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ABSTRACT

This paper reviews the studies involving the more commonly measured reading readiness factors, discusses some unique studies, and projects what some needs of future research should be. The research areas discussed include reading readiness tests as predictors of success in beginning reading, auditory discrimination factors and their relation to beginning reading, visual discrimination factors and their relation to beginning reading, oral language development before beginning reading, intelligence factors and their relation to beginning reading, and studies of a more diverse nature. Some generalizations are offered as a result of the conclusions of research in all areas of reading readiness. The author recommends, in particular, that future research should examine specifically the effects of many of the unmeasured factors and create and refine procedures to analyze and measure them. A 122-item bibliography is included. (Author/AW)

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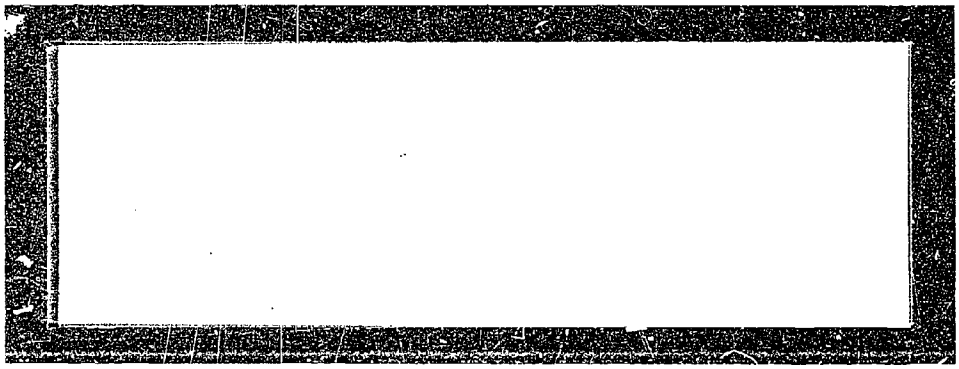

Reading Readiness: research in review

by

Norma J. Livo
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1972

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CONTENTS

Research in reading readiness has generally been of a very limited nature. Even though reading readiness is a complex perceptual and intellectual achievement composed of many diverse components, most researchers have chosen to investigate discrete variables such as auditory discrimination, visual discrimination, etc.

Many of these early studies have value for historical reasons, but in the future the thrust in research must be of a very different character.

This paper will review the studies involving the more commonly measured factors, discuss some unique studies, and project what some needs of future research should be. The research areas discussed will include reading readiness tests as predictors of success in beginning reading, auditory discrimination factors and their relation to beginning reading, visual discrimination factors and their relation to beginning reading, oral language development before beginning reading, intelligence factors and their relation to beginning reading, and studies of a more diverse nature.

READING READINESS TESTS AS PREDICTORS OF SUCCESS IN BEGINNING READING

Interest in reading readiness tests began to be felt in the middle 1920's and has continued to the present. During this time, the tests have been refined and evaluated experimentally. The following studies are described in affirmation of the fact that readiness tests do appear to measure factors which are related to first-grade reading achievement.

As a result of his 1939 evaluative study, Gates concluded that tests which measure a child's reading readiness two to three weeks after he enters school, on the whole, give satisfactory predictions of his reading ability at mid-year. However, the predictive value of these tests varies with the teaching method. The better the teacher adjusts the work to the pupil's special abilities, as revealed by the readiness tests, the better the prediction made by the tests. Tests should be used diagnostically so achievement can be assured by giving each pupil the kind and amount of help he needs.

In a predictive study, Wright (1936) used the Metropolitan Readiness Test, a pupil rating scale on which pupils were rated by their first-grade teachers, the Detroit First Grade Intelligence Test, the Lee-Clark Reading Readiness Test, and chronological age. The best predictive measures were found to be the pupil rating scale and the Metropolitan Readiness Test.

In another predictive investigation, Henig (1949) obtained scores with the Lee-Clark Reading Readiness Test, teacher rating of readiness, and marks at the end of the year (A, B, C, D, E) in reading. A substantial degree of relationship was found to exist between reading readiness test results and the marks in reading attained during the first year. However, the small sample (98) would limit the safety of generalizing these results to other populations, and the subjective marks in reading might not be a highly reliable measurement.

