

Abstract of Thesis

by

Rachel F. Dye

*Original*

S-2-01A-09-03-0119



U18400 9074967

S

ABSTRACT OF THESIS

EFFECT OF READING CLINIC ON  
SCHOLASTIC SUCCESS

Submitted by  
Rachel F. Dye

In partial fulfillment of the requirements  
for the Degree of Master of Education  
Colorado  
Agricultural and Mechanical College  
Fort Collins, Colorado

June 1949

LIBRARY  
COLORADO A. & M. COLLEGE  
FORT COLLINS, COLORADO

78.788  
A O  
1949  
42

## ABSTRACT

Since most of the information secured by college students comes either directly or indirectly from books, the success of each student in every subject studied depends very largely upon his ability to read or to get facts accurately and quickly from books. The majority of college students have had no opportunity to receive any type of reading instruction since the elementary grades. The material they read has become increasingly difficult, therefore, it is not surprising that in many cases their reading ability is inadequate to meet the growing demand made upon them. Some remedial instruction is necessary for many before they will be able to do their college work in a more satisfactory way.

Need for remedial reading instruction has been recognized at Colorado Agricultural and Mechanical College and this institution offers to students interested in improving their reading efficiency the services of a reading clinic. All students enter the clinic of their own volition. Attendance is not mandatory and students may complete the 12 weeks session or terminate their attendance when they feel they have received the

assistance they needed. No credit is given for the course.

Of particular interest at Colorado Agricultural and Mechanical College is the matter of determining how adequate a Reading Clinic functions in giving assistance to students in improving their reading skills and a greater opportunity to succeed in college subjects studied. This investigation is chiefly concerned with the effect of the reading clinic on scholastic success.

### Problem

What effect does Reading Clinic experience have on the scholastic success of students at Colorado Agricultural and Mechanical College?

Problem analysis.--The answers to the following questions are necessary for the solution of the problem:

1. What were the measured reading skills before participation in the Reading Clinic?
2. What were the measured reading skills after participation in the Reading Clinic?
3. How do reading skills before and after participation in the Reading Clinic compare?
4. How do grade-point averages before and after participation in the Reading Clinic compare?

Delimitations.--This study has been limited to all students who completed the Reading Clinic at Colorado Agricultural and Mechanical College during the period beginning with the Spring Quarter of the college year 1946-47 and ending the Spring Quarter 1947-48. The group selected was further limited to those students having completed a minimum of one quarter of work at Colorado Agricultural and Mechanical College prior to and after enrollment in the Reading Clinic.

Definition of terms.--In the study "scholastic success" was limited to mean grade-point average.

"Completion of the Reading Clinic" indicates those students who took the diagnostic reading test at the Testing Bureau before and again after the class was finished as well as participation in the class work at the clinic.

#### Methods and materials

In order to obtain data for the study records on file at the Testing Bureau were used to obtain profiles of all those students completing the Reading Clinic during the period beginning with the Spring Quarter of the college year 1946-47 and ending the Spring Quarter of 1947-48.

After investigating these profiles it was found that out of the initial list of 85 students only

47 could qualify for use in this study. Those students eliminated either had no quarter of work at Colorado Agricultural and Mechanical College prior to completion of the Reading Clinic, or none after completion.

The Iowa Silent Reading Tests were used as a diagnostic measure of the reading efficiency of students. The test was administered by the college psychometrist to all students who enrolled in the Reading Clinic both before and after the Clinic instruction was completed. The following nine areas were covered by the tests:

1. Rate
2. Comprehension
3. Directed Reading
4. Poetry Comprehension
5. Word Meaning
6. Sentence Meaning
7. Paragraph Comprehension
8. Location of Information-Index
9. Location of Information-Key Words

In addition a median raw score was obtained for each student.

The grade-point averages earned by each of the 47 students before, during, and after Clinic were obtained from the Office of the Registrar. At the same time the number of hours carried each quarter was also

obtained. There was considerable variation in the number of quarters of grade-point averages available. For the pre-clinic period the number of quarters of grades available ranged from one to eight, and for the post-clinic period from one to five.

Grade-point averages were calculated by weighting the letter grades for each quarter of college work so that an "A" equaled 4, a "B" equaled 3, a "C" equaled 2, a "D" equaled 1, and an "F" equaled 0. The weighted scores were multiplied by the number of hours of credit given in each course. The sum of these figures, which represents the number of quality points, was then divided by the number of hours carried to obtain the grade-point average. The range of credit hours carried before clinic was from 10.7 to 19.0, averaging 15.5 hours. During clinic the range of credit hours carried was from 10.0 to 21.0, averaging 15.6 hours. After clinic the range of credit hours carried was from 13.0 to 19.3, averaging 16.4 hours.

The instructor of the Reading Clinic furnished the class attendance for the group studied. The average attendance was 11 hours ranging from as low as four hours in one case to as high as 14 hours in other cases.

A master data sheet was made which contained the complete data used in the study: pre-clinic and post-clinic scores on the Iowa Silent Reading Tests,

grade-point averages before, during, and after Reading Clinic, average hours carried before, during, and after clinic, and hours attendance at the clinic.

#### Analysis of the data

To analyze the data for this investigation the following statistics were computed: mean, standard deviation, differences between means, standard error of the mean, and the critical ratio.

The first procedure was to determine the differences on the scores of the pre-clinic and post-clinic test of the Iowa Silent Reading Tests. Critical ratios were computed as measures of the significance of the differences. Data for the comparison of reading skills before, during, and after clinic are presented in Table 1.

The same procedure was followed in determining the significance of differences for grade-point averages before, during, and after clinic. The data for this comparison are found in Table 2.

The standards of significance accepted were t less than two, not significant; t equal to or greater than two but less than three, significant; and t three or more, very significant.

Table 2.--SIGNIFICANCE OF THE DIFFERENCES BETWEEN SCORES  
MADE ON IOWA SILENT READING TESTS ADMINISTERED TO 47  
COLLEGE STUDENTS BEFORE READING CLINIC EXPERIENCE  
(FORM A) AND AFTER CLINIC EXPERIENCE (FORM B)

	Mean Raw Score	S.D.	S.D.M	M <sub>2</sub> -M <sub>1</sub>	S.D.M <sub>2</sub> -M <sub>1</sub>	t
Rate						
Form AM	156.57	19.07	2.80			
Form BM	189.06	22.10	3.22	32.49	4.26	7.62
Comprehen- sion						
Form AM	168.49	19.41	2.83			
Form BM	180.15	13.68	1.99	11.66	3.46	3.37
Directed Reading						
Form AM	153.87	16.42	2.39			
Form BM	170.43	16.48	2.40	16.56	3.38	4.93
Poetry Com- prehension						
Form AM	153.40	21.09	3.07			
Form BM	176.77	15.02	2.19	23.37	3.70	6.32
Word Meaning						
Form AM	176.26	24.26	3.54			
Form BM	182.83	16.64	2.43	6.57	4.29	1.06
Sentence Meaning						
Form AM	177.45	15.88	2.32			
Form BM	183.32	15.63	2.28	5.87	3.25	1.81
Paragraph Comprehen- sion						
Form AM	168.38	20.97	3.06			
Form BM	177.23	20.60	3.00	8.85	4.28	2.07
Index						
Form AM	161.72	14.85	2.16			
Form BM	169.34	16.32	2.38	7.62	3.21	2.37

Table 2.--SIGNIFICANCE OF THE DIFFERENCES BETWEEN SCORES  
MADE ON IOWA SILENT READING TESTS ADMINISTERED TO 47  
COLLEGE STUDENTS BEFORE READING CLINIC EXPERIENCE  
(FORM A) AND AFTER CLINIC EXPERIENCE (FORM B)--  
Continued

	Mean Raw Scores	S.D.	S.D.M	M <sub>2</sub> -M <sub>1</sub>	S.D.M <sub>2</sub> -M <sub>1</sub>	t
Key Words						
Form AM	168.87	14.92	2.17			
Form BM	179.98	12.31	1.79	11.11	2.81	3.96
Median						
Form AM	166.96	12.91	1.88			
Form BM	178.79	10.43	1.52	11.83	2.42	4.89

Table 3.--SIGNIFICANCE OF DIFFERENCES IN GRADE-POINT  
AVERAGES EARNED BY 47 COLLEGE STUDENTS BEFORE,  
DURING, AND AFTER READING CLINIC EXPERIENCE

	Mean	S.D.	S.D.M	M <sub>2</sub> -M <sub>1</sub>	S.D.M <sub>2</sub> -M <sub>1</sub>	t
Before clinic	2.15	.14	.02			
During clinic	2.40	.66	.09	.25	.09	2.6
During clinic	2.40	.66	.09			
After clinic	2.39	.10	.01	.01	.09	0.1
Before clinic	2.15	.14	.02			
After clinic	2.39	.10	.01	.24	.02	10.9

#### Summary of findings

Gains were made on all subtests of the Iowa Silent Reading Tests. However, gains on two of the tests, "word meaning,"  $t = 1.06$ , and "sentence meaning,"

$t = 1.81$ , were not sufficient to be considered significant.

"Paragraph comprehension,"  $t = 2.07$ , and "index,"  $t = 2.37$ , showed significant gains. The remaining five subtests "rate,"  $t = 7.62$ , "comprehension,"  $t = 3.37$ , "directed reading,"  $t = 4.93$ , "poetry comprehension,"  $t = 6.32$ , and "key words,"  $t = 3.96$ , all showed very significant gains. The medians of the scores also indicated a very significant gain with a critical ratio of 4.89.

There was no significant gain in grade-point averages as between during clinic, and after clinic,  $t = 0.1$ . A significant gain in grade-point average was indicated during clinic as compared with before clinic,  $t = 2.6$ . Very significant gains were made in grade-point averages after clinic over before clinic,  $t = 10.9$ .

It is apparent that improvement was made in the reading efficiency of the group studied. It is agreed that numerous variables may affect scores made by students on the two forms of the Iowa Silent Reading Tests administered to the students. However, the results of comparison show such significant gains that there should be little doubt that increased reading efficiency has resulted as the outcome of participation in the Reading Clinic. The very significant gains made in grade-point averages after the reading clinic over the before clinic would indicate that the Reading Clinic favorably affects

the scholastic success of students.

Suggestions for  
further study

It is recommended that further investigation be made covering a greater length of time to test the implications of this study. Further analysis of the problem might be made through studies such as the following:

1. An investigation to determine at which levels of ability students profit most from reading clinic experience.
2. Study of students with high ability level but low reading ability to discover the extent of improvement which may be gained from a reading clinic.
3. Use of reading ability scores for predicting college success.
4. Investigation of the areas in which most difficulties are found in the reading ability of college students.
5. The repetition of the present study by a control group method to determine the relationship of reading efficiency to scholastic success.
6. A continuation of this study over a longer period of time to more accurately determine the permanence of the effect of the Reading Clinic.
7. The effect of a reading clinic in decreasing the number of students who withdraw from school.

