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ABSTRACT

The relationship between the reading abilities of 215 freshman composition students and the readability of their college textbooks was studied. Measures from the Nelson-Denny Reading Test and the Dale-Chall Readability Formula were used to assess the relationship between reading ability and the readability of the textbooks. Results indicated that 72% of the students were scoring at or above the freshman reading level. Therefore, four out of the six freshman textbooks used in the study might be considered inappropriate for over one-fourth of the total student sample. (Author/AA)

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TOWSON STATE COLLEGE

THE READING ABILITY OF COLLEGE STUDENTS VERSUS THE READABILITY OF THEIR TEXTS

by

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JUNE, 1976

ERIC

ABSTRACT

The relationship between the reading ability of college students with the readability of college textbooks they typically encounter was studied. Subjects in the study were 215 students enrolled in Freshman Composition during the Spring 1976 semester. Measures from the Nelson-Denny Reading Test and the Dale-Chall Readability Formula were used to assess the relationship between reading ability and the readability of the textbooks. It was concluded that 72% of the students were scoring at or above the freshman reading level. Moreover, 4 out of the 6 freshman textbooks used in the study might be considered inappropriate for over $\frac{1}{4}$ of the total student sample.

Introduction

Most studies have generally found that there are huge discrepancies between the reading ability of college students and the readability levels of their texts. This is quite a serious problem as most courses rely quite heavily upon assigned textbook materials. If the students are having difficulties with the readings, then they will most likely have trouble obtaining high grades in their courses or even passing their courses. Additionally, constant efforts by a student to read material which is significantly above his reading level might lead to frustration, anger, resentment, etc., feelings which are certainly not conducive to successful academic achievement nor continued college attendance. Thus, huge discrepancies between student reading ability and textbook readability probably exert a tremendous impact upon attrition rates.

The purpose of this study is to determine where students attending Towson State College stand in relation to the readability of their texts.

REVIEW OF THE LITERATURE

The average reading level of college freshmen has often been shown to be below grade level 13.0. However, the mean reading level is not indicative of the true seriousness of the problem as further inspection will usually reveal an extended range of reading level scores. Martin, for instance, obtained a mean reading level of 12.6 for freshmen at New York City Community College. However, individual scores on the Nelson-Denny Reading Test (Form A) ranged from the 1st percentile to the 99th percentile. While 43.6% of the students were reading at grade level 13.0 or above, 25% were reading at grade level 11.0 or below (with 19.7% of them reading at grade level 10.5 or below). Thus, college instructors, in assigning texts, must be cognizant of the fact that many of their students are reading considerably below grade level.

How well have college instructors reacted to the fact that many of their students are reading below grade level? Judging from the available research, the answer is "not very well at all". The discovery of substantial discrepancies between the reading level of students and the readability levels of their texts has been found to be the norm.

Cline (1972) compared the readability of textbooks at a Missouri community college with the reading levels of the freshmen who used them (reading ability was determined by the Nelson-Denny Reading Test, readability was determined by the Dale-Chall Readability Formula). Of the 17 textbooks he analyzed, 11 were above the reading ability of at least 50% of the students in those classes, while 7 were above at least 75% of the students in those classes. In all, Cline found that 52% of the students in all of the classes had reading abilities below their texts. He concluded that "The results are startling when it is considered that the average

ability of the students was computed to be grade level 12.6, which is probably higher than most community colleges. The results indicate that disparities exist between the readability of community college textbooks and reading ability of their users."

McClellan (1970), after administering the Nelson-Denny Reading Test to 358 students in 20 classes, found that:

a) 30.2% of the students were reading at the 13.0 grade level or above.

b) 33.5% were reading at the 10th, 11th, or 12th grade level.

c) 32.1% were reading at the 7th, 8th, or 9th grade level.

d) 4.2% were reading below the 7th grade level.

In comparing the readability level (Dale-Chall Readability Formula) of a social science text with the reading level of the 4 classes using it, McClellan discovered that the difference between the two measures to be statistically significant. She also found a statistically significant difference between the readability of a Guided Studies English text and the reading ability of the students using it. Finally, an analysis of 20 selected textbooks revealed that 8 had readability scores of grade level 16.0 or above, while 4 had a readability level ranging from grade level 13 through grade level 15.

Hagstrom, in one study (1971), compared the reading level of 359 junior college students (as determined by the Diagnostic Reading Test) with the readability of their textbooks (Dale-Chall Readability Formula). Of the 29 textbooks he evaluated for 16 different classes, almost half of them (14) "proved to be inappropriate for the learners if we say that a text should not be more than one grade level above the reading ability of the student who uses it". In another study (1974), Hagstrom compared the

reading level of students (Diagnostic Reading Test) in 5 different occupational courses with the readability levels of their textbooks (Dale-Chall Readability Formula). Of the 12 texts evaluated, he found that 9 proved to be inappropriate for the learners on the basis that a text should not be more than one grade level above the reading ability of the student who uses it.