Francis P. Robinson and William E. Hall (1942) concluded that reading readiness tests are highly valid. Although errors for pupils scoring in the middle range can occur in making reading prediction, the upper scores and the lower scores are almost certainly good predictors. The researchers felt that reading readiness tests tend to be primarily tests of intelligence or to measure primarily what present intelligence tests measure.

There is a lack of agreement between the above opinion and the conclusions of the following two studies.

Craig (1937) in his study, "The Predictive Value of Reading Readiness Tests," found that all of the tests considered showed a marked positive correlation with reading achievement as determined by the three types of the Gates Primary Reading Tests. Pupils' intelligence quotients obtained on the Detroit First Grade Intelligence Test proved to be a poorer predictive measure of reading success than did their total scores on any other of the tests. The Metropolitan Reading Tests proved to be the best predictive measure of reading success, with the Lee-Clark Reading Readiness Test and the Monroe Reading Aptitude Test also showing definite value as predictive measures.

Lee, Clark, and Lee (1934) used teacher's ratings and the Lee-Clark Reading Readiness Test to predict a student's reading success at the end of the first semester. Among the conclusions reached were these:

1. The readiness test predicted scores on reading tests which were given at the end of the first semester better than did two intelligence tests.

2. The reading readiness test had the extremely high reliability of 0.97.

3. The ten most accurate items of the teacher's rating scale did not predict reading success as well as did the reading readiness test.

In another predictive investigation, Gates (1940) employed the Pintner-Cunningham Primary Mental Test to measure mental ability; he used various readiness tests to measure performance. At the end of the term, reading achievement was measured using the Gates Primary Reading Tests. Gates concluded that a combination of readiness tests and mental age had greater predictive value for success in reading than either of the two measures alone.

Grant (1938) conducted a validity study of the Metropolitan Readiness Test and the Pintner-Cunningham Primary Mental Test in which he determined the relationship between scores on these two tests and reading achievement. The sample included 260 public school, first-grade pupils. Comparisons of the Metropolitan Reading Readiness Tests and the Pintner-Cunningham Test with achievement in reading (Gates Primary Reading Tests, Metropolitan Achievement Tests, and DeVault Primary Reading Test) showed that pupils who did well on the Metropolitan Reading Readiness Tests and the Pintner-Cunningham Test also did well on the reading achievement tests. There was, however, considerable overlapping of scores, so a high readiness score alone did not always assure success in reading. The correlation between the readiness test score and the total achievement score was 0.64. The achievement score correlated 0.48 with the similarities subtest, 0.49 for the copying, 0.41 with vocabulary, 0.38 with sentences, 0.54 with numbers, and 0.46 with information. The correlation between the mental test and achievement was 0.63.

Karlin (1957) tested 111 children who had IQ's of 90 or higher, normal vision, speech, attendance in kindergarten, and adequate social and emotional maturity. The Metropolitan Reading Readiness Test was administered in September and the Gates Achievement Test in May. The small relationship between scores on the reading readiness test and the achievement test indicated a need for better understanding of readiness tests. Karlin suggested

that reading readiness test scores may be more useful in planning instruction than in predicting achievement.

The relationship of beginning first-grade scores on the Metropolitan Reading Readiness Test and the Stanford Achievement Test in third and fourth grade was determined by Kingston (1962). First-grade reading readiness scores correlated significantly with scholastic achievement in all areas measured by the Stanford Achievement Tests at both the third- and fourth-grade levels. However, generalizations from this study must be limited because children whose records indicated poor health history, irregular attendance, or physical handicaps were not included.

The findings of the preceding research studies indicate that using readiness tests as one tool in determining beginning reading readiness is legitimate. Conclusions reached as a result of these research studies are:

1) Reading readiness tests are useful in predicting beginning reading success.

2) Reading readiness tests are more useful as predictors when the upper scores and the lower scores are used than when middle-range scores are used.

3) The better the teacher adjusts the work to the pupils' special abilities as revealed by the reading readiness tests, the better the prediction made by the tests will be.

