AN EVALUATION OF THE TECHNIQUES USED IN THE METHODS OF STUDY READING CLINIC AT THE UNIVERSITY OF OREGON

By

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A THESIS

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INTRODUCTION

Reading is becoming more and more widely recognized as a potent factor in scholastic success. Only recently has this fact been acknowledged in connection with work on the college level. Previously it was assumed that students learned all the reading necessary for future life in the elementary school. Teaching secondary school students to read would have been considered unnecessary; whereas teaching college students reading would have been thought ludicrous. In contradiction to this old belief, which is still somewhat prevalent, recent studies have revealed that many people enrolled in the higher institutions of the country do not know how to read adequately.

In the reading clinic at the University of Oregon cases have repeatedly been found of college students who were unable to grasp the meaning of written material on a sixth grade elementary school level. How could such individuals be expected to cover and understand their reading assignments? They could not compete with their classmates on an equal basis. For most of their information they had to rely upon class lectures or discussions which seldom contained all the material covered in the assignments or examination. Such students seldom realized their lack of proper reading ability as the cause of their scholastic difficulties. Often such

pupils were onsidered either mentally below average or lazy by their professors.

The students themselves wondered why they were unable to understand their work and soon developed feelings of inferiority which were unnecessary. The college mortality among this group has naturally been high.

DeBusk, professor of education at the University of Oregon, had worked for several summers with elementary students in the clinic for handicapped children held at the institution each summer. Upon being given charge of the methods of study class for college students he decided to apply to the older students as far as practical the techniques found successful with the children. After experimentation he found that a high percentage of the students on scholastic probation at the University of Oregon were also unable to understand their reading assignments. The students themselves were not aware of this. By combining methods used in the summer session clinic with some which he formulated to meet the specific conditions DeBusk devised a working technique for attacking the problem. The underlying theories were based upon the Gestault psycholoty. The methods employed are constantly being modified or revised in the light of experimental results. Although still imperfect the technique has already proved of great value.

The author assisted in the coaching of four clinic cases during a five month interval and was much im-

pressed by the progress which the students made. She realized that the results of the clinic treatment for reading should carry over into the students' class work and cause their university scholastic averages to raise. She felt that the change in ability to read would influence the students' scores on a retest of the entrance psychological examination since the test used at the University of Oregon was written and not oral.

The purpose of this thesis was to measure the improvement in scholarship and in psychological ratins of the students after taking the reading clinic work. In order to make the data more meaningful there has also been included a brief resume of the work being carried on in reading by several other institutions of higher learning, a few pages concerning the causes of reading difficulties, some information about the diagnostic and remedial procedures used at the University of Oregon, and a few typical case studies.

CAUSES OF READING DIFFICULTY

Elementary and secondary schools are not adequately equipped to deal with reading difficulties. Classes are too large, funds are insufficient for more specialized teaching of cases, and teachers are untrained in diagnostic and remedial measures. Moreover, the teacher usually finds her time so filled in dealing with the mass of the class that she is seldom able investigate the needs of the occasional retarded student. Even when she has time to give these pupils a little additional attention it is seldom that she knows how to approach the problem.

Reading and spelling are two common handicaps. Frequently children progress throughout grammar school and sometimes high school without their difficulty being recognized. Often pupils with reading handicaps will spend hours in trying to study their lessons only to discover that they know little if any more than before they started. Their time has been wasted; they become discouraged and develop feelings of inferiority. Such difficulties often have far reaching effects upon character and personality. Furthermore when a child is unable to understand the words he reads he soon finds that one of the greatest aids to gaining information is automatically closed to him. Naturally he gains no pleasure from reading if he is unable to understand the printed symbol, and he soon finds this

avenue of enjoyment also closed.

Sometimes pupils with a single disability such as reading are remarkably brilliant in other respects. With proper diagnosis and treatment they might even lead their classes. As the schools are organized today they must lag behing, sensitive to their failure, when if they were only given opportunity they might rise to unsuspected heights. Great harm is done these otherwise bright yougsters. If the difficulty is not overcome they soon drop out of school or continue to be passed along at the good grace of the teacher. Some of the milder cases even get into college.

Our whole plan of education is to blame for these failures. In our efforts to be democratic we run masses and classes, brilliant and dull, handicapped and normal children through our school systems--striving to treat all alike and impartially. This principle was undoubtedly founded upon an ideal of justice or equality, but it forgets that however much teachers may try to make them so, people will still remain different in their modes of learning. The methods of class procedure and speed of advancement are regulated by what the majority accomplish. Little attention is paid either extreme of the minority. The unfortunate with a reading handicap must either drop out of school, be content to drag along behind the others and occasionally pass a

grade because the teacher pities him, or depend upon other methods than reading to obtain his information. Many students are so skillful at the latter that their teachers are not aware that a reading difficulty exists. Literature on the subject contains examples of hundreds of cases of otherwise normal or superior children who were needlessly handicapped in this manner.

Reading difficulties are relative and not absolute conditions. If a student has an average amount of intelligence the trouble can be overcome with proper diagnostic and remedial treatment. Children with reading difficulties do not present one type of mind, but many. They do not necessarily think slowly, but may in many instances think with sparkling rapidity. *"They are cheerful and morose, good and bad, excitable and apathetic, a medley of emotions, an anarchy of actions."

The slow boy is not the only one whom the course of study and the method of teaching in the public school do not fit. Observation indicates that there is a type of mind which fails to grasp knowledge when presented in the abstract or by means of symbols, but which readily seizes upon the concrete and revels in things which the eye sees and hands handle. Such children find difficulty in learning to read, but they need not be confined to manual labor for that reason. In the clinics for reading it is being proved that these children can be taught

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* Arthur Holmes, "Backward Children"

to read by other methods than those usually employed in public school systems.

Laziness is one of the most common charges brought against the poor reader when the difficulty is so mild that it does not demand serious investigation. It is an eazy mode of explaining hard things. In fact, a lazy boy and a handicapped student, if they are not suffering from the same fundamental pathological conditions, act as if they were.

*Blanchard found that many students remain in school for five or six years without having anyone recognize the cause of their poor progress as a reading difficulty, and that they are usually referred for clinical study and treatment because of some minor behavior difficulties such as day-dreaming, seclusiveness, lack of interest, laziness, inattention, absent-mindedness, sensitiveness, symptoms of feelings of inferiority, or compensations, and because of failure in school. Clinical studies indicate that reading difficulties play a part in producing behaviour difficulties as well as failure in school work.

Many cases have indicated a relationship between reading ability and social adjustment. It has been a common occurrence for both teachers and parents to

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*Phyllis Blanchard, "Reading Disabilities in Relation to Maladjustment", Mental Hygiene, 0'28, 872-888

conclude that the child with a reading difficulty was sub-normal in intelligence. Difficulties that remain uncorrected may lead to serious vocational maladjustments in later life. This is particularly true when the child happens to be of high intelligence.

Common errors found include deficiencies in comprehension and interpretation, excessive re-reading, word reading with little attention to content, rapid but superficial reading, inability to formulate conclusions or to answer thought provoking questions, and deficiency in word recognition.

Most pupils who are deficient in comprehension and interpretation are also slow readers, although this does not hold true in every case. Some students are limited by lack of interest, illness, meager vocabularies, defective vision, and a disposition to listen to others instead of reading.

Each type of pupil must be approached differently. The proper place to do this is in the elementary school. There pupils with dreamy, meditative dispositions and indifferent attitudes may be reached by providing them with reading materials which challenge their interest. Nervous and excitable pupils and timid students may be placed in reading situations which tend to develop self-confidence, and pupils with impetuous dispositions may be held to accurate and careful interpretation.

Taken in the elementary grades trouble can quickly be averted by using the kinaesthetic technique of Fernald with students that are not learning under average school conditions.

Meager reading vocabularies may be considered either as a result or a cause. Advancement in the lower grades at too rapid a rate may have interfered with reading development. Such pupils should be encouraged to spend much time in reading simple materials in order to overcome deficiencies. They are usually capable of doing extra work and can readily overcome their handicaps.

Many factors cause reading difficulty. Sometimes the case has been caused by a physical disability such as defective eyesight, very bad tonsils or adenoids. Perhaps the child was ill and missed a great deal of school when the class was learning the fundamentals of reading. Such cases of physical difficulty are usually thethe easiest to remedy. Much more difficult to cure is the case that has an actual brain deformity or injury in the region that involves reading. If the brain is normal in other respects the student can learn to read in spite of the handicap.

Different sense organs predominate in different individuals. Some people obtain most of their impressions through one, some through another. There are people who learn more quickly through the auditory, and others

through the visual or through the kinaesthetic. In learning to read the one who learns primarily through kinaesthetic or auditory stimulus is at a great disadvantage.

