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ABSTRACT

Two hundred and twenty-five fourth, fifth, and sixth graders who represented a relatively wide range of abilities and socioeconomic backgrounds were the subjects of this study designed to investigate the relationships between language-pattern encoding (spelling) and reading proficiency. The two primary null hypotheses were (1) that knowledge of language pattern encoding has no effect upon total reading achievement in the intermediate grades and (2) that a knowledge of language-pattern encoding has no effect upon the attainment or utilization of any specific reading skill at this same level. An informal spelling inventory was used to find each pupil's encoding level, and the California Reading Test, Grades 4 through 6, Level 2, Form P, was used to measure the pupils' total reading achievement. The two null hypotheses were rejected. This study implied that sufficient attention is not being given to instruction in the encoding procedure and to assisting pupils in realizing how ability to encode and decode may be used to complement each other. Tables and references are included. (Author/NH)

AN INVESTIGATION INTO THE RELATIONSHIP BETWEEN LANGUAGE PATTERN ENCODING AND READING PROFICIENCY IN UPPER ELEMENTARY GRADES

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The increasing number of corrective and remedial reading programs across the nation today seems to indicate a general awareness that the ability to read is an essential factor for success in one's educational endeavor. Since almost all learning which takes place in this age of knowledge explosion and during this technological revolution is based upon reading ability, finding the most effective means by which reading proficiency may be attained has become a nationwide concern.

Although elementary teachers have employed various kinds of instructional methodologies in the teaching of reading, they are continuously criticized for failure to produce favorable results. According to Harris (3), ten to fifteen percent of American children are definitely reading below their potential capacity.

Recent literature in the field of linguistics has suggested that success in reading depends to a great extent upon one's ability to understand the relationship between oral and written language. In this connection, the linguist, Lefevre (5), has noted that the essence of reading American English as a language process lies in the ability to bridge the gap between

language and graphics, and that a clear-cut understanding of the relationship of spelling patterns to word patterns is the most important step in learning to read. Such a process must, of necessity, involve some degree of interaction between encoding and decoding, commonly referred to as spelling and reading, respectively. The implication here extends far beyond the usual explanation that "Reading is talk written down."

According to one psychologist (1), the alphabet was first created for the purpose of encoding our sound-symbol relationships and anyone who cannot encode will always be a relatively poor decoder. In support of this, Hanna and Hanna (2) have also attested to the belief that a child who has acquired a measure of confidence in his ability to encode his language should find the act of decoding far less mysterious, frustrating, and time consuming.

Though relatively few studies have been made which deal directly with the interaction between encoding and reading proficiency in the intermediate grades, there is evidence to indicate that a fairly close relationship exists. Plessas and Dison (8) found a significant correlation between reading achievement and spelling ability. Morrison and Petty (6) reported correlations between spelling and general reading abilities ranging from .85 at the third grade level to .75 at the eighth grade level.

Other studies report significant correlations between spelling and specific aspects of reading. Peake (7) found that high scores in spelling tended to accompany high scores in word meaning among the group of readers in grades four through eight used in her study. Mason (5) concluded

from his study that improvement in word discrimination was associated with significant improvement in spelling. From a review of several studies related to spelling disability, Spache (10) found a coefficient of approximately +.60 to be typical of the association between vocabulary and spelling.

The present study was designed to investigate the relationships between language pattern encoding and reading proficiency in the upper elementary grades. Two primary null hypotheses considered were: (1) that knowledge of language pattern encoding has no effect upon total reading achievement in the intermediate grades, and (2) that a knowledge of language pattern encoding has no effect upon the attainment or utilization of any specific reading skill at this same level. A secondary hypothesis considered was that any relationship between encoding and reading at the intermediate level will not be affected by any of the following factors: sex, race, socio-economic status, chronological age, intelligence, or grade placement.

Procedure

A total of 225 subjects in grades four, five, and six were examined. These pupils attended two randomly selected public schools in one administrative unit located in the piedmont section of North Carolina. This group represented a relatively wide range of abilities and socio-economic backgrounds. The total sample included 121 males and 104 females ranging in age from eight to fourteen years.

