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DEVELOPMENT AND REFINEMENT OF A TEST OF CRITICAL READING

ABILITY OF ELEMENTARY SCHOOL CHILDREN.

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DESCRIPTORS- *TEST CONSTRUCTION, *READING TESTS, *CRITICAL READING, *ELEMENTARY GRADES, READING SKILLS, READING ACHIEVEMENT, READING COMPREHENSION, DIAGNOSTIC TESTS, ACHIEVEMENT TESTS,

THE OHIO STATE UNIVERSITY DEVELOPED A CRITICAL READING TEST AS PART OF THE 3-YEAR USOE PROJECT 2612 CONDUCTED TO DETERMINE WHETHER CRITICAL READING COULD BE TAUGHT TO ELEMENTARY SCHOOL CHILDREN. THE TEST AIMS TO MEASURE THE ANALYTIC AND EVALUATIVE ABILITIES OF CHILDREN IN REACTING CRITICALLY TO MATERIALS READ. CRITICAL READING SKILLS WERE IDENTIFIED, LISTED, AND VALIDATED BY 14 READING EXPERTS ACROSS THE COUNTRY. REVISED ACCORDINGLY, THE LIST WAS PRESENTED IN CLASSROOMS WHERE ADDITIONAL CRITICAL READING SKILLS WERE OBSERVED. TRIAL FORMS DEVELOPED WERE GIVEN TO A NATIONAL SAMPLE. ITEM ANALYSIS OF THE RESULTS YIELDED ITEMS FOR THE THREE FINAL FORMS OF THE TEST. A DIFFERENT SET OF NATIONAL SAMPLES WAS USED FOR NORMING THE FINAL FORMS WHICH WERE AGAIN SUBJECTED TO ITEM ANALYSIS. RESULTS ARE PRESENTED IN SEVERAL TABLES. FACTORIAL ANALYSIS WAS STILL UNDERWAY AT THE TIME OF THIS REPORT, SO RESULTS ARE NOT REPORTED HERE. SAMPLE ITEMS OF THE THREE FORMS ARE GIVEN. THE TEST WILL BE AVAILABLE FOR USE AS A DIAGNOSTIC OR ACHIEVEMENT INSTRUMENT BY JUNE, 1967. (NS)

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Development and Refinement of a Test of Critical Reading
Ability of Elementary School Children

Occasional Paper #67-102

February, 1967

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DEVELOPMENT AND REFINEMENT OF A TEST OF CRITICAL READING ABILITY OF ELEMENTARY SCHOOL CHILDREN

Introduction

Researchers identifying new clusters of skills face a problem inherent in the identification. This problem is the absence of instruments for measuring the level of development of the newly identified skills. For example, when researchers began identifying creative thinking abilities they had to develop new instruments to assess skills of that nature. Similarly, when a research team at The Ohio State University began to work in the area of critical reading at the elementary school level, new measuring instruments were required. The Ohio State University Critical Reading Test was developed as a necessary part of a three-year feasibility study to see if elementary school children could be taught to read critically. A report of that research is being given by Willavene Wolf, Martha King, and Charlotte Huck in Session 33 at AERA.

Critical Reading Defined

It has been assumed that reading ability is a generalized ability; i.e., that there are no separable comprehension skills. Accordingly, most reading tests have only two sub-sections, one testing vocabulary and one testing comprehension. Scores from these two sections are usually added to obtain a total reading score. There has been some evidence presented, however, (Maney (1958), McCullough (1957), and Sochor (1958) to demonstrate that there is a positive but low correlation between various reading comprehension skills. These correlations suggest that a common



factor does pervade reading ability, but do not indicate that growth in one type of comprehension will insure growth in another. Recognizing the paucity of instruction in evaluative reading at the elementary school level, The Ohio State University research team wanted to see if elementary school children could be taught to read in this way. They identified a number of skills contributing to the analysis and evaluation of printed material which have been labeled critical reading skills. Critical reading is defined broadly as an analytical-evaluative type of reading in which the reader not only analyzes the content of what he reads, but also evaluates the effectiveness of the manner in which it is presented. Reading critically, then, requires the reader to make rational judgments based upon valid criteria. Reading tests presently available for elementary school children have mainly attempted to assess children's ability to read literally. Since the major purpose of the Critical Reading Project was to determine if elementary school children could be taught to read critically while growth in other basic reading skills was maintained, a new measuring instrument was required. The test needed to have the unique feature of requiring children to make rational judgments about material they read. Furthermore, it was hoped that skills measured in this test would not be dependent upon the child's general reading level. The test was developed as an experimental instrument to compare gains of experimental and control groups in the ability to read critically.