4) A combination of reading readiness test scores and mental test scores has greater predictive value for success in beginning reading than either of these two measures alone.

5) Reading readiness test scores are mildly successful in predicting scholastic achievement in third and fourth grade.

AUDITORY DISCRIMINATION FACTORS AND THEIR RELATION TO BEGINNING READING

As used here, auditory discrimination refers to a child's ability to distinguish differences and similarities among sounds (for

example, /m/ and /n/; /d/ and /t/. Attention has been given to the distinction between loss of hearing as such and defective auditory discrimination as well as to the fact that even though a child possesses normal hearing he may at the same time have abnormal auditory skill. The cited research studies reflect the above definition and support the theory that auditory discrimination is related to reading achievement and that it is a readiness factor which can be improved by direct teaching if the teacher provides experiences which are specifically aimed to develop it.

For example Durrell and Murphy (1953) matched two groups of children on intelligence and learning rate. The experimental group was given ten minutes of ear training daily for six weeks, while the control group received no special training. Tests indicated that the experimental group increased in learning rate with an average gain of 2.7 words, while the control group made a gain of one word in the same period.

In another study, Murphy (1953) divided 540 pupils into four groups which were equated for mental age, learning rate, speaking vocabulary, and auditory discrimination ability. Each day one group received auditory discrimination training for ten minutes; another group received ten minutes of instruction in visual discrimination of letters and words; a third group had a combination of auditory and visual discrimination training; and a fourth group followed the regular reading system. The combination of visual and auditory discrimination training brought gains superior to the gains of the other groups. Children low in auditory analysis skill profited particularly, and children with high initial scores in auditory analysis showed little profit from extra auditory training.

At least nine studies have indicated that auditory discrimination skill is closely related to initial success in learning to read. Harrington and Durrell (1955) concluded that skill in auditory and visual discrimination of word elements is more closely related to success in learning primary word vocabulary than is mental age. Alshan (1965) ranked (from highest to lowest) the following factors as predictors of first-grade reading achievement:

1) Auditory blending and consonant combinations

2) Teacher's ratings (excluding gross motor coordination)

3) Visual discrimination skill

4) Knowledge of letter names and consonant sounds

5) Oral language proficiency

Hanesian (1966), by administering the Wepman Auditory Discrimination Test; the Rosewell-Chall Auditory Blending Test; Wechsler's Intelligence Scale for Children--Digit Span; and specially constructed tests for discrimination of nonsense syllables, memory of words and nonsense syllables to 175 first graders, found a positive significant relationship between fall auditory abilities and spring reading achievement.

Birch and Belmont (1965) who required children aged five-and-one-half to eleven-and-one-half years to match a series of taps presented auditorily with a series of dots presented visually, found that test scores and reading achievement scores correlated significantly for the six- and seven-year-olds, but not thereafter. Sister Mary Nila (1953), who tested 300 first-grade entrants with four individual and four group tests, found that the factors which seemed to have the greatest relationship to reading achievement (in order of importance) were auditory discrimination skill, visual discrimination skill, range of information, and mental age.

Thackery (1965) tested 182 children in Britain by using the Harrison-Stroud Reading Readiness Profiles, the Kelvin Measurement of Ability Test for Infants, and the Southgate Group Reading Tests. He also included teachers' ratings of the childrens' language and speech and information on socioeconomic background. The measures of auditory discrimination and visual discrimination correlated most highly (0.53 and 0.50 respectively) with reading achievement.

Sylvia R. Gavel (1958) concluded that September tests of writing dictated letters, naming letters, identifying letter names, and word-learning rate were the best predictors of June reading achievement. February tests which best predicted June reading achievement were hearing sounds in words, applied phonics, and sounding lowercase letters. Letter-knowledge tests in February were so high for most children that they produced low correlations with reading achievement.