Kurzman (1974) compared the reading ability of 81 students taking social science courses at a senior college in the Bronx, New York, with the readability levels (SMOG) of 23 of their social science textbooks. The average reading level of the students, as determined by the Nelson-Denny Reading Test, was 10.4. The average readability levels of the texts (comprised of evaluations from the SMOG, from 2 reading teachers, and from the social science teachers whose books were being used) showed a range of from grade 13 through grade 17. Four of the texts were on the 13th grade level, 7 were on the 14th grade level, 5 were on the 15th grade level, 6 were on the 16th grade level, and 2 were on the 17th grade level. Kurzman stated that "This study shows that social science textbooks used by a group of college freshmen were in most cases many grade levels above their reading ability. For use in self-study, which is one of the main objectives of a college education, the textbooks were found to be too difficult for many of the students to comprehend adequately or properly".

Burford (1970) compared the reading ability (Cooperative English Test: Reading Comprehension Form 1A) of freshmen in 21 sections of the Earth Science 141 course at East Texas State University with the readability (Dale-Chall Readability Formula) of their earth science textbooks. The reading abilities of the students were found to range from the 8th grade level to the college graduate level, with the mean falling at the 13th

grade level. In comparison, a majority of the samples of reading material taken from the texts were rated at the 12th and 13th-15th grade levels. This was above the reading level of 38% of the students.

STATEMENT OF THE PROBLEM

This study was conducted to assess the relationship between the reading ability of college students with the readability of college textbooks they typically encounter.

SUBJECTS

The subjects in this study were 215 students enrolled in English 30-102 (Freshman Composition) during the Spring 1976 semester. Of the 215 subjects who participated in the study, 161 or 74.9% were freshmen, 33 or 15.3% were not freshmen, and 21 or 9.8% were unidentified with respect to class standing. The subjects were selected from intact classes consisting of approximately 15 students in each section.

The textbooks selected for the study were a sample of those texts commonly used by freshmen at Towson State College. Textbooks were selected from the lower division courses which offered the greatest number of sections (indicating that the course attracts a substantial number of underclassmen). Those courses which best fit that criteria were Freshman Composition 30-102, General Psychology 70-101, History of the United States 40-145 and 40-146, Introductory to Sociology 80-191, and Current Health Problems 41-101. Textbooks from several important subject areas were purposely excluded from the study. This was due to the fact that readability formulas are not applicable to all types of reading material. Textbooks in the areas of mathematics (which rely upon formulas) and the sciences (which rely upon highly specific terminology) would appear to be outside the jurisdiction of a readability formula such as the Dale-Chall. As a consequence, textbooks in these subjects were excluded from this study.

PROCEDURES

The Nelson-Denny Reading Test was administered to 215 Towson State College students during the second week of the Spring 1976 semester. All of the testing took place in 15 sections of Freshman Compositon. The selection of the specific Freshman Composition sections to be tested was based primarily upon availability. Testing occurred only in those sections in which the instructor had previously consented to the use of his students for the study.

In order to meet ethical demands, a statement was read prior to the administration of the examination which stressed the voluntary nature of the testing situation. The students were told that they were not required to take the test but could instead leave class early. Nevertheless, the vast majority of the students chose to take the exam.

A sample of textbooks which were commonly used by freshmen at Towson State College was selected from those lower division courses offering the greatest number of sections. These courses were: English Composition, History of the United States, Introduction to Sociology, Current Health Problems and General Psychology. The selection of the psychology and health textbooks was a relatively simple matter, as a decided favorite was clearly observed in both cases. However, for the remaining three courses, there was a multitude of textbooks from which to choose. As a result, a list containing several of the most commonly used textbooks in English 30-102, History 40-145, and Sociology 80-101 was requested from each of the appropriate department chairmen. From these lists, 4 textbocks were chosen to be used in the study (1 in history, 1 in English, and 2 in sociology).

Samples of approximately 100 words were taken from each textbook at intervals of 12-16 pages. Each sample was then fed to a computer previously programmed with the Dale-Chall Readability Formula.

RESULTS

Of the 215 students tested with the Nelson-Denny, 161 (74.9%) classified themselves as freshmen, 33 (15.3%) classified themselves as non-freshmen, and 21 (9.8%) failed to identify their class standing. Approximately one-half of the students were tested with Form C of the Nelson-Denny while the remaining half were tested with Form D. A summary of the test results is provided in Tables 1 and 2. In addition, highly detailed graphs of the raw data may be viewed in Appendix 1.

As indicated in Table 1, the mean scores on the vocabulary and comprehension sections of Form C of the Nelson-Denny were 36.58 and 41.80, respectively, with the mean total score being 78.38. The grade equivalents for these mean scores (see Appendix 2) are 14.5 (vocabulary), 13.5 (comprehension), and 13.9 (total). Thus, the mean student score on each scale of the Nelson-Denny was at the college level. With respect to Form D (Table 2), the mean raw scores were 40.41 (vocabulary), 43.92 (comprehension), and 84.33 (total). These translate into grade equivalents of 14.7, 13.7, and 14.1, respectively. Thus, once again, the mean score for each scale of the Nelson-Denny was at the college level.

Although the grade equivalents of the mean student scores closely approximated the actual grade level of the students tested, Table 3 reveals that individual student scores could be found all along the continuum of measurable grade levels. On the vocabulary section of the test, students scored anywhere from the 7th grade level to somewhere above the 15th grade level. Over 78% of the students received scores which were deemed to be on the college level, with 35.8% of them obtaining scores which, at the least, corresponded to the 15th grade. However, it must also be reported that 21.9% of the students did not score at the college level.

