

**ERROR PATTERN RELATIONSHIPS OF DEVELOPMENTAL
READERS AND FUNCTIONALLY ILLITERATE
ADULTS**

By

SHELDON NOEL RUSSELL

//

**Bachelor of Arts
Northwestern State College
Alva, Oklahoma
1968**

**Master of Science
Oklahoma State University
Stillwater, Oklahoma
1971**

**Submitted to the Faculty of the Graduate College
of the Oklahoma State University
in partial fulfillment of the requirements
for the Degree of
DOCTOR OF EDUCATION
July, 1973**

MAR 13 1974

ERROR PATTERN RELATIONSHIPS OF DEVELOPMENTAL
READERS AND FUNCTIONALLY ILLITERATE
ADULTS

Thesis Approved:

David D. Ray
Thesis Adviser

Bill F. Cron

Daniel Selkmit

Russell Brown

Larry M. Perkins

D. N. Burton
Dean of the Graduate College

875619

ACKNOWLEDGMENTS

The writer wishes to express his appreciation to the chairman of his Advisory Committee, Dr. Darrel D. Ray, whose guidance and confidence has been most highly valued.

Thanks is extended to Dr. Bernard Belden and to the members of the Advisory Committee: Dr. Billy Elsom, Dr. Russell Dobson, Dr. Daniel Selakovich, and Dr. Larry Perkins for their time and assistance given to this research.

Sincere appreciation is felt for the assistance and encouragement given so freely by the graduate students in the Reading Center. A special thanks is given Ann Bell for sharing her research so willingly.

Gratitude is extended to my parents and family who have steadfastly supported this endeavor.

For the years of work and immeasurable sacrifices, I lovingly dedicate this study to my wife, Nancy, and daughter, Shonda.

TABLE OF CONTENTS

Chapter	Page
I. PRESENTATION OF THE PROBLEM	1
Introduction	1
Need for the Study	2
Statement of the Problem	5
Hypotheses	6
Definition of Terms	7
Delimitations	8
II. REVIEW OF THE LITERATURE	10
Introduction	10
Studies Comparing Adults' and Children's Reading Behavior	10
Oral Reading Errors	17
III. DESIGN AND METHODOLOGY	21
Description of the Population	21
Testing Procedures	22
Instruments Used	24
Statistical Techniques Used in the Treatment of the Data	31
Summary	32
IV. TREATMENT OF DATA AND ANALYSIS OF RESULTS	33
Introduction	33
Discussion of the Point-Biserial Coefficient of Correlation	33
Tests of the Hypotheses	34
Summary	44
V. SUMMARY AND CONCLUSIONS	46
General Summary of the Investigation	46
Conclusions	48
Recommendations	51
BIBLIOGRAPHY	52

LIST OF TABLES

Table	Page
I. Statistical Comparison of Error Categories of the <u>B-S-R Error Analysis</u> at Instruction Level	35
II. Statistical Comparison of Error Categories of the <u>B-S-R Error Analysis</u> at Frustration Level	36
III. Statistical Comparison of the <u>Stanford Diagnostic Reading Test</u>	37
IV. Statistical Comparison of Error Categories on the <u>Bond-Balow-Hoyt Silent Reading Diagnostic Tests, Test 1</u>	38
V. Statistical Comparison of Error Categories on the <u>Bond-Balow-Hoyt Silent Reading Diagnostic Tests, Test 2</u>	39

LIST OF FIGURES

Figure	Page
1. <u>B-S-R Error Analysis</u> , Instruction Level	41
2. <u>B-S-R Error Analysis</u> , Frustration Level	42
3. Subtests of the <u>Bond-Balow-Hoyt</u> and <u>Stanford Diagnostic Reading Tests</u>	43

CHAPTER I

PRESENTATION OF THE PROBLEM

Introduction

The functionally illiterate adult has become an increasingly distressing problem for education. With the advancement of technology, the level at which a person must read in order to function as a productive citizen edges upwards. The problem has at last been recognized and efforts are being made to teach the adult to read through various adult basic education programs. However, little is known about his reading behavior and specific skill deficiencies. Much of the research investigating the reading behavior of children has relied on the analysis of oral reading error patterns to ascertain specific skill disability or lack of skill development. Analysis of these errors has contributed a great deal to the curriculum of reading programs. The functionally illiterate adult obviously has little in common with an elementary student except that both may well be reading at the same level. The question arises then as to the relationship that exists between their reading behavior. Do functionally illiterate adults exhibit the same types of errors and subsequent skill deficiencies as their developmental counterpart or has some factor precluded ordered development? If no similarity exists, then pedagogy has less to contribute to the curriculum for teaching adults to read. On the other hand, if a relationship does exist, much that has been learned in

elementary reading could be shared in the development of a reading curriculum pertinent to adults.

Need for the Study

The illiterate adult continues to be a major concern of education. Justification for this concern can be readily seen in the nation's strife over high school dropouts, unemployment, and poverty, all of which are close relatives of illiteracy. Man can no longer depend upon the land or manual labor to sustain himself and his family. He must be versatile and capable of making adjustments to new jobs and new situations. This requires reading ability, and without this capacity, he can become a burden to the whole society. Census figures (Summers, 1968), for example, show that for just nine Midwestern states in the area where North Central Reading Association operates, there are 1.8 million adults 18 years of age or older who have less than a sixth grade education. He states that this is probably a conservative estimate since the under-educated are often difficult to locate. In any case, the need to educate these people is evident. To do so properly will require a more thorough understanding of how the functionally illiterate adult fits into the developmental reading process.

The reading process, at this point, is theorized to be based primarily on the concept of a skill hierarchy. This theory rests heavily on Gagne's hierarchial framework of learning--specific responding, chaining, multiple discrimination, classifying, rule using and problem solving:

The capabilities underlying these performances form a partially ordered set; the acquisition of a more complex capability requires the previous existence of a simpler one, whereas the possession of a simpler capability does not imply that the individual can exhibit a more complex one. (Gagne, 1967)

In terms of reading, specifically, the hierarchial structure is probably best described in Gibson's article of 1965. She contends that, "Some aspects of reading must be mastered before others and have an essential function in a sequence of development of the final skills (Gibson, 1965)." Three phases of learning to read are presented: learning to differentiate graphic symbols, learning to decode letters to sounds, and using progressively high-order units of structure.

Much of the groundwork that supports the hierarchial concept of reading has been developed through Holmes' Substrata Theory. Harry Singer (1965) attempted to determine if certain reading factors were unique to a developmental stage by the implementation of Holmes' theory. Singer describes the theory in terms of a mental structure that has basically three levels, each level having cells that store specific information which has derived from instruction and learning in areas such as word recognition, word meaning, and reasoning in context. Singer then examined the abilities of his subjects, ranging from grades three through six to test the hypothesis that:

As an individual, in general, learns to read he sequentially develops a mental structure of complexly interwoven subsystems which he can mobilize or functionally organize into various working systems according to his purposes and the demands of the task. However, at least at the high school level, if the individual is to read at all he must call upon certain necessary subsystems, whether these subsystems are strengths or weaknesses in his substrata factor repertoire. (Singer, 1965)

Singer administered tests which measured mental abilities, listening comprehension, linguistic meaning, word recognition, and visual and auditory perception to a sample of 250 pupils, each in grades three through six. High reliabilities were found on each test. "Bivariate distributions of each variable with Speed and Power of Reading, respectively, satisfactorily passed the Chi-square test for rectilinear regression (Singer, 1965)." A modification of the Wherry-Doolittle Multiple was used to analyze the data. The analysis was extended to several levels to obtain the best pattern of abilities. Trends in the Developmental Model for Power of Reading revealed the following:

1. A combination of context clues and auditory word recognition processes are gradually integrated with other substrata factors and mobilized throughout the development of the working system for attaining Power of Reading.
2. Both auding and visual verbal meaning systems are mobilized for attaining Power of Reading, but auding becomes subordinately integrated with the visual verbal system after the fifth grade.
3. Individual differences at successively higher grade levels in Power of Reading are less attributable to word recognition processes and more associated with word meaning analysis and knowledge of word meanings and the concepts they represent.
4. A sequential integration of substrata-factors can be inferred from the model and was empirically demonstrated by substrata analysis at the second and third substrata levels.

Singer concludes his study by drawing parallels between the hierarchical structure of reading and intelligence. Although the processes are basically the same, Singer suggests that some differences are apparent. He states:

In the working system mobilized for attaining power of reading some subsystems, such as word recognition, are tapped which would not necessarily be mobilized for performance on

an individual test of intelligence, even though conceptualization abilities may enter into the acquisition of the word recognition system. Another way of stating the argument is simply to point out that although an individual may be bright, he still has to learn to read. This is tantamount to saying that he must acquire the necessary hierarchy of subsystems and learn to mobilize them into an integrated working system for attaining power of reading.

It appears that Singer's findings support the theory that certain skills in reading may be related to developmental level irrespective of chronological age or grade placement.

It would seem feasible that adults need the same basic skills to read new words as children. If the functionally illiterate adult is operating at the same reading level as a developmental reader, it would appear that the word recognition abilities would correspond as well.

