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ABSTRACT

The results of administering a 10-part diagnostic battery to more than 400 students in the basic reading course at Fullerton College in the fall of 1973 are reported in this document. Along with the basic data there is informal interpretation and speculation. The contents include: "Preface"; "Introduction: Purpose," which discusses the 10-part battery, impetus and history, staff training, scope, philosophy, and questions; "Reading Test Results," which presents rates of reading, retention, skimming and scanning, comprehension, and total scores; "Vocabulary Test Results"; "Spelling and Wide Range Achievement Test, Diagnostic," which discusses the spelling tests used and the results; "Test of General Ability"; "Visual Motor Gestalt Test"; "Test of Auditory Discrimination"; "Questionnaire," which includes a sample of the questionnaire used to gather data on laterality/dominance, laterality/vision problems, laterality/Wide Range Achievement Test--Diagnostic, laterality/family problems in reading, and eye problems related to reading; "The Writing Sample"; "Vision Screening," which discusses background, preliminary screening, inservice training, forms used, distribution of failures in subtests, overreferral, and vision training in the center; and "Aftermath." (WR)

North Orange County Community College District

Fullerton College

READING CENTER

April, 1974

Reading Center

Fullerton College

Report

on

A DIAGNOSTIC BATTERY

New Dimensions in Screening for Reading Disabilities

April, 1974

Reading Center, Fullerton College, 321 East Chapman Ave., Fullerton, Calif., 92634

Preface

The results of administering a 10-part diagnostic battery to more than 400 students in the basic reading course (English 81A) at Fullerton College in the fall of 1973 are reported here. Only one of the tests was a reading test. This is an in-house report prepared primarily for our staff, administrators, and colleagues. Along with the basic data, which has been carefully checked for accuracy, there is informal interpretation and speculation.

The long-range purposes of the study are

(1) to relate the Reading Center program to student needs more effectively;

(2) to determine a practical, responsible way for the Reading Center to screen for learning disabilities;

(3) to provide the basis for determining what the limits of the community college's commitments are, or should be, to the sizeable group of students who are educationally handicapped in ways not served by conventional methods of reading instruction.

The use of the extensive battery of assessments described below with so large a group of students is unique, as far as we know. It has generated information not previously available on a community college population. That the ambitious project was carried through is a tribute to the professional faculty and the auxiliary staff whose complete cooperation in training and performance is here gratefully acknowledged.

In academic life, there are occasional happy conjunctions of professional talent, common goals, good-will, and administrative support, and this study is the fruit of one of those conjunctions.

Mary Wortham
Director, Reading Center

April, 1974

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I. INTRODUCTION

Purpose

The purpose of this report is to present data which give a clear and extensive description of the characteristics of entering students in English 81A, Reading Skills. The interest is not so much in establishing levels of achievement in reading, since previous experience with testing has told us what to expect in reading scores. Rather, we are particularly interested in non-reading measures, particularly those psychological and physical measures which will be a clue to understanding the difficulties that underly reading problems.

There has been a need to establish a firmer base for our speculations about the proportion of non-success in language skills. The English 81A course is both remedial and developmental. Previous years of evaluation indicate that a substantial number of students show little or no measurable progress in reading skills, although a majority by test measurement increase their skills markedly. It is a commonplace among experienced instructors in reading at the college level that an undefined but troubling proportion of students show little or no progress, even when the motivation is apparently high.

This study was undertaken with some specific questions in mind; these are presented explicitly in a later section of this Introduction.

The 10-Part Battery

The diagnostic battery which was given to every entering student consisted of the following items:

1. Wepman Auditory Discrimination Test
2. The Keystone Visual Survey Test, Record Form No. 5A (Telebinocular)
3. Word Clues Placement Test, Form A. Educational Developmental Laboratories
4. The Bender Gestalt, Copy Portion
5. WRAT (Wide Range Achievement Test), Spelling
6. WRAT Diagnostic - A new group test of auditory-visual integration developed by four psychologists in the Fullerton Union High School District. It will be described in more detail later.
7. TOGA (Test of General Ability). Science Research Associates
8. Writing Sample - A relatively open-ended writing opportunity, unstructured in that a student had free choice of subjects, or he could write on one of several subjects suggested by the instructor.
9. Questionnaire. The questionnaire, subjective in nature, was conducted by the instructors. In addition to basic information such as address and phone number, an attempt was made to determine whether the student was left-handed, right-handed, left-eyed, or right-eyed, left-footed, or right-footed. The student also responded to questions such as: "Do you get tired when reading?" Does the print ever get blurry?" "Do your eyes feel irritated or itchy?" "Do you get headaches frequently when you read?" "Are there other members in your family who have a hard spelling/reading problem?"
10. McGraw-Hill Reading Test Form A. Parts scores on the McGraw-Hill are available for (a) words per minute on easy materials, (b) words per minute on hard material, (c) retention of material read under pressure of time, (d) efficiency in skimming and scanning, (e) paragraph comprehension, a thirty minute test on understanding content in short selections. A combination of (c), (d), and (e) gives a total score.

Although the McGraw-Hill Reading Test was the last to be administered to students, it is the first to be reported in this paper, because at the outset it establishes for instructors the basic reading performance of the student group.

Impetus and History

The instruction Office of Fullerton College in 1972 suggested to the Chairman of the Humanities Department and to the Director of the Reading Center that the possibility of vision training as an adjunct to the Reading Center be explored. The underlying assumption of the proposal was that a substantial proportion of the students in remedial reading at the college level would be benefitted by vision training.

By coincidental timing, the Southern California College of Optometry moved its campus from Los Angeles to a site in Fullerton within two miles of Fullerton College. Contacts at the administrative level on the subject of articulation of curriculum for students who might be involved in programs at both Fullerton College and the Southern California College of Optometry led to discussions of vision as it is related to reading.

The College of Optometry has for a number of years operated clinics in Los Angeles for vision training and for learning disabilities. The mutual interest of some of the Professors at the College of Optometry and Instructors in the Reading Center led to the proposal that vision screening of students in the Reading Center be conducted by the College of Optometry in the Spring of 1973. The result was that on Friday, April 6, 1973, a team of student doctors from the College of Optometry came to the Reading Center at 7:30 a.m. and conducted examinations throughout the day as students passed through a series of six stations. The examination was classified as a "modified clinic technique."