Student scores on the comprehension section of the Nelson-Denny were also distributed quite freely along the grade level continuum. Scores ranged anywhere from below the 6th grade level to an undetermined point above the 15th grade level. Between 64 and 65 percent of the students registered at the college level, with 23.8% of them attaining or surpassing the 15th grade level. In contrast, a total of 76 students or 35.5% failed to score at the college level.

Nelson-Denny total scores (which consist of both the student's vocabulary and comprehension scores) were also distributed across all the measurable grade levels. Scores ranged anywhere from approximately the 6th grade level to somewhere above the 15th grade level. On this measure of "total" reading ability, 72% of the students succeeded in reaching the college level while 28% fell somewhere below that point.

Information concerning the readability of each textbook used in the study is provided in Table 4. Both the English and History textbooks appear to pose the fewest problems to students reading at the college level, as only 9.4% of the samples taken from the History text and 21.4% of the samples taken from the English text were considered to be at the freshman reading level or above. The remaining 4 textbooks contain a much higher proportion of college reading material. Sixty-three percent of the samples taken from the psychology textbook were scored as being at or above the freshman reading level, while comparable figures for the remaining texts were 58.6% (health), 56.8% (sociology - Light and Keller), and 47.9% (sociology - Popenoe). Thus, over half of the samples taken from three of the six textbooks used in the study were at or above the freshman reading level; with the proportion of samples from a fourth textbook closely approaching this figure.

CONCLUSIONS

An inspection of the Nelson-Denny test data reveals that the distribution of student scores was visibly skewed towards the upper grade levels. Clearly, most of the students were scoring at or above the freshman reading level. This leads to two questions. First, are the Nelson-Denny grade equivalents valid interpretations of the raw scores? Second, even if the reading ability of the vast majority of students is at the college level, does this necessarily indicate that the situation is a totally satisfactory one?

As stated earlier, 72% of the students received total reading scores which corresponded to the college level. This was determined by use of the Nelson-Denny raw score to grade equivalent chart shown in Appendix 2. An important point to remember about this chart is that it is based upon data derived primarily from high school students. All the grade equivalents it lists which fall outside of the high school range are extrapolations. Thus, the college level grade equivalents were not developed from information supplied by college students, but were based upon extensions of the data obtained from high school students. This suggests that, for college students, the transformation of raw scores to grade levels is not a satisfactory manner of interpreting Nelson-Denny test results as the grade equivalents were not based upon a similar population.

Although the above statements offer a sceptical view towards the utilization of Nelson-Denny grade equivalents, the purpose of this study necessitated their use. Again, the purpose of this study was to determine the reading level of Towson State College students and compare it to the readability of several of their texts. Since reading level refers to the

degree of reading ability appropriate for a particular age or grade level, it was imperative that the experimenter be able to categorize test scores in terms of the grade levels for which they were appropriate. The grade equivalent chart offered the only available means of doing so; therefore, most of the student test data, including the following information, is interpreted in terms of these scores.

As reported earlier, 72% of the students received total reading scores which corresponded to the college level. This left 28% who did not ieve this mark, a relatively small but rather significant number. If these students were given the six textbooks listed in Table 3 to read, what would happen? Based upon the data, it appears that most of them would have little difficul y with the history text or possibly even with the English text. However, it is a completely different matter with respect to the remaining four books. With each, the data suggests that the student will be confronted with a considerable amount of reading material which is better suited for persons with greater reading ability. The proportion of sam d passages which were considered to be at the college level or above ranged from 47.9% to 63%. Thus, 4 out of the 6 freshman textbooks used in the study might be considered inappropriate for over $\frac{1}{4}$ of the total student sample. In addition, 34.5% of the sampled passages from the health text, 28.3% of the sampled passages from the psychology text, and 22.9% of the sampled passages from one of the sociology texts were calculated as being at least at the 16th grade level. This is well above the reported reading level of the vast majority of students. It, therefore, seems plausible to assume that even those students who exhibited average to above average reading ability would experience p riodic difficulty with these t e texts. However, before this sta ement is accepted as a valid conclusion, several points

should be made about the Dale-Chall Readability Formula.

The Dale-Chall Readability Formula is primarily based upon the familiarity of words within the reading sample; with sentence length comprising a secondary component to the readability equation. Thus, reading level is determined by the difficulty of individual words rather than by the difficulty of the overall concept presented in the sample passage. Secondly, the grade equivalents for scores derived from the Dale-Chall Readability Formula are far from exact. For instance, a score between 9.0 and 9.9 signifies that the sampled passage resides anywhere from the 13th through the 15th grade levels. Dale-Chall grade equivalents should, therefore, be thought of as rough approximations.