There are few places in school where students may read aloud. Furthermore oral reading is slower than silent. The progress of the kinaesthetic type is also greatly impeded. Lip and throat movements are frequently employed by such people to help them obtain meaning. This proves a hindrance to rapid reading.

Another common difficulty is that of glancing back. This not only slows down the reading, but also breaks the continuity of thought and the smooth flow of ideas.

In teaching too much stress has been laid upon the expression and inflection of oral reading without sufficient emphasis upon comprehension. Studies have repeatedly shown that many pupils are glibly able to read orally the words of a book, but when asked to give the thought of what they have read they are incapable of doing so. It is not enough to give the child the printed symbol of the word. The teacher must discover if the student has obtained the meaning. Many people are word readers. They read well enough each individual word and can explain the meaning of each, but when given passages of more than a sentence in length they lose the continuity of thought. The whole passage

becomes a meaningless jumble of words of which they understand the parts but cannot grasp the whole. This latter difficulty occurred commonly among the university students in the reading clinic.

READING CLINICS ELSEWHERE

Few of the institutions of higher learning are conducting reading clinics. Most of these few are of a temporary nature. Such clinics are operated for research purposes and exist only as long as the particular experiment concerned requires.

One of the more permanent clinics is at the University of Iowa where the relationship of handedness to reading ability is being studied. The underlying theory is that people are dominantly either left or right handed and left or right eyed. They found that right-eyed people tend to see letters best to the left of the fixaion point, and same being true of the right-handed ones but to a lesser extent. Their work is based upon the hypothesis that left-eyed people may have trouble in their reading since they tend to focus to the right half of the reading page whereas good reading depends upon getting the first part of sentences clearly in mind. They further believe that there is a definate relationship between eye and hand movements, and that to force a child to use another hand than that which is dominant upsets the natural relationship of eye-handedness and results in either reading or speech defects or both. This theory was not stressed in the clinic at the University of Oregon although in a few instances the possibility of such a difficulty being

a factor was considered as a cause of the particular difficulty involved.

Buswell, at Chicago, did considerable work in the measuring of the eye-voice span of readers. He found that in reading aloud the length of the eye-voice span often distinguished the good from the poor reader. With rapid readers the eye leads the voice by a wide span, occasionally as much as seven or eight words. With slow readers the eye and voice are close together, oftentimes on the same word or syllable. Such people are usually word callers with little knowledge of the meaning of the sentence as a whole. Ambiguous words, tenses, punctuation marks, and meanings are more easily caught in a wide eye-voice span. In diagnosis of reading difficulties the inability to grasp meanings and to read fluently is frequently found in cases that have a small eye-voice span. The latter is, however, a symptom of poor reading ability, rather than a cause. It has been demonstrated that as other reading handicaps are cured the eye-voice span naturally lengthens.

At the University of Chicago at least four accomplishment records of reading ability are secured at the beginning of each school year for each pupil. They are: (a) measurement of mechanics of oral reading by Standardized Oral Reading Paragraphs, (b) rate of reading simple material silently as measured by Courtis' Silent Reading Test No.2, (c) ability to understand

simple passages by Courtis' Silent Reading Test, (d) ability to understand increasingly difficult passages as measured by Monroe's Silent Reading Test or Thorndike's Scale Alpha No.2. A study is made of each individual's scores and remedial treatment is given accordingly. The results of the study showed that oral reading needed little emphasis in most cases above grade 3B. The most significant errors made by students during the testing included non-recognition, and total mispronunciation. With groups of words the most important errors were poor phrasing, omissions, insertions, substitutions, repetitions, and reversing the order of words and phrases.*

Gray at the University of Chicago considers the following the most important causes of reading difficulty as the results of his study in the clinic there: irregular attendance, poor health, malnutrition, nervous disorders, inappropriate or ineffective instruction, inadequate amount of reading material, uninteresting selections, organic causes such as visual defects, defective brain tissue, vocal defects, enlarged tonsils, adenoids, poor control of diaphragm and chest muscles, psychological causes such as general mental incapacity, inadequate attention to meaning, failure to associate

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W.S.Gray, "Diagnostic and Remedial Steps in Reading", Journal of Educational Research, 4:1-15

appropriate meaning with words, limited eye-voice span, limited span of recognition, inability to remember new words easily, inability to anlyze and pronounce words effectively.

*McCallester, also of the University of Chicago, considered the following among the most important reading deficiencies: excessive re-reading, poor comprehension and interpretation, word reading with little attention to content, and rapid but superficial reading.

**Parr, professor of education at Oregon State College, sent questionaires on reading to all the state universities. He attempted to find how many of the universities were doing remedial work in the field. The results of the study showed that nine of the institutions were attempting to discover the poor readers among their freshmen classes. They were the Universities of: Alabama, Southern California, Indiana, Iowa, Minnesota, Nebraska, Ohio, Oregon, and Wyoming. Three others were attempting to find the poor readers in their institutions, but their efforts were not confined to the freshmen class.

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* James M. McCallester: "Causes and Character of Retardation Among Pupils of the Seventh and Eighth Grades", Elementary School Journal, 33:35-44

** Frank W. Parr: "Educational Research and Statistics", School and Society, 31:547-48

They were the Universities of: New Hampshire, Arizona, and West Virginia.

CLASS ROOM CONDITIONS

Students used in this study were selected from the methods of study class at the University of Oregon. The class was divided into two sections on the basis of previous college records, psychological ratings, and reading scores on the Iowa Comprehension Reading Examination. The greater portion of those chosen for special help were on college probation or were reading not better than the third decile on the examination. Many had been sent into the class by professors who felt that the course might save such students from college failure. The group of students selected for special help was placed in a separate section called the reading clinic which was handled by student teachers. The clinic work, diagnosis, and remedial treatment were under the direction of DeBusk. Every Tuesday evening he met with the student teachers and for and hour and a half discussed the reading cases, diagnosis of difficulties and methods of remedying them. Usually during the first part of the seminar period a typical case of reading trouble was tested before the group and methods of attacking the particular handicap involved were pointed out.

The most common difficulty encountered was failure to obtain meaning from visual stimuli alone. Such students had learned to read by combining stimuli from some other sense organ with the visual, and had continued to do so. Touch and hearing were both commonly

employed as additional aids in reading. That is, some found auditory stimui more effective for themselves than visual. Such students had found it necessary to read orally in order to obtain meaning from what they read. Others had learned to read by appealing to their kinaesthetic sense through lip and throat movements or by writing out the material which they wished to remember. Many of the students could comprehend written material if allowed to study in this clumsy fashion. In high school where the assignments were short they could, with a little extra time and effort, learn their lessons and maintain good scholastic records. However, when they came to the longer college assignments they could not possibly keep up with their fellow students. As they lagged further and further behind they became discouraged. Few of them seemed to realize that their scholastic difficulties were caused primarily by inability to read adequately.

As soon as the cause of the trouble was discovered, DeBusk assigned the case to a student teacher and instructed him in the nature of the case and the method of approach for the remedial work. An attempt was made to assign the pupil to the teacher who would be best qualified to deal with the particular problem involved. When practical a number of the same type of cases were grouped together, but individual instruction was not sacrificed whenever it was considered necessary for progress. Reading material

was selected in which the student was interested and on a level which he could easily read. For many of these college students sixth grade readers or geography books were chosen. Even at this level some could not retain with ease the ideas read and retell them in their own words until after several periods of practice. Many did not realize thay they could not do this until they were tested. The task assigned seemed so simple to many of them that they were greatly chagrined to find they could not remember even a few sentences. The revelation of their trouble often came as a sort of shock. Frequently feelings of inferiority closely akin to shame bothered students when they discovered their disability. Tears were shed by some, and others showed unmistakable signes of discouragement. In order to alleviate this feeling, care was taken to explain to each the particular nature of his difficulty and the manner in which it might be cured. Great stress was laid on this latter item, and it served as a motivation power in speeding the student to achievement. Occasionally the feelings inferiority persisted for several weeks, but as the student progressed and realized his progress that difficulty vanished. Whenever his work warranted praise the student teacher pointed out improvement--encouraging the pupil, not in comparison with some other student but with what he had previously done and with what he

would soon be able to do.

Method of Diagnosis

The reading and psychological examinations previously referred to were used to separate from the balance of the methods of study class the group which needed remedial training in reading. Each member of the clinic group was then further tested to determine the nature of his difficulty. Before actually asking the pupil to do any reading the examiner tried to make the student feel at ease since by dispelling any nervousness which the pupil might have at being tested it was possible to obtain more accurate results. Information was secured in a conference with the student by having him talk about himself, his high school training, participation in athletics, books, work, family, college course, living group, friends, hobbies, and other interests. This questioning frequently helped to throw some further light upon the reason for scholastic failure or maladjustment. After about ten minutes of such informal discussion during which the examiner attempted to glean information and at the same time dispell whatever fear the student might have at being tested the instructor selected a book for the student to read. The book chosen varied somewhat according to the particular ability and interest of the pupil, but for college students was usually factual material on a sixth or seventh grade elementary

school level. In general the following techniques were used although the actual order of testing varied with each individual case. Holding a plain white card in one hand the instructor pointed to a passage with the forefinger of the other hand and asked the student to read aloud. After about a sentence and a half the white card was slipped over the written material and the student was asked to repeat the thought of the passage which he had just read.