It was found that, by the criteria used, a very high proportion of the students in English 81A "failed" the vision screening test. As a result of the screening, a number of students in our Reading Courses followed up with full scale vision tests at the clinic of the College of Optometry, or went to their own eye doctors.

Vision screening is discussed at greater length in section X of this report.

Reading Center Staff Training

In continuing meetings with the administration and with the instructors of English 81A in the Reading Center, the decision was taken to pursue a more careful diagnostic approach to entering students. The discussion was also taken at the Administrative level to support in-service training for present instructors in lieu of adding an entirely new staff and a new program which would require additional space.

The study that was the result of the exploration of vision problems led to an invitation by the Reading Center staff to the College of Optometry that a summer course be designed to fit our interests. Consequently, a one-quarter course was given as a seminar by the College of Optometry during the summer session. It was attended by every reading instructor on the Fullerton campus, as well as by our Lab Technician, and by faculty from Cypress College and Adult Education. The Professor of the course was Dr. Howard Walton, Associate Professor of Optometry; he was assisted by Ms. Vera Ives, Psychologist, Fernald Clinic, UCLA. The cost of tuition was borne by the college district. All twelve members were issued certificates indicating that the course in visual screening had beer completed, in compliance with California State provisions. A brief outline of the course follows:

Diagnostic Testing for Learning Disabilities
Related to Reading

Texts: (1) Gregg and Heath, The Eye and Sight. D.C. Heath & Co. Boston. 1966. (2) B.R. Gearheart, Learning Disabilities: Educational Strategies. C.V. Mosby Co., St. Louis. 1973.

Course Outline, Continued.

I. Definitions and History

II. Vision

- Anatomy
- Visual functions
- Visual analysis
- Screening techniques
  - Telebinocular
  - Eye Track

III. Perception

- Visual (Winterhaven)
- Laterality (Leavell)
- Dominancy
- Auditory (Wepman)

IV. Motor tests

V. Dyslexia (Boder)

VI. General Ability (TOGA)

VII. Diagnosis and treatment

Scope of Data Reported

The description of findings covers all students in the 19 classes in English 81A which opened in September, 1973. Of these, 14 classes were in the day and five were in afternoon or evening. The student population in the Reading Skills classes is for the most part referred on the basis of college placement scores as follows:

> On English COOP, students scoring at or below the 8th percentile on the Expression section, or at or below the 15th percentile on the Reading section;
>
> On ACT, students with scores of 9 or lower on the English sub-text.

This paper does not include reports of testing that was done at the end of the semester. Data presented here is to establish norms for our own group, showing the medians and the ranges, or other appropriate types

of frequency distribution. The establishment of these norms will enable instructors in their contacts with new classes to do more effective early planning.

Philosophy

Because this report deals chiefly with diagnostic tests, it may be important to make the following point. Stated negatively, it is not the belief of the Reading Center that the solution of reading problems will be achieved chiefly by giving tests. However, the early recognition of learning disabilities which may handicap the student's learning by conventional means justifies a wide range of diagnostic efforts. The causes of reading handicaps are so varied and complex that no one approach can be relied on.

Our staff has shared the recognition of many others that a high proportion of students who enter into remedial reading situations at the college level have suffered damage to ego. Strong efforts were made by instructors to use the tests to strengthen the student's self-image, rather than to undermine it. The accepted philosophy at the Reading Center is a humanistic one that expects instructors to come to grips with the self-image and the motivational problem at the earliest possible time. The inherent danger of over-testing and provoking a negative response from students was recognized at the outset. However, our experience does not indicate that the procedure was destructive of morale. The exploration of auditory, visual and perceptual skills was not threatening. Many students even welcomed the search for explanations as to why reading was hard for them.

Questions to be Answered

Following are some of the questions that it was hoped the study of test results would help answer:

A. Descriptive

1. What are the levels of performance (including range and median) on tests of vocabulary, spelling, rates of reading, skimming and scanning, and comprehension.

2. What indication is there that failure on the visual skills test is related to poor reading performance?

3. What evidence is there that a deficiency of auditory and visual perception is related to reading problems?

4. What is the median, range, and distribution of scores on a non-verbal intelligence test?

5. Does the questionnaire on visual problems in reading correlate with other evidence of disability?

6. What proportion of students report mixed dominance, and is there an apparent relationship between mixed dominance and perceptual problems?

B. Interpretive

1. Is our English 81A course designed realistically to serve students, considering their basic levels on entering?

2. Does the establishment of our own norms give an instructor of an 81A class early indications of the needs of that class?

3. Should the content of the course as now offered be modified to meet needs indicated by the survey?

C. Philosophical

1. What obligation has the community college to students severely disabled in reading?

2. Which students can effectively be served in the community college reading center without moving into a clinic operation.

3. What are the limitations on what should be attempted? Should there be priorities in the expense of energy and funds?

II. READING TEST RESULTS

Rates of Reading

The standardized reading test used was the McGraw-Hill Reading Test by Alton L. Raygor, published by McGraw-Hill, Form A. This test yields two rates of reading: The first is on easy material at a level of difficulty characteristic of most magazines, newspapers and novels. A WPM score is based on a 3-minute section, and questions about the passage are answered after a total reading time of 5 minutes. A second WPM score is taken from reading a passage from a typical college textbook. This is study-type material and is referred to as a "hard" material. Again the rate is based on a 3-minute period of reading, and questions are answered about the passage after a total of 5 minutes of reading.

The typical student complaint of low rate of reading is clearly warranted by measurement of rates on the McGraw-Hill reading test. On easy material, the median rate reported was 178 WPM. Only 20 students out of 418 had rates of 260 words per minute or more, and some of these showed very little retention.

On "hard" material from a college sociology textbook, the median rate of reading was 144 WPM.

The distributions of these rate scores will be found in Tables 1 and 2.