It was the considered opinion of this experimenter that the grade levels computed for the reading samples were, on the average, a bit high. What prompted this opinion was the observation that numerous samples contained several unfamiliar words (words not on the Dale-Chall familiar words list) which were thoroughly defined within the context of the book. For example, "socialization" might have been painstakingly defined within a sampled paragraph for the reader; with the remainder of the passage revolving around a discussion that constantly referred to the term. The constant repetition of this "unfamiliar word" subsequently increased the calculated reading level of the sampled passage, even though the reader had become familiarized with the term. This type of situation was witnessed frequently enough to suggest that it significantly influenced the overall computation of grade levels.

DISCUSSION

As related earlier, there existed a great deal of uncertainty in the assignment of grade levels to measures of reading ability. The same was also true with respect to the application of grade levels to samples of reading material. Yet even if the grade equivalents tentatively proposed in this paper were declared to be absolutely correct; it still would be questionable as to whether a student's reading level (as measured by the Nelson-Denny) accurately corresponded to the appropriate reading ability for material judged to be at the same grade level (by the Dale-Chall Formula) as both forms of assessment were devised from different student populations. This strongly suggests the use of an alternative experiemental design which tests the student's ability to master his textbook material in a more direct manner.

TABLE 1

Results of Student Testing

1) Nelson-Denny Reading Test - Form C

Vocabulary Section

Number of classes tested	= 7
Number of students tested	= 109
Mean	= 36.58
Median	= 35
Mode	= 35 (8 scores)
Range	= 8-78
Standard Deviation	= 12.9449

2) Nelson-Denny Reading Test - Form C

Comprehension Section

Number of classes tested	= 7
Number of students tested	= 109
Mean	= 41.80
Median	= 42
Mode	= 52 (10 scores)
Range	= 8-66
Standard Deviation	= 10.9878

3) Nelson-Denny Reading Test - Form C

Total

Number of classes tested	= 7
Number of students tested	= 109
Mean	= 78.38
Median	= 78
Mode	= 79 (5 scores)
Range	= 32-130
Standard Deviation	= 21.3939

TABLE 2

Results of Student Testing

4) Nelson-Denny Reading Test - Form D

Vocabulary Section

Number of classes tested	= 8
Number of students tested	= 106
Mean	= 40.41
Median	= 38.5
Mode	= 27, 32, 41 (4 scores)
Range	= 6-88
Standard Deviation	= 16.9093

5) Nelson-Denny Reading Test - Form D

Comprehension Section

Number of classes tested	= 8
Number of students tested	= 105
Mean	= 43.92
Median	= 44
Mode	= 50 (12 scores)
Range	= 18-68
Standard Deviation	= 9.9560

6) Nelson-Denny Reading Test - Form D

Total

Number of classes tested	= 8
Number of students tested	= 105
Mean	= 84.33
Median	= 84
Mode	= 74, 84, 86, 95 (4 scores)
Range	= 26-148
Standard Deviation	= 25.0564

TABLE 3

Distribution of Nelson-Denny Scores Across Suggested Grade Levels*

Vocabulary Section

Form D

Grade Level	Frequency	%
6	0	0 %
7	1	.9%
8	2	1.9%
9	4	3.8%
10	1	.9%
11	9	8.5%
12	11	10.4%
13	13	12.3%
14	23	21.7%
15+	42	39.6%
	106	student scores

Form C

Grade Level	Frequency	%
6	0	0 %
7	3	2.8%
8	3	2.8%
9	2	1.8%
10	1	.9%
11	5	4.6%
12	5	4.6%
13	21	19.3%
14	34	31.2%
15+	35	32.1%
	109	student scores

Comprehension Section

Form D

Grade Level	Frequency	%
below 6	0	0 %
6	1	1 %
7	1	1 %
8	3	2.9%
9	6	5.7%
10	4	3.8%
11	7	6.7%
12	11	10.5%
13	25	23.8%
14	21	20.0%
15+	26	24.8%
	105	student scores

Form C

Grade Level	Frequency	%
below 6	1	.9%
6	0	0 %
7	3	2.8%
8	7	6.4%
9	7	6.4%
10	7	6.4%
11	5	4.6%
12	13	11.9%
13	22	20.2%
14	19	17.4%
15+	25	22.9%
	109	student scores

*see appendix 2

TABLE 3 (cont.)

Total

Form D			Form C		
Grade Level	Frequency	%	Grade Level	Frequency	%
6	1	1.0%	6	0	0.0%
7	0	0.0%	7	2	1.8%
8	1	1.0%	8	2	1.8%
9	4	3.8%	9	3	2.8%
10	3	2.9%	10	7	6.4%
11	7	6.7%	11	4	3.7%
12	14	13.3%	12	12	11.0%
13	15	14.3%	13	32	29.4%
14	26	24.8%	14	22	20.2%
15+	34	32.4%	15+	25	22.9%
	105 student scores			109 student scores	

TABLE 4

Distribution of Reading Samples Across Suggested Grade Levels*

1) subject - psychology
textbook - Hilgard; Introduction to Psychology, 6th edition, Harcourt Brace, Jovanovich Inc.

Suggested Grade Level	Frequency of Textbook Samples	%
4 and below	0	0.0%
5-6	0	0.0%
7-8	1	2.2%
9-10	6	13.0%
11-12	10	21.7%
13-15	16	34.8%
16+	13	28.3%
	46 textbook samples	

2) subject - history
textbook Weinstein and Wilson; Freedom and Crisis, Vol. I, Random House.