Thompson (1963), who conducted a study to determine: (1) whether there was a relationship among auditory discrimination, intelligence, and success in primary reading, (2) whether the subjects made significant improvement in auditory discrimination skill in the first and second grades, and (3) whether the poor readers

established a different pattern from that of good readers in the twelve subtests of the Wechsler Intelligence Scale for Children, found that auditory discrimination skill and intelligence correlated highly with the success in primary reading. The test scores in first-grade auditory discrimination and the intelligence scores were highly prognostic in determining who would become a good reader. The mean Performance Scale IQ of poor readers was significantly higher than their mean Verbal Scale IQ. The difference in these two means of good readers was not significant.

Christine and Christine (1964) found that poor auditory discrimination skill is one casual factor of reading retardation and of functional articulatory problems.

Although these studies suggest that auditory discrimination skill is closely related to initial success in learning to read, and although most of them found significant correlations to support the theory, not all research has produced similar results. Dykstra (1962) reported comparatively low correlations between tests of auditory discrimination and achievement on a first-grade reading test. He found a group intelligence test (Lorge-Thorndike Intelligence Test) to be the best predictor of both word recognition and paragraph reading. As a result, he felt that there is relatively little need to test for auditory discrimination abilities if intelligence test data are available.

Kerfoot (1964) found measures of visual discrimination to be better predictors of reading and spelling achievement than measures of auditory discrimination; although, the best auditory measures were better predictors than the poorest visual measures. (Visual discrimination measures included Gates Picture Directions, Gates Word Matching, Gates Word-card Matching, Gates Naming Letters and Numbers, Goins Picture Squares, Goins Pattern Copying, and Goins Reversals). Intelligence was found to be less effective as a predictor than visual discrimination, but better than auditory discrimination.

It should be noted, however, that even these last two studies found some relationship between auditory discrimination skill and first-grade reading achievement. Therefore, the cumulative evidence appears to indicate that a relationship does exist between the two. It also indicates that children low in auditory analysis skill profit particularly, and children with high initial auditory analysis scores show little profit from extra auditory training.

In summary, it would seem that research has shown a positive relation between auditory discrimination skill for sounds in words and reading achievement, independent of both intelligence and chronological age. It has proved that auditory discrimination is closely related to initial success in learning to read.

VISUAL DISCRIMINATION FACTORS AND THEIR RELATION TO BEGINNING READING

Visual discrimination, like auditory discrimination, is believed to be an important skill in reading readiness and is therefore included as a part of most reading readiness tests. Barrett (1965), who analyzed the Gates Reading Readiness Tests, the Harrison-Stroud Reading Readiness Profiles, the Lee-Clark Reading Readiness Test, the Metropolitan Readiness Tests, and the Murphy-Durrell Diagnostic Reading Readiness Tests, found that the general factor of visual discrimination was measured by at least one subtest in all of the tests and that the visual discrimination of words was evaluated by four tests.

The importance of the relationship between beginning reading and visual discrimination in conjunction with auditory discrimination, intelligence, and specific variations of visual discrimination is underlined by the findings of various research studies.

Bryan (1964) investigated the importance of intelligence and visual perceptions in predicting first-grade reading success. His sample included 23 kindergarten, 25 first-grade, 26 second-grade, and 21 third-grade pupils in one California elementary school. Scores on the Kuhlmann-Anderson Intelligence Test, the Metropolitan Reading Readiness Test, and the Marianne Frostig Developmental Test of Visual Perception were correlated with the California Achievement Test scores. Visual perception appeared to have relatively more weight than either intelligence or total reading readiness scores in predicting first-grade reading success. This was also true for second-grade reading comprehension, but intelligence correlated higher with reading vocabulary than did visual perception. Intelligence was a better predictor in third grade of both reading comprehension and vocabulary. However, it should be noted that this study was limited by possible differing degrees of conscientiousness and ability with which the teachers administered and scored the tests.

Ashlock (1965), for his dissertation, investigated visual perception and its relation to reading performance. The vocabulary subtest from the WISC was administered, and the scores were used to hold verbal intelligence constant. Fifteen boys and fifteen girls in the second semester of each of the first three grades constituted the sample. Reading tests and the Ashlock Tests of Visual Perception were administered in the classroom setting. All the other tests were administered individually. The total testing was completed in one month's time.