Identification of Skills to be Tested

Before developing the test, specific skills that a mature critical reader exhibited were stated and defined in behavioral terms. For example, the ability to recognize omission of data, the ability to compare information



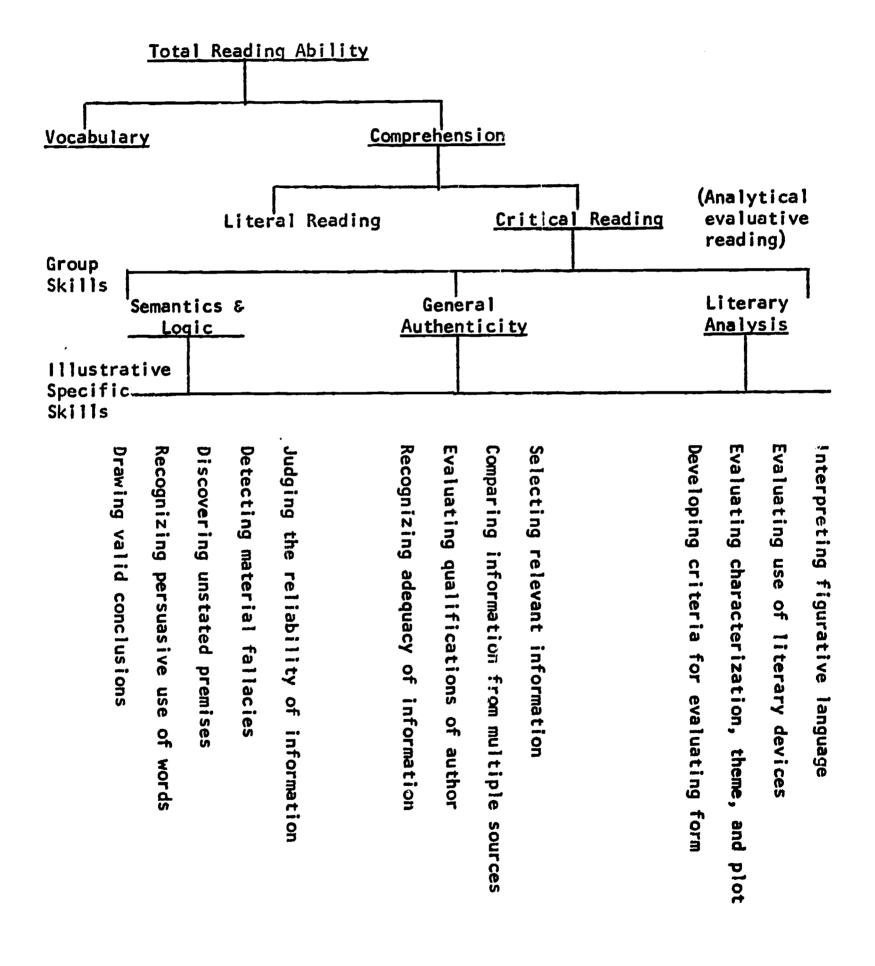
from a variety of sources, the ability to recognize persuasive devices, and the ability to assess literary merit were some of the skills identified. During the initial phase of the project, this list of skills was sent for validation to fourteen reading experts across the country.* The panel of experts was asked to critique the list, to rate the importance of each skill, and to suggest any other skills they believed contributed to critical reading ability. Following their recommendations the list of critical reading skills was revised. During a pilot observation phase of the project this list was checked for completeness in elementary school classrooms. When other behaviors were observed that contributed to critical reading ability they were added to the list. The list of critical reading skills was then divided into three major groups on the basis of the skills assessed: logic, general, and literary analysis. Examples of skills included in the <u>logic</u> section were drawing conclusions from stated premises, identifying fallacies in reasoning, and identification of persuasive techniques in writing. Skills in the general section included comparison and evaluation of sources, evaluation of author's competence and point of view, and contrasting contradictory reports on the same topic. Some of the <u>literary analysis</u> skills were identification of theme and setting, and evaluation of characterization and story structure. Figure I illustrates the relationship of the specific and group skills to total reading ability.



^{*}The panel of reading experts to whom the tentative definition of critical reading was sent are: David Russell, Nila Banton Smith, Russell Stauffer, Donald Cleland, Helen Robinson, Constance McCullough, Sterl Artley, Robert Ennis, William Sheldon, Albert Harris, John DeBoer, William Eller, Ruth Strickland, and Roy Kress.

FIGURE I

CRITICAL READING ABILITY IN RELATION TO TOTAL READING ABILITY





Development of Trial Forms of the Test

Due to the comprehensive nature of the list of critical reading skills and the practical problem of staying within reasonable time limits for testing elementary school children, not all skills cited could be tested. Therefore, a sampling of skills from each of the three major groups was used to develop the initial forms of the Critical Reading Tests. When two skills were similar only one was tested, and only those skills appropriate to the age level to be tested were included. Parallel items were written for each of the skills selected and were subjected to readability formulas. Items were refined and selected for the trial forms on the basis of test specifications and criteria developed by The Test Development Center at The Ohio State University. The trial forms for the primary and intermediate grades were then administered to a national sample of 3017 children. Item analysis was performed on the results of this administration in order to select items for the final forms of the test. Criteria for the selection of items included level of item difficulty, balance among incorrect alternatives, and discriminating power. Several changes in vocabulary were made as a result of empirical evidence from the trial forms. The reliability of each form at each grade level was regarded as acceptable. The reliability coefficients obtained with the KR-20 formula are presented in Table 1.