Suggested Grade Level	Frequency of Textbook Samples	%
4 and below	0	0.0%
5-6	1	3.1%
7-8	9	28.1%
9-10	11	34.4%
11-12	8	25.0%
13-15	3	9.4%
16+	0	0.0%
	32 textbook samples	

3) subject - health
textbook - CRM; Essentials of Life and Health, Random House.

Suggested Grade Level	Frequency of Textbook Samples	%
4 and below	0	0.0%
5-6	0	0.0%
7-8	1	3.4%
9-10	5	17.2%
11-12	6	20.7%
13-15	7	24.1%
16+	10	34.5%
	29 textbook samples	

TABLE 4 (cont.)

4) subject - English
Textbook - Guth; Words and Ideas, A Handbook for College Writing, 3rd edition. Wadsworth Publishing Company, Inc.

Suggested Grade Level	Frequency of Textbook Samples	%
4 and below	1	2.4%
5-6	0	0.0%
7-8	6	14.3%
9-10	15	35.7%
11-12	11	26.2%
13-15	8	19.0%
16+	1	2.4%
	42	

5) subject - sociology
textbook - Light and Keller; Sociology, Alfred A. Knopf.

Suggested Grade Level	Frequency of Textbook Samples	%
4 and below	0	0.0%
5-6	1	2.7%
7-8	1	2.7%
9-10	2	5.4%
11-12	12	32.4%
13-15	16	43.2%
16+	5	13.5%
	37	

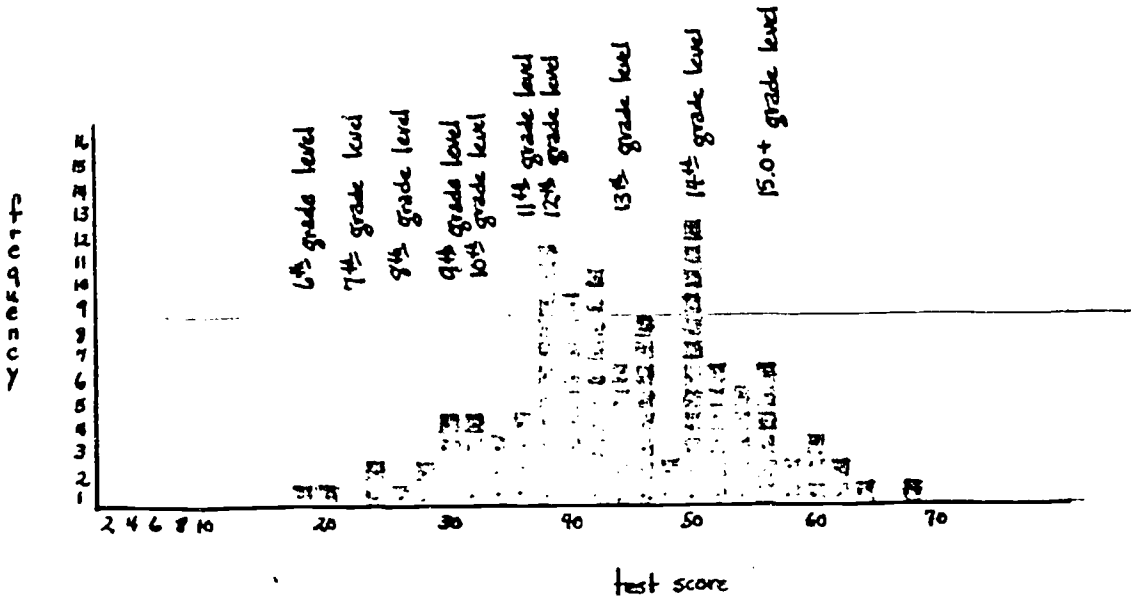
6) subject - sociology
textbook - Popenoe; Sociology, Second edition, Prentice-Hall Inc.

Suggested Grade Level	Frequency of Textbook Samples	%
4 and below	0	0.0%
5-6	1	2.1%
7-8	4	8.3%
9-10	5	10.4%
11-12	15	31.3%
13-15	12	25.0%
16+	11	22.9%
	48	

* A raw score was obtained for each reading sample by means of the Dale-Chall readability equation. These raw scores were then translated into grade equivalents; with the above table depicting the distribution of reading samples across grade levels.