Each visual perception test was correlated with reading performance, and each correlation was converted to a Fisher z score. The three Fisher z's for each category of visual perception tests were averaged. An analysis of variance was carried out to test the significance of the difference between these means. Two analyses of variance were also used for repeated measurements and for a multiple correlation. Findings of the study include: (1) the highest predictors of reading performance were the three alphabetical tests of visual perception; (2) the assumed hierarchy of difficulty of perceptual tasks (alphabetic material of most difficulty, digital and geometric material of moderate difficulty, and pictorial material of less difficulty) was not found to be true at any grade level; (3) the importance of visual perception as a predictor of reading performance decreased as the grade level increased. To test perception of geometrical and digital symbols, the Memory for Designs, Coding, and Block Design, subtests from the WISC were used. There was an unexpected high order positive correlation between the Gates Primary Reading Tests and the Gates Advanced Primary Reading Tests with the Memory for Designs subtest on the WISC.

Olson (1958) examined visual and auditory achievement. A sample of 1,172 first-grade pupils were tested on various word perception abilities in September, November, and February. Also in February, reading achievement was measured by the Detroit Word Recognition Test and an individual oral reading test. The oral reading test was designed to inventory words from the basal readers used (Scott Foresman) and certain other words of pre-primer and primer level. All words were placed in sentences which made a connected story. The total score was the number of words read correctly, the highest possible score being 162. The instructional program consisted of emphasis on letter names and auditory discrimination of word elements. In Olson's words, the children were given "intensive training." Olson concluded that a child must have a knowledge of letter names before he can master 75 words. Knowledge of letter sounds

and names does not necessarily assure high achievement, but lack of this knowledge is usually associated with low achievement. He found no support for the assumption that a sight vocabulary of 75 words should be established before word analysis instruction is given or that a mental age of seven is necessary for use of phonics. It should be noted that the instructional program of "intensive training" on letter names and auditory discrimination of word elements could account for results different from most other findings.

Wilson (1942) was interested in the importance of visual and auditory skills in guiding the progress of a beginning reader. A group of 10 kindergarten children were given the Wilson-Flemming Symbols Scales in the spring of 1939. In the fall, they were given the Gates Reading Readiness Test; in December and January, they were given the Metropolitan Achievement Test (two forms). A group of 10 first-grade children received the Gates Reading Readiness testing, and 23 children in the two grades of this school were also given the Wilson-Flemming Symbols Scales. Fairly high rank order correlations were found when the Gates tests were correlated with intelligence and the scales. Wilson concluded that successful reading of ideas depends on accurately perceiving the letters that form each word. Several considerations in evaluating these findings are:

1) The small number of cases (43) makes the reliability of the statistical results somewhat uncertain.

2) The tests or test used to obtain the intelligence measure was not indicated.

3) There was a marked difference in the socioeconomic levels of the groups as reported by the author.

The main purpose of a study by Silvaroli (1965) was to determine whether any combination of the readiness factors of mental age, auditory discrimination, visual discrimination, letter identification, social-class status, and maternal need-achievement could be used prior to a formal program of reading instruction to predict probable success in reading.

During May, 1962, the auditory and visual discrimination subtests of the Sheldon Pre-reading Test were administered to all 600 children attending kindergarten in the five public elementary schools in West Babylon, New York. From this population, a sample population of 87 first-grade children was obtained by random selection.

Each child was given the Durrell Informal Test of Upper and Lower Case Letter Identification and the Otis Quick-Scoring Mental Ability Test: Alpha Short Form. The Warner Index of Status Characteristics was used to obtain a quantitative measure of social-class status for each child. The mothers of all children in the sample were given the McClelland n-Achievement Test. The Gates Primary Reading Test was administered in March, 1963. Regression equations and multiple correlations were developed. The findings of this study would indicate that a measure of identification of upper and lower case letters could be used to predict probable success in first-grade reading.

Barrett (1965, Reading Teacher) obtained scores in seven visual discrimination tasks, as well as chronological age and intelligence quotient, to determine if they might be predictive of success in first-grade reading achievement. Using the multiple regression technique, he found that scores on reading letters and numbers, pattern copying, and word matching correlated most closely with total reading achievement. Pattern copying correlated more closely with word recognition than with paragraph reading. None of the other variables showed statistical significance. When all seven visual discrimination tasks were compared with reading achievement, the correlation was found to be statistically significant. However, Barrett felt the reading readiness factors investigated did not provide enough predictive evidence to use alone.