It has been demonstrated that:

. . . many adults do not develop the skills necessary for truly independent reading. While they may experience success at first, too often they remain unable to progress to more difficult reading material because they lack the means to unlock words that have not been directly taught them. (Otto, Askov, and Fischbach, 1971)

The above study indicated a statistically significant relationship between reading performance and word attack mastery at all grade levels. The justification for the present study is based on the assumption that mastery of word attack skills is as essential for the functionally illiterate adult as the developmental reader and that the most direct method of ascertaining developmental relationships is through a comparative analysis of the oral reading error patterns.

Statement of the Problem

The primary function of this study is to examine the oral error patterns of functionally illiterate adults reading extended oral

passages at two levels of difficulty and compare them to developmental readers to determine (1) if there is a relationship between the types of errors made; (2) if the relationship is maintained at both levels of performance; and (3) if there is a relationship in the types of errors measured on two standardized tests that use different error classification systems.

Hypotheses

The hypotheses to be tested are stated in the null form;

1. There is no significant relationship among the types of oral reading errors made by two experimental groups on an extended oral passage read at the instructional level. (Hypotheses 1 and 2 are tested on each of the following categories: visual perception errors, directional confusion errors, visual auditory errors, structural errors, behavioral characteristics, words aided errors, and syllabic division errors.)

2. There is no significant relationship among the types of oral reading errors made by two experimental groups on an extended oral passage read at frustration level.

3. There is no significant relationship of performance on the subtests of the Stanford Diagnostic Reading Test between two experimental groups. (This hypothesis examines the following subtests: Auditory Discrimination, Syllabication, Beginning and Ending Sounds, Blending, and Sound Discrimination.)

4. There is no significant relationship among types of reading errors as measured by the Bond-Balow-Hoyt Silent Diagnostic Reading Tests, Test 1: Words in Isolation, between two experimental groups. (Hypotheses 4 and 5 will examine each of the following error categories: initial errors, middle errors, ending errors, and orientation errors.)

5. There is no significant relationship among types of reading errors as measured by the Bond-Balow-Hoyt Silent Diagnostic Reading Tests, Test 2: Words in Context, between two experimental groups.

Definition of Terms

Developmental Readers are defined as second and third grade students reading at instruction level between 2.5 - 4.0 grade levels. A midpoint of 3.25 was established and a tolerance of plus or minus .75 years determined the outer limits of the range of performance. Instruction level was established on the Standard Reading Inventory (Form B) published by Klamath Printing Company (Bell, 1973).

Functionally Illiterate Adults are defined as adults 16 years old or older who are reading at instruction level between 2.5 - 4.0 grade levels. A midpoint of 3.25 was established and a tolerance of plus or minus .75 years determined the outer limits of the range of performance. Instruction was established on the Standard Reading Inventory (Form B), published by Klamath Printing Company.

Instruction Level refers to the passage on the Standard Reading Inventory (Form B) on which the reader meets a word recognition criteria of between 91% and 95% and at least 70% comprehension.

Frustration Level refers to the passage of the Standard Reading Inventory (Form B) on which the reader meets a word recognition criteria of between 85% and 90% and a comprehension criteria of less than 70%.

"Error or Miscue refers to any oral response which deviates from the written stimuli in oral reading (Berends, 1971)."

"B-S-R Error Analysis is an error classification system utilizing six major error categories . . . (Berends, 1971)" "Words Aided" were taken from the "Behavioral Characteristics" category and made into a seventh major error category for the purposes of this study. Chapter III describes the B-S-R Error Analysis in detail.

Error Type refers to specific errors that constitute the seven major categories of the B-S-R Error Analysis. Omissions, additions, corrections, and repetitions, for example, make up the category "Behavior Characteristics."

"Extended Oral Passage refers to any passage of at least 175 words read orally by the subject with the first 25 words being omitted from analysis (Stuever, 1969)."

Delimitations

It is assumed that mastery of word recognition skills reflects general reading ability based on Askov, Otto, and Fischbach's study (1971) in which it was found that a statistically significant relationship between mastery of skills and general reading performance existed. The relationship was positive.

It is assumed that each word in a passage yields an equal chance for a variety of reading errors to be made and that these words are representative of typical reading material.

CHAPTER II

REVIEW OF THE LITERATURE

Introduction

A search of the literature revealed few studies directly investigating the reading behavior of the functionally illiterate adult and the relationship of that behavior to the developmental reader. This lack of research was evident within the oral reading error pattern studies, these being primarily oriented to children. The review of the literature for this study will necessarily be restricted to two areas of investigation: (1) studies comparing adults' and children's reading behavior, and (2) oral reading errors.

Studies Comparing Adults' and Children's

Reading Behavior

Otto, Askov, and Fischbach (1971), postulate in their study that the adult will never be able to read independently until he has mastered basic word attack skills. They submit that, "There is no reason to believe that the reading skills essential for beginning adult readers are different from those required by children (Otto et al, 1971). Their null hypothesis stated that, ". . . there was no relationship between general reading performance and mastery level using multivariate analysis of variance." They tested the data by using an f-test

requiring significance at the .05 level. The data was collected from scores on the Wisconsin Design for Reading Skill Development that had been administered to children in grades one through six. The results were compared to scores made on standardized reading achievement tests. The null hypothesis was rejected in every case. "The relationship was found to be positive in that as mastery of specific skills increased so did reading performance (Otto et al, 1971). Moreover it was found that:

If one were to compare results between grades it would appear that the relationship noted above becomes more pronounced, or in simpler form as grade increases.

In conclusion, it was suggested that skills are not likely to be very different for adults than for children. Consequently, modification of format and wording may be the major focus in changing from an elementary to an adult situation.

Bishop (1964) investigated the transfer value of training with individual letters as compared with whole words. In addition, the role of grapheme-phoneme associations in reading was considered. The unique aspect of this study lies in the fact that, "The child's experience in learning to read was simulated by teaching adult subjects to read several Arabic words." The population consisted of sixty students enrolled in a beginning psychology course at Cornell University. Forty subjects were alternately assigned to single letter training or whole-word training. The remaining twenty received no special training. The English translations of the Arabic words were not taught thus eliminating the meanings of words. Bishop felt this was a separate learning problem that precedes reading. A native speaker recorded the sounds for use in the experiment. Graphic forms were printed on index cards. Homogeneity of the group was established by comparing SAT verbal scores

given prior to college. There was no significant difference between groups at the .01 level. Each group was then taught the words according to their assigned category. Mean differences and standard deviations were calculated. The t test was employed to determine significant differences between subgroups. Bishop (1964) drew four conclusions from this study:

- (1) letter training is superior to word training in transfer to reading new words.
- (2) Component grapheme-phoneme associations are not necessary for learning to read . . .
- (3) Although . . . application of these associations does facilitate the learning of new words.
- (4) Grapheme-phoneme associations, in fact, form the bases for transfer in this investigation.

Jeffrey and Samuels (1967) criticize Bishop's study on several points. They contend that:

Although her subjects could not originally provide a response to these Arabic words, the response to be learned was bisyllabic with each syllable a consonant-vowel phoneme pair, eg. "faru." It is proposed that because of past reading experience, the adult Ss would be quite likely to break these words into their syllable and letter components.

In other words, the adults' experiences may have contaminated their learning of whole words and may have afforded them the opportunity to learn the words in syllables, particularly since recombinations of syllables made up two of the words presented.

In 1968 Samuels attempted to predict that paragraphs containing words with high associative relationships would be recalled and read faster than words of low associative qualities. It was further hypothesized that when attempting to answer multiple-choice questions without having read the paragraph, the choices would be based on the high associative relationships between words in the stem and the response. The experiment was divided into two parts, one using fifth and sixth graders and one using juniors enrolled in a psychology course. The

same materials were used in both groups. The mean time to read the paragraphs and the mean number of question responses, according to associative qualities, were calculated. The t tests indicated the differences to be significant in favor of high associative paragraphs being read faster than low associative paragraphs. The responses on the multiple-choice test revealed that, "The high-association strength alternative was chosen more frequently for 11 of the 12 questions . . . (Samuels, 1968)." The college students took less time in recognizing the words than the children, suggesting perhaps that adults can recognize familiar words faster than children. Samuels (1968) submits that word associations, ". . . may influence reading speed by affecting seeing time, central processing time, and number of regressions."

The question naturally arose whether adults do recognize words more rapidly than children, and, if so, what word recognition strategies give them the advantage? Samuels and Chen (1971) attempted to answer these questions. A model was constructed to identify these strategies. It included the following:

- (a) More and faster partial perceptions in absences of total recognition, (b) Better ability to utilize clues such as first and last letters and word length, and (c) Greater willingness to alter incorrect hypotheses as to the identity of a word.

Twenty-five fourth graders and twenty-five college students were selected and pretested. The screening test insured that all subjects could read the flashed words. When the subjects answered, they were restricted to one of three responses, indicating the degree of confidence they had in their choice of words. It was concluded that:

When a word was flashed at speeds too fast to recognize, adults were able to perceive significantly more of the letters than the children. Adults were significantly

more aware than children when they had made an incorrect response. Adults were significantly better at correct partial perceptions than the children . . . The adults also reported the partial perceptions at faster speeds. Finally, the adults were more aware of when they were guessing . . . and, consequently, were more likely to change an incorrect response. (Samuels et al, 1971)

The four stages of the strategy model included:

Using information contained in a reading passage, generating hypotheses of what the next word might be, testing these hypotheses using cues such as partial perceptions of letters, word length, etc., and accepting or rejecting the hypotheses.