Frequency Distributions: Comprehension

Test Form D



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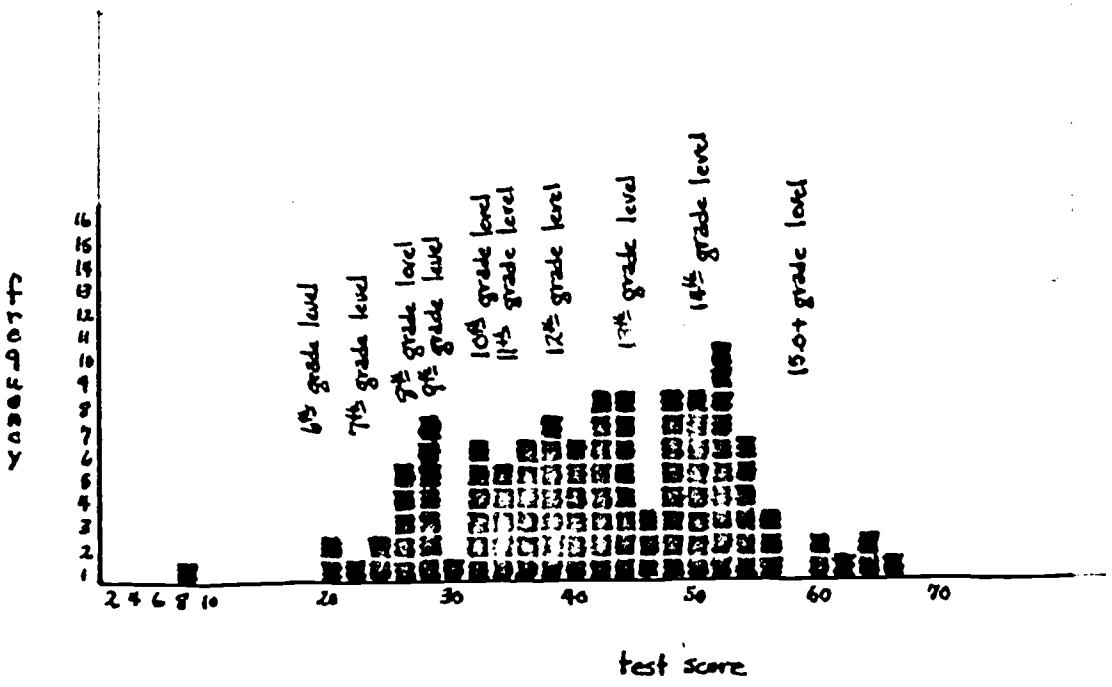