Many students define their reading problem as being one of slow rate. It lies with the instructor to help the student see that the solution of that problem is not just a trick of eye movements but a matter of quick comprehension of what is seen. Thus, instant recognition of word meanings (vocabulary) and efficiency in handling unfamiliar words are among the surest means to higher rates of reading.

Table 1

Rate of Reading in WPM on Easy Material: McGraw Hill, Part I, Form A, Eng. 61A, Fall, 1973, N = 418

Words per Min.	No. of Students	Percentage
99 and below	13	3.1%
100-119	33	7.8
120-139	41	9.8
140-159	63	15.1
160-179	64	15.3
180-199	43	10.3
200-219	66	15.8
220-239	48	11.5
240-259	27	6.5
260-279	5	1.2
280-299	6	1.4
300 and over	9	2.2
	418	100.0%

Median: 178 WPM

Table 2

Rate of Reading in WPM on Hard Material: McGraw-Hill, Part I, Form A, English 61A, Fall, 1973, N = 416

Words per Min.	No. of Students	Percentage
99 and below	56	13.5%
100-119	51	12.3
120-139	77	18.5
140-159	84	20.2
160-179	40	9.6
180-199	34	8.2
200-219	39	9.4
220-239	16	3.8
240-259	5	1.2
260-279	5	1.2
280-299	0	-
300 or more	9	2.2
	416	100.1%

Median: 144 WPM

Retention - Part I

Retention percentile scores are based on remembering the content of both easy and hard passages in the McGraw-Hill reading test. All McGraw-Hill scores were normed by the publisher on the group of community colleges listed below:

Alabama:	Lurlene B. Wallace Junior College, Andulusia
California:	Chabot College, Hayward
	Citrus College, Azusa
	Monterey Peninsula College, Monterey
Florida:	Lake-Sumter Jr. College, Leesburg
	Miami-Dade Junior College, Miami
Georgia:	DeKalb J.C., Clarkston
Illinois:	College of DuPage, Glenn Ellyn
	Harper College, Palatine
Michigan:	Flint Community College, Flint
New York:	Academy of Aeronautics, Flushing
	Rockland Community College, Suffern
	Voorhees Technical Institute, New York
Washington:	Highline Community College, Midway

The students in the reference group from the community colleges listed above were presumably a heterogeneous group of students, unlike our own students in English 81A who are selected on the basis of language deficiencies. The norming groups used by McGraw Hill for statistical purposes were usually the students in Health or Orientation courses where the full range of student abilities was represented. It is therefore somewhat surprising to find that many of our students score at higher percentiles in this test than they do on our college placement tests with local norms. There are several possible explanations for this, one of which is that our students at Fullerton College in the Reading Center do have a higher level of reading skills than equivalent groups on some other campuses.

The distribution of percentile scores on Retention in timed readings will be found in Table 3.

Table 3

Retention - Percentile Scores: McGraw-Hill, Part I, Form A, Eng. 81A, Fall, 1973, N = 423

Percentile Scores	Students	
	Number	Percent
0-9	87	20.6%
10-19	86	20.3
20-29	57	13.5
30-39	50	11.8
40-49	51	12.1
50-59	37	8.7
60-69	23	5.4
70-79	12	2.8
80-89	13	3.1
90-99	7	1.6
	423	99.9%

Median: 27th percentile

Interquartile range: 11th-49th percentile

The tally sheets reveal that there is a wide variation among classes of Eng. 81A. For example, in Bo-7, Ba-7, and Sa-8 there were four scores in the top quartile (75th percentile or better), while in classes Ag-8, Ag-10, Ed-9, To-10, and Wo-11, there were none of these high scores in retention. Furthermore, the proportion of lowest scores is not distributed evenly among the classes. For example, in Ag-8, Sa-9, and Gl-4, there was only one score at the 10th percentile or below; by contrast, there were six or more scores at the 10th percentile or below in Du-11, Gl-12, and Wo-10. The proportion of very high or very low scores in a single class may shift the "center of gravity" for instructional purposes.

The median percentile score of retention is the 27th percentile. The interquartile range is 11th - 49th percentile. (In other words, one-

half of all scores fall between the 11th and the 49th percentile.) While the overall median in retention is at the 27th percentile, it should be noted that in one class, Sa-8, the median was between 55 and 59, while in other classes such as Gi-12, To-10, To-11, and He-7, the median was between 15 and 19. The specifics are included here to reinforce the point that an early picture of class performance can constitute something of an early warning system to an instructor.

About 8% of all students had retention scores in the upper quartile. These students are candidates for immediate transfer to more advanced English courses; depending on the individual case, some transfers are made if writing skills are appropriately developed. Some students decline the opportunity to try a higher level English course.

In a hypothetical "average" class of 25 entering students in English 81A, the following distribution of scores would be found. This table is provided for purposes of comparison with any actual class, as wide variations from this "average" may provide a useful indication of the level of skills of the class. See Table 4.

Table 4

Retention - McGraw-Hill: The Distribution of Scores for a Hypothetical "Average" Class of 25 Entering Students

Percentile Scores	Expected Number of Students at this level
0-9	5
10-19	5
20-29	3
30-39	3
40-49	3
50-59	2
60-69	2
70-79	1
80-89	1
90-99	-
	25

Skimming and Scanning

Skimming and scanning scores are provided by a ten-minute test of search skills in the McGraw-Hill reading test, Part II. The median score is at the 27th percentile on community college norms. Table 5 shows the distribution of percentile scores on skimming and scanning.

Table 5

Skimming and Scanning - Percentile Scores
McGraw-Hill, Part II, Form A, Eng. 81A
Fall, 1973. N = 421

Percentile Score	Students Number	Percent
0-9	70	16.6%
10-19	65	15.4
20-29	90	21.4
30-39	45	10.7
40-49	59	14.0
50-59	34	8.1
60-69	26	6.2
70-79	20	4.8
80-89	8	1.9
90-99	4	.9
	421	100.0%

Median: 27th Percentile
Interquartile Range: 16th-47th Percentile

Comprehension

The McGraw-Hill Reading Test, Part III, allows 40 minutes for reading and answering questions on a series of short and varied passages. The student may refer back to the passages in answering. This portion of the reading test differs from the section on retention in that there is little time pressure; most students complete the test before the end of 40 minutes.