It was found that in this test the adults had superior performance to children and that this was probably accounted for by their superior strategies.

Another study (Dunn-Rankin, 1971) attempted to determine if the preference for an error-word was the same for adults and children. An Error-Word Preference Inventory was administered to a population of professors, graduate students, and several lower grades down to pre-school subjects. They were asked to choose between pairs of stimulus words, the one most similar to a target word. Uni-dimensional Rank-order Scale Scores of error preferences were used to analyze the data. The results indicated that preschool subjects prefer error-words having the same letters, even when the letters are permuted. Adults, on the other hand, prefer consistency of letter order even when letters have been added or omitted. The author suggests that:

Their profiles suggest that reading skill is a development that begins in a 'separate letter conscious' approach to word perception and ends with an emphasis on a 'connected letter order' view of words. (Dunn-Rankin, 1971)

It was purported that since young children have limited experience with words that this may prohibit them from using context clues as an aid in word identification, and since older children exhibit more consistency

in their preference that this may also be connected and ordered to age. In addition, it was found that normal readers tend to take on the characteristics of adult preference as they progress through the elementary school. He concludes that:

The study supports the contention that young children and adults use different methods in attacking and reading words but that most children change to an adult style of word perception by the end of fourth grade. (Dunn-Rankin, 1971)

It should be emphasized, however, that these results were dealing with normal adult readers and may not be pertinent to the disabled reader.

Knight and Alcorn (1971) support the possibility that the adult has an edge over the child but in a different aspect of reading. Their study was designed to investigate and compare the performance of a group of educationally disadvantaged adults and two groups of elementary school children on selected measures of reading achievement and intelligence. The match was made on the basis of performance on the California Reading Test for the adults and on grade level of the elementary students. The tests included: the California Reading Test; the Adult Basic Learning Examination (reading subtest); the IPAT Culture Fair Test of Intelligence; and a sixty item cloze test of comprehension written for disadvantaged adults and having a readability of 3.0. Group I was the adults, group II, elementary students of a lower socio-economic level, and group III, elementary students from higher socioeconomic level homes.

In considering intelligence scores and their relation to reading, it was found that stronger relationships existed for the elementary subjects, using IPAT intelligence scores. However, the adults performed as well as Group III and better than Group II on the California Reading Test and the graded word list. The adults performed better on

the ABLE and completed more items on the cloze than either elementary group. It was concluded that the cloze and ABLE were probably better predictors of the relationship between reading performance and intelligence for adults than the other tests.

Turning now to an analysis of the cloze test itself, it was noted that Group I appeared to be the most proficient on the test. They obtained higher scores with fewer responses than either Group II or Group III. It was submitted that this may be due to their superior abilities and experiences with language. Group II left the most blank. Group III filled in the most but responded with a greater variety of words. "Group III seemed to possess a greater vocabulary range than either Group I or Group II but with less understanding of the concepts involved than group I." Knight and Alcorn hypothesize that the performance of the adults on the cloze test suggests that educationally disadvantaged adults understand and are better able to utilize their limited reading skills to a greater extent than children. Both the ABLE and cloze tests were oriented more closely to the interests and experiences of adults and may allow for the differences in scores. It should be pointed out here that word recognition skills were not measured in these tests.

A study by Otto and Koenke (1968) investigated the possibility as to whether differences in response consensuality that has been demonstrated with children exists among adults from different reading levels.

Specifically the intent was to determine whether there are differences in the consensuality of responses to pictorial stimuli in a word-association task among groups of adults from three distinct reading levels.

Fifteen subjects were chosen at random from an adult basic education class. These students were receiving basic literacy training and were

reading below a third grade equivalency level. Others were chosen from a vocational school typing class where the students were operating at the high school level and a university class where most of the students were at the graduate level. Each subject was presented a stimulus and allowed to respond. Frequency scores were assigned and mean consensuality scores obtained. The results clearly demonstrate a decrease in consensuality from the University to the Vocational to the Adult Basic group.

Evidence has been presented suggesting adults and children may respond similarly or differently depending upon the circumstances and tasks under consideration. Educated adults, for example, may respond differently to word recognition than do elementary students. However, differences were also noted between the functionally illiterate and the developmental reader, but the literature fails to develop any correlation between the functionally illiterate adult and his developmental counterpart.

Oral Reading Errors

The literature is abundant with studies of the oral reading error patterns of children starting as far back as 1932 with Monroe. She suggested that when the same quantitative score is made by two children reading the same paragraph yet make different mistakes, then it may be assumed that some factor has interfered with normal process of learning to read. In 1935 Gates established norms for error patterns and included four categories: words omitted, words aided, repetitions, and mispronunciations. Gates classified the errors as perceptual while Monroe stressed phonic errors. In 1942 Bennett called attention to the

possibility of grammatical structure and its influence on the types of errors made. Schummers in 1956 studied the relationship of error patterns to difficulty of material. This was followed by a similar study in 1966 by Christenson. Both studies failed to carefully control the reading ability of the subjects. Schale in 1964 investigated the errors of elementary and secondary students. She hypothesized that error patterns would change with the increase of grade level. The results showed that repetitions, and no responses, decrease as grade level increases. Partial mispronunciations and gross mispronunciations increase as grade levels increase. Three errors, substitutions, insertions, and no responses, remain stable regardless of the difficulty level of the passage in relation to the grade level.

Stuever (1969) determined in her study that error types reached asymptote at 125-150 words in a passage. One of the recommendations made by Stuever was the investigation of error patterns at the frustration level of reading in order to determine differences in error rate. Subsequently, Berends (1971), utilizing the same pupil sample, attempted to determine the relationship that exists between error patterns as reported on specified standardized oral reading tests and at three levels of difficulty. She reports the scope of her study as follows:

This study includes an analysis of the oral reading errors made by disabled fourth grade pupils at the INSTRUCTIONAL, FRUSTRATION 1, and FRUSTRATION 2, levels on each of three standardized oral reading tests. Comparisons of the resulting error patterns were made between tests and between levels of performance.

To determine the relationships of error patterns on the oral reading tests and at the three levels of performance, the Kendall Coefficient of Concordance: W was employed. In terms of the performance levels alone, Berends found that repetitions and corrections decreased as the

level of difficulty increased while visual-auditory (vowels and consonants), syllabic division, directional confusion, words aided, medial errors, and ending errors increased as difficulty level increased.

Visual perception and omission errors remained stable irrespective of difficulty level. Berends suggests that:

Since most errors at the INSTRUCTIONAL level are visual perceptual or behavioral-type errors, to adequately sample the pupil's ability to apply phonic generalizations and sound-symbol relationships, it may be necessary to use FRUSTRATION level material.

She further suggests that subjects may return to a behavior similar to that of an earlier skill development when too difficult level of material is encountered.

A continuation of this investigation is currently underway (Bell, 1973) using developmental readers. The purpose is to determine if a shift in error types is evident between two levels of difficulty. The sample consists of thirty-four second and third-grade students reading between 2.5 - 4.0 grade levels. Each student was screened on the Standard Reading Inventory and then administered a series of graded reading passages. An error analysis was then performed and a rank order coefficient of correlation calculated for error types between performance levels. Replication of the oral passages and error analyses system used in Stuever (1969) and Berends (1971) permits meaningful relationships to be drawn. Preliminary results of this study suggest that a shift in error patterns did occur and is similar to the shift reported by Berends.

The sequential development of these research studies is evident. Schale's study in 1964 suggested a difference in error patterns between grade levels. Stuever in 1969 determined the number of words needed to

find a stable error pattern. Berends in 1971 investigated the shift in error types for disabled readers among three levels of reading performance. Bell in 1973 explored the possibility of error pattern shift at the instruction and frustration levels for developmental readers. One question remained in the scheme of things: Does an adult reading at the same grade level as a child exhibit similar error patterns and reading behavior typical of the developmental stage, or has the process been altered by differences between the samples?

CHAPTER III

DESIGN AND METHODOLOGY

Description of the Population

The population of this study consisted of adults sixteen years old or older reading between 2.5 and 4.0 grade levels. Remedial reading teachers were contacted at the Muskogee High School and the Oklahoma Childrens' Center in Taft, Oklahoma, and were asked to select their slowest readers for the screening procedures. In addition several subjects were identified through the Oklahoma State University Reading Center. No attempt was made to control race or sex of the subjects. The ages ranged from sixteen to twenty-six years of age with the majority falling within the sixteen to nineteen age-level bracket. Special Education classes were omitted because of the intelligence restrictions placed on this group. The population sampled included subjects of both Caucasian and Negro extraction. Socio-economic level was not identified, but it should be noted that part of the subjects at Taft Oklahoma Children's Center were wards of the court while others were residents of the city of Taft.

The developmental readers' scores were taken from a companion study. The population was selected from second and third grade classrooms in the Muskogee Public Schools. The screening and testing procedures were virtually identical to this study. A more detailed

description of the population may be found in the companion study (Bell, 1973).