TABLE 1

RELIABILITY COEFFICIENTS OF TRIAL FORMS
OF CRITICAL READING TEST

| | Primary Leve | 1 | 1n | termediate Leve | :1 |
|-------|--------------|--------|-------|-----------------|--------|
| Grade | Form 1 | Form 2 | Grade | Form 3 | Form 4 |
| i | .83 | .72 | 4 | .76 | .73 |
| 2 | .84 | .85 | 5 | .80 | .83 |
| 3 | .80 | .84 | 6 | .81 | .86 |



Development of Final Forms of the Critical Reading Test

Three forms of the Critical Reading Test were developed from the items on the trial forms. The Level 2 Primary Critical Reading Test was intended to be used with children in grades two and three who have developed a general reading level of 2.5. The Level 1 Primary Test is basically the same test with a lower readability level and one which can be read to the saudents by the test administrator. The Intermediate form was intended for use in grades four, five, and six. A 4.0 reading level is necessary to master the general reading mechanics of the Intermediate form.* Sample items from the Primary and Intermediate forms are provided in Appendix A.

Norming Final Forms of the Critical Reading Test

The Test Development Center selected another national sample for the purpose of norming the tests. Forty-six school systems from four major geographical areas contributed to the normative sample. A random sampling of schools listed in the state educational directories was used. The states which contributed to the normative sample with the number of schools and classes in parentheses after each state were Idaho, (7:18); Louisiana, (4:10); Maine, (7:14); Minnesota, (6:16); Mississippi, (5:10); New Jersey, (6:16); Oklahoma, (4:9); and South Carolina, (7:20). The total number of students included in the fall norms is 3527 and in the spring norms is 2143. The number of students at each grade level included in the present norms is reported along with the percentile ranks. The norms are expressed in terms of percentile rank equivalents and are found in Tables 2, 3, and 4.



^{*}In the Critical Reading Study (CRP 2612) the Level 1 Primary was used in grade 1, the Level 2 in grades 2 and 3, and the Intermediate form in grades 4-6.

TABLE 2
NORMS FOR LEVEL 2 PRIMARY TEST

| | Fa | 11 | Spr | ing |
|--|---|--|--|--|
| Percentiles | Grade 2 N=485 | Grade 3 N=513 | Grade 2 N=321 | Grade 3 N=341 |
| 99 97 95 90 85 80 75 70 65 60 55 40 35 30 25 20 | 29-34+ 26-28 24-25 21-23 19-20 18 16-17 15 14 13 10 9 8 7 | 37-39+ 33-36 32 30-31 28-29 27 26 24-25 23 21-22 20 19 18 16-17 15 14 13 12 11 | 34-37+ 30-33 29 27-28 26 23-25 22 21 20 19 18 17 16 15 14 13 12 11 | 38-41+ 37 35-36 34 32-33 30-31 29 28 27 25-26 24 22-23 21 20 18-19 17 15-16 14 12-13 10-11 |
| 10 5 3 1 | 6 5 1-4 | 8-9 7 1-6 | 9 7-8 6 1-5 | 7-9 6 1 -5 |
| Mean | 13.88 | 20.07 | 17.72 | 22.67 |
| Standard Deviation | 5.52 | 7.85 | 6.79 | 8.40 |

TABLE 3

NORMS FOR LEVEL 1 PRIMARY TEST

| | Fa | 11 | Spr | ing |
|---|---|---|--|--|
| Percentiles | Grade 1 N=570 | Grade 2 N=404 | Grade 1 N=334 | Grade 2 N=275 |
| 99 97 95 98 98 99 99 99 99 99 99 80 70 60 50 40 35 25 20 15 10 53 1 | 26-29+ 24-25 22-23 20-21 19 17-18 16 15 14 13 12 10 9 8 7 6 5 1-4 | 30-34+ 27-29 26 24-25 23 22 20-21 19 18 17 16 15 14 13 12 11 10 9 7-8 1-6 | 32-34+ 31 29-30 28 26-27 25 23-24 22 21 20 19 18 16-17 15 14 13 12 11 9-10 8 7 1-6 | 33-34+ 31-32 30 28-29 27 24-26 23 22 21 20 19 18 17 16 15 14 12-13 10-11 9 8 1-7 |
| Mean | 13.79 | 16.70 | 18.49 | 19.71 |
| Standard Deviation | 5.15 | 6.09 | 6.9 | 6.33 |