The median score on the comprehension section was at the 35th percentile.

As with the retention scores, about 8% of the entering students had scores in the upper quartile (above the 75th percentile).

The distribution of scores on Paragraph Comprehension is reported in Table 6.

Table 6

Paragraph Comprehension Percentile Scores: McGraw-Hill, Part III, Form A, Eng. 81A, Fall, 1973, N = 420

Percentile Score	Students	
	Number	Percent
0-9	60	14.3%
10-19	77	18.3
20-29	31	7.4
30-39	71	16.9
40-49	32	7.6
50-59	41	9.8
60-69	55	13.1
70-79	21	5.0
80-89	20	4.8
90-99	12	2.9
	420	100.1%

Median: 35th Percentile
Interquartile Range 16th-59th Percentile

Total Scores - Reading

Total Score represents a combination of scores on Parts I, II, and III of the McGraw-Hill Reading Test, including Retention, Skimming and Scanning, and Paragraph Comprehension. The median for total scores is at the 26th percentile. The interquartile range is from the 11th to the 45th percentile. The distribution of scores is shown in Table 7.

Table 7

Total Scores in Percentiles on McGraw-Hill Reading Test, Form A, Eng. 81A, Fall, 1973. N = 412

Percentile Score	Students	
	Number	Percent
0-9	88	21.4%
10-19	71	17.2
20-29	70	17.0
30-39	56	13.6
40-49	44	10.7
50-59	43	10.4
60-69	11	2.7
70-79	14	3.4
80-89	9	2.2
90-99	6	1.5
	412	100.1%

Median: 26th Percentile
Interquartile Range: 14th-45th Percentile

III. VOCABULARY TEST RESULTS

To get a measure of vocabulary level without giving another reading test, the Word Clues Test (EDL* was read aloud by the instructor as the students followed in the test booklet. The distribution of scores (see Table 8) confirms that the majority of our students are appropriately placed in 10th grade level vocabulary work. This test is used as a base for placement of students in Word Clues Books G, J, or L. The following cutting points for assignment into one of three books are suggested, but should be followed only if other diagnostic data confirm placement.

Total scores of 55 or below - consider for Book G. (7th gr.)

* Word Clues Test, Form A. Stanford E. Taylor et al., Educational Developmental Laboratories, 1962, McGraw-Hill, Inc.

Scores of 75-80 and over - consider for Book L. (13th gr.)

All others (above 55 and below 75) probably will fit into Book J (10th).

Table 8

Vocabulary, Word Clues Test, Form A. Total Raw Scores: English 81A, Fall, 1973. N = 378

Total Raw Score	Students	
	Number	Percentage
39 and below	12	3.2%
40-44	13	3.4
45-49	16	4.2
50-54	27	7.1
55-59	39	10.3
60-64	62	16.4
65-69	73	19.3
70-74	55	14.6
75-79	50	13.2
80-84	18	4.8
85 and above	13	3.5
	378	100.0%

Median: 66
Interquartile Range: 57-73

In an "average" class of 25, the following distribution of scores would be expected:

Word Clues, Test A Total Score	Number of Student Scores
49 and below	3
50-54	2
55-59	2
60-64	4
65-69	5
70-74	4
75-79	3
80 and above	2
	25 students

If students were assigned on the basis suggested in this hypothetical "average" class, there would be 5 in G, 15 in J, and 2 to 5 in L. Experience has found few classes with as many as 5 students working in book L. There are several reasons which could account for the small L population: (a) the L candidates are among those most likely transferred to English 60; (b) some of the high vocabulary scorers may have such serious shortcomings in reading/writing/spelling that the J book may seem a better choice; (c) in a class with only one or two candidates for "L" - the administration of such a small sub-group without adequate tutorial aid may make use of Book L impractical.

IV. SPELLING AND SPELLING DIAGNOSTIC FOR VISUAL-AUDITORY INTEGRATION

Spelling

The Wide Range Achievement Test, Spelling, (Level II) is a 46-word test in which the words dictated range from the very simple (cat) to the very difficult (iridescence). Scores ranged from 1 to 44, with a marked variation of medians among the classes. The median was 20 words correctly spelled.

It is apparent that at least a quarter of our students are so handicapped in spelling that they cannot present written communication appropriate for a college student. When words such as ruin, heaven, circle, believe, or educate cannot be spelled correctly, writing problems are acute, and, we believe, are often related to reading problems. See Table 9.

Table 9

Scores on WRAT Spelling Test, Level II, English 61A
Fall, 1973, N = 432

Number of Words Correctly Spelled	Students	
	Number	Percent
0-1	1	
2-3	2	
4-5	14	- - - 10%
6-7	8	
8-9	18	
10-11	20	
12-13	27	
14-15	36	- - - 36.8
16-17	41	
18-19	35	
20-21	44	
22-23	42	
24-25	33	- - - 41.4
26-27	33	
28-29	27	
30-31	17	
32-33	19	
34-35	9	- - - 11.3
36-37	2	
38-39	2	
40-41	0	
42-43	1	
44-45	1	
46	0	- - - .5
	432	100.0%

Median: 20
Interquartile Range: 15-26

Spelling Diagnostic (WRAT)

A modification of the WRAT Spelling Test, a new instrument developed by psychologists of the Fullerton Union High School District, was used as an aid in differential diagnosis of learning disabilities. The test utilizes the same 46 words as the conventional WRAT spelling test and is given immediately following it. It is essentially an attempt to measure the auditory-visual integration process. In it, the students listen to the list of words dictated and check the spelling that looks correct from a set of four spellings of the same word. The multiple-choice format provides for each word one correct spelling and three incorrect spellings. Of the incorrect spellings, one exemplifies an omission, one a substitution of sounds, and the third a reversal. The incorrect spellings reflect specific problems characteristic of the work of students with perceptual problems. The incorrect alternative spellings are not the type of spelling problems found in the general population, but are indicative of reading disabilities.