Subjects identified through the remedial reading teachers or through the Oklahoma State University Reading Center were then screened by the following testing procedures: each subject was asked to read orally, graded passages from the Standard Reading Inventory. These passages ranged in readability (according to the Spache Formula) from 2.8 to 4.0 grade levels. A trained clinician marked the errors as the subject read and then asked ten comprehension questions about the passage. Scoreable word recognition errors and comprehension errors were then computed on a percentage of correct responses. If the subject read at instruction level (word recognition) on any of the first three passages and frustrated on any passage of a more difficult level (word recognition or comprehension), he was identified as being within a developmental range of from 2.5 to 4.0 grade levels. Any subject falling above or below this criteria was not used in this study. The procedure was taped for rechecking of word recognition errors. Thirty-one subjects were ultimately used in the study.

Testing Procedures

Extended oral passages of at least 200 words were administered to the subject within a week of the initial screening. Subjects were removed from the classroom and were tested in private and on an individual basis. Each oral reading was tape recorded and timed for future reference for the error analysis. The reasons for testing were explained prior to the test and rapport was established at that time. The subjects were then asked to read orally as the reading clinician

marked the errors. Progressively more difficult passages were read until the subject reached both an instruction and frustration level on word recognition. If any subject failed to reach either of these levels, he was removed from the sample.

Within a week of the administration of the oral passages the subjects were grouped into small groups ranging from three to eight in number and were administered the Stanford Diagnostic Reading Test (Level I, Form W) and the Bond-Balow-Hoyt Silent Reading Diagnostic Tests. All subtests of the Stanford Reading Diagnostic Test were administered for reporting the results back to the school; however, comprehension and vocabulary subtests were omitted for the purposes of this study. Only the first two subtests of the Bond-Balow-Hoyt Silent Reading Diagnostic Tests were given, Test 1: Words in Isolation, and Test 2: Words in Context. All subtests were timed and administered in accordance with the specific instructions of the manual. All tests were scored and profiled by qualified reading clinicians. The collection of data extended over a period of two months; however, the battery of tests for any given individual were administered within a week.

After the data were collected, the instruction and frustration passages were played back for rechecking of word recognition errors. Each error was then classified as to its sub-type according to the B-S-R Error Analysis. A work sheet was devised for this procedure. The frequencies were then tallied on a summary record sheet for the statistical treatment.

Instruments Used

Stanford Diagnostic Reading Test, Level I,

Form W. (1966)

This test was administered to identify specific skills needed for word recognition. Each subtest is designed to measure a specific skill. Auditory Discrimination (Test 3) purports to test the ability of the subject to hear similarities and differences among sounds with words. Test 4, Syllabication, checks the ability to see words in their component parts while Test 5, Beginning and Ending Sounds, measures knowledge of beginning and ending sounds of words which begin or end with familiar sounds and combinations of sounds. Blending (Test 6) refers to the ability to both hear the component sounds and then blend them; and Test 7, Sound Discrimination, tests the subjects' knowledge of phonemes within words and his knowledge of various spellings of phonemes (Karlsen et al, 1966). Subtests 3 and 6 are read to the subject and the correct response is marked. Subtests 4, 5, and 7 are worked silently by the subject. Although the test is basically a group instrument, careful examination of the subtests provides beneficial diagnostic evidence.

The construction of the Stanford Diagnostic Reading Test was initiated by the identification of skills felt necessary for the reading process. This was done by a survey of over 200 factorial, experimental, and survey-type studies. Items were then written from this information. An item analysis was subsequently conducted using 15,000 pupils from seven school systems over a five state area. The standardization of the test (1965) utilized approximately 12,000 cases and included:

norms, intercorrelations among subtests, reliability, and equivalent forms. The norms were established as follows:

From the total group of pupils tested samples were selected for the development of norms. It was felt that definition of the SDRT norm group in terms of performance on Stanford Achievement Test: Reading Tests would allow development of a stable set of norms from relatively small but carefully selected samples of pupils. The final norm groups for the SDRT, then, are defined primarily in terms of their average and range of performance on the Stanford Achievement Test: Paragraph Meaning Test. (Karlsen et al, 1966)

Reliability data were obtained on Form W of the Stanford Diagnostic Reading Test through the use of corrected split-half (odd-even) reliability coefficients and standard errors of measurement. The reliability coefficients ranged from .87 to .96, at the third grade, and from .73 to .96 at the fourth grade. Standard error of measurement ranged from 1.7 - 2.5 and 1.5 - 2.6 respectively. Little information was available concerning the validity of the test:

A study at the third-grade level found the subtests to correlate positively with the teachers' grouping for reading instruction. In a study of the syllabication skill, the syllabication score of an experimental syllabication test (24 items) was found to correlate .85 with the ability to divide words into syllables with vertical dividing lines. (Karlsen, et al, 1966)

Bond-Balow-Hoyt Silent Reading Diagnostic Test (1970)

The first subtest was administered to measure recognition vocabulary. In addition an internal error analysis is provided by the key sheet to determine the location of recognition error within the word. The range of the test is from primer through mid-seventh grade. Fifty-four items are included. The subject is asked to select a correct response from five distractors, four of which are altered, that matches a

stimulus picture. Test 2: Words in Context (thirty items) tests the subject's ability to use context clues in word recognition. The range of this test is from second to mid-seventh grade. A sentence is presented with one word left out. The subject is to choose the correct response from five distractors, four of which are incorrect. An internal error analysis identical to Test 1 is provided. The error classifications for both tests include: initial, middle, ending, and orientation errors.

Standardization procedures included a sample of 2,500 pupils representative of approximately 38,000 pupils, due to the stratified sampling procedures. The median raw score for each grade determined the grade norm. Reliability was obtained by use of the split-half technique. Two third-grade classrooms were randomly selected to take Tests 1, 2, 6, 7, and 8 for the reliability check. Test 1 has a reported reliability coefficient of .95 with a standard error of measurement of 2.73. Test 2 has a reliability coefficient of .93 with a standard error of measurement of 1.60. The combined score of Tests 1 and 2 has a reliability of .97 and a standard error of measurement of 3.08.

Validity of the test is reported in terms of judgemental validity and the authors suggest that the test has the following characteristics:

1. The tests are highly relevant to reading instruction because they clarify important required skills.
2. The tests require item responses to situations either actually functional in reading or closely related thereto.
3. The tests are highly analytical and are based upon research evidence of learning difficulties.

4. The tests reveal the mental processes of the learner sufficiently to detect points of error for which remedial procedures are suggested.
5. The tests systematically cover a long sequence of word-recognition skills in detail. (Manual, 1970)

Primary validity is defended on the basis that the tests require tasks which are typically required in every-day use of reading. The manual (1970) reports that:

The items for all of the tests, but especially those of Recognition Techniques and Phonic Knowledge, were based upon frequency and utility studies of words, prefixes, suffixes, syllables, blends and digraphs, endings, and phoneme-grapheme correspondence.

Standard Reading Inventory, Form B (1966)

This test was used to determine those students reading at an instruction level of 2.5 - 4.0. Equivalent forms of this test are available. "The Standard Reading Inventory is an individually administered reading test for measuring reading achievement at pre-primer through seventh reader levels (McCracken, 1966)." There are eleven stories for oral reading and eight for silent reading. The length of stories varies from 47 words to 151 words. Ten comprehension questions accompany each passage.

The content of the Standard Reading Inventory is based on the Allyn and Bacon Inc., Ginn and Company, and Scott-Foresman and Company basal reading series. Content validity was obtained by the way the test was constructed:

Words were used in the stories and word lists at the levels in which they were introduced in three basal reader series. Sentence length, content, and general style were also based on the reader series. (Berends, 1971)

The content validity was further corroborated by testing 664 children in grades one through six using the stories and word lists. In addition, fifteen nationally recognized reading experts were asked to subjectively evaluate the basal book level of each story on both Form A and B. "The rank correlation between experts' ratings and S.R.I. book levels was 0.994 for Form A and 0.993 for Form B (McCracken, 1966)." Two concurrent studies between the Standard Reading Inventory and the California Reading Test correlated at 0.87 with 79 second-grade children. In addition, equivalent form reliability was established by having two examiners administer Form A and B to 60 children in grades one through six. All correlations were significantly different from zero ($p < 0.001$).

The SOS Reading Test

This test consisted of a series of extended oral passages taken from materials thought to be unfamiliar in most schools; however, the stories resemble those of basal materials. These passages were graded and organized specifically for Stuever's study in 1969. She reports that:

'How Baseball Began', written at the 3.0 level, was adapted from How Baseball Began in Brooklyn by LeGrand Henderson, Abington Press. 'The Mystery of the Creaking Stairs', by Charlotte Jeanes, published in the Lyons and Carnahan Curriculum Enrichment Series, New Trails, was used as the basis for the 3.6 story.

Readability levels of the stories were established using the Spache formula (1953) so that these levels would compare in readability with equivalent passages on the Standard Reading Inventory. (Stuever, 1969)

Other passages included were, "Old Grouch Moves In" selected from the book, Kilde's House by Rutherford Montgomery and "Mickey Mantle" from

Mickey Mantle of the Yankees by Gene Schoor. Additional passages were selected from the Harper and Row Basic Reading Program in order to extend the difficulty level of the passages, in half year intervals, up to 6.0 grade level. The Dale-Chall (1948) readability formula was employed because the Spache formula was restricted to levels below those needed.