TABLE 4
NORMS FOR INTERMEDIATE TEST

| | | Fall | | | Spring | |
|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| Percen- tiles | Grade 4 N=516 | Grade 5 N=522 | Grade 6 N=517 | Grade 4 N=301 | Grade 5 N=276 | Grade 6 N=295 |
| 99 | 33-36+ | 40-50+ | 41-47+ | 40-44+ | 39-44+ | 42-43+ |
| 97 | 30-32 | 35-39 | 39-40 | 37-39 | 38 | 40-41 |
| 95 | 27-29 | 32-34 | 37-38 | 34-36 | 37 | 39 |
| 90 | 24-26 | 30-31 | 35-36 | 31-33 | 35-36 , | 37-38 |
| 85 | 22-23 | 28-29 | 33-34 | 29-30 | 34 | 36 |
| 80 | 21 | 26-27 | 32 | 27-28 | 32-33 | 34-35 |
| 75 | 20 | 25 | 30-31 | 26 | 31 | 33 |
| 70 | 19 | 24 | 29 | 25 | 29-30 | 32 |
| 65 | 18 | 23 | 27-28 | 23-24 | 28 | 31 |
| 60 | 17 | 22 | 26 | 22 | 26-27 | 30 |
| 55 | | 21 | 25 | 21 | 25 | 29 |
| 50 | 16 | 20 | 24 | 20 | 24 | 27-28 |
| 45 | 15 | 19 | 23 | 19 | 23 | 26 |
| 40 | | 18 | 22 | 18 | 22 | 25 |
| 35 | 14 | 17 | 21 | 17 | 20-21 | 23-24 |
| 30 | | 16 | 20 | 16 | 19 | 22 |
| 25 | 13 | | 19 | 15 | 18 | 20-21 |
| 20 | | 15 | 17-18 | 14 | 17 | 18-19 |
| 15 | 12 | 14 | 16 | 13 | 15-16 | 16-17 |
| 10 | 10-11 | 12-13 | 15 | 12 | 13-14 | 14-15 |
| 5 | 9 | 11 | 13-14 | 9-11 | 11-12 | 12-13 |
| 5 3 | | 10 | 11-12 | 8 | 8-10 | 10-11 |
| 1 | 5 - 8 | 2- 9 | 5-10 | 1-7 | 1-7 | 1-9 |
| Mean | 17.22 | 21.23 | 25.00 | 21.55 | 24.78 | 27.21 |
| Standa Deviat | rd ion 5.54 | 6.80 | 7.69 | 7.92 | 8.20 | 8.42 |



Reliability of the Final Forms

Internal consistency of each form at each grade level was checked to get a measure of the reliability of the tests. The Kuder-Richardson formulas 20 and 21 and the split-half coefficients are given in Table 5 for the fall and spring administrations of the test.

The Kuder-Richardson formulae and the split-half methods were considered appropriate since the test was not timed. Reliabilities above .65 were considered acceptable since the scores were used to evaluate the level of group accomplishment.



TABLE 5

COEFFICIENTS OF RELIABILITY FOR THE OHIO STATE UNIVERSITY CRITICAL READING TESTS

| | | | | Fall | | | | | | Spring | ng | | |
|-----------------|-------|-------------|--------------|-------|--------------|-------|--------------|-------|--------------|--------|--------------|-------|--------------|
| Test | Grade | Grade KR-20 | St. Error | KR-21 | St. Error | 0d-Ev | St. Error | KR-20 | St. Error | KR-21 | St. Error | 0d-Ev | St. Error |
| Level Primary | _ | 89. | 2.89 | .67 | 2.97 | 69. | 2.86 | .82 | 2.90 | .80 | 3.07 | ₩. | 2.77 |
| Level Primary | 2 | 11. | 2.93 | .75 | 3.07 | .79 | 2.77 | .79 | 2.93 | .76 | 3.12 | .82 | 2.70 |
| Level 2 Primary | 8 | 17. | 2.99 | .70 | 3.04 | .70 | 3.6 | .80 | 3.05 | .78 | 3.18 | .82 | 2.88 |
| Level 2 Primary | m | .85 | 3.05 | .83 | 3.19 | ₹. | 3.11 | .87 | 2.98 | .86 | 3.19 | .89 | 2.79 |
| Intermediate | 4 | 99. | 3.24 | .63 | 3.37 | .68 | 3.13 | .83 | 3.29 | €. | 3.47 | .82 | 3.39 |
| Intermediate | 7 | .76 | 3.32 | .74 | 3.50 | .76 | 3.33 | ₩. | 3.31 | .82 | 3.52 | .83 | 3.39 |
| Intermediate | 9 | 8. | 3.34 | .79 | 3.54 | .82 | 3.29 | .85 | 3.30 | .82 | 3.52 | .83 | 3.50 |



Means, Standard Deviations and Grade Equivalent Scores

Evidence that the Level 1 Primary Test is easier to read than the Level 2 Primary can be seen by comparing the means of the two tests at the second grade level, shown in Table 6. Comparison of means across the primary grades shows a gradual increase. The same is true for the intermediate grades, although the mean for grade four is lower than the third grade mean. This is accounted for by the greater difficulty level of the Intermediate Test. The mean scores at each grade level were used to plot the grade equivalent scores, shown in Tables 7 and 8.