Smith (1928) questioned whether the child with skill in matching letters at the beginning of the term attained greater success in reading than the one who had difficulty. Scores on various tests of skill in matching, using capital and lower case letters, were correlated with the Detroit Word Recognition Test scores. Ability to match capital and lower case letters was measured during the first week of the term, and reading achievement was measured twelve weeks later. A correlation coefficient of 0.87 was found between the scores of letter matching ability and reading ability. The researcher discovered that it is the last part of the word which gives distinction for a child.

Weiner and Feldmann (1963) set out to determine the predictive validity of their Reading Prognosis Test, which includes three areas: language, perceptual discrimination, and beginning reading skills. The language area was divided into a Word Meaning subtest and a Story Telling subtest. Perceptual discrimination was designed to include Visual Similarities and Visual Discrimination

subtests, which required the student to match three- and four-letter words. The subtests Small Alphabet Letters and Capital Alphabet Letters, under beginning reading skills, required children to identify letters. The Reading Prognosis Test was administered in October, and the Gates Primary Reading Tests in June, to 138 students. It appeared that in the overall analysis the identification of letters had a somewhat closer relationship with later reading achievement than did the matching of printed words.

Keogh (1963) used the Bender Visual Motor Gestalt Test as a group test with youngsters in May of their kindergarten year; he then measured their achievement on the Lee-Clark Reading Test near the end of their first-grade year. Three methods were used to administer the Bender Gestalt, and results with the 149 subjects suggested that presenting the Bender designs on large cards at the front of the room was preferable to the two other methods. Keogh concluded that the Bender Gestalt may be a useful reading readiness screening instrument for first grade since it correlated at the 0.50 level with first-grade reading achievement.

Another study which utilized a different visual discrimination task was done by Ames and Walker (1964). The Rorschach scores of kindergarten children matched for intelligence were compared with their reading achievement in the fifth grade. According to Ames, children who became better readers showed greater clarity, accuracy, and appreciation of detail as well as fewer gross global responses to the Rorschach ink blots than did those who became poorer readers.

Another study which indicated that all readiness tests for visual discrimination need not be alike was conducted by Goins (1958). She found that the ability to keep a figure in mind against distraction, as demonstrated by a student's ability to complete a mutilated design when a completed design was in view, was a relatively good predictor of first-grade reading achievement. (Barrett (1965 Reading Teacher) provided cross validation for this in a later study.) Goins found significant correlations for the whole battery of perceptual tests combined and for individual tests of pattern copying and reversals. Tachistoscopic training in the perception of shapes did not improve the children's reading skill.

Several studies dealing with visual discrimination training are of interest in this discussion of visual discrimination factors and their relation to beginning reading. In one of these, King (1964) studied visual training and transfer of training with six groups (23 each) of kindergarten children. The six groups and their

stimuli were:

1) Different words from the reading task

2) Different meaningful words (visual, sound, and pictorial presentation)

3) Same words as reading task
   a) successive presentation
   b) simultaneous presentation

4) Same letters which were constituents of reading words

5) Geometric forms (the control group)

The words used for the stimuli and training of the same word groups were the words to be learned in the reading task. For the different word group, the words were different from those in the reading task. In addition to the printed words, the different meaningful word group was also provided with appropriate picture and auditory stimuli produced by the experimenter saying the words. The same letter group matched letters appearing in the words used in the reading task. An analysis of variance indicated significant group differences in reading performance, favoring groups trained in matching different meaningful words and the same letters. This writer disagrees with King's suggestion that beginning reading should:

> . . . include visual discrimination training with the easier task of matching single letters to be followed by the more difficult but effective training in the discrimination of words made meaningful by associating appropriate sounds and meaning to the visual forms. (King, 1964)

Reversing the order of suggested training and starting with meaningful presentation as the first method of word presentation seems preferable.