T H E S I S

-----

EFFECT OF READING CLINIC ON  
SCHOLASTIC SUCCESS

Submitted by  
Rachel F. Dye

In partial fulfillment of the requirements  
for the Degree of Master of Education  
Colorado  
Agricultural and Mechanical College  
Fort Collins, Colorado

June 1949

LIBRARY  
COLORADO A. & M. COLLEGE  
FORT COLLINS, COLORADO

## COLORADO AGRICULTURAL AND MECHANICAL COLLEGE

378.788

AO

1949

4  
cop. 2

June 1949

I HEREBY RECOMMEND THAT THE THESIS PREPARED UNDER MY  
 SUPERVISION BY RACHEL F. DYE  
 ENTITLED EFFECT OF READING CLINIC ON SCHOLASTIC  
SUCCESS

BE ACCEPTED AS FULFILLING THIS PART OF THE REQUIREMENTS FOR THE  
 DEGREE OF MASTER OF EDUCATION

MAJORING IN GUIDANCE AND COUNSELING

CREDITS 3

*Conrad N. Miller*  
 In Charge of Thesis

APPROVED

*David H. Morgan*  
 Head of Department

Examination Satisfactory

Committee on Final Examination

*W. D. Miller*  
*R. W. Canada*  
*S. V. Ballou*

*Walter R. McClanahan*  
*Dean Stinson*  
*Conrad N. Miller*

*David H. Morgan*  
 Dean of the Graduate School

Permission to publish this thesis or any part of it  
 must be obtained from the Dean of the Graduate School.

## ACKNOWLEDGMENTS

Grateful acknowledgment is made by the writer to Dr. David H. Morgan, Dean of the Graduate School, and Head of the Department of Psychology and Education at Colorado Agricultural and Mechanical College, for his assistance in the preparation of this study and for his wise counsel and guidance.

To Mr. Carroll H. Miller, Associate Professor of Psychology and Education at Colorado Agricultural and Mechanical College, the writer is deeply indebted for his kindly encouragement and constructive criticism in the conduct of this investigation.

The writer wishes to extend special thanks to Mrs. Fern Hintz, Instructor of the Reading Clinic, the Office of the Registrar, and the Testing Bureau for the data used in this study. Their cooperation was greatly appreciated.

It is a pleasure to acknowledge my great debt to Ruth Hunter for her generous and untiring assistance.

Finally, the writer wishes to thank her husband for his encouragement, patience, and cooperation.

## TABLE OF CONTENTS

<u>Chapter</u>		<u>Page</u>
I	INTRODUCTION . . . . .	7
	Statement of the problem . . . . .	8
	Problem analysis . . . . .	9
	Delimitations . . . . .	9
	Definition of terms . . . . .	9
II	REVIEW OF LITERATURE . . . . .	11
	Effect of remedial reading on scholastic success . . . . .	11
	Effect of remedial reading on reading efficiency . . . . .	30
	Summary . . . . .	38
III	METHODS AND MATERIALS . . . . .	43
	Sources and methods of collecting data . . . . .	43
	Description of the group . . . . .	45
IV	ANALYSIS OF DATA . . . . .	47
	Statistical methods . . . . .	47
	Reading skills . . . . .	49
	Rate and comprehension . . . . .	50
	Directed reading . . . . .	50
	Poetry comprehension . . . . .	50
	Word meaning . . . . .	51
	Sentence meaning . . . . .	51
	Paragraph comprehension . . . . .	51
	Location of information . . . . .	51
	Median standard scores . . . . .	51
	Comparison of reading skills before and after clinic experience . . . . .	51
	Comparison of grade-point averages before, during, and after clinic experience . . . . .	54
	Summary . . . . .	56

## TABLE OF CONTENTS--Continued

<u>Chapter</u>		<u>Page</u>
V	DISCUSSION . . . . .	58
	Comparison of pre-clinic and post-clinic scores on the Iowa Silent Reading Tests . . . . .	59
	Rate . . . . .	59
	Comprehension . . . . .	60
	Directed reading, Poetry comprehension, and Key words . . . . .	61
	Paragraph comprehension and Index . . . . .	62
	Word meaning and sentence meaning . . . . .	62
	Median . . . . .	63
	Comparison of grade-point averages before, during, and after Reading Clinic experience . . . . .	65
	Comparison of grade-point averages before and during clinic . . . . .	65
	Comparison of grade-point averages before and after clinic . . . . .	66
	Comparison of grade-point averages during and after clinic . . . . .	67
	Related factors . . . . .	68
	Summary . . . . .	69
	Suggestions for further study . . . . .	69
VI	SUMMARY . . . . .	71
	APPENDIX . . . . .	74
	BIBLIOGRAPHY . . . . .	76

## LIST OF TABLES

<u>Table</u>		<u>Page</u>
A	GAINS MADE IN LEARNING TO READ BY THE COLLEGE CLASSES . . . . .	13
B	HOURS OF WORK DONE BY "TRAINED" AND "UNTRAINED" GROUPS . . . . .	16
C	DIFFERENCE IN GRADES PRODUCED BY TRAINING . . . . .	17
D	RESULTS OF SIX WEEKS OF REMEDIAL INSTRUCTION IN READING GIVEN TO FRESHMEN AT HARVARD COLLEGE . . . . .	37
1	DESCRIPTION OF THE GROUP USED IN THE INVESTIGATION . . . . .	46
2	SIGNIFICANCE OF THE DIFFERENCES BETWEEN SCORES MADE ON IOWA SILENT READING TESTS ADMINIS- TERED TO 47 COLLEGE STUDENTS BEFORE READING CLINIC EXPERIENCE (FORM A) AND AFTER CLINIC EXPERIENCE (FORM B) . . . . .	53
3	SIGNIFICANCE OF DIFFERENCES IN GRADE-POINT AVERAGES EARNED BY 47 COLLEGE STUDENTS BEFORE, DURING, AND AFTER READING CLINIC EXPERIENCE . . . . .	56

## Chapter I

### INTRODUCTION

Reading efficiency of students has been found to affect success in college subjects. The last decade has shown a marked interest, by both high schools and colleges, in the reading ability of their students, which up to that time was considered a problem of the elementary school.

With the knowledge that reading ability can be improved, at any age, with correct and persistent practice, colleges accepting this new educational trend offer assistance in the Reading Clinic as part of their curriculum. An ever increasing number of students are enrolling in the Reading Clinic at Colorado Agricultural and Mechanical College.

The Reading Clinic at Colorado Agricultural and Mechanical College had its beginning in the fall of 1944. At that time candidates for the class were recommended from the English Department. Diagnostic reading tests were administered by the instructor in charge of the Reading Clinic preliminary to students taking the course and again at its completion. In the spring of 1947 the Testing Bureau was delegated the responsibility of

administering the diagnostic reading tests before and after the completion of the reading class. Since then students low in reading ability as discovered on entrance tests and by counseling have been encouraged by the Testing Bureau to enroll in the Reading Clinic. The reading class is scheduled for two one-hour sessions a week. Students are given training in all phases of reading which will aid them in improving their reading ability.

In the Spring Quarter of the college year, 1947-48, a meeting was held to formulate plans for evaluating the Reading Clinic program at Colorado Agricultural and Mechanical College. The following persons attended the meeting: the Dean of the Graduate School, who is also Head of the Department of Psychology and Education, the instructor of the Reading Clinic, Director of Testing, the College Psychometrist, and two graduate students from the Department of Education. As an outgrowth of this meeting two studies were to be undertaken. One study was concerned with investigating the effect of Reading Clinic experience on entrance test scores and the other the effect of Reading Clinic on grade-point averages. This study is concerned with grade-point averages and will attempt to reveal how experience in the Reading Clinic affects the scholastic success of students.

#### Statement of the problem

What effect does Reading Clinic Experience have

on the scholastic success of students at Colorado Agricultural and Mechanical College?

Problem analysis.--The answers to the following questions are necessary for the solution of the problem:

1. What were the measured reading skills before participation in the Reading Clinic?
2. What were the measured reading skills after participation in the Reading Clinic?
3. How do reading skills before and after participation in the Reading Clinic compare?
4. How do grade-point averages before and after participation in the Reading Clinic compare?

Delimitations.--This study has been limited to all students who completed the Reading Clinic at Colorado Agricultural and Mechanical College during the period beginning with the Spring Quarter of the college year 1946-47 and ending with the Spring Quarter of 1947-48. The group selected was further limited to those students having completed a minimum of one quarter work at Colorado Agricultural and Mechanical College prior to and after enrollment in the Reading Clinic.

Definition of terms.--In this study "scholastic success" was limited to mean grade-point average.

"Completion of the Reading Clinic" indicates those students who took the diagnostic reading test at the Testing Bureau before and again after the class was

finished as well as participation in the class work at the clinic.

## Chapter II

### REVIEW OF LITERATURE

The importance of reading and the part it plays in the lives of students cannot be over-emphasized. The fact that a considerable amount of research has been done in this field during the past several years is evidence that reading has been increasingly recognized as a factor in scholastic success. A great many of these investigations have been concerned with reading difficulties at all grade levels.

It is the purpose of this chapter to review that portion of the literature which is definitely related to the effect of a reading clinic on scholastic success and reading efficiency. The review will be confined exclusively to a consideration of studies conducted with college students.

#### Effect of remedial reading on scholastic success

Book (2), 1927, measured the reading ability of college students and attempted to ascertain how far reading deficiencies were responsible for academic failure of college freshmen. He also investigated the extent to which reading deficiencies might be improved

by special instruction.

Two types of reading tests were given to 900 first semester freshmen and 214 upper classmen at Indiana University. The students were divided about equally into a training and a control group. Marked deficiencies in ability to do plain reading and to master an ordinary reading assignment were found among all college students. In fact, the reading deficiencies of most of the students tested were so great that one could not expect success from them until their reading skills were improved.

The author made the following conclusions from his study of data:

1. The ability to read accurately and rapidly had much to do with college success.
2. Many freshmen do not possess sufficient reading skills to succeed with academic work.
3. Students should be made aware of their reading difficulties.
4. There was a need for special remedial reading instruction among college students.
5. The results of two "how to study" classes showed the following improvements:
  - A. There was an increase of 102 per cent in reading efficiency during the semester.
  - B. The ability to master an assignment had improved from 60 to 97.3 per cent.

C. Some students improved their reading efficiency as much as 250 per cent.

Table A summarizes the results of improvement in reading efficiency of the two groups of students.

Table A.--GAINS MADE IN LEARNING TO READ BY THE COLLEGE CLASSES

Tests	Average per cent of Efficiency	Efficiency Ratio of Average Efficiency per Unit of Time	Cases
In First Test	60.0	1.06	54
In Second Test	84.1	1.84	
In Third Test	97.3	2.14	
-----			
Per cent of Improvement	37.3	102.00	54

(2:248)

During the second semester two educational psychology groups were given instruction along the same line as was given in the "how to study" course. Near the end of the semester the students themselves estimated that their improvement was 32 per cent. The groups were given the same tests as were given to the freshmen and the "how to study" group. The results made on these tests were compared with scores on the same tests made by two other psychology classes of the same general college standing, but with no instruction in learning

reading skills. The two training classes showed an average percentage of 69.5 in efficiency in reading while the control groups averaged 59.2 per cent. The ratings on the intelligence test happened to be several points higher for the control group than for the training group.

The author made the following final conclusions:

We conclude that the reading ability of college freshmen should be accurately determined; that special remedial instruction should be given to all who are found to be deficient in this regard; that this instruction should be given in a special orientation or "how to study" course, and given by an instructor who is specially interested in the work and well equipped to give the type of help which these students need. (2:248)

Pressey and Pressey (14:203-11), 1930, investigated the effects of remedial reading in terms of gain in reading skill and academic work. Four hundred twenty-two freshmen at Ohio State University who scored in the lowest fourth on a reading test were selected for training which lasted seven weeks. These students were paired with students who had entered the University two years previously. They were matched according to intelligence, reading score on the initial test, sex, age, and college. At the beginning of their University career these two groups were similar, excepting that one group was given remedial reading training and the other group served as a control group.