An informal spelling inventory designed by the investigator was used to find the encoding (spelling) level of each pupil. The inventory was administered by the regular classroom teachers since it was felt that the pupils would perform better by having the words dictated by someone to whom they were accustomed. At two separate sessions, each pupil transcribed a total of seventy-five words; twenty-five of which were at a level two grades below actual grade placement, twenty-five one grade below, and twenty-five at grade level. The encoding grade score was determined by the level at which seventy-five percent or more of the words were correctly transcribed. The California Reading Test, Grades 4 - 6, Level 2, Form Q was used to measure the pupils' total reading achievement. From this test, vocabulary and comprehension scores were also obtained. Intelligence quotients for the pupils were determined by use of the Cattell Culture Fair Intelligence Test, Scale 2, for ages 8 4 and average unselected adults. Parts I and II of this test were used in order to obtain the highest possible reliability and validity. The Revised Scale for Rating Occupations based on research by Warner, Meeker, and Eells (11) was used in the determination of the social status of each pupil. Fathers' occupations were obtained for all the children used in the study and subsequently given a number which corresponded to its category on the Rating Scale. In instances where the father was not designated as a part of the family unit, the occupation of the person with whom the child lived was used to assign a class rating.

Findings

In analyzing the data collected on the samples in the study, it was necessary to nullify the effects of extraneous variables, and the null hypotheses were accepted or rejected by the F statistic. The values of the F ratios were compared to the values from Snedecor's (9) tables corresponding to the appropriate degrees of freedom. When probability statements based on the F statistic fell at the .05 confidence level, they were considered significant.

The results of the analysis of variance and covariance for encoding factors and appropriate predictor variables with the criterion variables are summarized in Tables 1, 2, and 3. Table 1 indicates that a knowledge of encoding is a very significant variable in predicting total reading achievement at the intermediate grade level. The second primary null hypothesis that knowledge of encoding has no effect upon the attainment or utilization of any specific reading skill was also rejected. Tables 2 and 3 show that knowledge of encoding significantly effects reading vocabulary and reading comprehension in upper elementary grades. It was concluded that a very close relationship exists between encoding and reading vocabulary. It was further concluded that a close relationship exists between encoding and reading comprehension.

Table 1 indicates further that total reading achievement is effected by sex, I Q, and grade. Differences in any relationship between total reading achievement and knowledge of encoding could not be traced to

differences in sex, age, or socio-economic status alone. However, these three factors do effect total reading achievement when treated in combination with the encoding factor.

Again, it was found that any relationship between reading vocabulary and knowledge of encoding is dependent on race, I Q, and grade. The factors of sex, age, and socio-economic status were not significant in determining the degree of relationship between reading vocabulary and encoding and encoding. A very close relationship was found to exist, however, when these factors were treated in combination with the encoding factor. This is shown in Table 2.

Table 3 shows that reading comprehension is significantly effected by race, I Q, and grade. It can be seen further that sex, age, and socio-economic status effect reading comprehension only when combined with the encoding factor.

Summary and Conclusions

In view of the findings of the present study, the following conclusions appear to be justified:

1. Reading achievement at the intermediate grade level is effected by knowledge of language pattern encoding.

2. Reading vocabulary and reading comprehension at this grade level are also effected by knowledge of encoding.

Table 1. Multiple Correlations and Criterion Variance of Total Reading Achievement (YI) Functioning as the Criterion Variable

Variables	P*	RSQ**	F***	$(df)_1$	$(df)_2$	significance****
All variables as listed in Table	14					
1. All variables except encoding grade level	13	.6114	.4840	1	207	
2. All variables except percent of words encoded correctly	13	.6086	2.0108	1	207	
3. All variables except encoding grade level and percent of words encoded correctly (hereafter listed as encoding factors)	12	.5685	11.7096	2	207	*****
4. All variables except sex	13	.6105	.9858	1	207	
5. All variables except race	13	.5946	9.4656	1	207	*****
6. All variables except IQ	13	.5658	24.8288	1	207	*****
7. All variables except age	13	.6087	1.9412	1	207	
8. All variables except SES	13	.6123	.0000	1	207	
9. All variables except grade	12	.5867	6.8562	2	207	*****
10. All variables except sex and encoding factors	11	.5585	9.5884	3	207	*****
11. All variables except race and encoding factors	11	.5596	9.3800	3	207	*****
12. All variables except SES and encoding factors	11	.5679	7.9070	3	207	*****
13. All variables except age and encoding factors	11	.5635	8.6835	3	207	*****
14. All variables except grade and encoding factors	11	.5496	8.3726	4	207	*****

* Number of Predictor variables

** Squared Multiple Correlation Coefficients. Equal to the ratio of the criterion variance accounted for by the prediction system.