B-S-R Error Analysis (1969)

The B-S-R Error Analysis was devised by Berends, Stuever, and Ray at the Oklahoma State University Reading Center. An attempt was made to combine Gate's (1947) and Monroe's (1932) error classification systems, Gate's being primarily visual perception categories and Monroe's visual-auditory categories. A model of the B-S-R Error Analysis is presented in Stuever's study (1969) as follows:

Visual Perception--word parts. These occurred where it was evident that the reader quickly and fluently produced the word error, perhaps because of faulty perception.

1. - + + middle end correct: pet - set
2. + - + where the first and last letter are correct:
front - faint, want - went
3. + + - end incorrect excluding s, ed, ing which were categorized under structure:
as - ask, saw - sat
4. - - + end only correct: at - out
5. + - - beginning only correct: do - did, called - come
6. - + - middle only correct: sat - ran
7. - - - word completely wrong or if correct word consisted of one or two letter word.

Directional confusion.

1. Rotations: dig - big

2. Reversals: Both whole and partial reversals and word sequence--was - saw, less - else

Visual Auditory Perception errors. These included errors of sound-symbol relationships, where it was evident that the reader was struggling with the sound-symbol relationships or gave the wrong sound for the symbol. Under these were categorized:

1. C Single consonant: raced - raised
2. CC Ka nights - knife - knight
3. V lat - late
4. VV eespecially - especially, cont - count
5. CCVV ex-mine - sminned - examined
6. Syllabic Division: ex-ae-md - examined

Structure: This category included contractions, compound words, inflexional endings, and prefixes and suffixes.

Behavior: Included in this general heading were omissions of whole words, additions of whole words, words aided, repetitions, and corrections. These are symptomatic of various reading difficulties.

Repetitions, additions, and omissions were counted as one error regardless of the number of words included. Corrections were placed under "Behavior" as repetitions. Dialectical errors were not counted as errors for the scoring procedure but were analyzed according to the type of error made. One deviation from the B-S-R was made: Words Aided were recorded as a seventh major category for the purposes of this study.

Stuever (1969) established the reliability of the B-S-R Error Analysis as follows:

Five subjects were randomly chosen and errors checked and analyzed by two other clinicians besides the researcher to establish reliability. The reliability coefficient was 94.4.

The reliability was re-established for this study by selecting 12 clinicians to individually listen to, score, and analyze the oral readings of one of the subjects. The Scotts Coefficient formula was used to compute the data. A reliability coefficient of .96 was established.

Statistical Techniques Used in the Treatment of the Data

Point-Biserial Coefficient of Correlation

To test hypotheses 1, 2, 3, 4, and 5, the Point-Biserial Coefficient of Correlation (rpbi) was computed. This computation determines the relationship of a continuous variable and a dichotomous variable, in this case developmental readers and functionally illiterate adults. The Point-Biserial Coefficient of Correlation depends directly on the difference between the means (Guilford, 1965). As a result, the closer the mean scores between the two samples, the smaller the correlation coefficient becomes. Guilford (1965) states that:

Since $rpbi$ depends directly upon the difference between M_p and M_q , a significant departure from a mean difference of zero also indicates a significant correlation. A t test of the difference between means can therefore be used to test the significance of the departure of the correlation of coefficient from zero.

A direct t test of the correlation coefficient can also be made, but only for the hypothesis of a correlation of zero.

Since this study was designed to determine the similarities of errors between two groups, a zero coefficient of correlation indicated a high degree of similarity in mean error types. A t test measures the probability of samples coming from different populations; thus when determining if they are the same population, a non-significant

t is desired. The hypotheses were tested on the preceding logic.

Total error frequencies were tabulated for each category of the B-S-R Error Analysis and total number of items wrong were counted for each subtest of the Stanford Diagnostic Reading Test. The Bond-Balow-Hoyt Silent Reading Diagnostic Tests (subtests 1 and 2) were calculated on the number wrong for each of the following error types: initial, middle, ending, and orientation.

The following formula for rpbi describes the computational procedure:

$$rpbi = \frac{M_p - M_q}{Q_t} \sqrt{pq}$$

where M_p = mean of X values for the higher group in the dichotomized variable, the one having more of the ability on which the sample is divided into subgroups.

M_q = mean of X values for the lower group.

p = proportion of the cases in the higher group.

q = proportion of the cases in the lower group.

Q_t = standard deviation of the total sample of the continuously measured variable, X. (Guilford, 1965)

Summary

This chapter has described the population of this study and the testing procedures employed. A detailed description of the instruments used and the reliability and validity information about each test was included. In addition, the statistical techniques and computational formulas were presented.

CHAPTER IV

TREATMENT OF DATA AND ANALYSIS OF RESULTS

Introduction

The purpose of this study was to examine the oral reading error patterns of functionally illiterate adults and developmental readers to determine the degree of similarity that exists between them. The range of reading ability was constant for both groups. Comparisons of error patterns were made at the instruction and frustration levels of reading. These errors were taken from oral readings of graded extended passages and categorized on the B-S-R Error Analysis. Additional comparisons were made on selected subtests of the Stanford Diagnostic Reading Test and the error analysis of the Bond-Balow-Hoyt Silent Reading Diagnostic Tests.

Discussion of the Point-Biserial Coefficient

of Correlation

The hypotheses presented question the similarities of developmental readers and functionally illiterate adults on oral reading error patterns. The Point-Biserial is calculated on the basis of the difference between the means of the two groups; thus, highly similar means give a coefficient of correlation that approaches zero and a non-significant probability level. In terms of the rpbi formula, this is

indication of little difference between the two populations which is desirable in light of the hypotheses of this study; therefore, a low level of significance is indication that the probability of the two groups coming from the same population is high.

Tests of the Hypotheses

Five hypotheses will be discussed in terms of the statistical treatment of the data.

Hypothesis I: There is no significant relationship between the error types of oral reading errors made by two experimental groups on an extended oral passage read at the instruction level (Hypotheses 1 and 2 are tested on each of the following categories: visual perception errors, directional confusion errors, visual-auditory errors, structural errors, behavior characteristics, words aided errors, and syllabic division errors.). Table I reports the results. Hypothesis 1 was not rejected on the basis of a non-significant relationship between mean raw score differences. The correlation coefficients indicate a high degree of similarity between error patterns at the instructional level on visual perception errors, directional confusion errors, visual auditory errors, structural errors, behavioral characteristics, and syllabication. Only one error category, words aided, exhibited little relationship. Differences between populations were not discernible at the instructional level of reading.

Hypothesis II: There is no significant relationship between the types of oral reading errors made by two experimental groups on an

TABLE I
 RELATIONSHIPS OF ERROR CATEGORIES OF THE B-S-R ERROR ANALYSIS
 AT INSTRUCTION LEVEL

Error Categories of the B-S-R Error Analysis	Error Patterns at the Instructional Level of Reading				
	Mean of Bevel.	Mean of Illit.	Combined SD	rpbi	Sign.
Visual Perception	14.647	16.00	23.193	-.029	NS
Directional	.647	.484	1.426	.057	NS
Visual Auditory	2.382	3.645	5.269	-.119	NS
Structural	2.823	4.161	5.609	-.119	NS
Behavioral	12.764	15.452	22.236	-.060	NS
Words Aided	8.941	3.935	11.320	.220	NS
Syllabication	.088	.193	.400	-.131	NS

extended oral passage read at frustration level. Table II reports the results. Hypothesis 2 was not rejected on the basis of a non-significant relationship between mean raw score differences. The correlation coefficients indicate a high degree of similarity between error patterns at the frustration level of reading on visual perception errors, directional confusion errors, visual auditory errors, structural errors, behavioral characteristics, and words aided errors. Only one category, syllabication errors, could be rejected. Differences between populations were not discernible at the frustration level of reading.

TABLE II
RELATIONSHIPS OF ERROR CATEGORIES ON THE B-S-R ERROR ANALYSIS
AT FRUSTRATION LEVEL

Error Categories of the B-S-R Error Analysis	Error Patterns at the Instructional Level of Reading				
	Mean of Devel.	Mean of Illit.	Combined SD	rpbi	Sign.
Visual Perception	11.911	20.548	25.276	-.171	NS
Directional	1.088	.935	2.453	.031	NS
Visual Auditory	11.059	4.419	12.939	.256	NS
Structural	3.353	5.193	7.078	-.129	NS
Behavioral	10.735	16.677	22.392	-.132	NS
Words Aided	13.970	7.774	19.576	.158	NS
Syllabication	0	.419	.632	-.330	S

Hypothesis 3: There is no significant relationship of performance on the subtests of the Stanford Diagnostic Reading Test between two experimental groups. (This hypothesis examines the following subtests: Auditory Discrimination, Syllabication, Beginning and Ending Sounds, Blending, and Sound Discrimination.) Table III reports the results. Hypothesis 3 was not rejected on the basis of a non-significant relationship between mean raw score differences. The correlation coefficients indicate a high degree of similarity of performance on Auditory Discrimination, Syllabication, Beginning Sounds, Ending Sounds, Blending, and Sound Discrimination. Differences between populations were not discernible on the subtests of the Stanford Diagnostic Reading Test.