Two hundred twelve students who had taken the

training showed an increase in point-hour-ratio of .50 over their control group partners. The authors indicate this improvement is equal to a rise from about half-way between a "D" and a "C" to approximately a "C".

The authors made the following conclusions:

It seems quite evident from this investigation that it is possible to train students to read effectively and that such training is more likely than not to transfer to the preparation of lessons and to general understanding of college work. It must be remembered that the individuals being dealt with are adults and the subject one of elementary character. It is, therefore, reasonable to suppose that there would be a considerable increase in skill with relatively small amounts of labor. Similar results have been shown in other institutions. It is likely that the poor preparation which many students show at entrance may be much helped by intensive drill covering a few weeks. It would probably be advisable for training classes to be instituted, either in a university or in the high schools, for those students whose reading habits are inadequate. If the exercises were done under supervision, the results would be still better than those reported. Such an arrangement is now in force at Ohio State University, the results of which will be reported later. (14:210)

The following two pertinent statements were presented in the summary:

(1) The academic work for two quarters of those trained is shown to be definitely superior to the academic work done by similar groups of students of the same initial intelligence and reading skill.

(2) It is concluded that training college students to read is entirely feasible and results in real gains in academic work. (14:211)

At Ohio State University in 1930, Pressey (13) investigated the scores in the lowest quartile of 606

freshmen, made on either of the two reading tests given to all entering freshmen. The students were listed in order of their intelligence percentiles and every other student on the list was selected for training in reading technics. The author attempted to determine the difference between the academic work done by the trained students as compared with that done by the untrained students of the same initial ability.

The author summarized his findings in the following tables:

Table B.--HOURS OF WORK DONE BY "TRAINED" AND "UNTRAINED" GROUPS

Number of Hours	Trained Group	Difference	Untrained Group
Hours of A	91		20
Hours of B	338		114
Hours of C	934		726
Hours of D	443		680
Hours of E	362		623
Number of students	141		141
Average point-hour-ratio	1.70		1.18
Difference in ratio		.52	
Median intelligence percentile	16.30		16.30
Average number of hours carried	15.30		15.30

Table C.--DIFFERENCE IN GRADES PRODUCED BY TRAINING

Number of Hours	Probable Grades without Training	Actual Grades	Difference
Hours of A	20	91	+71
Hours of B	114	338	+224
Hours of C	728	934	+206
Hours of D	682	443	-239
Hours of E	624	362	-262

(13:568)

Even though the average intelligence and the average number of hours carried are the same for both groups the grades of the trained group average slightly over 12 1/2 per cent higher than those of the untrained group. From Table 2 it appears that probably training prevented 262 E's and 239 D's, and produced 71 A's, 224 B's, and 206 C's in excess of expectation.

Pressey made the following remarks in conclusion:

It is on the basis of such objective evidence as presented in the foregoing that those in charge of this remedial work feel it to be of real value in handling those students whose preparation is inadequate for their needs. It is suggested that training of this type be given when necessary--by means of an educational laboratory, perhaps--and that every effort be made to get this remedial work done in the high schools. It is quite possible that in the course of a few years such training will be needed by only a relatively few freshmen because it will have been done at some previous time.

(13:568-69)

Parr (11), 1931, at the University of Iowa, set up and administered a remedial reading program to study the following problems:

1. To what extent does academic success depend upon the ability to read textbook material rapidly and accurately?
2. To what extent is reading comprehension increased by remedial reading instruction?
3. To what extent is rate of reading increased by remedial reading instruction?
4. How consistent is the improvement in grade-point average after remedial reading instruction?

The Iowa Silent Reading Test was given to 169 juniors and seniors who were enrolled in educational psychology during the first semester. Approximately one third of the students who scored in the lowest fourth on the reading test made a grade lower than "C" as compared to 13 per cent of the normal readers and four per cent of the superior readers.

The second-semester group which took educational psychology took an Educational Psychology Reading Test, constructed by the author, in addition to the Iowa Silent Reading Test. The students who scored in the lowest fourth on the reading tests were shown the results of the first experimental group. They were given the opportunity to take remedial reading instruction.

Twenty students met for two-hour laboratory periods once a week for 15 weeks to drill in reading and study skills.

The following four comparisons were made to show the effect of remedial instruction on scholarship:

1. Mean grade-point average for the semester during which the remedial instruction was given versus the mean previous general grade-point average.

2. Mean grade-point average for the semester during which the experiment took place versus the mean grade-point average for the previous semester.

3. Number and percentage of students making gains or loss in grade-point averages.

4. The number and percentage of students in each group who earned a grade-point average that was higher for the semester under consideration than for any one previous semester. (11:328-29)

The students in the experimental group made an average gain of 16 per cent, whereas the two control groups showed small losses. About four times as many experimental students as control students made their highest grade-point averages during the semester when remedial instruction was given.

Every member gained in comprehension as measured by the Educational Psychology Reading Test. The author used control groups for each semester. The "second semester control group" was made up of educational psychology students whose reading scores exempted them from remedial instruction.

Six members of the control group lost in comprehension ability. The experimental group showed twice

as much improvement as did the control group. Each one of the experimental students showed a gain whereas several of the control students failed to gain.

However, the fact that the average final comprehension score for the experimental group almost approached the average initial comprehension score for the control group, a group of better than average readers, indicates that the remedial instruction in a specific type of reading has transferred to some extent to the broader fields of reading. (11:326)

On the initial tests the control group read 22 words per minute more than the experimental group. However, on the final test the experimental group read 26 words per minute more than the control group.

It was found that improvement in reading ability varied according to mental ability. That is, those of highest intelligence profited most from remedial instruction and those of lowest intelligence profited least.

In order to measure the carry-over training of the experimental group the author obtained the grade-point averages for the year following remedial instruction. Of the 16 students, whose data were available, 10 made higher grade-point averages, three made lower averages, and three made the same grade-point averages as they did for the year in which the training was given.

Robinson (16), 1931, reported on a study at the University of Iowa entitled, "Can College Freshmen in the Lowest Tenth in Reading be Aided Scholastically?"

The investigation endeavored to answer the following questions concerning poor readers:

1. How much does the clinical analysis and treatment of the reading inadequacies of freshmen in the lowest tenth in reading ability aid them scholastically?
2. Which students benefit most from this training?
3. Is the clinical or the class method of training more efficient in remedying the difficulties of the lowest tenth in reading? (16:843)

The experimental group was composed of 42 freshmen who scored in the lowest tenth in comprehension on the Iowa Silent Reading Tests. The academic gain with reading instruction was evaluated in terms of achievement of a control group consisting of the 95 freshmen who scored in the lowest tenth the year previously. Both groups were of equal intelligence.

The method of remedial instruction was as follows:

A clinician held half-hour training periods twice a week for about eight weeks with each student. The length of training was dependent upon the progress made. In addition to these training periods every effort was made to have the students practice outside on their lessons. All participation was voluntary and most of the students were cooperative, particularly after they had noted some progress. Tests were given again after the training was completed to note the gains made. (16:843)

The experimental group raised its rank in comprehension from the fifth to the 29th percentile. In rate the percentile increase was from 27 to 70.

The remarks of the investigator concerning the gains in scholastic success are of interest.

Even though training was not started until the middle of the first semester there was an 18 per cent increase in grade point average over the control group. That the gain in grades was due to the gain in comprehension is further brought out by the fact that 80 per cent of those making above average gains in comprehension exceeded the group grade point average. Also, the mortality during the freshman year of the lowest tenth in reading was reduced from 25 per cent in the control group to 17 per cent in the training group. The fourteen fortnightly delinquency reports, or warnings of failing work, made a good measure of scholastic improvement, since there was an average of five reports before training started and nine afterwards. After training started there was a steady decrease in the number received. During the period from the time training started until the end of the school year, the training group received 39 per cent fewer delinquencies than the control group. Therefore, training in reading can be considered a scholastic aid to those freshmen in the lowest tenth in reading. (16:843-44)

He made the following conclusions from his study:

1. The lowest tenth in reading after clinical treatment of their difficulties showed marked improvement in reading ability and school success.

2. The lowest tenth in reading without training can be considered scholastic failures since most of them are eliminated the first year and those remaining continue as very poor students.

3. Intelligence and cooperation, two independent factors, determine the amount of gain with training. For the best results, students who are willing to work should be selected in order from those with the highest intelligence downward until the remedial quota is filled.

4. A clinical method is more efficient than a class method and should be used in remedying specific reading difficulties. (16:846)

In 1934, Gerberich (5) made a study of achievement value of a five-year remedial reading course given at the University of Arkansas. Scores made by the freshmen in reading and psychological tests were used to select the personnel of the remedial reading class. Students with extremely low scores were omitted from remedial reading instruction since it was presumed they had little chance for success in the University. Since 1929 approximately 50 freshmen each term, who were deficient in reading technics, had been required to take the remedial instruction.

The author used the following factors as criteria for judging final achievement:

1. General scholastic success for the first and subsequent semester of University attendance.
2. Percentages of students persisting varying numbers of semesters in attendance.
3. Percentages of students placed on probation because of poor scholarship.
4. Percentages of students dropped from their colleges of registration because of poor scholarship.
5. Percentages of students withdrawing during the progress of a semester. (5:41)

The control group was composed of students whose scores on entrance tests were just above those made by the experimental group. The difference in mean scores

showed the control group were distinctly superior in both the reading and psychological tests. The differences were all more than four times their probable errors and were, therefore, significant.

Pierce (12), 1948, made the following comment on the Gerberich study:

Gerberich showed that even though in scholastic averages, greater persistence in the University, and fewer scholastic difficulties, the results were in favor of the control group, the differences were comparatively small and without statistical reliability. The control students on the second test did not maintain their original superiority in achievement. Because these control students did not maintain their gains, Gerberich assumes that the lessening of the difference between the two groups is evidence of the instructional efficiency of the experimental technic. (12:30-31)

Anderson and Dearborn (1:387-96), 1941, studied the relationship between reading ability and achievement when the intelligence factor was held constant. According to them, earlier investigations by Lee and Bond found a significant relationship between reading ability and achievement in grades four, five, six and nine. Anderson and Dearborn made their investigations on the college level. Their study was made at Harvard University in the academic year 1938-39 with 68 pairs of freshmen who were matched for intelligence but unmatched in scholarship. Students were selected from History I, Government I, Economics A and English I and only those pairs were selected whose marks were one whole rank apart, such as, A and C, or B and D.

The experimental group was given a battery of reading tests consisting of the Nelson-Denny, Iowa Silent Reading Tests, and the Whipple Reading Test. On each of the tests the scores of the better and poorer students were averaged and compared statistically. Data were secured for both the pairs within courses separately and for all pairs regardless of course.

The investigators considered two values of 't' important to their study, .05 and .01 criteria of significance, where the probabilities are respectively only one in 20 and one in 100 that the observed differences would be obtained if the true differences between means were zero. Ordinarily, a difference which meets the .05 but not the .01 criterion is considered significant, while results which reach the .01 criterion are referred to as very significant. Differences not significant were those failing to reach the .05 criterion.