TABLE 6

OHIO STATE UNIVERSITY CRITICAL READING TEST MEANS AND STANDARD DEVIATIONS

| | | | Fall | | | Spring | |
|-----------------|-------|--------|-------|-----------------------|--------|--------|----------------------|
| Test | Grade | Number | Mean | Standard Deviation | Number | Mean | Standard Deviatio |
| Level Primary | 1 | 570 | 13.79 | 5.15 | 334 | 18.49 | 6.90 |
| Level Primary | 2 | 404 | 16.70 | 6.09 | 275 | 19.71 | 6.33 |
| Level 2 Primary | 2 | 485 | 13.88 | 5 .52 | 321 | 17.72 | 6.79 |
| Level 2 Primary | 3 | 513 | 20.07 | 7.85 | 341 | 22.67 | 8.40 |
| Intermediate | 4 | 516 | 17.22 | 5.54 | 301 | 21.55 | 7.92 |
| Intermediate | 5 | 522 | 21.23 | 6.80 | 276 | 24.78 | 8.20 |
| Intermediate | 6 | 517 | 25.00 | 7.69 | 295 | 27.21 | 8.42 |



TABLE 7

GRADE EQUIVALENT SCORES

| Level 1 Prima | ry Test | Level 2 Primar | y Test |
|------------------------------------|------------------------------|---------------------------------|---------------------------------------|
| Grade | Raw | Grade | Raw |
| Equivalent | Score | Equivalent | Score |
| 4.5 | 42 | 4.5 | 38-46 |
| 4.4 | 40-41 | 4.4 | 37 |
| 4.3 | 38-39 | 4.3 | 35-36 |
| 4.2 | 34-37 | 4.2 | 32-34 |
| 4.1 | 31-33 | 4.1 | 28-31 |
| 4.0 | 28-30 | 4.0 | 25-27 |
| 3.9 | 27 | 3.9 | 24 |
| 3.8 | 26 | 3.8 | 23 |
| 3.7 | | 3.7 | |
| 3.6 | 25 | 3.6 | 22 |
| 3.5 | | 3.5 | |
| 3.4 | 24 | 3.4 | 21 |
| 3.3 | | 3.3 | 20 |
| 3.2 | 23 | 3.2 | 20 |
| 3.1 | 22 | 3.1 | 10 |
| 3.0 | up. tax and div are | 3.0 | 19 |
| 2.9 | 21 | 2.9 | 18 |
| 2.8 | | 2.8 | 17 |
| 2.7 | 20 | 2.7 | 17 |
| 2.6 | ga ga 60 es es | 2.6 | 16 |
| 2.5 | 19 | 2.5 | 10 |
| 2.4 2.3 | an in; an an aj | 2.4 | 15 |
| 2.3 | ***** | 2.3 | 15 14 |
| 2.2 | 18 | 2.2 | 17 |
| 2.1 | | 2.1 | 13 |
| 2.0 | 17 | 2.0 | 13 12 |
| 1.9 | 17 | 1.2 | iī |
| 2.0 1.9 1.8 1.7 | 16 15 | 2.0 1.9 1.8 1.7 | 10 |
| 1./ | 15 14 | 1.6 | 9 |
| 1.6 1.5 1.4 1.3 | 17 | 1.6 1.5 1.4 1.3 1.2 | 8 |
| 1.5 | 13 12 | 1 1 1 | 7 |
| 1 . 4 4 | 11 | 1.3 | 6 |
| 1.2 | 10 | 1.2 | 5 |
| 1.2 | , , | 1.1 | 4 |
| 1.1 | 8 | 1 1.0 | 10 9 8 7 6 5 4 3 |
| 1.1 1.0 .9 .8 .7 .6 | 9 8 7 6 5 1-4 | 1.0 .9 .8 .7 .6 | * |
| , | 6 | .8 | 2 |
| .7 | 5 | .7 | |
| • 6 | 1-4 | .6 | 1 |



TABLE 8

GRADE EQUIVALENT SCORES

| Intermed | iate Test | |
|----------|--|---|
| Raw | Grade | Raw |
| Score | Equivalent | Score |
| 50-54 | 5.4 | 22 |
| 44-49 | 5.3 | 21 |
| 42-43 | 5.1 | 20 |
| 40-41 | 5.0 | 19 |
| 37-39 | 4.9 | 18 |
| 34-36 | 4.8 | 17 |
| 33 | 4.7 | 16 |
| 32 | 4.6 | 15 |
| 31 | 4.4 | 14 |
| 30 | 4.3 | 13 |
| 29 | 4.1 | 12 |
| 28 | 4.0 | 11 |
| 27 | 3.8 | 10 |
| | 3.7 | 9 |
| 26 | 3.6 | 8 |
| | 3.4 | 7 |
| 24 | 3.3 | 6 |
| | 3.1 | 1-5 |
| | Raw Score 50-54 44-49 42-43 40-41 37-39 34-36 33 32 31 30 29 28 27 26 | Score Equivalent 50-54 5.4 44-49 5.3 42-43 5.2 40-41 5.1 37-39 5.0 34-36 4.9 33 4.8 32 4.7 31 4.6 30 4.5 4.9 4.4 29 4.4 28 4.3 27 4.1 26 4.0 3.9 3.8 25 3.7 3.5 3.4 3.3 3.2 3.1 3.2 |



Item Analysis

University Critical Reading Test. The average level of difficulty of each section was assessed and is reported in Table 9. Examination of results for the Level 2 Primary at grade two shows that the test was very difficult at the fall administration and only a little less difficult in the spring. The Intermediate Test was also difficult for fourth graders, particularly in the fall testing. These results, plus the high correlations between critical reading and general reading ability in CRP 2612, suggest that our test is not free from the influence of general reading ability. The authors realize that critical reading requires a basic level of general reading ability, but do not accept the idea that general and critical reading ability are synonymous.