This very new test has been used in the Fullerton Union High School District as a screening test, and is more fully described in the research report.* In the research study on students in grades 9-12, statistically significant differences were obtained among classes of regular, educationally handicapped, and educable mentally retarded. The gifted group had near-perfect scores. Classes of regular students show a mean error rate of only 4 items per 46 words; EH students show a mean of 14 errors per test; and EMR classes show a mean of 23 errors per test.

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*Gillespie, Jacquelyn, Donald G. Hays, Walter F. Ratzlaff, Jacqueline Shohat, "The Diagnostic Spelling Test: A Modification of the Wide Range Achievement Test, Spelling (Level II). A Progress Report", Fullerton Joint Union High School District, 211 West Commonwealth Ave., Fullerton, California 92632. March, 1972. 22 pp. Unpublished.

The Diagnostic Spelling Test was devised primarily as a tool for differential diagnosis of students with established learning problems. A high proportion of incorrect choices indicates a particular kind of disability associated with problems in cross-modal learning.

Using this WRAT Diagnostic with the English 81A classes has not enabled us to set a single error score as a precise cutting point diagnostically to indicate the degree or type of learning disability, yet a comparison can be made with the error scores of regular, EH, and EMR scores from high school groups. Of the 431 students tested, 24% had 10 or more errors in substitutions, omissions and/or reversals -- none of which are ordinary or "normal" types of spelling errors such as mistakes in doubling consonants, silent letters, etc. Further, we have not found a correlation with performance on the Wepman Auditory Discrimination Test.

In addition to the usefulness of this WRAT Diagnostic Test in the Reading Skills course in providing an early alert to the instructor of possible perceptual problems or learning disability, we have found it invaluable in the Spelling course. In brief, students who enroll for the Spelling Mini-course and who show extreme tendencies to omit, reverse, and substitute sounds/letters do not profit from conventional methods of spelling instruction. We now know from experience that some students will profit immensely from a program of visual/perceptual training, phonics, and the Fernald tracing technique.

See Table 10 for the distribution of error scores on the WRAT Diagnostic.

Table 10

WRAT Diagnostic Test - Auditory-Visual Integration. English 81A, Fall, 1973. N = 431.

Number of S-O-R Errors	Students Number	Percentage
3 or less	111	25.8%
4-6	125	29.0
7-9	90	20.9
10-12	47	10.9
13-15	27	6.3
16-18	14	3.2
19 or more	17	3.9
	431	100.0%

V. TEST OF GENERAL ABILITY

The need is often felt by instructors for some measure of general intelligence (or IQ) which is not related to reading competence, arithmetic, or other school achievement. The TOGA (Test of General Ability)* tests the student's familiarity with the world around him through his observations and general knowledge and presents geometric drawings designed to test the student's powers of abstract reasoning. Although the test hopes to be "culture-free," it probably is not, but it is partly language-free, and entirely reading-free.

In the TOGA, Part I, the instructor poses a series of "problems" as the student looks at a series of pictures in the test booklet. The oral question asks the student to identify the picture which best "answers" the question. Oral vocabulary is a major factor. In Part II, there is no oral component. The student is asked to observe a series of designs using tri-

* Tests of General Ability, Form A, Grades 9-12, developed by John C. Flanagan. Science Research Associates, Inc., Chicago, Illinois. Rev. Sept. 1960.

angles, squares, or straight and curved lines. Four of the pictures in each series follow a rule, but one does not. The divergent design is to be identified.

The result of administering the TOGA to the English 81A classes has been to dispel any lingering doubt that the students as a group are "bright." Aside from reading/writing competence, 50% of them are approximately "college freshman level" or higher in intellectual level. Considering that our reading courses will inevitably have a fraction of ESL students, culturally deprived students, anti-test students, and psychologically maimed students, we must conclude that in general we are dealing with a student population which has no generalized intellectual deficit, although there is a deficiency in language development by college standards.

The import of the TOGA test is that instructors are assured that there is a competence in the students generally which precludes condescension -- however untrained, unlearned, undisciplined they are in matters linguistic.

The scores and grade-level expectancies of the TOGA scores are reported in Table 11.

VI. VISUAL MOTOR GESTALT TEST

The nine cards commonly referred to as the Bender copy forms* were administered to class groups by use of transparencies and the overhead projector. The test was used as a test of visual motor gestalt function rather than to explore personality deviations. The forms were exposed one at a time on the screen, and uniform instructions were given to the students to copy the forms on blank paper. In this test the student has a sensory re-

* Bender-Gestalt Test Figures, Copyright 1946 by Lauretta Bender and American Orthopsychiatric Assoc., Inc.

Table 11

TOGA (Test of General Ability), Form A, Grades 9-12: Distribution of Raw Scores, English 81A, Fall, 1973 N = 431

Raw Scores	Grade Expectancy	Students Number	Students Percent
19 and less	5.1 or less	2	.5%
20-24	5.3 - 6.2	7	1.6
25-29	6.4 - 7.2	8	1.9
30-34	7.5 - 8.6	39	9.0
35-39	8.8 - 9.9	44	10.2
40-44	10.2 -11.5	69	16.0
45-49	11.7 -12.9+	70	16.2
50-54	*13 +	78	18.1
55-59	*13 +	61	14.2
60-64	*13 +	38	8.8
65-69	*13 +	15	3.5
70 +	-	0	-
		431	100.0%

Median - 48

* Extrapolated. As norms are based on high school grade levels, the tables in the TOGA Manual do not give grade expectancies above 12.9.

Visual Motor Gestalt Test (Continued)

sponse (visual), he perceives the pattern and relation of the parts to the whole (Gestalt), and reproduces by drawing (motor) what he has perceived. Where drawings show marked distortions, rotations, collisions, perseverations, and lacks of integration, then there is reason to consider the possibility of visual-motor immaturity or malfunction.

The use of the Bender was limited by the lack of time to do an objective scoring of the drawings which could be tabulated. Neither was instructor time available to follow up with an individual test such as the Boder, an individual test for dyslexia. Our procedure was to ask each instructor

to separate the student drawings into two piles -- one for those that were clearly good drawings, and one pile for the questionable. The questionable stack of Bender drawings was referred to two consultants for evaluation -- both Psychologists from prominent clinics dealing with learning disabilities and experienced in interpretation of the Bender drawings. Their reports to our reading staff in consultation meetings were oral and in all cases related the student's performance on the Bender to other diagnostic tests in the battery, particularly to the writing sample.