Five of the differences were significant while three were very significant. Of the differences which were very significant two of them were on figures for all courses combined. In each case the better readers were the ones with the highest grades. It seemed, also, that the better students read more accurately and covered more material. The investigators found that 21 of the differences were not significant, however, eight of the differences showed that the better students were the

better readers.

The total results showed that 24 of the 29 differences were of identical sign. This consistency in itself, according to the authors, makes the results take on a positive character.

Anderson and Dearborn concluded that there is a positive relationship between reading ability and college achievement, even when the factor of intelligence does not influence the results. Achievement was measured by grades and reading tests. Since grades are known to be unreliable and reading tests to have their limitations, the authors felt that the relationship was probably even higher than their findings indicated. Of the tests used, the authors felt that the Nelson-Denny Reading Test yielded the most significant results, and was the best diagnostic test to measure the type of reading ability called for by college work.

Simpson (17), 1942, reported on the service rendered by the reading laboratory at Carnegie Institute of Technology. The experimental group consisted of the students of the freshman engineering classes from 1939-41 who received low reading scores and low to relatively higher mental ability scores on the college entrance tests. The students were divided into three sections on the basis of mental ability. Students received the remedial instruction until they had improved their

deficiencies satisfactorily. The training consisted of a detailed analysis of the reading difficulties of each student, and such remedial practice as seemed necessary.

According to the author, the two trained groups made a decisive improvement in scholarship over the control groups. The improvement was slightly better than one-fourth letter grade.

In conclusion the author made the following comments:

It is possible to improve the scholarship of freshman students in college by a concentrated attack upon their principal difficulties in learning. The improvement may not be great in some instances and, in a few instances, it may not even be apparent; but, on the whole, there will be improvement if the program of remedial work is carefully organized and supervised.

It is the opinion of the writer that the service of the reading laboratory should not be confined entirely to removing reading difficulties for the obvious reason that there are many other kinds of difficulties that influence the student's marks. (17:623)

At Yale University in 1944, Wittenborn (20) made the following conclusions concerning work with speeded-reading classes.

1. The averaged scholastic records of students attending the reading classes show continuous and stable increments and, despite their low scholastic predictions, tend to equal the records for the total class of which they are members.

2. Poor readers who are uninstructed are decidedly inferior to the poor readers who received instruction. (20:576)

3. The gains in rate are greater than the

gains in story comprehension and paragraph comprehension. (20:578)

4. It has been observed that many slow painful readers have a characteristically high degree of retention for details in general. (20:580)

Kilby (6), 1945, reported a study of freshmen students at Yale University to determine the relation of their remedial reading program to scholastic success in college.

The study attempted to answer the following questions concerning the remedial reading program:

1. The value of a remedial reading program for improving grades in general.

2. The value of a remedial reading program for improving grades in particular subjects or in groups of related subjects.

3. Which students improved scholastically as a result of the remedial instruction.

4. What kind of remedial reading program is valuable for improving grades. (6:513)

Each one of the 110 students who enrolled and completed the first half of the course was paired with a non-remedial student from the total freshmen class having the same predicted grade score and the most similar reading test score. The following four procedures were emphasized: (1) Intensive reading; (2) rapid reading with thorough comprehension; (3) rapid reading; and (4) skimming.

Kilby (6) drew the following conclusions from his study:

1. Significantly higher final grade averages were received by freshmen who had taken remedial reading instruction than those untrained students of equal predicted grade status and slightly higher initial reading status.

2. The combination of procedures used was of value in verbal type courses but was of little value in quantitative type courses.

3. The effect of remedial instruction on special courses could not be determined.

4. It was not established that the remedial reading instruction was scholastically more beneficial to one student than to another.

5. Although no remedial procedure produced a consistently significant superiority of one group over another in final grades, analysis of the data revealed skimming for main ideas tended to profit most from the reading instruction.

6. Analysis of gains on the Iowa Silent Reading subtests revealed that all groups improved in speed and comprehension.

7. In general, the four different procedures produced little difference between performance of groups on the Iowa Silent Reading retest.

McGann (10), 1948, studied the problem of improving the scholarship of college freshmen at Worcester,

Massachusetts with remedial reading instructions.

The Iowa Silent Reading Tests, Revised Form A, and the Tyler-Kimber Study Skills Test were given to the entire freshmen class. Individual conferences with students and remedial reading teacher were held to inform students of their particular weaknesses, and their quartile rank.

Those students participating in the remedial instruction met for a two-hour period each week. The time was evenly divided between reading and study skills.

For retesting the Nelson-Denny Reading Test was given which gave evidence of the progress since the instruction.

The author made the following conclusions at the close of the study:

Definite trend toward improvement in reading can result even from weekly lessons given during a period of three months. The class work, also, showed great improvement because the students were gaining confidence with added skill. Remedial reading, when provided at the beginning of the freshman year, can help to eliminate failure which results from lack of good reading and study habits, and aid in the development of better scholarship during the years to come. If a similar program were provided at the senior high school level, students would be better prepared to do college work with success.

Effect of remedial reading  
on reading efficiency

Remmers and Stalnaker (15), 1928, at Purdue University conducted an experiment with seven students

to study the gain in speed and comprehension of motivated remedial speed drills. The following quotation is from their study:

The results indicate that for approximately three hours of reading time spread over a period of nearly two months the increase in both these functions approximates twenty-five per cent for the material read. It is not known to what extent if any this gain transferred to other types of reading situations. (15:800)

Eurich (4), 1931, at the University of Minnesota studied the effects that drills in vocabulary, paragraph reading, and study have upon reading efficiency, vocabulary marks in English, and marks in all subjects taken by the students. The experimental group and control group each consisted of freshmen in four sections, English Composition 4, 1928. The individuals of the two groups were paired on the basis of their decile score on the college ability test. Sex was also kept constant in the matched pairs.

The author found the following results from the study:

The results at the end of the fall quarter show that the experimental group had made definite and significantly greater improvement on a specific vocabulary for which drills were given than the control group. When the combined groups are considered, a significantly greater gain on the general vocabulary test also is observed for the experimental. During the winter quarter the control group continued its normal growth and made significantly greater gains than the experimental group but not sufficient to offset the increment of the experimental group during the fall quarter. The gain over the two-quarter

period was still in favor of the group with special training. At the close of the spring quarter, during which none of the members of the experimental classes had special vocabulary drills, both groups made equal gains. Considering the three-quarter period the experimental group made significantly greater gains on this specific vocabulary but did not in any of the other functions measured. (4:167)

Thompson (18), 1931, reported at Teachers College, University of Nebraska, on the effects of remedial reading instruction on freshman students who scored definitely lower than the reading norm for the tenth grade.

Form A of Whipple's High School and College Reading Test was administered to 273 freshmen. Thirty-eight students enrolled in the reading classes. The classes met once a week for eight weeks. Each student was given remedial treatments for his particular difficulty. Near the end of the first semester, Form B of Whipple's Reading Test was taken by the students.

A control group was selected on a basis of percentile rank on the Ohio State University intelligence examination and the reading score. No pair was selected which varied more than two percentiles in the intelligence or two scores on the reading test. This rigorous method of selection made it possible to obtain only 26 pairs. After group comparisons and paired comparisons were made from the data the following summary was made by the author.

1. 18 per cent of the Teachers College freshman class had less reading ability than the average child in the tenth grade.

2. 59 per cent of poor readers of the Teachers College freshman class constituted delinquents for the first semester.

3. College freshmen as a group do not improve in reading ability after a semester of college work.

4. Remedial reading classes improved the students' ability to read in a short time.

5. The evidence yielded by this investigation suggests that poor reading is a potential factor in the failure of freshmen to succeed in the first year of college work. (18:158)

Lauer (7), 1936, at Iowa State College set up an experimental procedure which might be used by the average student to increase his reading ability. The study was conducted as a part of the course in educational psychology for a group made up largely of sophomores, juniors, seniors, graduate students and a few freshmen. Most of the records were collected during the years, 1931, 1932, 1933, and 1934. More than 400 records were made, but only 367 of these were used in the present analysis of results. Summations were made from a total of 355 cases, 224 women and 131 men. Each student was given a six page mimeographed form on improvement of reading. Twenty practices were set as the improvement period. The readings were done under ordinary conditions of study and the reading material consisted of the regular assignments in two or more courses.

These conclusions were stated by the author:

1. Students improved their reading rate on

the average about thirty-five percent over a period of twenty days under the conditions of this study.

2. The study indicates that students at Iowa State College do not increase their reading rate while in college unless some regular remedial program is carried out. There is some evidence that they read progressively slower between freshman and senior years, since it is assumed that the selective factors operate to eliminate some of the poor readers from college.

3. The relative speeds of reading from highest to lowest were as follows: Literature, social sciences, history, and science. The differences were relatively small, in no case exceeding thirteen per cent of the slowest read material. Students in agriculture were found to be the slowest readers. Students majoring in the more theoretical sciences were superior to students in the strictly applied sciences.

4. Greatest improvement was found in literature and non-technical reading, although differences were not marked.

5. Those who read more rapidly at the beginning generally improved most in terms of percentage improvement. In general, it seems advisable to provide remedial reading for all students in college. It is assumed that the permanence of improvement is a function of the amount of over-learning, spacing of practice periods, and other variables known to affect learning in a general way.

6. In general it suffices to say that students can improve their reading ability by self-administered methods and the improvement of mature students may be even greater than that of younger students. Curves of improvement constructed from successive practices, indicate certain characteristics of learning to read more rapidly. (7:661)

McCallister (8), 1936, at the Chicago City Junior Colleges studied the effect of reading on marks in comprehensive entrance examinations.

The correlations show a positive relationship varying from .47 in physical science to .67 in English between comprehension in reading and success in the survey courses. In rate reading the correlations vary from .16 to .37. It is interesting to note that the correlations for comprehension in reading are consistently higher than the correlations for rate of reading. The form which training should take is indicated in part at least by the data presented. It has been shown that emphasis should be placed on the improvement of ability in comprehension. Rate of reading should also receive attention, but it does not appear to be as significant as comprehension. (8:79-80)

Weber (19), 1939, experimented with 99 freshmen in 1937 at Wells College. These students were given the American Council on Education Psychological Examination, several tests of personality trends, and the Iowa Advanced Silent Reading Tests, Form A.

Remedial reading exercises were given to forty-four college freshmen showing scores in the thirty percentile or less on the Iowa Advanced Reading Test, Form A. Two equated groups of experimentals were formed, one group taking the exercises of the Pressey Manual of reading exercises for freshmen, the other group taking tachistoscopic reading exercises. Both groups received six periods of remedial training distributed over six weeks. The resulting gains of experimentals are compared with scores of control groups immediately after the period of remedial work, and again one year later. The chief results were as follows:

(1) Immediately after the remedial work, both groups of experimentals show residual gains over the control subjects, both for speed and comprehension.

(2) The reading exercises result in greater increments of reading speed than of comprehension scores.

(3) The remedial methods used, the Pressey

Manual and the Tachistoscopic exercises, yielded approximately equal improvements in reading skills.

(4) The improvement of the experimentals are not materially affected by the fact that the remedial work was found a burdensome addition to regular college work.

(5) Personality trait scores, taken singly have no apparent relation to initial reading scores and rates of improvement. However, traits of low emotionality and high ascendancy when combined in the same subjects lead to larger improvements due to remedial reading.