TABLE 9

ITEM ANALYSIS OF CRITICAL READING TEST

| | | | | | Fall | | | | | | | | Spring | gu | | | |
|-----------------|-------|---------------------|----------------------------|---------------------|----------------------------|--------------------|----------------------------|---------------------|----------------------------|--------------------|----------------------------|---------------------|----------------------------|---------------------|----------------------------|---------------------|----------------------------|
| | | Logic | U | General | le. | Li teratu | ature | Total | - | Log | Logic | General | le. | Literature | sture | Tota | ta i |
| Test Gr | Grade | No. of I tems | Ave. Lev. of Dif. | No. of I tems | Ave. Lev. of Dif. | No. of Items | Ave. Lev. of Dif. | No. of I tems | Ave. Lev. of Dif. | No. of Items | Ave. Lev. of Dif. | No. of I tems | Ave. Lev. of Dif. | No. of I tems | Ave. Lev. of Dif. | No. of I tems | Ave. Lev. of Dif. |
| Level Primary | _ | 17 | .32 | 0 | .33 | 15 | .34 | 42 | .33 | 17 | 14. | 10 | .45 | 15 | 94. | 74 | 44. |
| Level Primary | 7 | 17 | .36 | 0 | 14. | 15 | .42 | 42 | 04. | 17 | .43 | 0 | .5 | 15 | .50 | 745 | .47 |
| Level 2 Primary | 7 | 17 | .29 | 12 | .34 | 17 | .28 | 947 | .30 | 17 | .38 | 12 | .41 | 17 | .38 | 947 | .39 |
| Level 2 Primary | m | 17 | 97. | 2 | .47 | 17 | #. | 947 | \$. | 17 | 94. | 12 | .53 | 17 | .50 | 94 | 64. |
| Intermediate | 7 | 21 | .30 | 15 | .36 | 8 | .3 | 54 | .32 | 21 | .37 | 15 | #. | 8 | 04. | 54 | 04. |
| Intermediate | 2 | 21 | .36 | 15 | .45 | 8 | .39 | 54 | .39 | 21 | .43 | 15 | .51 | 8 | 94. | 75 | 9 4. |
| Intermediate | 9 | 21 | ## . | 15 | .51 | 81 | .45 | 54 | 94. | 21 | 64. | 15 | -54 | 81 | .49 | 54 | .50 |

Average level of difficulty = Per cent getting items in each section correct.



Factor Analysis of the Critical Reading Test

Factor analysis of <u>The Ohio State University Critical Reading Tests</u>
is currently being done for the following purposes:

- 1. to clarify what these tests measure.
- 2. to obtain factorial validity of the test.
- 3. to better understand the nature of critical reading.
- 4. to find specific areas in which the tests need improvement.

Hotelling's Principal Axis Method of factoring the correlation matrix was used in the first factor analysis. In view of the non-availability of outside criteria it was decided to factor analyze the 42 X 42 matrix of inter~item correlations. This was accomplished through the use of the "OSU Factor Analysis Program (FACANA)" and the Ohio State University Computer Center's IBM 7094 computer. After 20 iterations the entries in the residual matrix appeared to be small. The 20 factors thus obtained were then rotated according to Kaiser's Varimax Method. The first grade data, which is illustrative of other grades, showed that (a) the total fractional contribution of the 20 factors is equal to .7090, (b) the contribution of the first rotated factor is .0605 and that of each of the remaining 19 factors varies between .03 and .04, and (c) the 20 X 20 correlation matrix of these rotated factors (arranged in a decreasing order of magnitude) shows the varying degree of relationship between the different factors.

Seeing the results obtained by the Principal Axis Method, it was decided to study the data by using the Hierarchical Method (Vernon) in order to identify possible group factors. It appears that critical reading abilities may be described by a hierarchy ranging from the very broad factors to those present in very specific items. Continued work with the Hierarchical Method will confirm or deny this assumption.



Validity of the Final Forms

It has not been feasible to assess the predictive validity of the Critical Reading Test. During the year in which norms were established, the research team used the test as a pretest-posttest measure of growth in critical reading ability of elementary school children. Teachers selected randomly from the control and experimental groups were asked to list the five highest and five lowest critical readers in their group according to their judgment. Their ratings were compared to the ratings made by the Critical Reading Test. When the teacher judgments were compared with the results of the test, the teachers selected three of the five highest and two of the five lowest according to the test. The probability that this would occur by chance is .16-02 (hypergeometric prob. dist.)