Frequency Distributions: Vocabulary

Test Form D

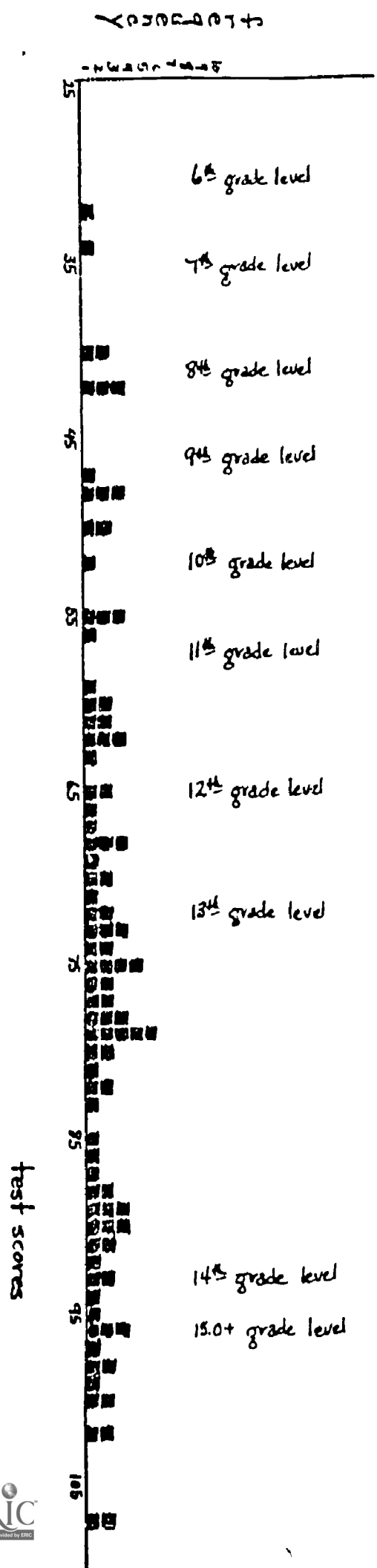
Test Form C

Frequency Distributions: Vocabulary

Test Form C

Test Form D

2,6



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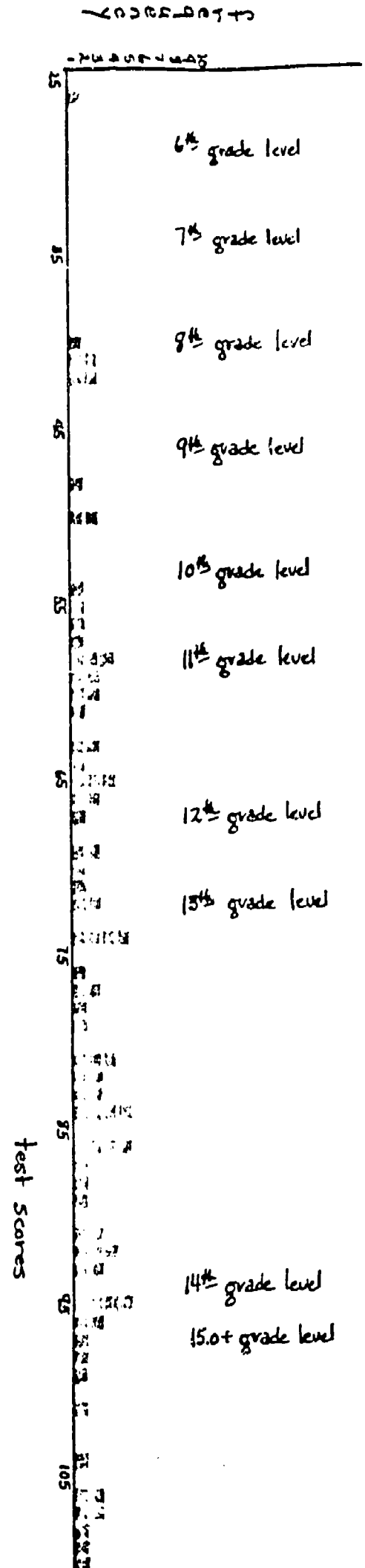
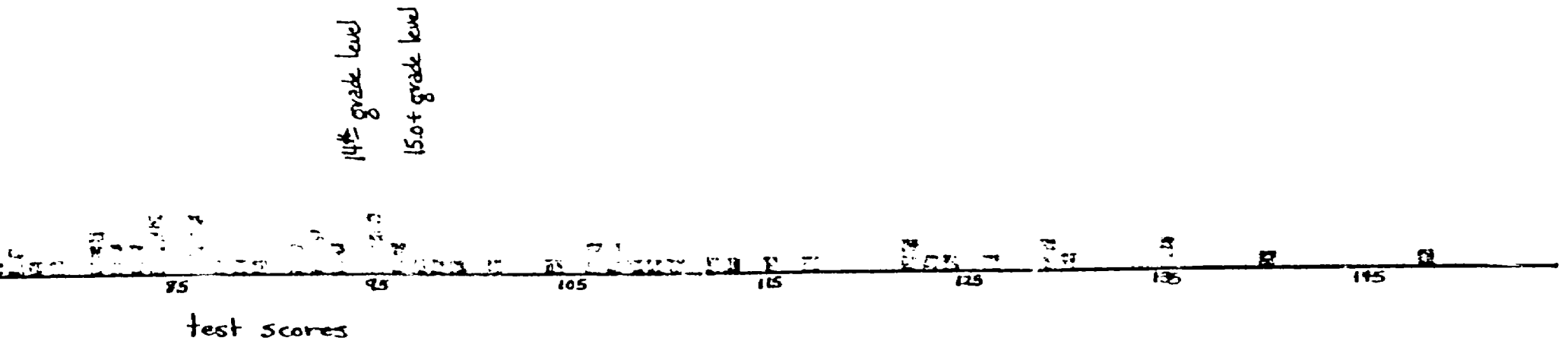


Test Form D

Frequency Distributions: Total

Frequency Distributions: Total

Test Form D



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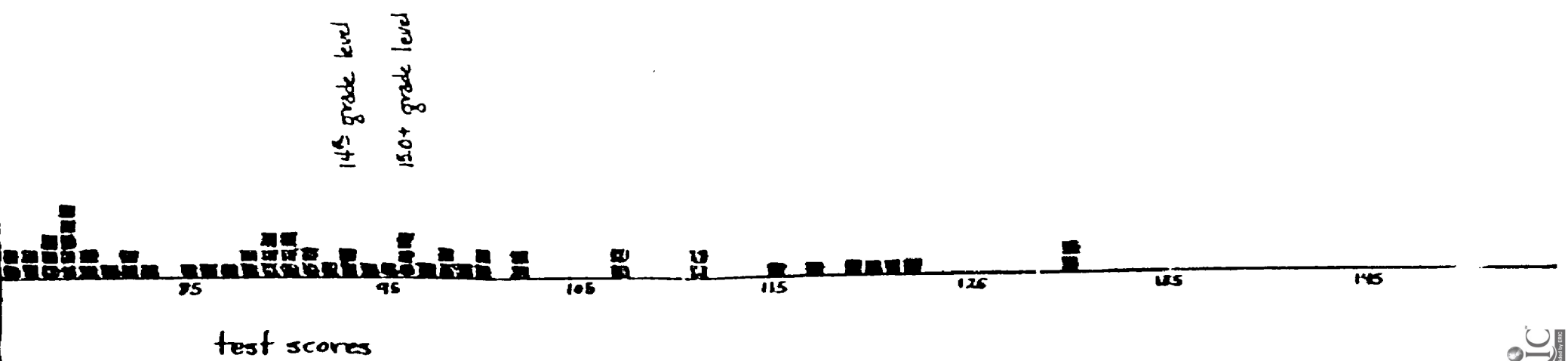