(6) Retests of controls and experimentals after the lapse of a year indicate that the gains made due to remedial reading are substantially retained for the period of a year. (19:460)

Dearborn and Wilking (3), 1939, published the following data showing the results of six weeks remedial instruction in reading given to freshmen at Harvard College.

In 1945, McCaul (9) at the Junior College of the University of Chicago, reported on the effects of their remedial-reading program. During freshman week all students are given a battery of aptitude and achievement tests including the American Council on Education Psychological Examination. The results of these tests were sent to the remedial-reading teacher who selected names of prospective trainees.

The results of the remedial-reading program demonstrate that students on the average gain 20-percentile ranks in vocabulary, 30-percentile ranks in comprehension, and 110 words a minute in speed. Progress in other areas such as skimming, study habits, and personal adjustments

Table D.--RESULTS OF SIX WEEKS OF REMEDIAL INSTRUCTION IN READING GIVEN TO FRESHMEN  
AT HARVARD COLLEGE

Test	Mean Score of all Entering Freshmen	Harvard Remedial Group					
		Initial Test		Final Test		t	Level of Significance
		Mean Score	Standard Deviation	Mean Score	Standard Deviation		
<hr/>							
Cooperative							
Reading Test							
Speed of							
Comprehension	66.00	55.83	6.90	59.83	6.80	4.40	Better than 1 per cent
Level of							
Comprehension	66.94	59.30	6.00	64.43	7.63	4.26	Better than 1 per cent
 Nelson-Denny							
Reading Test							
Vocabulary		49.13	15.95	55.70	15.85	3.48	Better than 1 per cent
Comprehension	54.73	47.34	8.15	49.47	8.15	1.87	7 per cent
Entire test	118.00	96.10	21.35	104.33	20.32	3.63	Better than 1 per cent
 Iowa Silent							
Reading Test							
Parts A & C							
Number of words							
per minute	289.00	213.04	39.50	316.70	58.50	33.48	Better than 1 per cent

(3:678)

cannot be measured reliably, and an assertion that much is accomplished would be merely an opinion. Remedial-reading students also tend to get higher marks than do the students matched with them by similarity of reading deficiencies but who have not asked for remedial instruction. This superiority could be produced by a host of un-controlled influences, and we are not disposed to attribute it to remedial reading. It is logical, for example, to postulate that a student who takes the training is more conscientious and industrious than an equally poor reader who does not choose to avail himself of remedial-reading services. Our data do justify a generalization that any student who is willing to apply himself diligently to the training can improve his reading. (9:42)

Pierce (12), 1948, studied the effect which the remedial work in reading has upon changes in entrance test scores. His investigation revealed that apparently there was no transfer value of reading ability to gains on the entrance tests. He stated, however, that progress in reading was made as a result of participation in the reading clinic. The following statement presents evidence to this effect:

The experimental group made significant gains during the remedial course as measured by the Minnesota Test and the Iowa tests. The gain in means on the Minnesota Test was 3.29 with a critical ratio of 3.05 which showed significant progress. The correlation of scores of the two tests was .50 with a probable error of .09. The gain in means on the Iowa tests was 10.12 with a critical ratio of 7.28, over twice enough to be practically certain of significance. (12:105)

### Summary

The overview of the literature on the problem under consideration revealed that the investigations

have dealt primarily with college freshmen. A variety of opinions were expressed relating to the methods of selecting reading trainees. A summary of these opinions is stated here:

1. Instruction should be given to all who are deficient in reading.
2. Students receiving low reading scores and low to relatively higher mental-ability scores on the college entrance tests should receive training.
3. Students should receive training whose non-verbal-test scores are 40 or more percentile ranks higher than their verbal-test scores.
4. Students in the lowest quartile on all tests should receive training.

The reading tests most frequently used in the diagnosis of reading abilities of college students were the Nelson-Denny and the Iowa Silent Reading Tests. The value of these tests is augmented by their widespread use. The American Council on Education Psychological Examination was found to be administered most commonly as a college entrance examination.

The majority of cases reviewed used controls secured on an objective basis with freshmen college students comprising the greatest number of experimental and control groups.

Evidence was given that the experimental

students made their highest grade-point averages during the semester when remedial instruction was given. A large majority of writers stated that significantly higher grade averages were made by students who had taken remedial reading than those untrained students of the same initial intelligence and reading skill. Findings of other investigators revealed positive relationship between reading ability and college achievement even when the effect of intelligence is held constant. Furthermore, it was stated that remedial reading and a concentrated attack upon principal difficulties in learning at the beginning of the freshman year can help to eliminate failure.

The studies concerned with reading efficiency revealed that in most cases decided gains were found in both speed and comprehension. It is significant to note that investigators found these results in reading efficiency after students participated in remedial reading training:

1. An increase of 102 to 250 per cent in reading efficiency during the semester when the training was taken.
2. Ability to master an assignment had improved 60 to 97.3 per cent in some cases.
3. Training classes in reading showed an average percentage of 69.5 in efficiency in reading while the control groups averaged 59.2 per cent.

4. Results of remedial reading programs demonstrate that students on the average gain 20-percentile ranks in vocabulary, 30-percentile ranks in comprehension, and 110 words a minute in speed.

5. Students improved their reading rate on the average about 35 per cent over a period of 20 days.

Other studies stated that gains in rate were greater than the gains in story comprehension. Further analysis of the data in these studies revealed skimming for main ideas tended to profit most from the reading instruction.

Of particular interest in this study is the reference made by investigators to the transfer-value of remedial instruction. It was suggested that there is definite possibility of training students to read effectively and that such training is more likely than not to transfer to the preparation of lessons and to general understanding of college work. One author stated that of 16 students, 10 made higher grade-point averages than they did for the year in which the training was given. In studies involving retests of controls and experimentals after the lapse of a year indications were that the gains made due to remedial reading were substantially retained for a period of a year. It was found in some cases that remedial reading methods were of value in verbal type courses but were of little value in

quantitative type courses. Another author stated that greatest improvement was found in literature and non-technical reading, although differences were not marked. Finally, it was the assumption of one investigator that the permanence of improvement is a function of the amount of overlearning, spacing of practice periods, and other variables known to affect learning in a general way.

Most common among recommendations offered in the review was the need for continued assistance to those students deficient in reading ability, and that if possible these training classes be instituted in the colleges or high schools. In addition it was felt that emphasis should be placed on the improvement of ability in comprehension, as well as rate of reading.

### Chapter III

#### METHODS AND MATERIALS

What effect does reading clinic experience have on the scholastic success of students at Colorado Agricultural and Mechanical College? In order to obtain data to study the problem the following sources were used: records of grade-point averages from the office of the college registrar, records of the Iowa Silent Reading Test scores from the Colorado Agricultural and Mechanical College Testing Bureau, and attendance records of students from the instructor of the Reading Clinic.

#### Sources and methods of collecting data

From the records on file at the Testing Bureau were procured the profiles of all those students who had completed the Reading Clinic during the period beginning with the Spring Quarter of the college year 1946-47 and ending the Spring Quarter of 1947-48. This gave an initial list of 85 students. These 85 students were listed and from the Testing Bureau was secured the date when each student enrolled in and completed the course in Reading Clinic. From the office of the college registrar the following data were secured: the year in college when the course was taken, the year in college when the

records were obtained, and the number of quarters of work taken prior to the quarter when the training was taken.

After these data were compiled 34 students in the group were unable to qualify. At the close of the Spring Quarter 1947-48 it was found necessary to reduce the original number still further as four more students had withdrawn from school. There were no grade-point averages for those students after taking the Reading Clinic. After eliminating those persons who did not qualify by having a minimum of one quarter of work at college prior to and after the completion of the Reading Clinic the group finally selected included 47 students.

The grade-point averages earned by each of the 47 students before, during, and after training were obtained from the Office of the Registrar. At the same time the number of hours carried each quarter was also obtained. There was considerable variation in the number of quarters of grade-point averages available. For the pre-clinic period the number of quarters of grades available ranged from one to eight, and for the post-clinic period from one to five.

The instructor of the Reading Clinic furnished the class attendance for the 47 students in the group studied.

The Iowa Silent Reading Test was used as a

diagnostic measure of the reading efficiency of students. 1/ This test was administered by the college psychometrist to all students who enrolled for the Reading Clinic class. An alternate form of the same test was also given by the psychometrist to the students upon completion of the course. The following nine areas were covered by the test:

1. Rate
2. Comprehension
3. Directed Reading
4. Poetry Comprehension
5. Word Meaning
6. Sentence Meaning
7. Paragraph Comprehension
8. Location of Information-Index
9. Location of Information-Key Words

In addition a median raw score was obtained for each student.

The complete data used in the investigation were recorded on the Master Data Sheet. 2/

#### Description of the group

The total number of students in the group was

---

1/ Greene, H. A., Jorgensen, A. N., Kelley, V. H. Iowa Silent Reading Tests, New Edition. New York, Yonkers-on-Hudson, World Book Company, 1939.

2/ See Appendix. Master Data Sheet.

composed of 18 freshmen, 18 sophomores, and 11 juniors.

Table 1.--DESCRIPTION OF THE GROUP USED IN THE INVESTIGATION

	Reading Clinic		
	Before	During	After
Number of students	47	47	47
Mean number of hours carried	15.5	15.6	16.4
Range of hours carried	10.7-19.0	10.0-21.0	13.0-19.3
Mean number of clinic meetings attended		11	
Range of number of clinic meetings attended		4-14	

## Chapter IV

### ANALYSIS OF DATA

To provide data concerning the effect of the Reading Clinic upon scholastic success at Colorado Agricultural and Mechanical College an investigation was made of certain students who had completed the Reading Clinic course.

The data collected from the records of students in the Office of the Registrar, the Testing Bureau, and from the Instructor of the Reading Clinic, will be presented in this chapter. These data consist of grade-point averages before, during, and after training, the number of hours carried each quarter, attendance at the clinic, pre-clinic and post-clinic scores on the Iowa Silent Reading Tests for the entire group.

These data will be presented under the following headings: Statistical methods, Reading skills, Comparison of reading skills before and after clinic experience, Comparison of grade-point averages before, during, and after clinic experience, and Summary.

#### Statistical methods

In order to analyze the data for this investigation the following statistics were computed: mean,

standard deviation, differences between means, standard error of the mean, and the critical ratio.

The arithmetic mean was computed by adding all the scores in a group and dividing the sum by the number of scores. This procedure is expressed in the following formula for calculating the mean from ungrouped data:

$$A.M. = \frac{\text{Sum of the scores}}{\text{Number of scores}} = \frac{\Sigma X}{N}$$

The following fundamental formula for calculating the standard deviation from ungrouped data was used:

$$\text{Standard deviation} = \sqrt{\frac{\Sigma X^2}{N}} = M^2$$

The difference between means was found by subtracting the smaller of the obtained statistical measures from the larger.

The formulas then used for computing the standard error and the critical ratio were:

$$S.E.M = \frac{S.D.}{\sqrt{N}}$$

$$S.E.(M_1 - M_2) = \sqrt{(S.E.M_1)^2 + (S.E.M_2)^2}$$

$$\text{Critical ratio} = \frac{M_1 - M_2}{S.E.(M_1 - M_2)}$$

The following standards of significance were accepted:

1. A critical ratio,  $t$ , of three or more was

regarded as very significant since the probabilities are only about 14 in 10,000 that such results could be obtained by chance.