This comprehension test was followed by one for eye-voice span. Another white card, three by five inches, was used for this purpose. A slit about three inches long, and wide enough to expose a single line of printed material had been cut in this card. This was placed upon the printed page, and as the student read orally it was moved so that the student could continue to read the line through the slit. When the student had read several lines and begun another the card was suddenly moved down over the reading matter and the pupil was asked to tell as much of the remainder of the line as he had been able to see. This was repeated eight or ten times to find out just how far ahead of what he was saying his eye was traveling. In general the faster the reader the greater the eye-voice span. Cases that were unable to see beyond the word which they were saying usually also had difficulty with com-

prehension. A poor eye-voice span was considered more as a symptom of reading difficulty than a cause, and measurement of it was taken as a means of discovering the extent of difficulty rather than the cause of trouble.

Many college students showed difficulty with word attack by hesitating whenever they came to a long word. With these the instructor selected another paragraph and pointed out the difficult words for the student to pronounce before asking him to read the section. The pupil was usually able to master the words taken singly. After each difficult word had previously been pronounced he could more fluently read the section and comprehend its meaning. The student was next shown how to break long words into their component parts, and the student supervisor was instructed to help the pupil with word analysis. This routine generally completed a diagnosis.

As soon as the student left the room the instructor wrote down what he had learned concerning the history of the case, comprehension, word attack, eye-voice span, rate, and general level of reading ability. The entire process of diagnosis for college students did not usually require more than fifteen minutes time. The student's rating on the A.C.E.* Psychological Examination, and his decile rating on the Iowa Comprehension Reading

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American Council on Education

Examination were also recorded. From the list of supervised teachers the case was assigned to the one considered best qualified to deal with the particular difficulty. The student teacher was given the information obtained during the conference and was instructed in the particular methods to employ in overcoming the difficulty.

Remedial Treatment

The reading disabilities of the college students tended to fall into four classifications or combinations of the four. These were comprehension, organization, word attack, and speed. In general if the first three were taken care of the last one followed as a natural result. All were able to read to a certain extent or they would not have been able to progress along the educational ladder as far as college. However, some of the disabilities were so marked that one could not help wondering how students so handicapped had been able to finish high school. A few of the more typical cases are discussed in the following chapter.

The commonest difficulty encountered was comprehension. Such pupils read fluently when asked to read orally, but were unable to recall the thought of the passage. For them the printed word carried little or no meaning. These students were the ones that were so frequently termed "lazy". In order to overcome this the student was given very short sections (usually a single sentence) and was asked to repeat the thought after

reading aloud. The combination of visual with auditory and throat kinaesthetic stimuli usually made it possible to accomplish this much. After much drill the length of the section was gradually increased from one sentence to two, then to a paragraph, finally to a page, and later still to a chapter or book.

This same process was also employed to teach the student organization of material. For some the material read was all of equal value. That is, they could not pick out the central thought from the supporting details and extraneous or explanatory material. Such pupils were treated in the above manner until they could understand a paragraph or half page. Then they were asked to tell in a phrase what the passage read was about. Next they would expand this to a sentence, and finally add any auxillary material which they might recall. If the student was unable to do this the teacher read the passage to him and asked the student to try and visualize what was being read. The auditory stimuli sometimes made this possible. After the teacher had done several sections in this manner and had helped the student pick out the central thought, the pupil was again asked to read--first orally for the combination of visual with auditory stimuli and later silently. If, after a little drill, the student still could not do this the teacher selected a more factual book on a lower

level and continued using it as long as he deemed necessary. Written outlining and briefing were also used with these students to help get the relationship and relative improtance of the various items.

In cases of a faulty method of word attack the student was shown how to break the long words up into their component parts and was drilled in this process. During the first five or six practice periods with such a case the student teacher pointed out the difficult words in the passages and allowed the students to master these before undertaking to read the material in much the same manner that was used in the diagnosis. No attempt was ever made to increase the students reading speed at the expense of comprehension. Often it was necessary to considerably slow down the rate of reading until the student had overcome other difficulties. Not until the other troubles were taken care of was this difficulty attacked. This was generally toward the end of the term of work and sometimes was not attempted at all for fear of undoing what had been accomplished. In general as comprehension increased the eye-voice span naturally lengthened and the student read faster. Sometimes the student was given a book and asked to read against time. His record for five and ten minute intervals would be kept and each day he would try to better his own previous score. In such instances he was always held for the meaning of the material which he had read. This

helped to keep him from slipping back into the old method of not comprehending the meaning. A few members of the class were also given drill to overcome spelling difficulties and vocabulary deficiencies.

CASE STUDIES

A few of the more typical cases are discussed in this chapter. The material was obtained from conferences with student teachers, term reports of their work, and personal knowledge concerning the students.

In the tales in the appendix are given the scores of these students on the American Council on Education Psychological examinations, scores on the Iowa Comprehension Reading test, and grades, before and after taking the methods of study course. The case numbers assigned in this section correspond to those in the tables.

Case 26

Because Margaret, case number 26 typified such a large variety of reading troubles and because the writer is so familiar with the peculiarities of her handicaps and the treatment used to cure them, this case will be taken up in detail.

Margaret was an eighteen year old freshman girl who entered the clinic class during the Spring term of 1933 of her own accord. The test given at the beginning of the term revealed that she was reading in the bottom of the first decile, which is the lowest one tenth. In striking contrast to this her high school rating placed her in the tenth, or topdecile, and her English rating in the seventh. Such a combination is unusual. In order to accomplish such a high English

and high school rating she had trained herself to start studying each morning at eight o'clock and to continue until after midnight. She frequently spent as much as five or six hours on a single daily assignment. In spite of the long hours she studied she probably would not have been able to achieve such scholastic results with her reading disability were it not for the care with which she chose her courses. By managing to escape heavy reading subjects, by taking some scientific work such as mathematics, and by long hours of study she was able to achieve scholastic success.

Margaret was blind in the right eye. In order to see both sides of the page more easily she had developed the habit of moving her head from left to right as she read. This considerably slowed down her reading rate. Another factor which tended to have the same effect was lip movement. She thought this kinaesthetic aid necessary to obtain meaning from the reading matter. Visual impressions alone did not seem to carry meaning for her. Yet even when she used this extra kinaesthetic and sometimes auditory aid she still found it necessary to re-read passages many times before she knew the material contained. It took her an hour to read ten pages, without stopping to go over any section. Thus in order to know the material required many times this length of time. At first it

seemed impossible to solve the problem because of the variety of difficulties, but her high intelligence and indomitable perseverance were constant aids to the remedial treatment.

Throughout the term she worked an hour a day, six days a week, on reading. She began with short factual sentences which she read and later repeated the thought. When she had mastered this step the length of the passage was gradually extended. When she had progressed to several sentences she first gave the central thought and then added explanatory details. Figures of speech were a great puzzle to her, but by analyzing them she gradually came to understand their meaning. Considerable time was spent on Wordsworth's poetry, and thus she had ample opportunity to unravel the mysteries of metaphorical language.

With a little effort she was soon able to control the lip and throat movements, but the head movements were much more difficult. Her teacher thought that perhaps the blindness in her right eye would make it a physical impossibility to read without moving the head, but she conquered the trouble. She stated that she had her four roommates coached to watch her reading. When one of her roommates found her either moving her head or lips it was the roommates duty to call her attention to it. She would then consciously control the movements. When she lapsed again,

she was reminded of the fact. Thus with conscious effort and perseverance she mastered the habit. Now she only occasionally slips back into her old methods, and these lapsès are becoming more and more widely separated.

In her remedial treatment most of her effort was concentrated on obtaining meaning from the printed pge and little attention was paid to speed. In spite of this her rate which is still comparatively slow increased about 350 per cent. Whereas, at first she could read only ten pages an hour she can now read thirty-five or thirty-six of the same type of material. Even more important than this is the fact that now she seldom needs to re-read her lessons. Her reading comprehension as measured by the Iowa Comprehension Reading test raised from the bottom of the first decile to the middle of the seventh.