*** F Test as described by Bottenberg and Ward (1963, Ch. 2)

$(df)_1$ Degrees of freedom - numerator

$(df)_2$ Degrees of freedom - denominator

**** Starred variables indicate significance at the .05 level of confidence.

***** Indicate significance at the .01 level of confidence.

Table 2. Multiple Correlations and Criterion Variance of Reading Vocabulary (YII) Functioning as the Criterion Variable

Variables	P*	RSQ**	F***	$(df)_1$	$(df)_2$	significance****
All variables as listed in Table	14					
1. All variables except encoding grade level	13	.6158	.2350	1	207	
2. All variables except percent of words encoded correctly	13	.6117	2.4559	1	207	
3. All variables except the encoding factors	12	.5775	10.4535	2	207	*****
4. All variables except sex	13	.6149	.7021	1	207	
5. All variables except race	13	.5966	10.5657	1	207	*****
6. All variables except I Q	13	.5739	22.8036	1	207	*****
7. All variables except age	13	.6116	2.4891	1	207	*****
8. All variables except SES	13	.6162	.0255	1	207	
9. All variables except grade	13	.5851	8.3914	2	207	*****
10. All variables except sex and encoding factors	11	.5695	8.4063	3	207	*****
11. All variables except race and encoding factors	11	.5672	8.8097	3	207	*****
12. All variables except SES and encoding factors	11	.5775	6.9690	3	207	*****
13. All variables except age and encoding factors	11	.5720	7.9437	3	207	*****
14. All variables except grade and encoding factors	11	.5540	8.3914	4	207	*****

* Number of Predictor variables

** Squared Multiple Correlation Coefficients. Equal to the ratio of the criterion variance accounted for by the prediction system

*** F Test as described by Bottenberg and Ward (1963, Ch. 2)

$(df)_1$ Degree of freedom - numerator

$(df)_2$ Degree of freedom - denominator

**** Starred variables indicate significance at the .05 level of confidence.

***** Indicate significance at the .01 level of confidence.

Table 3. Multiple Correlations and Criterion Variance of Reading Comprehension (YIII) Functioning as the Criterion Variable

Variables	P*	RSQ**	F***	$(df)_1$	$(df)_2$	significance****
All variables as listed in Table	14					
1. All variables except encoding grade level	13	.5273	2.2892	1	208	
2. All variables except percent of words encoded correctly	13	.5411	.5873	1	208	
3. All variables except the encoding factors	12	.4901	11.8719	2	208	*****
4. All variables except sex	13	.5402	.9672	1	208	
5. All variables except race	13	.5266	7.1494	1	208	*****
6. All variables except I Q	13	.4922	22.7918	1	208	*****
7. All variables except age	13	.5388	1.6355	1	208	
8. All variables except SES	13	.5426	.1078	1	208	
9. All variables except grade	12	.5237	4.2425	2	208	*****
10. All variables except sex and encoding factors	11	.4818	9.1775	3	208	*****
11. All variables except race and encoding factors	11	.4839	8.8546	3	208	*****
12. All variables except SES and encoding factors	11	.4899	7.9440	3	208	*****
13. All variables except age and encoding factors	11	.4853	8.6495	3	208	*****
14. All variables except grade and encoding factors	11	.4772	7.4094	4	208	*****

* Number of Predictor variables

** Squared Multiple Correlation Coefficients. Equal to the ratio of the criterion variance accounted for by the prediction system

*** F Test as described by Bottenberg and Ward (1963, Ch. 2)

$(df)_1$ Degrees of freedom - numerator

$(df)_2$ Degrees of freedom - denominator

**** Starred variables indicate significance at the .05 level of confidence.

***** Indicate significance at the .01 level of confidence

3. Any relationship existing between reading and encoding is significantly effected by race, I Q, and grade.

4. Sex, age, and socio-economic status are not significant factors in determining the degree of relationship between encoding and reading proficiency.

Implications

The data obtained in this investigation have a number of implications for reading programs in elementary schools. One very important question raised by the findings of this study is whether sufficient attention is being given to the encoding procedure or whether much of this aspect of the language arts is left to chance and incidental realization on the part of pupils as to how ability to encode and ability to decode may be used to compliment each other. These findings further suggest that more attention to the intermediate grade spelling program may enhance reading proficiency. A further corollary of the first two implications is the matter of the feasibility of special training for the teachers of spelling as well as the already available special training for teachers of reading. Results of the present study suggest a need for further investigation of this subject.

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