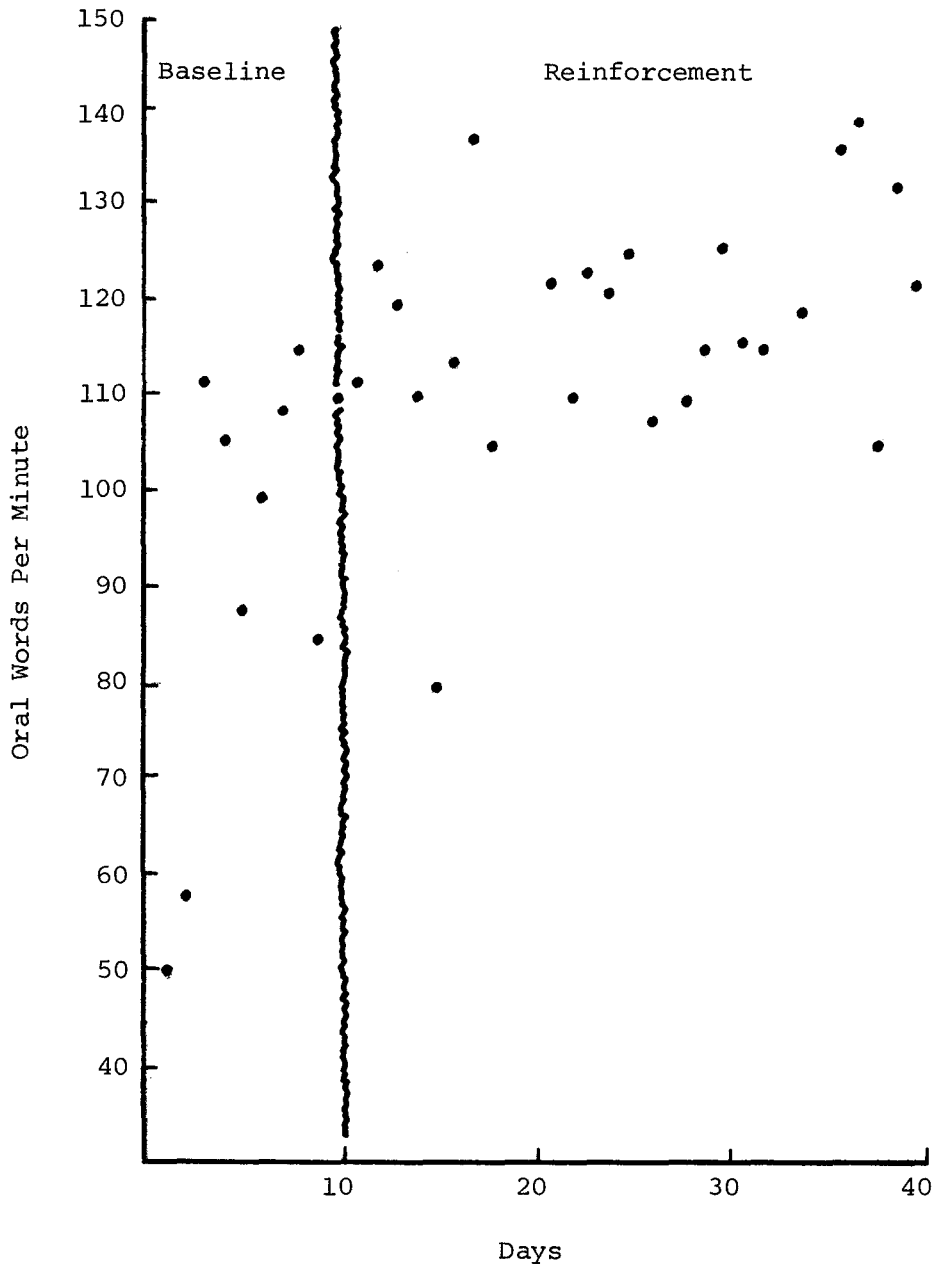


Figure 11. Oral Reading Rate of Subject K.