In a study of visual discrimination pretraining, Muehl (1961) used another set of pretraining tasks. He concluded that beginners discriminate among words having similar length and different shapes on the basis of specific letter differences. Again this suggested that pretraining with relevant letters as parts of the total words was more effective than pretraining with letters presented singly.

The effects of different types of visual discrimination pretraining on the performance of kindergarten children learning to read a vocabulary list were also investigated by Muehl (1960). One group learned to match the same words that appeared on the vocabulary list. Another group learned to match words different from those on the list, and a third group learned to match geometric forms. There were no control groups in this study. All three groups were evaluated on their success in learning the vocabulary list. Results indicated that the group matching the same words which appeared on the vocabulary list learned faster than the other groups.

In a similar study, Staats, Staats, and Schutz (1962) studied the comparative effects of (1) discrimination pretraining using the same words as those in the list, (2) pretraining with letters making up the words in the list, and (3) no discrimination pretraining. All three groups were then tested for their ability to learn the same list of words. Final retention of the test words was similar for all types of discrimination training.

Muehl and Kremenak (1966) investigated the relation between reading achievement and prereaders' abilities to integrate sensory information. Four matching tasks involving visual and auditory dot-dash patterns were given to 119 first-grade pupils in September. Also given in September were the Harrison-Stroud Reading Readiness Profiles. The Lorge-Thorndike Intelligence Test was administered in May. The ability to match visual-to-auditory and auditory-to-visual patterns of dots and dashes made significant contributions to predicting initial reading success. The ability to name letters was the best predictor of reading achievement at the end of the year. Muehl and Kremenak felt naming letters might be a good screening device for prereaders.

Nicholson (1958) developed a design to:

1) Make an extensive and precise inventory of certain visual, auditory, and kinesthetic abilities in relation to letters and words.

2) Learn the retention capacities for sight words.

3) Relate these abilities to chronological age, mental age, and sex of first-grade entrants.

The learning rate was measured by the Murphy Durrell Diagnostic Reading Readiness Test. Ten words were presented on flash cards,

five of which were accompanied by pictures. The words were shown to children in a small group, and each word was discussed and practiced for a minute in a standard presentation. This was followed by ten minutes of practice on all ten words. An hour later each pupil was tested individually for recognition of the words and helped on those he did not remember. Two additional individual test periods followed, one during the middle of the day and one before the close of the day. This established the children's learning rate. Other test measures used were the Boston University Letter Knowledge Tests, the Otis Quick-Scoring Mental Abilities Tests, and the California Mental Maturity Test. Letter knowledge rather than mental age produced the highest learning rate according to Nicholson. An area of concern in evaluating this study was the fact that tests were scored by the classroom teachers, but a spot check on the scoring found few errors. It is to be hoped the teachers were dedicated and did not feel so threatened by the testing of their pupils that they were inaccurate in scoring.

In a study on pretraining of visual discrimination skills, Gorelick (1965) found that the control group did as well as the experimental groups. She did feel that the simple auto-instructional device used in this study should be considered in kindergartens since sex was not a relevant factor in the study.

However, in another study of visual discrimination skill training, Wheelock and Silvaroli (1967) found significant differences in visual discrimination ability between students taught to make instant responses of recognition to capital letters and those who did not receive this training. This study involved all the morning kindergarten children in three schools in Phoenix, Arizona. From the population of ninety children, 45 were placed in the experimental group and 45 in the control group. All of the children were administered visual discrimination subtests one, two, and four of the Lee-Clark Reading Readiness Test and a Letter-Form Training Criterion Test designed by the authors.

In addition to their regular kindergarten activities, the children in the experimental group were given training fifteen minutes a day, five days a week, to establish instant responses of recognition to the capital letters. Following the training, all of the children in both groups were again administered subtests one, two, and four of the Lee-Clark test and the Letter-Form-Training Test. Analysis of covariance was employed. Not only was there a significant difference in visual discrimination ability in favor of the group which received the training, but children from the lower extreme

on the socioeconomic continuum within the district seemed to profit most from the training.