Margaret was very enthusiastic about her progress. Early in the term her family feared that she might have a breakdown from oversork. In spite of all the doctor's threats she refused to stop studying until her next day's lessons were prepared--regardless of what time in the morning she finished. As the term progressed she found that she was able to obtain all the rest her family could desire. In addition her grades remained almost as high. The term before taking the course they had been 2.24, which is a little better than a "B" average, and the term of the course they dropped 0.03 of a grade point to 1.94, or a

trifle under a "B" average. This was the greatest drop in grades sustained by any of the pupils taken up in this study although some improved as much as 1.46 grade points. Her slightly lower grades are easy to understand in the light of the terrific strain under which her reading handicap had made her work during the first two terms. Her health was breaking down, and her doctor claimed that she was in the first stages of a nervous breakdown. As her reading improved she found that she could "get by" in her school work with much less time, and that is exactly what she did.

Perhaps the greatest indication of her progress was the fact that formerly she never read anything which was not assigned in school while during the latter weeks of the course she began to read for pleasure.

Case IV

Edward was quite a different case. In order to compensate for a poor school record he had built up an indifferent, nonchalant air that often irritated his professors. Many of them termed him "lazy". He did not know exactly what his difficulty was, but he complained that he was not quite making a "C" average. He was a senior in the school of business administration and unless he made up some grade points he would be unable to graduate. He thought that perhaps his low grades were due largely

to the fact that he worked part time while attending the university. He stated that he could read over any of his assignments in an hour.

His chief difficulty was in sociology courses. He had taken elements of sociology and made a "D" average in three terms of work. The words did not mean much to him, and he acknowledged that his vocabulary was poor and limited. He could not give back what he read.

In testing his reading his supervisor found that he read on the average a page a minute, enunciated well, and gave the proper inflections. However his comprehension was poor. He elaborated too much on the material read, and often inserted wrong information from his imagination. This latter was common with many of the cases. It was almost impossible to have him give back the actual thought contained in a passage. He was very general in his statements and with his limited sociological vocabulary tried to express much of what he said with the old worn-out trite words. When his teacher told him that in order to make progress he would need to be more specific he replied that that was what his professors wrote on his returned papers. He said that he did very little outlining of his work because it took too much time. He and his teacher spent coc-siderable time in briefing. He began in the same manner that he had used with his oral reports; namely, by exten-

sive elaboration. They followed the "Rules for Constructing a Brief" by Foster. Toward the end of the term he began to be able to find the essential points and to tie them together.

Another common occurrence was an attempt to remember words. Often he would repeat an entire sentence almost perfectly, and then when asked to analyze its meaning he was unable to do so. Often when he was reading his teacher would suddenly cover the material and ask for the essence of the last sentence read, and he could not give a single word of it. His teacher frequently picked out the difficult words in the passages and asked for their meanings.

At the end of the term Edward had made a vast improvement in understanding what he was reading. His condition was still far from perfect, and it would probably require several more terms of similar work to undo the bad habits of reading which have been becoming more and more set during the last fifteen years. However, when one considers the amount of change which took place in the short span of ten weeks it seems remarkable.

Case XIX

Leo, a senior in the school of music, case number nineteen in the tables in the appendix, was a rather quiet and easy going fellow. Nothing seemed to excite him very much. If he were late to class, which was often, he would not even offer an excuse for his tardiness.

In giving a little history of himself he said that he had always received good grades in his music work. His difficulty came, however, in his reading courses and especially in history. He said that he managed to cover all his reading assignments, but that when taking an examination it was impossible to recall or formulate coherently the material asked for. He added that frequently he could not even remember having read about certain material. He said the professors complained that he was too general in his answers and that he never really attacked the specific problem.

Leo read on the average a page every two and one-half minutes. His teacher said that he read so slowly that he seemed to lose the significance of the material. For some time he had great difficulty in giving back what he read in a single sentence. By the end of the term he could do this fairly well.

His entire reading was clumsy. He had a poor attack on words and also hesitated in his reading when he finished one line and started another. His eye-voice span was very poor. At the beginning of the term he could not see more than two words beyond his actual reading. Toward the end of the term he could take in three or four medium sized words and remember them.

Another persistent habit was to run one sentence into another, disregarding periods. Leo did not speak or read

his words distinctly. He rather mushed them. This seemed to be a defense mechanism which he used when coming in contact with difficult words. When he came to these he read slightly above a whisper. In silent reading he omitted the harder words. In order to overcome this his teacher had him read each word very slowly and distinctly, stopping to analyze the meanings of the more difficult ones. He was then asked to give the meaning of the sentence entirely in his own words. He was surprised to find how much could be obtained from a few words and intimated that they were producing "miraculous" results.

A great deal of time was spent upon briefing. He was prone to brief in such a manner that the central thought was obscured. Moreover he did not make a good choice of words in his briefing, and consequently there was little connection between the brief and the material used.

In her term report on Leo, his teacher writes the following:*

> "First we worked on words, by taking them apart and sounding them out for enunciation and also to see what smaller words made up the big ones and what the relationship was between the units of the word and the entire word.
>
> "The next step that we took was to improve his eye-movement span with the use of the flash card. It was not long before he made a great

---

* Helen Rothenburger, student instructor in the clinic.

> effort to consume all the words on a line before I might put the flash card down. This taxed his concentration very much and at the end of the period he would be quite fatigued. He said that he wasn't used to putting so much thought on his reading. This also helped to increase his rate of reading a little; however, I wasn't as anxious for this as I was to improve his other habits. I felt that this improvement would naturally follow when the other difficulties were cleared up."

His grades improved from 1.13 to a 1.80 or .67 of a grade point.

Case XXV

Tucker* worked with Ruth, case 25 in the appendix. Ruth was on college probation, but cleared it during her term of work in reading. Her grades which had been 0.18, or a trifle better than a "D" average raised to a 1.64, or a "C+". This meant an improvement of 1.46 grade points, and were by far the highest grades which she had ever earned. Inwriting about her case Tucker says:

> "Ruth and I worked together for twenty minutes every day using the National Geographic Magazine because it contained very factual, vividly colored material. She read three or four sentences silently and then would tell what she had read, keeping a mental picture of the whole thing before her all the time. We are striving to bring a connection between the visual and auditory imagery. There has certainly been a marvelous improvement in her reading and in her comprehension of what she has read."

---

* Barbara Tucker, student instructor in the clinic.

Case XXX

Sometimes the results have not been so encouraging. In writing of another case Tucker says:

> "Mary and I have also been reading together, but we have chosen work less difficult than that chosen for Ruth. She also has been attempting to build up a mental picture of what she reads. Her progress has not been nearly so marked, but this is without doubt partly due to an emotional difficulty. Also her mental feeling toward the whole question has not been nearly so receptive as Ruth's. I doubt if she has tried a quarter as much."

Case XI

Lund* instructed Gertrude who is case number 11 in the tables. Gertrude was unable to remember or interpret what she read. Her vocabulary was small, but she was not hampered by poor word attack. They started their study with very simple factual material and built up a sentence at a time until Gertrude could retain a page of material in the book "Nations as Neighbors." They then went to a high school history in which she also did quite well. However, when it came to social science she could read factual material easily but had some trouble with interpretation unless carefully guided. Previous to the work with Lund, she had not even read magazine stories. Since the course she claims that she frequently reads simple for pleasure.

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* Thelma Lund, student instructor in the clinic.

Case I

Lund also helped Joaquin with reading. Joaquin is listed as case number I in the tables. This difficulty had been built up through an inadequate word attack. When she came to a word which she did not know she would skip it or substitute another. She had done this for so long that she was not conscious of it. In passages in which she did not encounter difficult or unfamiliar words she succeeded very well. It was only when the word she substituted distorted the meaning that she encountered difficulty.

Case XIV

Increasing her rate of reading was the only difficulty of Helen, case number 14 in the tables. This was done by reading easy material against time. By the end of the term she was reading more than a page a minute.

RETESTING WITH STANDARDIZED TESTS

Various studies have been made to determine the amount of change to be expected in the scores of students who are retested with standardized tests. The data in this study was based largely upon the results of repeating the Iowa Comprehension Reading test and the A.C.E. psychological examination. The literature in the field was gone through to discover how much of the improvement obtained in the scores on the second tests over the first was due to actual improvement in reading and how much to practice effect or to growth. This question has been a controversial topic among statisticians and psychologists during recent years. Similar studies conducted by college professors under similar conditions have produced different results. Some found practically no change, while others found over ten times the amount of variation. Some attributed the differences in scores which they found to practice, others to growth, and still others to a combination of the two.

The writer was unable to find much material upon retesting with the Iowa Comprehension examination and only one study upon repeating the A.C.E. psychological examination. This latter study was the thesis of Gross which was done at the University of Oregon in 1932. The A.C.E. test was given to all entering students at the University.

Extract from Mable Gross' Thesis.

Means of the Totals on the Tests for Groups Having Different Time Intervals Between Tests, Compared With University of Oregon Norms.