Our experience with the Bender does not lend itself to tabulation. The administering of the Bender test with the overhead projectors as a group test is so easy and consumes so little time (10 minutes), and it is usually so non-threatening to the students, that if it yields early indication of a disability in even a few cases, it may be worth the small trouble it is to administer.

Further experience in relating the Bender test to the whole assessment process will wait on more semesters and instructor time.

VII. TEST OF AUDITORY DISCRIMINATION

Given as a group test, the Wepman* was used as a measure of accurate hearing and perception of small differences. In it, the student listens to 40 pairs of words and indicates whether the pairs are the same or different. The speaker stands behind the students, so no visual clues are available to him.

According to the Wepman Manual of Directions, a cutting score which would indicate inadequate development of auditory discrimination would be

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* Auditory Discrimination Test, Joseph M. Wepman. Copyright 1958 by Language Research Assoc., Inc., Chicago, Ill.

4 errors or more. In tabulating the number of errors, we found that in certain classes the proportion of students with 4 or more errors was very high. By doing an item analysis, we learned that in some classes a majority of the students missed the same items, and thus we concluded that the acoustics were inadequate in some situations, or inconsistency in pronunciations among different instructors was giving us invalid results. We found that in the group administration of the Wepman, the fricatives were particularly susceptible to skyrocketing error rates in some rooms with some teachers. Therefore, no tables of performance on the Wepman test are presented here.

In the future, one solution to standardizing the presentation of the paired words will be to work from a tape recording.

If a guess were to be hazarded as to the proportion of students who have 4 or more errors on the Wepman test, it would be in the area of 10%, and a number of these would be cases of hearing loss. One of the useful results of using the Wepman was in the identification of hearing loss among students, some of which had been previously recognized, but not all. It was observed that students with hearing loss do not necessarily adjust with compensatory behavior in the classroom, and instructors can assist them in picking up new and sensible habits to compensate for hearing loss. Observation suggests that among veterans and older students there is a higher incidence of hearing loss.

The concept of auditory perception is different both from acuteness of hearing and from skill in phonics. It involves awareness and recognition of the stimulus, and also auditory memory. It does not, like phonics, involve matching of sets of sounds with sets of spellings. Some students, for example Orientals for whom English is a second language, will have very high error scores on the Wepman test; they have not developed auditory per-

ception for some English sounds which are not identical with sounds in their native language.

VIII. THE QUESTIONNAIRE: LATERALITY and VISION

The Questionnaire, a copy of which follows, was filled out by students under the guidance of the instructors. The tabulations of the responses entail too much space for reproduction here, and only an interpretive summary of the results will be given.

Since this is a subjective questionnaire, all data and interpretation deriving from it must be considered tentative. For example, the identification of dominant eye, hand, and foot may not be reliable in spite of attempts to standardize the methods of identification in the classroom situation. The questionnaire has been revised since the fall of 1973.

Laterality/dominance

Of 389 students who filled out the questionnaire, 250 reported consistent dominance, and 139 (or 36%) reported mixed dominance, including the ambidextrous. Of the consistent-dominance group, about 10% reported left-handedness.

Laterality and reported vision problems linked to reading

Do students reporting mixed dominance also report more troubles with vision and reading than those with consistent dominance? Are there more instances of fatigue in reading, print blurring, itchy eyes, etc.? (See Questionnaire, items 3 and 4.) A cross-check revealed no correspondence: the responses occurred in almost identical proportions for the two groups. Therefore, on the basis of subjective reporting, students with mixed dominance have no more symptoms of visual problems than those with consistent dominance.

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QUESTIONNAIRE
September, 1973

Name_____

Instructor_____

Hr. _____Phone no._____

Address_____

_____

Are you a vet? (circle) YES NO

What is the last school you attended?

_____

Year _____

1. Laterality/dominance: eye _____

hand_____variations_____

_____

foot_____

2. Do you have glasses (spectacles)? _____When do you wear them?_____

_____

Do you have contact lenses? _____ When do you wear them?_____

_____

3. Do you get tired or sleepy rather often when you read_____

Do you get headaches from reading? (circle) NEVER SOMETIMES OFTEN

Does reading make your eyes feel itchy or irritated?_____

4. Does the print ever blur? _____ Do you lose the place easily?_____

Do you often skip little words? _____ Do you ever reverse letters?_____

5. Do you read with "silent speech" (subvocalization)?_____

6. What subjects do you really like to read about?_____

_____

7. Does anyone in your family have hard spelling/reading problems?____

Who?_____

Laterality and the WRAT Diagnostic test

Do students reporting mixed dominance have a greater tendency to omit, substitute, and reverse sounds/letters as measured by the WRAT Diagnostic test? (See Section IV.) No, the distribution of S-O-R scores is remarkably similar for mixed-dominance and consistent-dominance groups. Both the median scores for number of errors and the proportion of S-O-R scores of 9 or more are similar for both groups.

Laterality and Hard Problems in Reading in the Family

Do students with mixed dominance report a higher frequency of hard spelling/reading problems in their families? Although 29% reported the presence of difficulties in the family for the mixed-dominance group as compared to 21% for the consistent-dominance group, this difference is not a reliable indication of significant difference between the two groups.

Eye problems related to reading

Only 10% of students replied negatively to all seven of the questions in Items 3 and 4 on the questionnaire which associate the following problems with reading: (1) fatigue, (2) headaches, (3) irritated eyes, (4) blurring print, (5) losing place, (6) skipping words, (7) reversing letters. The positive response to this laundry list of complaints is more notable when it is reported that almost half of all students checked three or more of the seven items. Fifteen percent of the students checked 5 or more of the problems.

As there is no control group with which to make comparisons, interpretations of these figures is further complicated beyond the problem of assigning causes. However, one can say with some assurance that on the whole these students in the reading course do not associate the act of sustained reading with an easy, pleasant experience.