2. When the critical ratio,  $\underline{t}$ , was equal to or greater than two but less than three it was interpreted as showing a significant difference. The possibilities that such a ratio would result from chance are only 228 or less in 10,000.

3. When the critical ratio,  $\underline{t}$ , is less than two, the difference was not interpreted as significant.

### Reading skills

The following discussion of reading skills is based on the Manual of Directions for the Iowa Silent Reading Tests. 1/

These reading skills are very important in silent reading situations:

1. Ability to recognize new words.
2. Skill in locating material quickly.
3. Ability in comprehending quickly what is read.
4. Skill in selecting and evaluating material that is needed.
5. Skill in organizing what is read.

---

1/ Greene, H. A., Jorgensen, A. N., Kelley, V. H. Iowa Silent Reading Tests, New Edition. New York, Yonkers-on-Hudson, World Book Company, 1939.

The Iowa Silent Reading Tests attempt to measure economically, accurately, and reliably the proficiency of high school students and college freshmen in silent reading skills. The items in the several parts of the test are arranged in order of increasing difficulty. The different forms of the test are carefully balanced as to difficulty. Evidence on the reliability of each of the separate tests indicates that the results may be effectively used in assisting with the reading difficulties of individual students. Following is a description of each subtest:

Rate and comprehension.--The student is asked to read two diverse types of prose at a rate which, for him, is best for clear comprehension. The rate score is expressed in terms of the total number of sentences read in one minute in each of the articles. The comprehension scores are based on the two selections which are on different levels of understanding. Test 1 is a measure of reading rate under specific comprehension conditions.

Directed reading.--This subtest measures the ability of the reader to comprehend general and specific situations expressed in the article without unduly stressing memory. It gives a measure of ability to comprehend and answer questions of a rather detailed type.

Poetry comprehension.--This test measures the ability of the student to read and understand poetry by

a series of questions about a poem. The student locates passages in the poem that answer specific questions.

Word meaning.---This test was designed to measure understanding of significant words in social science, science, mathematics, and English.

Sentence meaning.---The sentences in this test are so stated that the meaning of the sentence as a whole must be comprehended. The content level of difficulty is comparable to the comprehension difficulties involved. The sentences are arranged in ascending order of difficulty.

Paragraph comprehension.---The ability to select the central topic of the paragraph, and the ability to identify details essential to the meaning of the paragraph are the two aspects of this test.

Location of information.---Part A of the test measures ability to refer to a simple index for answers to questions. Part B yields an index to the ability to select words under which information about a given question might be found.

Median standard scores.---In general the median score indicates the average reading performance of each student on the Iowa Silent Reading Tests.

Comparison of reading  
skills before and after  
clinic experience

The differences in the raw scores on the Iowa

Silent Reading Tests before and after training are reported in Table 2. It was found that "word meaning" and "sentence meaning" were the only two subtests with no significant differences. However, "sentence meaning" approached significance with a critical ratio of 1.81.

The subtests, "paragraph comprehension" and "location of information-index" showed significantly higher differences after clinic experience. Their critical ratios were respectively 2.07 and 2.37, Table 2.

In order of decreasing significance the following five subtests showed very significant differences between post-clinic scores and pre-clinic scores:

1. Rate
2. Poetry Comprehension
3. Directed Reading
4. Key Words
5. Comprehension

On two subtests, "rate" and "poetry comprehension" the scores of the post-clinic test were very significantly higher than those of the pre-clinic test. Their critical ratios were 7.62 and 6.32 respectively, Table 2.

The post-clinic scores were found to be very significantly higher than the pre-clinic scores on "directed reading" with a  $t$  ratio of 4.93, Table 2.

The subtests, "key words"  $t = 3.96$  and

"comprehension"  $t = 3.37$ , showed the post-clinic scores to be very significantly higher when compared with the pre-clinic scores, Table 2.

The median scores on the post- and pre-clinic tests revealed a very significantly higher  $t$ , 4.89, for the post-clinic test, Table 2.

Table 2.--SIGNIFICANCE OF THE DIFFERENCES BETWEEN SCORES MADE ON IOWA SILENT READING TESTS ADMINISTERED TO 47 COLLEGE STUDENTS BEFORE READING CLINIC EXPERIENCE (FORM A) AND AFTER CLINIC EXPERIENCE (FORM B)

	Mean Raw Score	S.D.	S.D. <sub>M</sub>	$M_2 - M_1$	S.D. <sub><math>M_2 - M_1</math></sub>	$t$
Rate						
Form AM	156.57	19.07	2.80			
Form BM	189.06	22.10	3.22	32.49	4.26	7.62
Comprehen- sion						
Form AM	168.49	19.41	2.83			
Form BM	180.15	13.68	1.99	11.66	3.46	3.37
Directed Reading						
Form AM	153.87	16.42	2.39			
Form BM	170.43	16.48	2.40	16.56	3.38	4.93
Poetry Com- prehension						
Form AM	153.40	21.09	3.07			
Form BM	176.77	15.02	2.19	23.37	3.70	6.32
Word Meaning						
Form AM	176.26	24.26	3.54			
Form BM	182.83	16.64	2.43	6.57	4.29	1.06
Sentence Meaning						
Form AM	177.45	15.88	2.32			
Form BM	183.32	15.63	2.28	5.87	3.25	1.81

Table 2.--SIGNIFICANCE OF THE DIFFERENCES BETWEEN SCORES  
MADE ON IOWA SILENT READING TESTS ADMINISTERED TO 47  
COLLEGE STUDENTS BEFORE READING CLINIC EXPERIENCE  
(FORM A) AND AFTER CLINIC EXPERIENCE (FORM B)--  
Continued

	Mean Raw Score	S.D.	S.D. <sub>M</sub>	M <sub>2</sub> -M <sub>1</sub>	S.D. <sub>M<sub>2</sub>-M<sub>1</sub></sub>	t
Paragraph Comprehension						
Form AM	168.38	20.97	3.06			
Form BM	177.23	20.60	3.00	8.85	4.28	2.07
Index						
Form AM	161.72	14.85	2.16			
Form BM	169.34	16.32	2.38	7.62	3.21	2.37
Key Words						
Form AM	168.87	14.92	2.17			
Form BM	179.98	12.31	1.79	11.11	2.81	3.96
Median						
Form AM	166.96	12.91	1.88			
Form BM	178.79	10.43	1.52	11.83	2.42	4.89

Comparison of grade-point  
averages before, during,  
and after clinic  
experience

Records in the Office of the Registrar were used to obtain data on grade-point averages of students before, during, and after training in the Reading Clinic.

Following are the methods used by the registrar to calculate the grade-point averages: The letter grades for each quarter of college work were weighted so that an "A" equaled 4, a "B" equaled 3, a "C" equaled 2, a "D" equaled 1, and an "F" equaled 0. The weighted scores were

multiplied by the number of hours of credit given in each course. The sum of these figures, which represents the number of quality points, was then divided by the number of hours carried to obtain the grade-point average. The following is an example of the computation involved in figuring grade-point averages:

Grades	Grade-Points	Number of Credit Hours	Quality Points
C	2	5	10
A	4	3	12
D	1	2	2
B	3	3	9
A	4	<u>3</u>	<u>12</u>
Total		16	45

The total quality points (45) divided by the number of credit hours (16) gives a grade-point average of 2.81.

The differences in grade-point averages for students before, during, and after reading clinic experience are reported in Table 3. Comparisons were made of grade-point averages for students completing the Reading Clinic. Grades made before clinic were compared with those made during clinic; grades made during clinic were compared with those made after clinic; and grades made before clinic were compared with those made after clinic.

The differences in grade-point averages during

clinic were significantly higher than those made before clinic. The critical ratio was 2.6, Table 3.

No significant difference was found in grade-point averages during and after clinic experience, the  $t$  being .11.

The differences in grade-point averages after clinic compared with before clinic were found to be very significantly higher,  $t = 10.9$ , Table 3.

Table 3.--SIGNIFICANCE OF DIFFERENCES IN GRADE-POINT AVERAGES EARNED BY 47 COLLEGE STUDENTS BEFORE, DURING, AND AFTER READING CLINIC EXPERIENCE

	Mean	S.D.	S.E.M	$M_2 - M_1$	$S.E_{M_2 - M_1}$	$t$
Before clinic	2.15	.14	.02			
During clinic	2.40	.66	.09	.25	.09	2.6
During clinic	2.40	.66	.09			
After clinic	2.39	.10	.01	.01	.09	0.1
Before clinic	2.15	.14	.02			
After clinic	2.39	.10	.01	.24	.02	10.9

### Summary

The general method of analysis was a computation of the mean, standard deviation, differences between the means, and standard error of differences of means. The differences were interpreted by the critical ratio.

Reading skills were measured by the Iowa Silent Reading Tests. The nine areas covered by the test include rate, comprehension, directed reading, poetry comprehension, word meaning, sentence meaning, paragraph comprehension, and location of information-key words and index. The average reading ability of each student was indicated by the median score.

Only these parts of the test, "word meaning" and "sentence meaning" showed no significant differences. "Paragraph comprehension" and "location of information-index" were found to be significantly different. "Rate," "poetry comprehension," "directed reading," "key words," and "comprehension" showed very significant differences after training as compared with before clinic.

Records of grade-point averages were secured from the Office of the Registrar.

The differences in grade-point averages after clinic as compared with those before clinic were found to be very significantly higher. Grade-point averages earned during clinic experience were significantly higher than those earned before clinic experience. No significant differences were found in grade-point averages earned during and after clinic experience.

## Chapter V

### DISCUSSION

Numerous research studies have been made to investigate the effect of remedial reading as an aid to college students. These studies and the increasing use of reading clinics may be regarded as an indication of the interest shown by colleges and universities in improving the reading efficiency of their students.

Colorado Agricultural and Mechanical College has been among those institutions recognizing the need of a reading clinic. Since 1944 such a program has been offered under the English Department to those students interested in improving their reading efficiency. Candidates enter the class of their own volition. After enrolling in the clinic attendance is not mandatory. Students may complete the 12 weeks session or terminate their attendance when they feel they have received the aid they needed. No credit is given for the course.

This study is concerned with the effect of the Reading Clinic on the scholastic success of students at Colorado Agricultural and Mechanical College. The data for this investigation were furnished by 47 students who completed the Reading Clinic during the period beginning

the Spring Quarter of the college year 1946-47 and ending the Spring Quarter of the college year 1947-48.

The problem, What effect does Reading Clinic experience have on the scholastic success of students at Colorado Agricultural and Mechanical College? will be discussed under the following headings: Comparison of pre-clinic and post-clinic scores on the Iowa Silent Reading Tests, Comparison of grade-point averages before, during, and after Reading Clinic experience, Related factors, Summary, and Suggestions for further study.

Comparison of pre-clinic and post-clinic scores on the Iowa Silent Reading Tests

Rate.--As a result of comparing pre-test and post-test scores it was found that "rate" exceeded each of the other subtests. The difference in the post-clinic rate test as compared with the pre-clinic test was found to be very significantly higher. The critical ratio was 7.62, over twice enough to be certain of significance.