Population	N	Form	Test	Mean	(T2-T1)	(T3-T2)	Interval of time between T1 & T2
U. of O.	796	1928		138.4			
	827	1929		140.0			
	837	1930		143.3			
	647	1931		144.1			
Group 1	92	1931	T1	147.5			
		1930	T2	174.8	27.3		1 quarter
Group 11							4 quarters.
A	57	1930	T1	160.8			
		1930	T2	205.4	44.6		
		1931	T3	206.8		1.4	
B	75	1930	T1	150.6			4 quarters.
		1931	T2	180.9	30.3		
		1930	T3	209.1		28.2	
Group 111	3	1928	T1	158.7			
Part of	34	1929					Chiefly 8
group	37	1930	T2	192.2			quarters.
Remainder							
of group	15	1928	T1	140.0			8 or more
	20	1929					quarters.
	35	1931	T1	186.3	46.3		

These values are composed of scores on two forms which may not be absolutely equivalent. The numbers of cases are not great enough to warrant treating the tests singly.

Gross retested part of these students after intervals of one, four, and eight or more quarters of college work. She writes that an attempt was made to give the second test under conditions similar to those used at entrance. The differences of the mean scores of each of the groups improved from 27.3 points after one quarter of college work to 46.3 points after more than eight quarters of college study. The preceding table, taken from Gross' thesis, gives the means of the totals on the tests for groups having different time intervals between tests, compared with University of Oregon norms.*

Gross writes that there is a slight tendency for increase in mean performance as the time between tests is lengthened.

> "That there is this slight tendency is indicated by rise in value from 27 points mean increase after an interval of a quarter of college work, to somewhere between 30 and 40 points gain after eight quarters in college. But this tendency toward greater augmentation is not sufficiently pronounced to indicate that growth or educational development is a primary factor in raising the level of performance of the group as a whole. On the contrary, we believe that our data derived from fairly long periods of time support the contention which Slocombe based upon the repetition of certain tests over a much shorter time, that the practice in taking tests and familiarity with the test situation are more important factors than the mere lapse of time."

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* Mable Gross: "Interval Between Tests as a Factor in the Stability of Scores Made on a Psychological Examination For College Students."

Inasmuch as the students who repeated the test after eight or more quarters of work did nineteen points better than those after one quarter of college it would seem that growth is a more potent factor than Gross attributed to it. The fact that those with additional training in the University did so much better than those with only a term of work would seem to indicate that some change had occurred during the interval in the student's ability to handle the test material. Regular routine of college work, lectures, reading material, briefing, and class work, has a tendency to accomplish in a lesser degree the same of results that the clinic class accomplished in a much shorter period of time. One theory concerning this change is that the weaker students dropped out of school while only those with the most perseverance continued throughout eight quarters. If this is the case it is possible that many of them may have been handicapped by some difficulty such as reading when they took the first test. Some of those more perseverant, undoubtedly, either consciously or unconsciously, overcame their difficulty during the interval of time while the student who did not overcome his trouble was unable to remain in school.

Among the various sections of the A.C.E. test Gross found that the scores made upon arithmetic were apparently little influenced while artificial language changed the

most.

Ruch gave the Thorndike Intelligence Examination and the Iowa Comprehension examination to 1,550 seniors in the Iowa high schools. He found that the mean scores of the different schools varied 27.2 points on the Thorndike examination or 1.5 standard deviations. They varied 12.9 points on the reading test or 1.74 standard variations.

In describing the 1919-1924 series of the Thorndike Intelligence Examination for high school graduates wood reports a reliability coefficient of .85. Ruch estimated the reliability of Part 1 of 1925-1930 series as "at least .85 and probably .90 or slightly higher." Both of these quotations are based on the assumption of immediate repetition of similar forms of the test.*

At Mills College Wolcott gave the Thorndike Intelligence examination to a group of 190 seniors and compared the results with their scores on the same test at their entrance to college three and one half years before.** Her results differed quite strikingly from all the others

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* Cowdery, K. M: "Repeated Thorndike Intelligence Examinations." School and Society 27:367-69 (1928)

** Wolcott, Willa: "Changes in Thorndike Intelligence Scores at the End of College Course." School and Society 37:630-32 (1933)

which the writer found upon similar studies. Wolcott found an average gain of 60.5 on the retest. This was seventeen times as large as the standard error of the difference (3.48).

Eels retested a few students at Stanford and found for 29 cases who repeated the test at an interval of less than a year a mean increase of 9.4 points in the gross scores.* Of the six cases that repeated the test after an interval of more than a year he found a mean increase of 11 points. He did not correlate the scores on the first and second tests.

Cowdery gave a retest of the Thorndike test to 207 members of a beginning psychology class three weeks after the beginning of the autumn quarter. He then segregated the groups according to the length of time since they had taken the first test and found the following results:

	r	N
Same test within one year.....	.889	19
New form after one year.....	.751	104
New form after two years.....	.720	59
New form after three years.....	.648	25
Total group--mixed intervals.....	.752	207

Cowdery also studied the variation in the mean scores and standard deviations of the two tests and found relatively little change. The largest absolute difference of 2.16 points at the three year interval is only 1.46

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* Ibid

times its standard error. The difference in means for the entire mixed group is slightly more significant (2.38) times the standard error, but still is slight. The absolute amount of increase was 1.35 points. His results are tabulated below.

N	Within 1 yr.	After 1 yr.	After 2 yrs.	After 3 yrs.	Total
N.....	19	104	59	25	207
1st mean score	80.5	79.54	79.74	70.20	79.8
2nd mean score	81.3	81.22	79.34	72.36	80.15
Difference	0.8	1.69	-.40	2.16	1.35
Diff. Stand. Dev. of diff.	0.514	2.26	0.365	1.46	2.38
1st stand. dev.	14.15	11.10	11.60	9.06	12.25
2nd stand. dev.	12.82	1.20	10.88	8.58	11.65

Cowdery states that these results may not be overly significant because of a difference in the students' attitudes toward the two tests. The first examination was competitive, with admission to the University at stake. The second test was merely a required classroom excercise. This difference in incentive might account for the small increase in score.

Hartson inter-correlated the college scholarship, high school scholarship, Ohio State University Psychological Examination scores, and eleven items on a rating scale, for one hundred and twenty-two subjects. The items were rated by the high school principal, a teacher, and a friend. In all, four sets of 1,296 inter-correlations were computed. He found the correlation between

intelligence test scores and college scholarship to average 0.47. When a combination was made of selected personal estimates and high school scholarship the correlation with college scholarship rises on the average to 0.568. Combining intelligence test scores with personal estimates gave an average correlation of .627. *

Rogers made a study at Bryn Mawr College to discover whether or not growth in intelligence among women continues at the college level.** Students were given the Thorndike Intelligence examination at entrance to the college. It was later repeated under similar conditions. The 1924-28 class after an interval of three years showed a gain of 5.36 points. The 1925-29 class after an interval of two years gained 4 points. The 1926-30 class gained 2.6 points after one year. The scores increased slightly with the length of the interval. These gains from year to year of 2.6, 3.86, and 5.36 for successive years substantiate the theory that growth continues at the college level.

Dr. Rogers also classified the results according to the entrance ages of the students and found data.

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* Hartson, L. D: "The Validation of the Rating Scales Used With Candidates for Admission to Oberlin College." Sch. and Soc. Sept. 24, 1932 P. 413-416.

** Rogers, Agnes L: "Growth and Intelligence at the College Level." Sch. and Soc. 1928 P. 267-69.

Age at entrance	N	Average Score	Average Gain
Under 16	1	108	-1
16-17	4	87	9
17-18	17	90	5
18-19	27	87.4	3.7

Average age 18 years 6 months.
Total N.... 56

CONCLUSION. Little valid information was obtained from the material found in previous studies of retesting. Various studies carried on under apparently similar conditions by well known educators yielded highly contradictory results. Some found a great mean improvement in the second testing over that obtained in the first while others found the change to be so slight as to be practically negligible. Similar variations were found in the interpretations of causes of improvement. However, the majority of recent studies which the writer read emphasized the continued growth or development theory rather than practice.

DATA AND TREATMENT

The data available consisted of four parts: (1) grades before and after taking the clinical course in methods of study, (2) scores on the psychological examination of the American Council on Education, at entrance to the University of Oregon and after taking the course in methods of study, (3) reading scores on the Iowa Comprehension Reading examination at the beginning and end of the term's work, and (4) case studies of the individual students.

It was possible to obtain data for only thirty-five cases. Thirteen of these took the course during the winter term of 1932-33 and twenty-two during the spring of the same year. Several members of the class failed to take the reading test at the beginning of the term, while for others retests of the reading or of the psychological examination were not obtained. However, every case for which complete data was obtained has been included. Although the number was small it was considered representative of the entire group.

The case studies have been treated in a separate section beginning on page twenty-seven. There are three possible statistical methods of dealing with the remaining types of data as follows: (a) the correlation technique, (b) a direct determination of the increases in

each of the variables for each of the students under observation, and (c) a comparison of the means of the groups.