For future research, the relation of visual problems to passing the fusion test on the telebinocular screening will be of great interest. Do students who fail to get fusion in the vision screening report more eye symtoms than students who pass the fusion test? If there should be a positive correlation between fusion-failure and high rate of eye symptoms associated with reading, the argument for a vision training program in conjunction with the reading Center would be persuasive.

IX. THE WRITING SAMPLE

Students were asked to write on a subject of their own choice or from a short list of topics suggested by the instructor for 20 minutes or "until you are through." Efforts were made to make the communication a nontest, nonthreatening exercise.

An attempt was made to objectify the results by a rough measure of length (fluency), content (number and quality of ideas), and standard usage of the language, as scored by the instructors. The effort was judged in retrospect to have been more well-intentioned than useful.

However, in conjunction with other parts of the test battery, the writing sample was perhaps one of the most useful of all components, revealing a wide range of information about the student aside from the content of the paper. Some of the clues to the student's written language competence include indications of motor skills in handwriting, tendencies to reverse, omit, or substitute letters, level of usage, vocabulary, sentence sense, format, punctuation, spelling, etc. Signs of maturity and attitudes are often clearly implied by the writing sample.

We would classify the writing sample as an invaluable diagnostic instrument.

X. VISION SCREENING

Background

Our concern with vision and perception problems* stems from a generalized concern for well-motivated students who fail to complete the Reading Skills course with a competence in reading that is adequate to the academic programs they undertake. The impetus to explore diagnostically some underlying handicaps came from a Dean of Instruction who proposed that the Reading Center investigate vision training as a potentially helpful adjunct to the Reading Center. An extended exploration, led by the Chairman of the Humanities Department and the Director of the Reading Center tentatively concluded -

(a) The area of vision and perception training is controversial. In general, medically-oriented authorities doubt its value; other practitioners, such as psychologists and optometrists, believe that perhaps 15% to 25% of students with reading deficiencies may have visual or perceptual problems.

(b) There is very little precedent for work in vision or perceptual training in the community colleges. Programs at L.A. City College and Harbor College are exceptions.

(c) The new presence of the Southern California College of Optometry in Fullerton, with multiple Clinics for vision training and learning disabilities, presents a rich resource not available to many colleges.

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* The term perceptual is used with assorted meanings in the professional literature of various disciplines. For purposes of this paper, visual refers to the functions of the eye, with motor and sensory components. Visual adequacy is a term for unimpaired reception of the image in the occipital area of the brain (area #17, according to Brodmann's method of classification). Thus, if the eye does not effectively deliver the image, the problem is one of vision. However, the eye may function perfectly, but the recognition or awareness or significance of the image may be lacking or distorted, and we call this dysfunction perceptual.

Diagnostically, it may be difficult to determine whether a problem is visual or perceptual. Since the vision occurs first in the time sequence, visual adequacy should be established before suspecting a perceptual problem;

(d) The Reading Center should explore the possibilities of vision screening and training as an extension of its present function.

Preliminary Vision Screening by the College of Optometry

In April, 1973, a team of 24, comprised of Doctors and 4th-year students from the Southern California College of Optometry (SCCO), came to the Reading Center, set up six stations, and screened 86 students in English 81A, using a Modified Clinic Technique. Of these 86 students, 55% failed one or more tests; another17% were classified as "borderline," and only 28% passed all tests.

All students who failed the screening were invited to come to the College Clinic for a full examination. Sixteen did so, and were the subject of a research paper by four students at the College of Optometry. They reported that the primary problem was in the area of binocularity, mainly in the lateral phoria category and fusion.

In-service Training Preparatory to Faculty Screening

Training sessions in the use of the telebinocular were conducted for the staff by a representative of the manufacturers of the instrument in the spring of 1973. The summer seminar attended by the staff at the College of Optometry has been described on pages 4 and 5 of this report.

Procedures in Faculty Screening with Telebinocular in September, 1973

Visual screenings on the Keystone telebinocular were given to over 400 students in the first two weeks of the semester by the staff. The Reading Center owned one telebinocular, and two others were borrowed.

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*Evaluation of Screening Techniques: A Senior Research Project. Domroy, Ted, Lee Diggins, William Diamond. Southern California College of Optometry, Fullerton, January, 1974. Part I, 22 pp; Part II, 8 pp. Unpublished.

Any student who failed the screening was retested before a referral was discussed with him. Before suggesting a full vision examination, instructors explored with the student his past and present contacts with ophthamologists or optometrists, as well as his own personal view of the effectiveness of his vision, particularly as it related to reading or other close work. For example, students who fared poorly on the screening and who had glasses "five years ago" were urged to get an update. Students who were confident of excellent vision because they were 20/20 on the test for driver's license, were given some explanation of why their visual performance at near point might be less than adequate. The inadequacy of the Snellen chart in screening for near-point visual skills was explained. Students were encouraged to go to the eye doctor of their choice, with the SCCO Clinic as an alternate option.

Appointments were made with 76 students at the SCCO Clinic, with an arrangement for partial waiver of fees in the light of research being conducted. Despite a reminder system, only half of the students turned up for their appointments. Other students visited their own choice of eye doctors, but the exact number is not known. At a conservative estimate, the visual screening resulted in 50 visits for full eye examinations, about 12% of the students.

In our screening, there was an unexpectedly high proportion of failures of fusion at near point. Students were not referred for this failure <u>if</u> the fusion test was the only test failed and if they reported no symptoms of eye problems. A failure of convergence with ease at near point is not usually corrected by lenses, although it may be corrected fairly easily by training exercises.

<u>Forms Used in the Keystone Test</u>

Both a long form of the Keystone Visual Survey Test (No. 52) which em-

ployed 15 cards for 15 tests and the short form, which uses 3 cards for 7 tests, were used in initial screening. With the long form, 175 students were screened, and with the short form, 231 students. Any student who failed either test was re-screened at a later date with the long form. We do not have accurate data on what percentage of students failed the first test and later passed the second screening, but a number of them did.