As a result of six weeks remedial instruction in reading given to freshmen at Harvard College, Dearborn and Wilking (3) report very significant gains,  $t = 33.48$ , made on rate as indicated by a comparison of initial and final test scores on the Iowa Silent Reading Tests. The same group was given the Cooperative Reading Test. Their gains after instruction were again very significant,  $t = 4.40$ . Robinson (16) reported a percentile increase

in rate from 27 per cent before training to 70 per cent after training. McCaul (9) stated that his remedial reading group gained an average of 110 words per minute.

In another investigation reported by Remmers and Stalnaker (15) the results indicate that for motivated remedial speed drills spread over two months the increase approximates 25 per cent for the material read. Lauer wrote that his experimental group increased 35 per cent in 20 days while the control group showed no increase. He furthermore stated "that students at Iowa State College do not increase their reading rate while in college unless some regular remedial program is carried out." (7:661)

The critical ratio of rate,  $t = 7.62$ , was approximately twice that of comprehension, 3.37. Not only were the gains in rate more significant than gains in comprehension, but the amounts of gains were greater. These findings agreed favorably with earlier studies made by Wittenborn (20), Weber (19), and McCallister (8) who found rate gains for their experimental groups were greater than comprehension gains.

The majority of investigations reviewed by the writer concerning reading improvement agreed that instruction increased speed of reading.

Comprehension.--A critical ratio of 3.37 on comprehension shows a very significant increase on the

post-clinic test over the pre-clinic test. Comprehension was the fourth in order of significance of gain.

Dearborn and Wilking (3) testing students after six weeks of remedial instruction at Harvard College found a very significant gain, which was indicated by a critical ratio of 4.26. This gain was shown on the Co-operative Reading Test, level of comprehension section. On the Nelson-Denny Test, this same group was reported as showing a difference which only approached significance, critical ratio 1.87.

Parr (11) indicated that the remedial reading group showed twice as much improvement in comprehension as the control group. Robinson (16) found that his group made an even greater improvement. Before taking reading instruction the group rated in the fifth percentile. After training they rated on the 29th percentile. McCaul (9) found an average gain in comprehension of 30-percentile ranks while Remmers and Stalnaker (15) reported an approximated gain of 25 per cent for material read as a result of drills spread over a two month period.

Though improvement in comprehension was indicated in numerous studies, it is apparent from the findings in this study and others that gains in comprehension tend to be less than rate of reading.

Directed reading, Poetry comprehension, and Key words.--These subtests will be discussed as a group

since no reference was made to them in the literature. In this study there were very significant differences showing gains on each of the tests. The critical ratios of differences on the subtests were "directed reading,"  $t = 4.93$ , "poetry comprehension,"  $t = 6.32$ , and "key words,"  $t = 3.96$ . "Poetry comprehension" ranked next to "rate" most significant of the gains made on the nine areas included in the entire test.

Paragraph comprehension and Index.--Post-clinic scores on "paragraph comprehension," were significantly higher,  $t = 2.07$ , than were pre-clinic scores. Post-clinic scores were also found to be significantly higher on "index," than the pre-clinic scores as indicated by a critical ratio of 2.37. No mention was made of these reading skills in the literature reviewed by the writer.

Word meaning and Sentence meaning.--Even though there were gains in "word meaning,"  $t = 1.06$ , and "sentence meaning" after clinic as compared with before clinic, the gains were not significant. The "sentence meaning" differences approached significance with a critical ratio of 1.81.

Dearborn and Wilking (3) found a critical ratio of 3.48 difference in "word meaning" which was considerably higher than the ratio found in this study; however this result was obtained from the Nelson-Denny Reading Test. McCaul (9) reported that the results of the

remedial reading program at the University of Chicago showed that students on the average demonstrate gain of 20-percentile ranks in vocabulary after reading clinic participation. Eurich (4) stated that the experimental group at the University of Minnesota made definite and significantly greater improvement than did the control group on a specific vocabulary for which drills were given.

Median.--The critical ratio,  $t = 4.89$ , between medians showed a very significant gain was made by students in this study on the post-clinic as compared with the pre-clinic test. This indicates an improvement in general reading efficiency since the obtained difference was greater than could be attributed to chance.

Dearborn and Wilking (3) comparing initial and final scores on the Nelson-Denny Test found a critical ratio on the entire test of 3.63 which is less than the gains made in this study. Perhaps this may be attributed in part to a difference in tests.

Book (2) stated that during the semester when the training was taken there was an increase of 102 per cent as a result of training and that some students improve their reading efficiency as much as 250 per cent. He further reported that students themselves estimated their improvement was 32 per cent. He also pointed out that his two training classes showed an average percentage

of 69.5 in reading efficiency while the control groups averaged 59.2 per cent.

McGann (10) reported that reading improvement can result from weekly lessons given during a period of three months. Thompson (18) found in an earlier study that remedial reading classes improved reading ability in a "short time." The length of time was not reported.

Pierce (12) in 1948, at Colorado Agricultural and Mechanical College, found that his experimental group made significant gains during the remedial course as measured by the Minnesota Test and the Iowa Test. He reported the gain in means on the Iowa Test was 10.12 with a critical ratio of 7.28, over twice enough to be certain of significance. This critical ratio was nearly twice that found in this study.

Since the same group was used throughout this study the intelligence factor was controlled. The sample available was too small to permit interpretation with reference to levels of intelligence, therefore this investigation is not concerned with the relation of reading ability to intelligence but references to this factor as made in the literature reviewed are of interest. Parr (11) found that improvement in reading ability, varied according to mental ability. That is, those of highest intelligence profited most from remedial instruction and those of lowest intelligence profited least.

In a study made by Robinson (16) students in the lowest tenth in reading, after clinical treatment of their difficulties, were found to show marked improvement in reading ability. Wittenborn agrees with this statement as he concluded from his work with speeded-reading classes that "poor readers who are uninstructed are decidedly inferior to the poor readers who received instruction." (20:576)

It is agreed that numerous variables may affect the scores made by students on the two forms of the Iowa Silent Reading Tests, however, the results of comparison show such significant gains that there should be little doubt that increased reading efficiency has resulted as the outcome of participation in the Reading Clinic.

Comparison of grade-point averages before, during, and after Reading Clinic experience

Comparison of grade-point averages before and during clinic.--Differences in grade-point averages before clinic and during clinic were significant,  $t = 2.61$ .

Parr (11) stated in his study that approximately four times as many students of the remedial reading group increased their scholastic averages as did those of the control group. Earlier Book (2) reported more than a 10 per cent gain in grades for the training

group over the control group.

The group reported by Simpson (17) increased their averages by one-fourth of a letter grade. Robinson (16) wrote that he found an 18 per cent increase during the period the students received training in remedial reading.

McGann (10) stated that remedial reading, when provided at the beginning of the freshman year can help to eliminate failure which results from lack of good reading and study habits. Wittenborn made this conclusion concerning scholastic success and reading:

The averaged scholastic records of students attending the reading classes show continuous and stable increments and, despite their low scholastic predictions, tend to equal the records for the total class of which they are members.

(20:576)

Comparison of grade-point averages before and after clinic.--The critical ratio between post-clinic and pre-clinic grade-point averages was very significant,  $t = 10.9$ . These findings are fairly comparable to those of Kilby (6) who stated that significantly higher final grade averages were received by freshmen who had taken remedial reading instruction than by those students of equal predicted grade status and slightly higher initial reading status. Training in the freshman year, reported McGann aids "in the development of better scholarship during the years to come." (10:185) Thompson found evidence from his investigation that "poor reading is

a potential factor in the failure of freshmen to succeed in the first year of college work." (18:158)

In an investigation of 606 freshmen at Ohio State University, Pressey (13) reported that trained groups averaged slightly over 12 1/2 per cent higher than those of the untrained groups. His groups were matched as to intelligence and number of hours carried. Pressey further states that training probably prevented 262 E's and 239 D's and produced 71 A's, 224 B's, and 206 C's in excess of expectation.

Pressey and Pressey (14) reported that academic work for two quarters of those trained was shown to be definitely superior to the academic work done by a similar group of students possessing the same initial intelligence and reading skill. They concluded that training college students to read is feasible and that it results in real scholarship gains.

Parr (11) measured the carry-over training of his experimental group by obtaining the grade-point averages for the year following remedial reading instruction and found that of the 16 students studied, 10 made higher grade-point averages, three made lower grade-point averages, and three made the same averages as they had during the year of training.

Comparison of grade-point averages during and after clinic.---There was no significant difference found

between grade-point averages during and after Reading Clinic experience, the critical ratio was 0.1.

### Related factors

It has been stated previously that a number of factors may influence the results of this study to some degree. The two which might be most apparent and most readily discernable will be discussed here.

In all probability the credit hours carried each quarter by students enrolled in the Reading Clinic is one of these factors. The range of credit hours carried before clinic was from 10.7 to 19.0, averaging 15.5 hours. During clinic the range of credit hours carried was from 10.0 to 21.0, averaging 15.6 hours. This shows the average hours carried before and during clinic corresponded almost to the exact number. After clinic the range of credit hours carried was from 13.0 to 19.3, averaging 16.4 hours. The average student load was approximately one hour greater for the period after clinic, than in either of the other periods, before or during clinic. This fact is particularly interesting when it is noted that highest grade-point averages were made after clinic, the period of greatest student load.

Another factor which should not be minimized is the class hours attendance at the clinic. It is shown by the data that the average attendance was 11 hours ranging from as low as four hours in one case to

as high as 14 hours in other cases.

### Summary

Significant gains were made in grade-point averages during Reading Clinic as compared with before Reading Clinic. Very significant gains were made in grade-point averages after Reading Clinic as compared with before Reading Clinic. These definite gains indicate that the differences found are greater than can be attributed to chance and it seems clear that Reading Clinic favorably affected grade-point averages. Reading Clinic experience then may be considered a factor in the scholastic success of those students participating in reading instruction. The need for some type of aid to students in learning to read at the college level cannot be overlooked and the maintenance of the Reading Clinic as a tremendous assistance to students is most highly recommended.

### Suggestions for further study

It is recommended that further investigation be made covering a greater length of time to test the implications of this study. Further analysis of the problem might be made through studies such as the following.

1. An investigation to determine at which levels of ability students profit most from

Reading Clinic experience.

2. Study of students with high ability level but low reading ability to discover the extent of improvement which may be gained from a Reading Clinic.

3. Use of reading ability scores for predicting college success.

4. Investigation of the areas in which most difficulties are found in the reading ability of college students.

5. The repetition of the present study by a control group method to determine the relationship of reading efficiency to scholastic success.

6. A continuation of this study over a longer period of time to more accurately determine the permanence of the effect of the Reading Clinic.

7. The effect of a Reading Clinic in decreasing the number of students who withdraw from school.

## Chapter VI

### SUMMARY

The intent of this study was to ascertain the effect of Reading Clinic experience on the scholastic success of students at Colorado Agricultural and Mechanical College.

To analyze this problem the following data were needed: Measured reading skills before participation in the Reading Clinic, Measured reading skills after participation in the Reading Clinic, Comparison of reading skills before and after participation in the Reading Clinic, and Comparison of grade-point averages before and after participation in the Reading Clinic.

The study was limited to 47 students who completed the Reading Clinic at Colorado Agricultural and Mechanical College during the period beginning with the Spring Quarter of the college year 1946-47 and ending the Spring Quarter of the college year 1947-48.