(a) The correlation technique assumes a normal distribution of cases. According to their scholastic records this group of remedial students represented only the lower end of such a distribution. Furthermore the number of cases (35) was so small that the indefiniteness of the correlation when found made it of little value.

(b) The amount of the increase in each of the variables was computed for each of the students. (See tables I, II, and V in the appendix). This showed individual improvements and made possible an analysis of the results. There was some inaccuracy in measurements of the tests, but this was less than would have been obtained by the correlation method, for the latter included not only the errors obtained in testing but also those involved in the interpretation of the coefficient of correlation. The method of direct determination of the increases made by each of the students was considered best adapted to the case studies.

(c) A comparison of the means or of the means of the differences made upon the first and second tests gave the best analysis of the trends of the group.

In light of the treatment used, the data available, and the below average distribution of cases according to scholastic records and psychological scores, a combination

of methods (b) and (c) above seemed the most profitable for an analysis of the results of the term's work.

IOWA COMPREHENSION READING TEST

Two forms of the Iowa Comprehension Reading examination were used, D1 and D2. They were similar in form, but differed in the reading texts and questions asked. Form D1 was given to the students during the first week of the course. It consisted of reading material in three fields, social science, English, and physical science. Fifteen questions were asked on each of the three sections. One point was allowed for each correct answer. From this the student's total score from one to forty-five points was computed. The correct answers to the items were given in keys which were supplied with the tests. Thus the score for each part was the number of answers which agreed with the scoring key. Omitted items were counted as wrong, as were those in which more than one answer was given.

Decile ratings were given in the standard norms which accompanied the tests. These norms were obtained by giving the test to 887 University of Iowa freshmen. A decile rating of "1" means that the individual is in the lowest one-tenth of a normal distribution. The tenth decile is the highest.

Twelve minutes were allowed for each part, or a total of thirty-six minutes of working time for the entire test. An additional four or five minute period was required for giving directions and the preliminary exercises.

The purpose of the test as explained in the manual of directions is as follows:

> "The Iowa Comprehension Test is a reading comprehension test of a difficulty suitable for high school seniors and college freshmen. It measures the student's ability to get accurate information and valid concepts from three types of reading material common in higher education (social studies, English, and science). The ability measured by this test constitutes a large factor in tests of intelligence.
>
> "The Iowa Comprehension Test will be found to predict general academic success in the freshman year of college (as measured by marks) about as well as the standard mental test, the coefficient of correlation (r) varying from .40 to .50.
>
> "The results of the testing are helpful in student guidance, for they are a means of disvoovering cases of special reading difficulty."

The reliability of the test was obtained by the correlation of chance halves of the test. The obtained (r) was then "stepped up" for the entire test by the Spearman Brown prophecy formula: $r_{11} = \frac{2 r_{\frac{1}{2}\frac{1}{2}}}{1 + r_{\frac{1}{2}\frac{1}{2}}}$. This gave a reliability of 0.88 for form D1 and of 0.82 for form D2 with standard deviation of 6.6 and 6.0 respectively. The standard deviation of our group was 5.2.

Upon the first testing with form D1 of the test the mean of the students' scores was 17.61. According to the standard norms this placed the mean of the group in the third decile. On the retest after ten weeks of work in the reading clinic the average score for D2 was 28.70, or the the top of the sixth decile. When the differences between each student's scores on forms D1 and D2 were found, the mean of the differences was computed and found to be 10.6 points. Thus on the average the students increased from the middle of the third decile in reading ability to the top of the sixth. Individual increases ranged from a minus two points to a plus twenty-four. Only one student had a lower score on D2 than on form D1, while thirty-two students raised their scores from five to twenty-four points.

PSYCHOLOGICAL EXAMINATION OF THE AMERICAN COUNCIL ON EDUCATION

The Psychological Examination of the American Council on Education was prepared by L. L. Thurstone and Thelma Gwinn Thurstone of the University of Chicago. The 1932 edition was used in testing the majority of the group. Three hundred and eighty-nine institutions ordered this issue according to the report published in the April 1933

edition of the Educational Record. In all 134,773 copies were sent out. Norms for the test were based on the records of 43,384 students sent in by 205 colleges.

The test was composed of five separate sections: completion, artificial language, analogies, arithmetic and opposites. The completion section contained forty definitions from which the key word or term being defined had been omitted. Before each statement was a number indicating the number of letters contained in the word which had been left out. In the directions at the beginning of the exercises the student was told to supply the missing word which contained the proper number of letters, and which was most appropriate for the space. One point was given for every word correctly supplied. Ten minutes were allowed for the working of the section.

The artificial language test contained rules and vocabulary for an imaginary language. Thirty sample sentences were translated at the bottom of the page, and the student was instructed to check errors in the translation according to the rules given. One point was given for each word corrected according to the directions. Eleven minutes were allowed for this section.

The part on analogies was composed of small figures. There were eight drawings in each series and twenty-nine series. The student was to underline the figure in each

series which bore the same relationship to the third figure as the second had to the first. Two points credit were given for each correct series. Twelve minutes were allowed for the working of this section.

The arithmetic part was composed of twenty problems. Four points were given for each correct solution and twenty minutes were allowed for the test.

The prt on opposites was made up of words, four in a series, and twenty-seven series. In each series two of the four words were either alike or opposite in meaning. It was the task of the student to select these two words. Three points credit were allowed for each correct answer. Time for the section was seven minutes.

The gross score for each individual was obtained by totaling the scores which he received upon each of the five separate sections.

Correlations between the odd and even scores on three hundred tests were calculated. These correlation coefficients measured the reliability of half of each section and of half of the total test. Thurstone found that sppli-cation of the Spearman Brown prophecy formula gave the following measures of reliability on each section and on the entire test:

Completion.....	.843
Artificial language.	.981
Analogies.....	.786

Arithmetic..... .824

Opposites..... .850

Gross score..... .943

On the entrance examination the gross scores of the thirty-five cases in this study ranged from forty-six to two hundred and thirty points. On the retest their scores ranged from sixty to two hundred and thirty-nine points. The entire test required sixty minutes to administer and was given consecutively.

Although the clinical class was composed of students with decided reading handicaps their scores upon the entrance A.C.E. psychological examination varied from the lowest to the highest decile of the University of Oregon student body. (See table I in appendix).

Twenty of the students in the class had taken the 1932 entrance psychological examination, eight the 1931, four the 1930, and three the 1928. Each of these tests differed slightly from the other forms. In order to keep the results of each student's retesting as nearly comparable as possible the student was given the same form of the test which he had taken at college entrance, in the retesting after a term of work in the clinic on reading. Upon the second test thirty-four of the students improved from one to eighty-six points in gross scores. Only one member of the group tested failed to raise his score. The average score made upon the first test was 109 and

upon the second 152. As would be expected of a group with such a low scholastic record the first score was much less than Gross found for any of the normal groups which she used in her study of retesting with the A.C.E. test (see page 41). In the fall of 1932 the median score made by entering students at the University of Oregon on the A.C.E. examination was 154.62, the first quartile 120.50, and the third 195.57. Thus on the entrance test the median of this group was in the lowest quartile.

After the differences between the scores made upon the entrance examination and the retest had been found for each of the students the mean of these differences was computed. The average improvement of the group on the second test over the first was found to be 43.5 points.

Since the class was primarily made up of freshmen it most closely resembled the group which Gross retested after a one term interval. For matters of comparison the mean improvement of the twenty freshmen in the class was determined and found to be 41.45 points after a two and one half term interval. Gross found an average improvement of 21.3 points after a one term interval. Thus the group which had had remedial work in reading in the methods of study class improved their scores nearly one hundred percent more on the retest than did the control group which had not had special reading training.

An attempt was also made to discover whether the change in A.C.E. test scores was due to an increase in speed or in accuracy. In order to determine this the number of items attempted on each of the tests was computed. (See tables III and IV in appendix). It was found that these students attempted on the average 81 questions on the first test and 97 on the second. From this it would seem that both speed and accuracy had incresed. Although their rate of reading was increased so that they were able to read on the average fifteen more questions on the second test than on the first their comprehension increased even more, for their gross scores improved on the average 43.5 points.

CORRELATION

The differences in the scores which the students made in the A.C.E. psychological examination were correlated with the differences made in the scores on the Iowa Comprehension test of reading. The result was a positive correlation of .407. Reasons beyond the control of the clinic caused three students who improved greatly in their reading and psychological examinations to drop in their grades. One of these was Margaret, whose health broke down during the term of remedial treatment. Her case is described on pages 27 to 31. In a group of only

thirty-five cases three individuals were able to materially influence the results.