Appendix 2

RAW SCORE TO GRADE EQUIVALENT

FORM C

Raw Score	Vocabulary G.E.	Comprehension G.E.	Total G.E.	Raw Score	Reading Rate G.E.
50			15.0+	278	15.3+
49			14.9+	266	14.6+
48			14.9+	252	13.8+
47			14.8+	241	13.0+
46			14.7+	230	12.3
45			14.6+	219	11.3
44			14.5+	207	10.3
43			14.5+	195	9.1
42			14.4+	182	8.4+
41			14.3+	170	7.7+
40			14.2+	161	7.0+
39			14.2+	156	6.5+
38			14.1+	143	6.0+
37			14.0+		
36			14.0+		
35			13.9+		
34			13.9+		
33			13.8+		
32			13.7+		
31			13.6+		
30			13.6+		
29			13.5+		
28			13.4+		
27			13.3+		
26			13.3+		
25			13.2+		
24			13.1+		
23			13.1+		
22			13.0+		
21			12.9+		
20			12.8+		
19			12.7+		
18			12.6+		
17			12.5+		
16			12.3		
15		15.0+	12.1		
14		–	12.0		
13		14.7+	11.9+		
12			11.8		
11			11.8		
10			11.5		
9			11.3		
8			11.1		
7			10.9		
6			10.7		
5			10.6		
4		–	10.4		
3		14.4+	10.2		
2		–	10.0		
1		14.1+	9.8		
0		–	9.7		
		13.8+	9.5		
		–	9.3		
	15.0+	13.5+	9.1+		
	14.9+	–	8.9+		
	14.8+	13.2+	8.8+		
	–	–	8.6+		
	14.7+	12.8+	8.5+		
	14.6+	–	8.3+		
	14.5+	12.2	8.1+		
	14.4+	–	7.9+		
	14.3+	11.5	7.7+		
	14.2+	–	7.5+		
	14.0+	10.8	7.3+		
	13.9+	–	7.1+		
	13.8+	10.0	6.9+		
	13.6+	–	6.8+		
	13.5+	9.3	6.6+		
	13.3+	–	6.4+		
	13.1+	8.7+	6.2+		
	12.9+	–	6.0+		
	12.7+	8.1+			
	12.4+	–			
	12.0	7.5+			
	11.7	–			
	11.4	7.0+			
	11.1	–			
	10.9	6.6+			
	10.5	–			
	10.1	6.3+			
	9.6	–			
	9.2	6.0+			
	8.9+				
	8.6+				
	8.3+				
	8.1+				
	7.9+				
	7.7+				
	7.5+				
	7.3+				
	7.1+				
	7.0+				
	6.8+				
	6.6+				
	6.4+				
	6.2+				
	6.1+				

*Extrapolated.

FORM D

Raw Score	Vocabulary G.E.	Comprehension G.E.	Total G.E.	Raw Score	Reading Rate G.E.
95			15.0+	305	15.1+
94			14.9+	291	14.6+
93			14.9+	276	13.8+
92			14.8+	262	13.2+
91			14.7+	256	12.7+
90			14.6+	245	12.2
89			14.5+	232	11.4
88			14.4+	223	10.3
87			14.3+	212	9.1
86			14.2+	202	8.6+
85			14.2+	189	7.8+
84			14.1+	183	7.3+
83			14.1+	175	6.8+
82			14.0+	163	6.2+
81			14.0+	152	5.8+
80			13.9+		
79			13.9+		
78			13.8+		
77			13.7+		
76			13.6+		
75			13.6+		
74			13.5+		
73			13.4+		
72			13.3+		
71			13.2+		
70			13.1+		
69			13.0+		
68			12.9+		
67			12.8+		
66			12.7+		
65			12.6+		
64			12.5+		
63			12.4+		
62			12.3		
61			12.1		
60			12.0		
59			11.9+		
58			11.8		
57			11.6		
56			11.4		
55			11.2		
54			10.9		
53		15.0+	10.7		
52		–	10.6		
51		14.7+	10.5		
50		–	10.3		
49		14.4+	10.2		
48		–	10.0		
47		14.0+	9.8		
46		–	9.7		
45		13.7+	9.5		
44	15.0+	–	9.3		
43	14.9+	13.4+	9.1		
42	14.8+	–	9.0+		
41	14.7+	13.1+	8.9+		
40	14.7+	–	8.7+		
39	14.6+	12.6+	8.5+		
38	14.5+	–	8.3+		
37	14.4+	11.9	8.1+		
36	14.3+	–	8.0+		
35	14.2+	11.2	7.8+		
34	14.0+	–	7.7+		
33	13.9+	10.6	7.5+		
32	13.8+	–	7.3+		
31	13.6+	9.9	7.1+		
30	13.5+	–	6.9+		
29	13.3+	9.2	6.7+		
28	13.1+	–	6.6+		
27	12.9+	8.7+	6.4+		
26	12.7+	–	6.2+		
25	12.5+	8.1+	6.0+		
24	12.2	–			
23	11.9	7.5+			
22	11.6	–			
21	11.3	7.0+			
20	11.0	–			
19	10.7	6.6+			
18	10.4	–			
17	10.1	6.3+			
16	9.8	–			
15	9.3	6.0+			
14	9.0+				
13	8.7+				
12	8.3+				
11	8.0+				
10	7.8+				
9	7.6+				
8	7.4+				
7	7.2+				
6	7.1+				
5	7.0+				
4	6.8+				
3	6.6+				
2	6.4+				
1	6.2+				
0	6.1+				

*Extrapolated.

APPENDIX 3

DALE-CHALL FORMULA

$$\text{Dale Score} = \frac{\text{Number of unfamiliar words}}{\text{Total Number of words}} \times 100$$

$$\text{Average Sentence Length} = \frac{\text{Number Words}}{\text{Number Sentences}}$$

Raw Score = (Average Sentence Length X .0496) +
(Dale Score X .1579) +
Constant (3.6365)

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