TABLE III

RELATIONSHIPS OF THE STANFORD DIAGNOSTIC READING TEST

Subtests of the <u>Stanford Diagnostic Reading Test</u>	Performance on Word Recognition Skills				
	Mean of Devel.	Mean of Illit.	Combined SD	rpbi	Sign.
Auditory Discrimination	15.059	18.516	25.509	-.067	NS
Syllabication	10.676	6.548	13.190	.156	NS
Beginning Sounds	2.235	3.677	4.970	-.145	NS
Ending Sounds	6.708	5.774	9.598	.048	NS
Blending	10.912	13.194	18.403	-.062	NS
Sound Discrimination	11.559	22.710	25.490	-.218	NS

Hypothesis 4: There is no significant relationship between types of reading errors as measured by the Bond-Balow-Hoyt Silent Diagnostic Reading Tests, Test 1: Words in Isolation, between two experimental groups. (Hypotheses 4 and 5 will examine each of the following error categories: initial, middle, ending, and orientation errors.) Table IV reports the results. Hypothesis 4 was not rejected on the basis of a non-significant relationship between mean raw score differences. The correlation coefficients indicate a high degree of similarity of error patterns on initial errors, middle errors, ending errors, and orientation errors. Differences between populations were not discernible on Test 1 of the Bond-Balow-Hoyt Silent Diagnostic Reading Tests.

TABLE IV

RELATIONSHIPS OF ERROR CATEGORIES ON THE BOND-BALOW-HOYT SILENT READING DIAGNOSTIC TESTS, TEST 1

Error Categories on Test 1: Words in Isolation	Error Patterns Analyzed on the <u>Bond-Balow-Hoyt</u>				
	Mean of Devel.	Mean of Illit.	Combined SD	rpbi	Sign.
Initial Errors	4.059	4.290	6.306	-.018	NS
Middle Errors	4.559	4.387	6.878	.012	NS
Ending Errors	3.029	4.193	5.717	-.102	NS
Orientation Errors	2.882	4.097	5.379	-.113	NS

Hypothesis 5. There is no significant relationship between types of reading errors as measured by the Bond-Balow-Hoyt Silent Diagnostic Reading Tests, Test 2: Words in Context, between two experimental groups. Table V reports the results. Hypothesis 5 was not rejected on the basis of a non-significant relationship between mean raw score differences. The correlation coefficients indicate a high degree of similarity of error patterns on initial errors, middle errors, ending errors, and orientation errors. Differences between populations were not discernible on Test 2, of the Bond-Balow-Hoyt Silent Diagnostic Reading Tests.

TABLE V

RELATIONSHIPS OF ERROR CATEGORIES ON THE BOND-BALOW-HOYT SILENT READING DIAGNOSTIC TESTS, TEST 2

Error Categories on Test 2: Words in Context	Error Patterns Analyzed on the <u>Bond-Balow-Hoyt</u>				
	Mean of Devel.	Mean of Illit.	Combined SD	rpbi	Sign.
Initial Errors	3.971	2.323	5.059	.163	NS
Middle Errors	4.265	4.161	6.604	.008	NS
Ending Errors	3.206	3.871	5.499	-.060	NS
Orientation Errors	3.353	3.903	5.574	-.049	NS

A graphic comparison of observed behavior, Figure 1, indicates that the mean raw scores on the B-S-R Error Analysis at the instruction level of reading are similar for all error categories except category VI, words aided. Functionally illiterate adults made considerably less words aided errors than did the developmental readers. Marginally more visual auditory and behavioral errors are recorded for the functionally illiterate adults.

In general the mean raw scores are less similar at the frustration level of reading on the B-S-R Error Analysis as reported in Figure 2. The largest areas of discrepancy are noted for visual perception, visual auditory, behavioral, and words aided categories. As can be seen a similar trend in the words aided category is evident at the frustration level with the developmental reader making the highest number of errors.

Figure 3 represents the mean raw score comparisons on the Bond-Balow-Hoyt and Stanford Diagnostic subtests. The mean raw scores are highly similar for all error categories on both tests of the Bond-Balow-Hoyt. However, discrepancies are apparent for the Syllabication, and Sound Discrimination subtests of the Stanford Diagnostic Test. The functionally illiterate adults made less Syllabication and more Sound Discrimination errors than did the developmental readers.

The observed mean raw scores are similar for both groups between subtests and error types. Some exceptions, however, were the Stanford Auditory Discrimination and Sound Discrimination subtests on which the functionally illiterate adult made considerably more errors than did the developmental reader, 3.457 and 11.151 respectively. Other areas of difference were noted on the B-S-R Error Analysis, frustration level,