In writing of correlations between grades and scores on the A.C.E. examination Thurstone says:

> "Another important factor not so often noted is the range of ability of the freshman class. A college that selects its students carefully at the time of admission must expect to find lower corfelations between tests and scholarship than the college in which selection of freshmen is less rigorous. The correlations are, in fact, highest for the colleges in which the range in ability is the greatest."

Our group was highly selected as far as psychological scores and scholastic ratings were concerned. For these reasons, according to the results of Thurstone's study a low correlation would be expected between the grades and psychological or reading scores.

When the differences in grades before and after taking the clinic work, for each student, were correlated with the differences in psychological test scores and with the differences in the reading test scores slight negative correlations were found. This might be expected because of (1) the small number of cases, and (2) the smallness of individual variances in each of the items measured. The variances correlate much less closely than actual items and a higher correlation would probably have been obtained if the items instead of the variances had

been correlated. It was not deemed advisable to make these additional correlations since the fewness of the cases and their high selectivity would have made the correlations of little value.

The size of the correlation coefficient depends upon three items: (1) the relationship between the variables, (2) the reliability of the measures used, and (3) the variability as measured by the standard deviation of the group.

The variability of the differences was small as was the standard deviation of the differences. The sigmas of the differences of the test scores were 5.2 for reading and 4.5 for the A.C.E. examination.

All the scores and differences are in the same units. Since the variability is small, that makes the reliability much smaller than it would be with a normal group. According to Huffaker the more highly two measures are correlated with each other the harder it becomes to get any correlations with the differences.

Theoretically all the students should have made approximately the same gains. This would cause an inter-correlation approaching zero. The very fact that the differences did not correlate significantly proves that something was accomplished. It is statistically impossible to get large correlation coefficients with differences if the items

themselves are correlated.

A direct comparison of means proved more worth while in evaluating the results of the repeated testings of the clinic class.

Let:

σ = standard deviation of a small range.

r_{1I} = reliability in small range.

Σ = standard deviation in a large range.

R_{1I} = reliability in large range.

Then $\sigma \sqrt{1 - r_{1I}} = \Sigma \sqrt{1 - R_{1I}}$

since the standard deviations and reliabilities of the two ranges are equal.

The σ score = σ dia $\sqrt{1 - r_{1I}}$ 2.4 for the Iowa Comprehension test.

$$\sigma \text{meas.} = \frac{2.4}{\sqrt{34}} = .41 \quad *$$

This means that, whereas differences on the first and second Iowa Comprehension tests cover a range of 26 points, the probable error of the mean is only 0.41 of a point. Since the test is fallible there is a certain amount of difference between the true and obtained mean and it is this probable error which was measured. The error was so slight that a comparison of the means of the test scores was considered the most accurate method of evaluating the data.

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* According to the technique described by Huffaker in "The Effect of Errors of Measurement on the Differences Between Groups." J. of Comp. Psychol. V. 8, No. 4.

GRADES

Grades at the University of Oregon are given upon a five point scale of "A", "B", "C", "D", and "F". Grade points are allowed for each hour of credit carried as follows: An "A" receives three grade points, a "B" two grade points, a "D" none, and for each hour of "F" one grade point is subtracted. The total number of grade points is added and is then divided by the number of hours of work which the student is carrying. The result is called his grade point average. Thus a G.P.A of .50 is halfway between "D" and "C". Underclassmen with G.P.A.'s of less than 0.50 and upperclassmen with G.P.A.'s below a 1.00 or a "C" are placed upon college probation. Twenty-six of the thirty-five students in the reading clinic had G.P.A.'s below a 1.00 or a "C". (See table V in appendix for distribution of grades.)

Perhaps the most significant change in the students who took the clinic work in the methods of study course appeared in their grades. Twenty-seven of them improved from 0.11 to 1.56 of a grade point; two remained the same, and six dropped from 1.6 to 0.30 of a grade point. The mean of their grades the term before taking the course had been 0.57, or approximately a "D+". During the term of the course this raised to a 1.02 or slightly better than a "C". Of the thirty-five students involved, all

except eight raised their grades. The term before they took the work eight of the group had grade point averages of "D" or lower. The term of the class only one ranked below a "D".

Thirteen of the students had taken the course during the winter term. In order to find what effect the clinic had upon the following term's grades their averages were computed for the fall, winter, and spring terms with the following results:

TERM	N	G.P.A.
Fall (before taking Clinic)	12	0.69
Winter (while taking Clinic)	13	1.14
Spring (after taking Clinic)	13	1.10

Although the number of cases was small, the results indicated that the gains were not mere chance, since the mean improvement in grades remained considerably higher for two terms.

Some facts concerning grades at the University of Oregon were revealed by a research study by the class in statistical methods during the spring term of 1933. The grades of one hundred students in education for two consecutive terms were correlated for two, three, and five terms with the following results:

N (cases	n (terms)	r
50	5	.92
100	3	.95
100	5	.93
50	3	.95
100	2	.87

It was further found that each term the students were in college there was a tendency for their grades to increase slightly. The mean of this improvement for the one hundred cases taken over a three term interval was 0.08 of a grade point a term. The clinic students improved 0.45 of a grade point or 0.37 above normal college gain. With a reliability of 0.87 for college grades for two consecutive terms neither errors of measurement could explain the rise of from 0.57 to 1.02 of a grade point nor could the usual college gain of 0.08 of a grade point nearly account for the improvement of the group.

FINDINGS

Number of cases	35

Iowa Comprehension Reading Examination

Mean score on T1	17.61
Mean score on T2	28.70
Mean of diff. or improvement	10.6
Standard deviation	5.2

A.C.E. Psychological Examination

Mean score on entrance test	109.11
Mean score on retest	152.54
Mean of differences on T1 and T2	43.5
Mean improvement of 20 freshmen on T2 over T1	41.45

Grades

Mean G.P.A. term before treatment	0.57
Mean G.P.A. term of treatment	1.02
Mean improvement	0.45
No. who raised grades	27.00
No. who failed to raise grades	8.00
No. with G.P.A. of 1.00 or below term before course	26.00
No. with G.P.A. of 1.00 or below term of course	18.00
No. with G.P.A. of 0.00 or lower term before course	8.00
No. with G.P.A. of 0.00 or lower term of course	1.00
G.P.A. of students who took course Winter term varied thus:	
Fall	0.69
Winter	1.14
Spring	1.10

SUMMARY OF FINDINGS

Backgroud Materials

Surveys conducted at the Universities of Oregon, Chicago, and Iowa have indicated that there are a relatively large number of college students who do not know how to read adequately. In spite of this there are still relatively few institutions of higher learning in the country conducting clinics to overcome such defects. People differ in their modes of learning, and especially in the sense organs through which they receive their dominant impressions. Reading as it has been taught has not taken adequate consideration of the student who learns primarily through auditory or kinaesthetic stimuli instead of through the more usual visual. Neither has adequate attention been given the student whose thinking is mainly in terms of the concrete instead of the abstract. Word readers were common among the students in the University of Oregon reading clinic. They understood the meanings of individual words, but lost the continuity of thought in long passages.

The purpose of this study was to evaluate the remedial work of the reading clinic. This was done on the basis of the grades of students, scores on the Iowa Comprehension Reading test, and scores on the A.C.E. Psychological examination, before and after

taking the clinical course in methods of study. Thirty-five cases were used.

TREATMENT OF DATA

Two forms of the reading test, D1 and D2, were used. The average score made on D1, which was given during the first week of the term, was 17.61. Form D2 was given ten weeks later after a term of remedial instruction, and the average score on it was 28.70. Differences between each student's original and re-test scores were computed. The mean of these differences was 10.6 or an average improvement of 10.6 points. The standard deviation of the differences was only 5.2 points.

The A.C.E Psychological examination was given all entering students at the University of Oregon. The mean of the scores which the students in this study made on the entrance examination was 109.11. When they were retested after having had the clinical treatment for reading their scores averaged 152.54. The mean of the differences of their scores on each of the testings was 43.5. The mean improvement of the twenty freshmen in the class was also computed and found to be 41.45.