Construct Validity. In the study being reported by Willavene Wolf, (CRP 2612) it was found that the experimental groups trained in the skills of critical reading based on the operational definition differed significantly from control groups. Children who were taught critical reading skills did gain significantly more than a "control" or alternate treatment group. This "non-equivalent control group" received instruction in general reading skills and used children's literature in all areas of the curriculum. The "control" group gains in general reading ability were comparable to the experimental, but not in the specific skills of critical reading. Evidence for construct validity is shown in the data on correlations presented by Wolf. General reading did correlate significantly with critical reading ability at all grade levels. Intelligence occrelated significantly with critical reading at all grade levels except grade four. This is difficult to interpret because of the low reliability of the Critical Reading Test at this grade level.



Summary

In summary, The Ohio State University Critical Reading Test was developed to measure the analytic and evaluative abilities of elementary school children. It was developed as a part of USOE Project 2612. As an experimental instrument it has been normed and factor analysis is underway. The test will be available by June, 1967, for use as a diagnostic or achievement instrument from The Ohio State University Press. Although the test will be refined in the future, it now provides a reasonably adequate measure of growth in a previously undefined area of reading.



APPENDIX A

SAMPLE ITEMS FROM PRIMARY AND INTERMEDIATE
OHIO STATE UNIVERSITY
CRITICAL READING TEST

PRIMARY TEST OF CRITICAL READING

Sample Test Items on Logic

1. Recognizing False Analogies

a) A boy is like a tree. He must stand straight to grow tall.

What is wrong with these sentences?

- (1) Trees are always straight, but boys are not.
- (2) Trees are always straighter than boys.
- (3) Boys are not as tall as trees.
- (4) Boys are not like trees in most ways.

2. Making Generalizations

b) Nancy said, "Boys are bad. All the girls in my class said so. I think our teacher should tell boys that they can't come to school.

What should Nancy have said?

- (1) Every girl in the world thinks boys are bad.
- (2) All of the girls in my class think boys are bad.
- (3) Boys are bad because all the girls in my class said so.
- (4) Everybody knows that girls think boys are bad.

3. Drawing Conclusions

c) Anyone who is on a TV show is rich. Captain Kangaroo is on a TV show.

If the above sentences are true, what else must be true?

- (1) Captain Kangaroo is rich.
- (2) People who are not on a TV show are poor.
- (3) Captain Kangaroo may be rich.
- (4) Anyone on a TV show may be rich.



Sample Test Items on General Skills

1. Comparing Information from Two Different Sources

The First Story

The little deer stood still as the lion walked in the forest. The deer's fur was the color of many of the fall leaves. The lion did not see the deer.

The Second Story

In a war, men paint their clothes and tanks with many colored spots. They use colors that look like the trees, ground, and sky. The enemy cannot see the men in the forest.

- a) How are these two stories alike?
 - (1) They tell how colors can protect you.
 - (2) They tell about men who paint their clothes.
 - (3) They tell about a lion and a deer.
 - (4) They tell about a walk in the forest.
- b) How are these stories different?
 - (1) One is about clothes, the other is about leaves.
 - (2) One is about colors, the other is about leaves.
 - (3) One is about lions, the other is about trees.
 - (4) One is about animals, the other is about men.



Sample Test Items on Literary Skills

1. Identifying Literary Form and Theme

The Fox and the Grapes

A fox looked at some grapes that grew up high. He wanted to eat them. When he could not get them, he said, "Oh, well, the grapes would be sour anyway."

- a) What kind of a story is this?
 - (1) A story that tells about someone's life.
 - (2) A true story.
 - (3) A story that explains things.
 - (4) A fable.
- b) What is the main idea of this story?
 - (1) Grapes that grow up high are hard to reach.
 - (2) Grapes that grow up high are sour and no good.
 - (3) If you can't have something you want, pretend it isn't any good.
 - (4) If you want to eat grapes that grow up high, climb up to get them.



INTERMEDIATE TEST OF CRITICAL READING

Sample Test Items on Logic

1. Recognizing Omission of Data

a) Mr. Clark said that all women are bad drivers. However, Mrs. Clark said "Official records show that men have twice as many accidents as women do. So women drivers are really twice as safe as men."

What must you know before you could agree with Mrs. Clark?

- (1) How many women have taken driving lessons.
- (2) How many drivers are men and how many are women.
- (3) Do men drive faster than women?
- (4) How many bad drivers have stopped driving.

2. Making Generalizations

b) Once a little boy who was out walking with his collie wandered away from home and fell into a well. His collie went for help, and led the boy's father to the well. Another time a collie helped a lost boy find his way back to his home.

What conclusion can be drawn from these statements?

- (1) Collies are the best pets children can have.
- (2) Collies are helpful in saving all children.
- (3) Collies are good pets because they always bring people to help you.
- (4) Collies were helpful in saving two children.

3. Recognizing Unstated Assumptions

c) John received an A in Science. He must be smart,

If these statements are true, what is taken for granted?