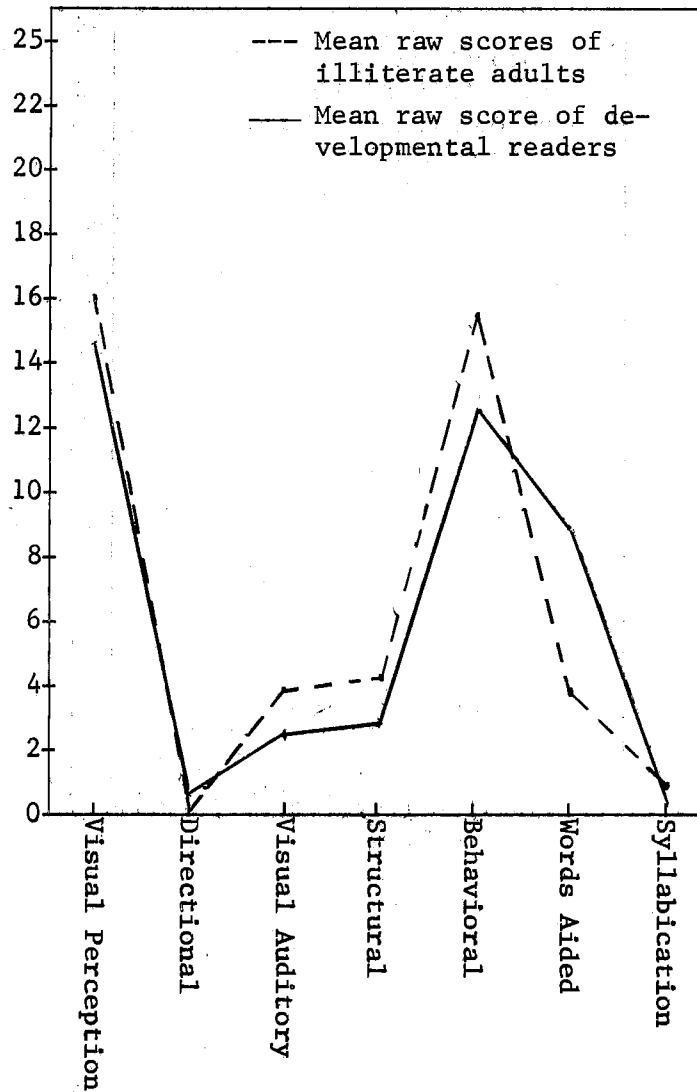


Figure 1. B-S-R Error Analysis,
Instruction Level

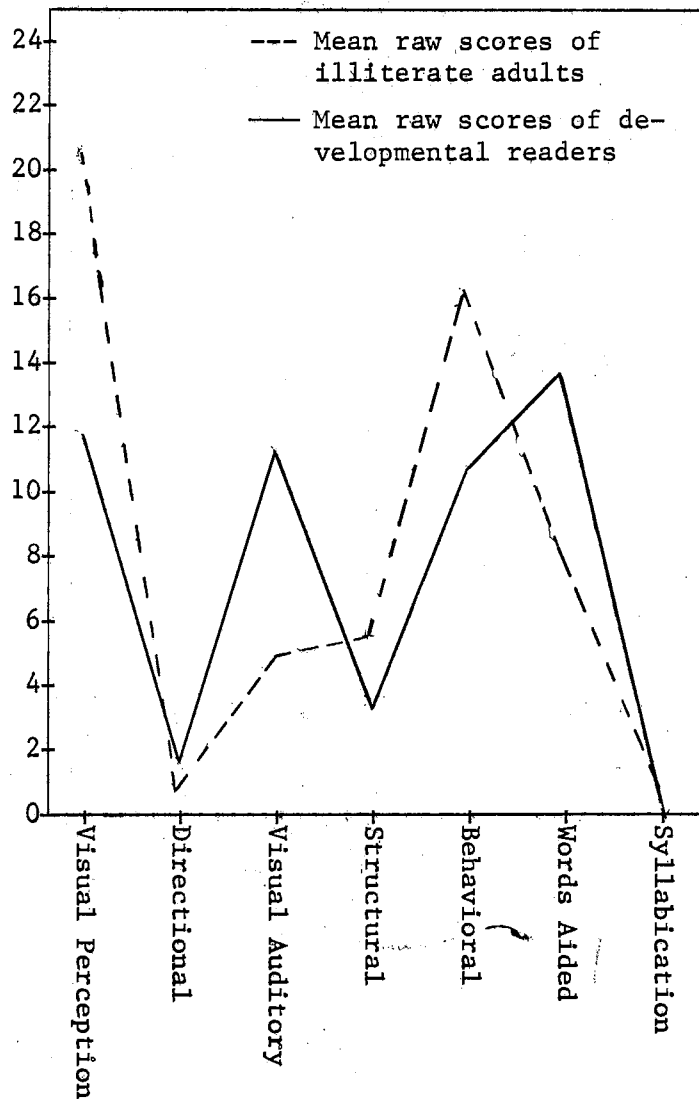


Figure 2. B-S-R Error Analysis,
Frustration Level

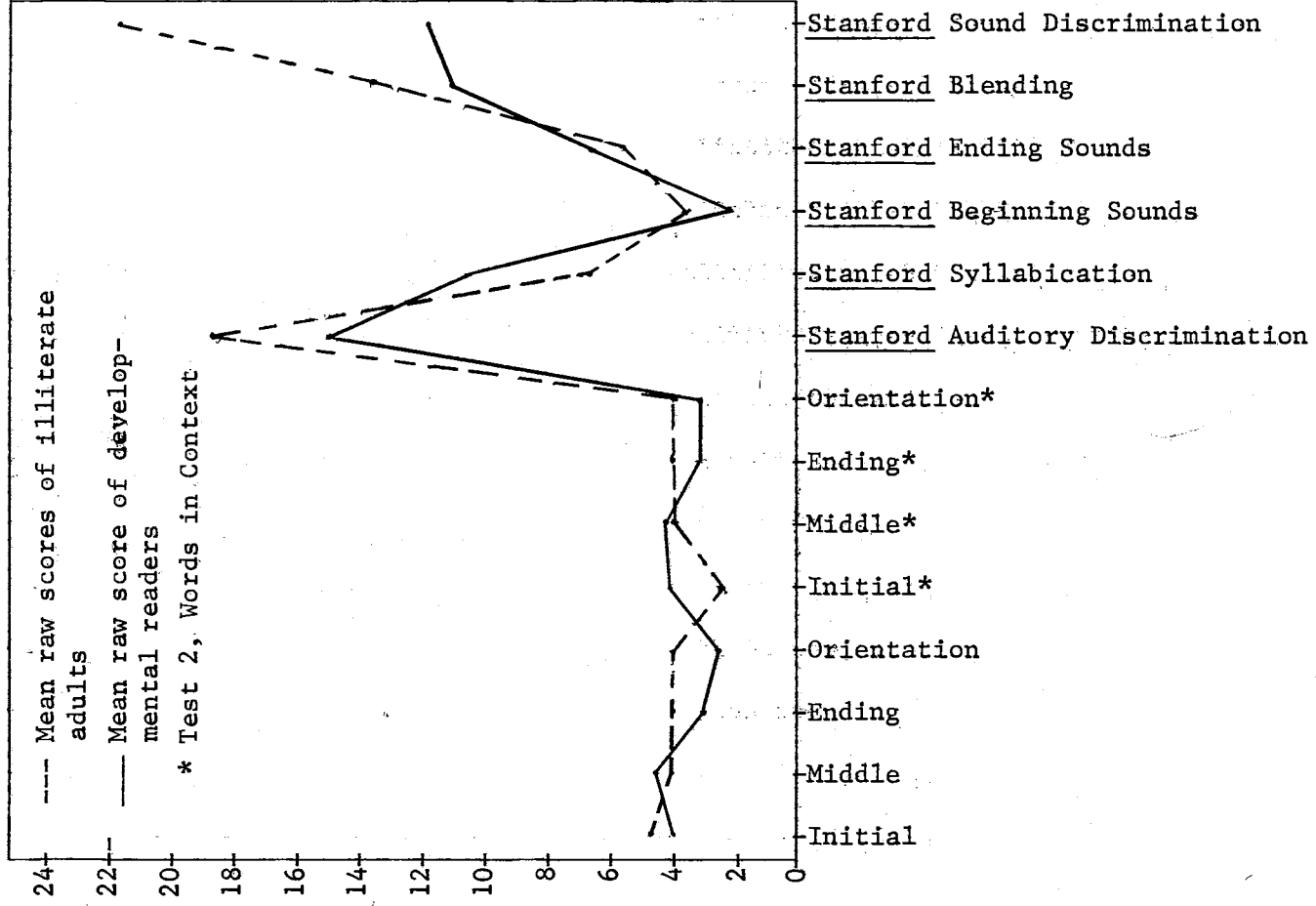


Figure 3. Bond-Balow-Hoyt Silent Reading Diagnostic Test

on which the functionally illiterate adults made a mean raw score of 8.637 more visual perception and 5.942 more behavioral errors. At the instruction level the adults made 5.006 more words aided errors. At the frustration level, however, they scored 6.196 fewer words aided errors. More visual auditory errors, 6.640, were reported for developmental readers at the frustration level of reading. Some differences were noted on the Stanford syllabication subtest with a discrepancy of 4.128 errors, with developmental readers making the most errors.

Summary

This chapter has presented the statistical treatment of the data. The Point-Biserial coefficient of correlation was calculated to determine the relationship of oral reading error patterns between functionally illiterate adults and developmental readers.

In comparing the error patterns of the two groups, two levels of reading performance, instruction and frustration, were considered. The B-S-R Error Analysis was utilized for oral reading errors. These errors were categorized into seven major categories. Two standardized tests, the Stanford Diagnostic Reading Test and the Bond-Balow-Hoyt Silent Reading Diagnostic Tests were correlated on specific subtests. The formula (rpbi) used in the treatment of the data relied on the differences between sample means to determine the correlation. A correlation approaching zero was desirable to establish the similarities between samples. No significance was indicated that the probability of the populations being the same was in fact high. Only one error category could be rejected under the null hypothesis, syllabication

at the frustration level of reading as measured on the B-S-R Error
Analysis.

CHAPTER V

SUMMARY AND CONCLUSIONS

General Summary of the Investigation

This study examined the oral reading error patterns of functionally illiterate adults and developmental readers. The adults and children were matched on reading levels, between 2.5 - 4.0 grade level. These are the levels in which word recognition skill development is considered to be most vital for developmental readers. The subjects were screened on the Standard Reading Inventory. Both word recognition and comprehension were taken into account for the screening procedure. Each child and adult was then asked to read extended oral passages of graded difficulty. The difficulty levels ranged from 2.5 - 6.0 grade levels, in half-year intervals. The subjects continued to read until two levels of performance were achieved, instruction and frustration. Each reading was tape recorded for future reference. The two performance levels were to test instruction and frustration reading behavior.

The final sample consisted of thirty-four developmental readers (Bell, 1973) and thirty-one functionally illiterate adults. The developmental readers were selected from second and third grade classrooms in Muskogee public schools. The functionally illiterate adults, sixteen years old or older, were selected from Muskogee public high school, Children's Center at Taft Oklahoma, and Oklahoma State University Reading Center.

Each subject was administered the Standard Reading Inventory, extended oral passages at two levels of reading, the Stanford Diagnostic Reading Test, and the first two subtests of the Bond-Balow-Hoyt Silent Reading Diagnostic Tests. The B-S-R Error Analysis was utilized to classify the oral reading errors made on the extended oral passages. Seven categories were included. They were: visual perception, directional confusion, visual auditory, structural, behavioral, words aided and syllabic division. The Bond-Balow-Hoyt utilized four error types: initial, middle, ending and orientation. Six areas were investigated by the Stanford Diagnostic: auditory discrimination, syllabication, beginning and ending sounds, blending, and sound discrimination.

From the raw scores of each error category, it was hoped to determine if there was a relationship of error patterns at two levels of performance, and if word recognition abilities were similar. The Point-Biserial coefficient of correlation (r_{pb1}) was employed to determine the relationship of error patterns between the two groups. The r_{pb1} utilizes the difference between means to determine the correlation. If means were highly similar, the correlation necessarily approaches zero; consequently, those coefficients of correlation closer to zero indicated a higher degree of similarity between error types. Non-significance indicated that the populations were probably one. A correlation was calculated on each of the twenty-eight variables measured by the tests.

Conclusions

Results of this study indicate that in general oral reading error patterns of developmental readers and functionally illiterate adults are similar. One error subtype could be rejected, syllabication at the frustration level of reading.

At the instruction level of reading, observed errors classified on the B-S-R Error Analysis show a high degree of similarity between the two groups on visual perception errors - .029. The observed mean raw scores indicate that the functionally illiterate adult tends to make slightly more visual perception errors. Directional confusion was similar between groups; however, neither group made a substantial number of these errors, which would be expected for the developmental level under consideration. Visual auditory errors were not as similar as visual perception errors. The mean raw scores show that the adult made only slightly more visual auditory errors than did the developmental reader. Neither group, however, differed significantly on this error category. Behavioral errors showed a high degree of similarity, with the adults making slightly more errors than the developmental readers. Structural errors were correlated at -.119. It may be that dialect errors of the adults could account for this lower correlation. Omission of prefixes and suffixes were categorized under structural errors. Many of the dialect errors were of this nature. Syllabication had next to the last similarity. Very few errors for either group were recorded. This again may be a result of the developmental level, in which syllabication is one of the most difficult skills and would be mastered by only those at the top end of the range. Words aided were the least significant of all the error categories at

the instruction level. It could be speculated that adults because of experience and maturity were less willing to elicit the aid of the examiner, particularly at the instruction level where adequate comprehension of the story allowed for an "educated guess."