One of the most striking changes in the students who took the clinic work appeared in their grades. The mean of their grade point averages the term before had been 0.57, or approximately a "D+". This

raised to a 1.02, or slightly better than a "C", during the term of clinic treatment. Of the thirty-five students involved, twenty-seven improved from 0.11 to 1.58 of a grade point; two remained the same; and six dropped from 1.6 to 0.30 of a grade point. The preceding term eight members of the group had G.P.A. of "D" or lower while the term of the class only one ranked below a "D" average. The thirteen students who took the work during the winter term maintained higher grades the following term as follows:

Fall.....0.69
Winter.....1.14
Spring.....1.10

APPENDIX

TABLE I

Scores and Decile Ratings on the First and Second A.C.E. Tests

Case No.	Deciles		Raw Scores		Diff.
	T1	T2	T1	T2	
1	II	IV	80	121	41
2	III	VIII	123	190	67
3	I	II	55	95	40
4	IV	IX	122	197	75
5	II	VI	80	158	78
6	VI	VIII	157	197	40
7	IV	VI	104	159	55
8	I	III	78	117	39
9	I	II	46	92	46
10	X	X	230	239	9
11	III	II	110	102	-8
12	I	I	63	75	12
13	II	IV	104	134	31
14	VI	VIII	148	194	46
15	I	I	54	60	6
16	I	II	88	108	20
17	VII	X	165	236	71
18	I	V	80	145	65
19	I	V	60	140	80
20	II	IV	95	137	42
21	II	VII	101	179	78
22	I	II	83	104	21
23	III	VI	117	166	49
24	III	V	106	145	39
25	III	V	119	146	27
26	VI	X	a67	235	68
27	II	VI	100	155	55
28	I	IV	74	132	58
29	VI	VIII	156	187	31
30	VIII	VIII	190	191	1
31	I	IV	72	118	46
32	IV	VI	113	153	40
33	V	V	119	149	30
34	V	VII	140	177	37
35	III	IX	120	206	86

Mean of T1..... 109.11
Mean of T2..... 152.54
Mean of differences..... 43.51

TABLE II

Scores and Decile Ratings on the First and Second Iowa Comprehension Reading Test

Case No.	Deciles T1	Deciles T2	Raw Scores T1	Raw Scores T2	Diff.
1	I	VII	13	30	17
2	V	VIII	21	32	11
3	I	II	8	20	12
4	III	VI	17	29	12
5	VI	VIII	23	34	11
6	IV	VIII	20	34	14
7	V	V	21	26	5
8	IX	IX	31	36	5
9	V	-	22	-	-
10	VIII	X	28	38	10
11	I	I	11	15	4
12	I	III	13	22	9
13	II	III	14	22	8
14	VI	VI	23	28	5
15	V	VIII	22	34	12
16	V	VII	22	31	9
17	II	VII	14	30	16
18	IV	IX	20	35	15
19	II	VIII	17	32	15
20	III	IV	17	25	8
21	V	X	21	37	16
22	II	III	15	23	8
23	III	VI	17	28	11
24	III	IV	17	24	7
25	II	I	16	14	-2
26	I	VII	7	31	24
27	VI	IX	23	35	12
28	II	IV	15	25	10
29	VI	X	23	38	15
30	II	IX	14	36	12
31	-	II	-	21	-
32	I	III	13	23	5
33	I	V	12	27	15
34	II	V	16	27	11
35	III	V	17	26	9

Mean of T2..... 28.70
Mean of T1..... 17.61
Mean of diff..... 10.2

TABLE III

Items Attempted on First A.C.E. Examination by Parts and Totals

Case No.	Comp.	Art.L.	Anal.	Arith.	Opp.	Total
1	6	6	28	6	13	59
2	30	26	29	8	27	120
3	8	10	29	11	10	77
4	29	11	28	10	23	101
5	17	13	15	6	18	69
6	30	18	25	15	19	107
7	14	15	21	10	22	82
8	18	10	10	6	12	56
9	-	10	28	5	12	55
10	27	17	26	13	27	110
11	17	29	29	8	22	105
12	8	18	25	10	12	73
13	14	16	29	8	8	75
14	17	17	28	9	24	95
15	23	7	28	10	3	71
16	11	15	29	7	13	75
17	16	8	25	14	18	81
18	12	15	8	6	15	56
19	18	4	18	8	9	57
20	14	9	27	4	17	71
21	14	13	29	11	24	91
22	13	14	23	9	17	76
23	11	19	18	8	18	74
24	9	17	24	9	16	75
25	10	19	29	8	16	82
26	13	16	23	11	20	83
27	22	10	16	8	18	74
28	21	7	0	8	11	47
29	28	9	24	12	19	92
30	-	-	-	-	-	-
31	21	6	28	16	16	127
32	-	-	-	-	-	-
33	14	10	15	12	16	116
34	23	9	26	13	18	86
35	15	9	21	10	16	71

Mean of items attempted.... 81.48

TABLE IV

Items Attempted on Second A.C.E.
Examination by Parts and Total

Case No.	Comp.	Art.L.	Anal.	Arith.	Opp.	Total
1	9	17	28	6	19	79
2	26	17	29	12	25	109
3	14	17	29	9	27	96
4	22	12	23	13	27	97
5	21	17	28	4	27	97
6	20	30	29	18	21	118
7	24	19	25	11	27	106
8	21	17	29	9	21	97
9	-	9	28	11	21	69
10	29	23	29	19	27	127
11	22	21	28	5	24	100
12	8	13	20	9	12	62
13	26	23	27	12	23	111
14	25	17	28	8	26	104
15	25	7	21	6	18	77
16	27	19	29	12	13	100
17	22	18	28	14	24	106
18	22	17	22	11	12	84
19	26	16	28	8	17	95
20	14	15	29	5	19	82
21	27	30	25	11	27	120
22	17	12	23	8	23	83
23	19	30	20	8	24	101
24	16	23	29	9	27	104
25	25	22	29	6	21	103
26	23	26	29	14	27	119
27	29	21	18	13	26	107
28	17	10	13	9	14	63
29	26	13	28	13	21	101
30	36	11	10	5	27	-
31	23	13	28	13	19	96
32	-	-	-	-	-	-
33	18	17	24	11	23	93
34	14	17	23	14	27	95
35	16	16	29	13	19	93

Mean of items attempted on second test.. 96.79
Mean of items attempted on first test... 81.48
Increase in items attempted..... 15.48

TABLE V

Grade Point Averages of Students
Term Before Taking Course,
Term of Course, and
Differences

Case No.	Term Before	Term of Course	Difference
1	0.00	0.92	0.92
2	-0.08	0.14	0.22
3	-0.75	0.56	-0.19
4	1.00	1.31	0.31
5	0.00	1.25	1.25
6	0.81	1.12	0.31
7	0.29	0.86	0.57
8	0.17	1.44	1.27
9	0.83	0.67	-0.16
10	0.25	0.88	0.63
11	-0.73	-0.13	0.60
12	0.00	0.54	0.54
13	0.75	0.47	-0.28
14	0.20	1.39	1.10
15	0.38	1.00	0.62
16	0.31	0.87	0.56
17	1.00	1.30	0.30
18	1.40	1.24	-0.16
19	1.13	1.80	0.67
20	0.31	0.94	0.63
21	1.08	1.08	0.00
22	0.46	0.85	0.39
23	0.29	0.50	0.21
24	0.18	1.64	1.46
25	2.24	1.94	-0.30
26	1.25	1.25	0.00
27	1.53	0.64	0.11
28	-0.27	1.31	1.58
29	-0.27	0.58	0.85
30	2.35	2.53	0.18
31	0.73	1.67	0.94
32	-0.19	0.77	0.96
33	0.89	1.08	0.19
34	0.69	0.50	-0.19
35	0.38	0.93	0.55

Mean of grades during term of course..1.02
Mean of previous term's grades..... 0.57
Difference..... 0.45

TABLE VI

Grades of Students Before, During, and After Term of Clinic Treatment

Case No.	Before Course	During Course	After Course
2	-0.08	0.14	0.00
5	0.00	1.25	1.44
6	0.81	1.12	0.81
8	0.17	1.44	1.00
15	0.38	1.00	1.47
16	0.31	0.87	0.56
18	1.40	1.24	1.24
21	1.08	1.08	0.73
22	0.46	0.85	1.15
26	1.25	1.25	0.80
28	-0.27	1.31	0.79
30	2.19	2.35	2.53
33	0.89	1.08	1.15
35	0.38	0.93	0.58

Mean of grades term before clinic... 0.69
Mean of grades term of clinic..... 1.14
Mean of grades term after clinic.... 1.10

TABLE VII

Time Interval in Terms in Relation to Differences Made in Scores on Retests

Case No.	Interval	Diff. in Reading	Diff. in Psych.
1	6	17	41
2	3	11	67
3	3	12	40
4	15	12	75
5	6	11	78
6	3	14	40
7	3	5	55
8	6	5	39
9	6	-	46
10	3	10	9
11	3	4	-8
12	3	9	12
13	3	8	31
14	6	5	46
15	9	12	6
16	3	9	20
17	9	16	71
18	3	15	65
19	9	15	80
20	3	8	42
21	3	16	78
22	3	8	21
23	3	11	49
24	3	7	39
25	3	-2	27
26	3	24	68
27	12	12	55
28	3	10	58
29	9	15	31
30	15	12	1
31	9	-	46
32	6	5	40
33	3	15	30
34	9	11	37
35	3	9	86

Terms	Cases	Mean Reading Differences	Mean A.C.E. Differences
3	20	10	41
6	6	9	48
9	6	14	45
12	1	12	55
15	2	12	38

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