The Iowa Silent Reading Tests were used as a diagnostic measure of the reading efficiency of these students. The test was administered by the college psychometrist to all students who enrolled in the Reading Clinic both before and after the Clinic instruction was

completed. Raw scores were used in the compiling of these data.

Grade-point averages were obtained from the Office of the Registrar. To qualify in this study each student had to have a minimum of one quarter at Colorado Agricultural and Mechanical College prior to and after enrollment in the Reading Clinic. The grade-point averages were compiled separately for three periods, before clinic, during clinic, and after clinic.

Common statistical devices which would lead to the computation of the critical ratio were used in the analysis of the data.

Gains were made on all subtests of the Iowa Silent Reading Tests. However, gains on two of the tests, "word meaning,"  $t = 1.06$ , and "sentence meaning,"  $t = 1.81$ , were not sufficient to be considered significant.

"Paragraph comprehension,"  $t = 2.07$ , and "index,"  $t = 2.37$ , showed significant gains. The remaining five subtests "rate,"  $t = 7.62$ , "comprehension,"  $t = 3.37$ , "directed reading,"  $t = 4.93$ , "poetry comprehension,"  $t = 6.32$ , and "key words,"  $t = 3.96$ , all showed very significant gains. The medians of the scores also indicated a very significant gain with a critical ratio of 4.89.

There was no significant gain in grade-point averages as between during clinic and after clinic,

$\underline{t} = 0.1$ . A significant gain in grade-point average was indicated during clinic as compared with before clinic,  $\underline{t} = 2.6$ . Very significant gains were made in grade-point averages after clinic over before clinic,  $\underline{t} = 10.9$ .

It is apparent that improvement was made in the reading efficiency of the group studied as was shown in the gains made on the Iowa Silent Reading Tests. The very significant gains made in grade-point averages after the Reading Clinic would indicate that the Reading Clinic favorably affects the scholastic success of students.

## APPENDIX

BEFORE CLINIC										DURING CLINIC										AFTER CLINIC																				
Grade Point Average by Quarter Prior to Reading Clinic Experience										Diagnostic Test Scores										Diagnostic Test Scores																				
CASE NUMBER	1	2	3	4	5	6	7	8	AVERAGE	HOURS CARRIED	RATE	COMPRE- HENSION	INFER- PRECESSION	WORLD REASONING	INTELLIGENCE	INDEX	KEY WORDS	GRADE POINT AVERAGE	HOURS AT CLINIC	RATE	COMPRE- HENSION	INFER- PRECESSION	WORLD REASONING	INTELLIGENCE	INDEX	KEY WORDS	GRADE POINT AVERAGE	HOURS AT CLINIC	RATE	COMPRE- HENSION	INFER- PRECESSION	WORLD REASONING	INTELLIGENCE	INDEX	KEY WORDS					
1	341	381	377	253					338	152	166	190	154	177	190	191	147	167	180	177	400	120	12	199	151	183	177	196	190	163	186	189	187	340	353	325	350	357	328	148
2	263	212							237	145	160	126	154	135	108	121	112	127	128	127	262	170	6	177	168	174	191	168	165	150	155	183	168	74	219	144	38	240	135	152
3	220								220	150	163	171	183	152	208	192	215	164	180	180	331	160	9	204	207	183	201	208	212	201	181	184	201	235	229	229	180	182	211	170
4	107	136	74	167	181	184	250	183	161	154	189	184	192	181	183	186	208	81	184	184	179	140	7	216	171	142	191	188	201	181	159	189	188	320	323	193	246		270	133
5	190								190	155	134	151	164	146	166	169	153	169	176	164	232	155	5	166	168	164	152	173	177	163	193	176	168	230	238			234	130	
6	244	306	347	333	312				318	156	172	158	159	208	193	186	166	169	141	169	329	210	4	184	181	201	177	203	192	166	155	198	184	224			224	170		
7	242	251	224	176					223	151	144	184	164	191	185	193	164	175	184	184	200	185	12	187	190	197	184	193	201	190	202	189	190	206	276	211			231	173
8	180								180	150	184	130	149	152	188	191	177	181	156	177	167	150	12	209	171	174	181	210	199	201	181	156	181	180			180	150		
9	276	225	217						239	170	166	193	154	157	188	184	175	187	184	184	237	190	10	199	193	179	163	195	171	177	175	169	177	250	267			158	180	
10	212								212	170	157	184	135	163	187	189	181	169	176	176	209	170	12	187	190	179	177	195	192	181	193	198	190	143	194	144			160	183
11	244	261	271	344					280	172	147	175	154	163	158	182	173	159	165	163	363	160	14	178	199	188	184	180	184	181	181	180	181	274	300	300			291	163
12	139								139	140	134	135	121	146	113	126	144	150	131	137	113	115	8	147	151	179	157	139	142	173	150	169	151	165					165	130
13	163	147	244	133					171	137	178	151	121	115	160	171	153	143	153	153	207	140	9	223	181	174	181	131	162	109	169	162	174	200	250	247			232	150
14	300	300	300	231					277	146	189	193	154	181	183	196	166	164	189	183	200	150	14	216	151	154	177	196	165	177	175	184	177	280	228	216			241	173
15	90								90	156	166	174	164	152	193	186	190	159	140	175	107	145	11	203	178	179	184	192	196	185	155	176	184	172	212	233			205	158
16	283	286	271	300					285	150	166	181	154	184	176	179	185	181	184	181	332	190	12	216	199	174	194	192	179	181	187	189	189	205	274	253			250	180
17	128	167	177	277	169	160			179	155	172	199	174	130	197	220	185	169	189	185	364	140	12	223	199	179	191	208	209	190	175	209	194	220	217	185			207	143
18	231	300	267	267					266	152	154	154	135	163	183	184	150	169	145	154	275	160	14	211	181	159	152	187	190	157	169	176	176	263	187	200			216	173
19	295								295	190	151	178	174	152	176	182	177	159	173	174	213	160	12	199	171	174	177	180	184	201	187	162	180	268	281	244			264	193
20	162	238	238	200	215	143	112	258	174	138	121	154	164	163	169	169	153	155	149	163	277	130	12	137	199	179	181	185	190	181	164	184	181	300	273	380			317	143
21	233								233	150	160	181	121	135	197	177	166	156	176	166	267	150	13	181	181	149	152	178	177	201	175	180	178	156	133	213			167	160
22	300	167	292	233	272				252	152	141	161	128	135	162	173	157	127	180	157	229	170	12	213	178	164	157	166	175	160	119	189	166	271	244	267			267	153
23	185								185	130	160	151	121	130	154	179	147	143	161	151	124	170	12	195	171	121	132	168	177	163	127	165	165	106	135	250			163	170
24	27								21	140	141	148	121	119	148	165	147	155	161	148	158	120	13	134	161	121	168	171	165	138	155	184	161	206			206	160		
25	157								157	175	134	148	164	135	168	165	160	169	161	161	174	175	9	160	176	183	197	169	158	160	181	176	176	238	263	270			257	166
26	206	219	276	279	164	200	133	231	213	154	160	171	159	130	169	177	167	159	156	159	318	170	9	154	175	164	157	190	196	170	181	180	175	300	289	329			306	176
27	150	240	189						193	168	178	165	169	181	180	182	181	175	176	178	200	140	14	216	178	164	184	187	193	185	175	184	184	244			244	160		
28	224								224	170	163	158	142	130	178	165	195	169	173	165	262	170	11	192	184	179	191	166	177	201	169	189	184	300	272	321			297	173
29	343	210	192	94					202	165	163	184	149	191	205	193	201	175	165	184	263	135	12	187	184	197	184	207	193	201	193	198	193	258	303	212			261	181
30	171								171	155	147	171	159	130	178	191	177	159	180	171	203	145	12	172	181	159	168	181	192	208	164	173	173	127	231	173			177	163
31	254	229	292	150					231	147	151	176	151	157	193	167	181	175	184	177	172	180	9	166	196	164	181	166	171	177	169	184	471	300	271			247	173	
32	311	300	315	247	300				294	168	130	171	154	168	164	171	157	164	176	164	300	180	9	169	190	179	181	200	175	163	175	184	179	278	300	317			298	177
33	175								175	160	154	178	169	163	160	169	166	155	156	163	219	160	11	192	193	183	163	162	182	181	187	189	183	144	200	206			188	170
34	175	200	171	140	193	319	231		204	135	134	122	142	141	166	169	129	127	157	141	267	150	12	169	165	149	168	171	164	141	155	165	165	238	217			225	165	
35	315	239	235	306					273	167																														

## BIBLIOGRAPHY

## BIBLIOGRAPHY

1. Anderson, Irving Howard, and Dearborn, W. F.  
Reading ability as related to college achievement. *Journal of Psychology*, 11:387-96,  
April 1941.
2. Book, William F. How well college students can  
read. *School and Society*, 26:242-48,  
August 1927.
3. Dearborn, Walter F. and Wilking, S. Vincent.  
Improving the reading of college freshmen.  
*School Review*, 49:668-778, November 1941.
4. Eurich, Alvin C. Reading abilities of college  
students. Minneapolis, University of  
Minnesota Press, 1931. 208 p.
5. Gerberich, Joseph Raymond. Five years of expe-  
rience with a remedial reading course for  
college students. *Journal of Experimental  
Education*, 3:36-41, September 1934.
6. Kilby, Richard W. Relation of a remedial reading  
program to scholastic success in college.  
*Journal of Educational Psychology*, 36:513-  
34, December 1945.
7. Lauer, Alvhh R. An experimental study of the  
improvement of reading by college students.  
*Journal of Educational Psychology*, 27:655-62,  
December 1936.
8. McCallister, James Maurice. Reading ability in  
relation to survey courses. *Chicago Schools  
Journal*, 18:79-82, November-December 1936.
9. McCaul, Robert L. Jr. Remedial reading training.  
*Journal of Higher Education*, 16:40-42,  
January 1945.
10. McGann, Mary. Improving the scholarship of  
college freshmen with remedial reading  
instructions. *Journal of Educational  
Psychology*, 39:183-86, March 1948.

11. Parr, F. W. Teaching college students how to read. *Journal of Higher Education*, 2:324-30, June 1931.
12. Pierce, Hugh F. Remedial reading program of Colorado Agricultural and Mechanical College. Master's thesis, 1948. Colorado Agricultural and Mechanical College. 115 p. ms.
13. Pressey, Luella C. College remedial reading classes. *English Journal*, 19:566-69, September 1930.
14. Pressey, Luella C. and Pressey, S. L. Training college freshmen to read. *Journal of Educational Research*, 21:203-11, March 1930.
15. Remmers, H. H. and Stalnaker, J. M. An experiment in remedial reading exercises at the college level. *School and Society*, 28:797-800, December 22, 1928.
16. Robinson, F. P. Can college freshmen in the lowest tenth in reading be aided scholastically? *School and Society*, 34:843-46, December 19, 1931.
17. Simpson, R. G. Reading laboratory as a service unit in college. *School and Society*, 55:621-23, May 30, 1942.
18. Thompson, William H. An experiment in remedial reading. *School and Society*, 34:156-58, August 1, 1931.
19. Weber, C. O. Acquisition and retention of reading skills by college freshmen. *Journal of Educational Psychology*, 30:453-60, September 1939.
20. Wittenborn, J. R. Classes in remedial reading and study habits. *Journal of Educational Research*, 37:571-86, April 1944.