The short form can be administered in 2 or 3 minutes; the long form generally takes 10 or 12 minutes on the average, and often longer because of conversation with the student. The one-to-one contacts between instructor and student on a nonacademic focus of interest resulted in gains in rapport that instructors felt were valuable. Recommendations for referral to an optometrist or ophthamologist were made only after two screenings, usually by different instructors.

Table 12 indicates that the short form is not as demanding as the long form, on which 47% of the students failed one or more of the subtests, compared to a 30% failure rate on the short form. This difference was confirmed in several cases where a student who had passed the short form was later tested on the long form and did not pass it.

Table 12

Comparison of the Long and Short Forms of Keystone Visual Survey Tests in Proportion of Failures Reported: English 81A, Fall, 1973. N = 406

Of 175 Long Form Tests		Of 231 Short Form Tests	
Number Failing	%	Number Failing	%
82	47%	70	30%

Distribution of Failures in the Subtests on Keystone Visual Survey

Since the two forms of the screening test differ both in length and style of test item, they are not strictly comparable. The discussion of incidence of failure on the subtests will be limited to the 175 tests on the long form. In Table 13, each of the 15 subtests is listed, with the number of failures reported for each, and the percentage of the whole.

It is apparent that the failures fall heavily in the near point category. It should also be noted that our table understates the proportion of fails originally recorded, because a number of students took their tests with them to their eye examinations, and the forms were not recoverable for tabulation. In all cases, they would have added to the proportion of failures.

Inasmuch as failure in fusion at near point is closely related to the quick onset of fatigue in reading, and 34% of this group failed the fusion test, the relationship between this figure and the number of students reporting eyestrain is hard to ignore, although it does not constitute hard proof. (See Section VIII, Questionnaire, Eye Problems Related to Reading.)

An added test for hyperopia was given in some cases, using a 1.5 diopter lens with occlusion on test 4½. An experimental test card for astigmatism was used with one group. The purpose was to identify hyperoptic astigmats on the basis of evidence that this anomoly is a handicap in reading and is not identified by the other Keystone tests. We do not have enough data to report on these tests to be significant.

Over-referral

One common complaint about the use of the Keystone telebinocular as a screening instrument in the hands of teachers is that it over-refers. We have been told informally by SCCO administrators that we have not over-referred. Part of the student research project of the SCCO was to compare

Table 13

Distribution of Failures on the Subtests of the Keystone Visual Survey Long Form: English 81A, Fall, 1973, N = 175

Subtest	Number of Students Passing*	Failing	Percentage Failing of Total 175
AT FAR POINT			
1. Simultaneous vision	174	1	0.5%
2. Vertical posture	170	5	2.9
3. Lateral posture	168	7	4.0
4. Fusion	164	11	6.3
4½ Usable vision - both eyes	170	5	2.9
5. Usable vision - right eye	167	8	4.6
6. Usable vision - left eye	166	9	5.1
7. Stereopsis	162	13	7.4
8. Color Perception	167	8	4.6
9. Color Perception	165	10	5.7
AT NEAR POINT			
10. Lateral posture	155	20	11.4
11. Fusion	115	60	34.3
12. Usable vision - both eyes	172	3	1.7
13. Usable vision - right eye	170	5	2.9
14. Usable vision - left eye	165	10	5.7

*All tests were passed by 93 students, or 53%.

the efficiency between screenings performed by the teachers vs the optometry students. To quote from the conclusions,

> The results of this portion of our study indicate that, with regard to Keystone Visual Skills screening, teachers who have been properly instructed are able to administer the test with equal, or possibly greater efficiency than optometry students. (Evaluation of Screening, Part II, p. 8)

Vision Training in the Reading Center

There are types of visual skills which can be enhanced by training; all are skills that are unconsciously learned or are consciously taught during a child's normal development at home and school. They include motor and sensory fusion, pursuit movements, accommodation (focus for distance), saccadic movements, span of recognition, and duration of fixation. After consultation and training sessions with faculty from the College of Optometry, instruction is being given in the vision/perception lab, a special activity which includes training some of the above skills.

XI. AFTERMATH

The diagnostic battery has enhanced our understanding of the range and depth of individual differences in measurements other than reading. However, the new dimensions are all language-related.

On the whole, the venture has been an exciting exploration in the identification of students with learning disabilities who may need special strategies of instruction. The concern with learning to cope with intrinsic obstructions to cognitive learning is in step with professional interests from other disciplines, such as psychology, neurology, pediatrics, optometry, and medicine, all centering on the remediation of learning disabilities. Understanding the problems must precede the solutions.

We have found that such an extended battery need not be a depressant to students, except for the reading test and the WRAT spelling. All test results are shared with students. The generalized student anxiety about "Did I pass?" can be answered with an honest "You did fine" in most cases (Wepman, Bender, TOGA, Questionnaire, Vocabulary, WRAT Diagnostic and the writing sample. The vision screening is not seen as another English test.

In the semester following the tightly-coordinated administration of the battery, all instructors chose to repeat most of the tests. Some added the California Phonics Test. Discussions of abandoning entirely some of the tests invariably met with the response from some instructor, "But that one was so useful for ...." At present we risk the charge of being "test-happy" but gain a clearer sense of purpose and control in organizing instructional programs.

The new profiles of students and classes now available enable us to exploit the instructional materials in the center to greater advantage. They also indicate where new and other kinds of teaching materials are needed.

Expectations are more realistic, hence more humane. For example, the student who spells very-vary and verry on the same page is not a poor student to groan over, but a fresh candidate for Fernald slips and other neurosensory integration programs.

As for our venture into vision screening and training, it is impossible to evaluate the degree of profit to the students. A few striking examples do not necessarily make a case for our investment in this area. The goal of 100% screening is apt to be at the expense of too much classroom time, or too much faculty overtime. Some selective procedures will probably need to be developed. Working cooperatively with the College of Optometry, we hope to refine and abbreviate the screening process.

Permanently useful will be the establishment of a total-group profile of our English 81A students. It has enabled us to establish our own norms against which progress may be measured. The data may also be useful to other institutions, including those who train reading instructors for college teaching.

Justification of an extended diagnostic battery can only come through evidence of better teaching and learning. How to use our information is the present and future challenge.