At the frustration level of reading, errors classified on the B-S-R Error Analysis indicate, in general, less similarity of error patterns than at the instruction level. One exception, directional confusion, reported a higher correlation, however, based on relatively few numbers of errors. A look at the rank of similarities in descending order shows that words aided had a higher degree of similarity than visual perception and visual auditory errors at the frustration level and a lesser similarity at the instruction level.

Figures 1 and 2 (Chapter IV) show that illiterate adults made less mean words aided errors at instruction level and more at frustration than developmental readers. Visual auditory errors, however, were only slightly higher at instruction level for illiterate adults and considerably higher for developmentals at the frustration level. Perhaps as the difficulty of the material made content clues less available, the adult was forced to rely on the examiner; whereas, the developmental reader relied on visual auditory skills, being more recently associated with phonic generalizations.

Syllabication error category could be rejected under the null hypothesis. Again, this may have been the function of the developmental level. In any case, all error categories were sufficiently similar between groups at both levels of reading, except syllabication, to indicate a congruency in error patterns. The similarities, however, become less evident at the frustration level of reading.

Examination of the statistical relations of the Stanford Diagnostic Reading Test shows that ending sounds, blending, and auditory discrimination correlate highly, from high to low in order presented. Lesser similarities are noted for beginning sounds, syllabication and sound discrimination. Figure 3 shows that functionally illiterate adults consistently made more errors on sound discrimination than did developmental readers. This perhaps is indication of the adult being more visually oriented in his reading behavior. All subtests of the Stanford correlated sufficiently to indicate a similarity in word recognition abilities between developmental readers and functional illiterate adults.

The error analysis of the Bond-Balow-Hoyt, Test 1: Words in Isolation, reports the highest correlation with middle errors. Initial errors were second. Ending errors and orientation errors were of discernibly lesser similarity. Figure 3 indicates that adults made marginally more mean initial errors on Test 1. The second subtest of the Bond-Balow-Hoyt, Words in Context, indicate a different relationship with middle and orientation errors having the highest similarity while ending and initial errors had the lowest. It may be speculated that the context clues provided in Test 2 may have affected the strategy of word attack. Test 2, for example, shows that the adults made less initial errors when provided with context clues than did the developmental readers.

The results of this study lend credence to the developmental theory of reading in that whatever differences exist between children and adults do not seem to greatly influence the error patterns exhibited by each group when reading level is held constant. If in fact, error patterns are representative of skill disability and word

recognition difficulties, then the similarities exhibited by these groups has implications for the curriculum of illiterate adult programs. It would seem that for adults to become independent readers, word recognition skills normally learned by developmental readers at the same reading level would be a useful teaching tool. Perhaps skill development should not be sacrificed for approaches which give immediate but superficial success. In any case, it is hoped that this study will stimulate further research into the reading behavior of the illiterate adult.

Recommendations

1. A study should be made to determine the shift in error patterns at different levels of reading difficulty for functionally illiterate adults.
2. A study should be initiated to investigate the relationship between comprehension and oral reading error patterns of functionally illiterate adults.
3. The differences in oral reading error patterns between children-oriented and adult-oriented materials when read by the illiterate adult should be explored.
4. A comparative study of oral reading errors between young disabled readers and illiterate adults should be initiated.
5. A study should be made to determine the effect of context clues on the location of errors within a word and/or error type made by the illiterate adult.

BIBLIOGRAPHY

- Bell, A. A study of the shift in error patterns between instructional and frustration levels among third grade developmental readers. Unpublished doctoral dissertation, Oklahoma State University, 1973.
- Bennette, A. An analysis of errors in word recognition made by retarded readers. Journal of Educational Psychology, 1942, 33, 25-38.
- Berends, M. An analysis of error patterns, rates and grade equivalent scores on selected reading measures at three levels of performance. Unpublished doctoral dissertation, Oklahoma State University, 1971.
- Bishop, C. H. Transfer effects of word and letter training in reading. Journal of Verbal Learning and Verbal Behavior, 1964, 3, 215-221.
- Bond, Balow & Hoyt. Silent Reading Diagnostic Tests. Chicago: Lyons, and Carnahan, 1970.
- Bruning, J. & Kintz, B. Computational Handbook of Statistics. Dallas: Scott, Foresman and Company, 1968.
- Christension, A. A disgnostic study of oral reading errors of intermediate grade children at their independent, instructional, and frustration reading levels. Unpublished Ed. D. dissertation, Colorado State College, 1966.
- Dale, E. & Chall, J. A formula for predicting readability. Educational Research Bulletin, 1948, 18, 16-20, and 28, 37-54.
- Dunn-Rankin, P. Analyzing the development of reading skill using an error-word preference inventory. Paper presented at the meeting of the American Educational Research Association. New York: February, 1971, Ed - 051-960.
- Gagne, R. M. Instruction and the conditions of learning. In Siegel, L. (Ed.) Instruction: Some Contemporary Viewpoints. San Francisco: Chandler Publishing Company, 1967.
- Gates, Arthur. The Improvement of Reading. New York: The MacMillan Company, 1935.
- Gibson, E. J. Learning to read. Science, 1965, 148, 143-148.
- Guilford, J. Fundamental Statistics in Psychology and Education. New York: McGraw-Hill, 1965.

- Jeffrey, W. E. & Samuels, S. J. Effect of method of reading training on initial learning and transfer. Journal of Verbal Learning and Verbal Behavior, 1967, 6, 354-358.
- Karlsen, B., et al. Stanford Diagnostic Reading Test, Form W. New York: Harcourt and World Inc., 1966.
- Knight, D. & Alcorn, J. Comparisons of the performance of educationally disadvantaged adults and elementary children on selected measures of reading performance. In Schick, G. & Merrill, M. (Eds.) Reading: Process and Pedagogy: 19th yearbook of the National Reading Conference. Milwaukee, Wisconsin: The National Reading Conference, 1971.
- McCracken, R. Standard Reading Inventory. Klamath Falls, Oregon: Klamath Printing Company, 1966.
- Monroe, M. Children Who Cannot Read. Chicago: University of Chicago Press, 1932.
- Otto, W., Askov, E. N., & Fischbach, T. J. Development of specific reading skills in adult education. In Greene, F. P. (Ed.) Reading: The Right to Participate, 20th Yearbook of the National Reading Conference. Milwaukee, Wisconsin: The National Reading Conference, 1971.
- Otto, W. & Koenke, K. Idiosyncratic word-association among adults at divergent levels of reading ability. In Schick, G. (Ed.) Multidisciplinary Aspects of College-Adult Reading, 17th Yearbook of the National Reading Conference. Milwaukee, Wisconsin: The National Reading Conference, 1968.
- Samuels, J. S. Effect of word associations on reading speed, recall, and guessing behavior on tests. Journal of Educational Psychology 1968, 59, 12-15.
- Schale, F. Patterns of change in oral reading errors from primary through secondary levels. Paper presented at the meeting of the International Reading Association. Atlantic City: April, 1971, Ed - 053-862.
- Schummers, J. Word pronunciation in the oral sight-reading of third-grade children. Unpublished doctoral dissertation, University of Minnesota, 1956.
- Singer, H. Changing patterns of factors in power of reading, elementary through college levels. In Thurston, E. & Lawrence, E. (Eds.) The Philosophical and Sociological Bases of Reading, 14th Yearbook of the National Reading Conference. Milwaukee, Wisconsin: The National Reading Conference, 1965.

- Spache, G. A new readability formula for primary-grade reading materials. Elementary School Journal, 1953, 53, 410-413.
- Stuever, R. Analysis of relationship of length of passage to categories of oral reading errors. Unpublished doctoral dissertation, Oklahoma State University, 1969.
- Summers, E. G. Adult basic education--a new dimension in reading. In Wark, E. G. (Ed.) College and Adult Reading, 5th Yearbook of the North Central Reading Association. University of Minnesota: Reading and Study Skills Center, Student Counseling Bureau, 1968.

VITA

Sheldon Noel Russell

Candidate for the Degree of

Doctor of Education

Thesis: ERROR PATTERN RELATIONSHIPS OF DEVELOPMENTAL READERS AND
FUNCTIONALLY ILLITERATE ADULTS

Major Field: Secondary Education

Biographical:

Personal Data: Born at Waynoka, Oklahoma, December 6, 1942, the
son of Ralph J. and Violet O. Russell.

Education: Attended elementary and secondary school in Waynoka,
Oklahoma; graduated from Waynoka High School in 1960;
received the Bachelor of Arts degree from Northwestern State
College in 1968 with a major in English; received the Master
of Science degree in 1971 with a major in Secondary Education;
completed requirements for the Doctor of Education degree in
July, 1973.

Professional Experience: Entered the United States Air Force in
1961 and was discharged in 1965; taught 7th and 8th grade
English at East Junior High, Ponca City, Oklahoma from 1968-
1971; assistant supervisor of student English teachers in the
spring of 1972; instructor of college reading improvement,
summer of 1972; diagnostician for Community Based Right-to-
Read program, Fall, 1972; instructor of undergraduate reading
diagnosis, Spring, 1973; consultant to El Paso Community
College Right-to-Read program, Spring, 1973; consultant for
the development of a model reading program in the Aline-Cleo
Oklahoma, public school, Spring, 1973.