- (1) All children who get A's in science must be smart.
- (2) Some children who get A;s in science must be smart.
- (3) A child receiving an A in any subject must be smart.
- (4) Other children in the class may not be smart.



Sample Test Items on General Skills

1. Comparing Information from Two Sources

The Autobiography of Benjamin Franklin

"I was put in grammar school at eight years of age, my father intending to devote me...to the service of the church. My early readiness in learning to read (which must have been very early as I do not remember when I could not read), and the opinion of his friends, that I should make a good scholar, encouraged him in this purpose... I continued at the grammar school not quite a year, though I had risen gradually from the middle of the class of that year to the head of it... But my father, in the meantime, thinking of the expense of a college education, which having so large a family he could not well afford... took me from the grammar school and sent me to a school for writing and arithmetic...I acquired fair writing pretty soon, but failed in the arithmetic. At ten years old I was taken home to assist in my father's business, which was that of tallow candle-maker and soapboiler."

Benjamin Franklin

'When Benjamin was eight years old, his father sent him to grammar school. He rose to the head of his class in reading and writing, and he read every book he could lay his hands on. But he was poor in arithmetic. His father began to think that perhaps Benjamin should be a tradesman like his brothers. So, when Benjamin was ten years old, he was taken out of school to learn the trade of candlemaking."

- a) How are the two stories different?
 - (1) The second story gives more information about Franklin than the first story.
 - (2) The second story is a second-hand report, the first story is a first-hand report.
 - (3) The second story is more accurate than the first one.
 - (4) The second story is better than the first one because it was written by a more experienced novelist.



- b) How do the two stories describe the <u>reasons</u> for Ben's removal from grammar school?
 - (1) In the first story his father wanted Ben to be a writer; in the second story he wanted him to be a tradesman like his brothers.
 - (2) The first story and the second story both say that his father removed Ben from grammar school because he was poor in arithmetic.
 - (3) The first story says that his father wanted Ben to work at soap boiling; the second story says he wanted Ben to be a candle-maker.
 - (4) The first one says that Ben's education was too expensive and the second says his father wanted Ben to be a tradesman.
- c) Which of the following sources would you choose if you wanted the best account of Franklin's thinking?
 - (1) An encyclopedia
 - (2) The second story
 - (3) The first story
 - (4) A history book



Sample Test Items on Literary Skills

1. Testing Ability to Assess Characterization, Setting, and Symbolism

The Cabin Faced West

Ann Hamilton swept the last of the day's durt out of the door into the sunset. Even the cabin faced west, Ann shought as she jerked the broom across the flat path the daylight made as it fell through the open door-way. It was the only place the daylight had a chance to come in. The cabin was solid logs all the way around without another opening anywhere. Its back was turned squarely against the East just as her father had turned his back. Just as her brothers David and Daniel had. 'We've cast our lot with the West," her father had said as he stood in the doorway the day the cabin was completed. 'And we won't look back."

Ann sighed as she leaned the broom against the wall near the hearth where her mother was rocking the baby.

"Ann." Mrs. Hamilton looked up with a little frown between her eyes. "Ann, there's no more work for you today. I can finish alone. You run along, if you've a mind to."

Ann went over and gave her mother a quick hug before she started for the door. "I'm going down to the road," she said.

Of all the places on her father's hill, Ann liked the road best. She had a feeling about the road. Sometimes her mother said she had a "feeling in her bones." She couldn't explain it; it was just there. That was the way Ann was about the road.

As she stood now, looking down where the road dropped over the hill and melted away under the great trees and tangled grapevines, Ann felt the usual excitement. It was silly to feel that way, she told herself. Nothing ever happened at this end of the road; everything exciting was at the other end—the Gettysburg end. Certainly there was nothing exciting about the road itself. Ann shuddered when she remembered the long, weary miles the road took up each of those dreadful mountains and the slipping, sliding miles down the other side, as they crossed Pennsylvania. Yet when Ann was alone, she usually came right here. It was almost as if the road held some kind of special promise for her.

- a) Which of the following words describes Ann Hamilton?
 - (1) Lazy
 - (2) Indifferent
 - (3) Ungrateful
 - (4) Lonely



- b) Which of the following statements best describes the time and setting of this story?
 - (1) A family living in a log cabin on a hill during the colonial period.
 - (2) A pioneer family living high in the Rocky Mountains.
 - (3) A modern family camping out in a national park.
 - (4) A family of early settlers on the western plains.
- c) Building the cabin to face west held a special meaning for Ann's father. Which of the following statements best describes that meaning?
 - (1) He wanted a better view of the road.
 - (2) He wanted to face the sunset.
 - (3) He was looking to the west for his future.
 - (4) He wanted to face Gettysburg.
- d) The last paragraph of this story suggests that the road holds a "special promise" for Ann. What do you think it might be?
 - (1) The end of the road offers new experiences for her.
 - (2) A return home to visit her friends in the East.
 - (3) A frightening but tempting visit to the West.
 - (4) A chance to travel down the road.