In his excellent study, Rosen (1966) concluded that improvement in trained perceptual capabilities was evident; however, improvement in these abilities was not reflected by comparable superior performance on criterion reading measures in experimental groups. He further stated:

> It appears that additional time devoted to reading instruction was more important for reading achievement in this particular capability /comprehension of ideas found in a short paragraph/ than time devoted to the types of perceptual training in this investigation. (Rosen, 1966)

It appeared evident that the training of certain visual perception capabilities by means of the specific adaptation of the Frostig program for undifferentiated groups of first-grade pupils did not result in significant improvement in reading scores.

Similarly, Jacobs, Wirthlin, and Miller (1968) evaluated over 300 prekindergarten, kindergarten, first- and second-grade children to determine the cumulative effects of the Frostig program on reading achievement. The Frostig Test of Visual Perception and the Metropolitan Reading Tests were administered in May of the kindergarten year. The Gates-MacGinitie Test was given in May to first-grade groups; at the end of grade two, the Stanford Primary I was administered. Little relationship was found between the Frostig program and reading achievement.

Eleanor B. Linehan (1958) evaluated the effect of a program of systematic teaching of letter names and sounds upon first-grade reading achievement. An experimental group followed a program of systematic presentation of letter knowledge and phonics development in addition to an incidental program of word recognition. The control group used a systematic program of word recognition skills with an incidental program of letter and phonics development. February tests showed statistically significant differences favoring the experimental group in all tests.

Wilson and Flemming (1938) examined the relationships between measurable traits and abilities and early progress in the mechanics of reading. Tests included measures of abilities with letters and phonic combination, measures of mental ability, measures of psychophysical characteristics, and measures of personality traits and

characteristics. The dependent variable was performance on reading tests. The researchers concluded that lack of ability with letters was causal in poor reading, and superior ability with letters was causal in reading success.

A study which disagrees with the findings of Linehan and Wilson and Flemming was done by Muehl (1962). He investigated the effects of letter-name knowledge on learning to read a word list. The pretraining consisted of practice on letters which were relevant or irrelevant to the reading task. Muehl felt that the results supported the hypothesis that the acquisition of letter names by kindergarten-aged children interferes with performance in learning to associate picture names with nonsense words containing the same letters used in the critical stimulus.

Several conclusions may be made from studying the research done on visual discrimination:

1) Visual discrimination is an important skill in reading readiness and reading performance.

2) Skill in visual discrimination can be improved to a large extent by direct training.

3) More than one type of discrimination task is beneficial. The Bender Visual Motor Gestalt Test, the Rorschach ink blot test, and a test to complete a mutilated design when a completed design is in view were all relatively good predictors of first-grade reading achievement.

4) Letter knowledge is important (Olson, Nicholson, Wilson, Flemming, Silvaroli), but there may be reason to devote reading instruction time to activities other than perceptual training in letter knowledge (Muehl, King, Staats, Staats, Schutz, Rosen, and Barrett). Muehl, in his several studies, suggests that meaningful presentation is superior to isolated presentation. Letter knowledge is an advantage in reading but not a causal factor of reading difficulties for students lacking letter-knowledge skill.

ORAL LANGUAGE DEVELOPMENT AND BEGINNING READING

Experts such as Cleland and Vilscek (1964) emphasize that the language arts are best learned in relation to one another. Anyone who has observed child development, formally or informally, is aware that children learn to talk and use language through repetition and association. Indeed, it is a proven fact that a child of four is probably silent only some nineteen minutes of his waking day (Blakely and Shadle, 1961). Any mother of preschoolers can nod her head in violent agreement with this discovery!

Since spoken language and reading appear to be closely related, numerous investigations have been, and must continue to be, conducted to determine the degree of this relationship and the usefulness of knowledge of the one in predicting success in the other.

Investigations completed on various aspects of language development have been identified by McCarthy (1954) in one of the most detailed reviews and extensive bibliographies of literature and research dealing with language. (This source of information was updated by Carroll (1960) in the Encyclopedia of Educational Research.) Another early comprehensive source of material by Dora V. Smith (1944) appeared in the National Society for the Study of Education Yearbook.

Topics for investigation have included extent and growth of children's vocabularies, length of language responses, sentence structures used, grammatical form, and the effects of hereditary and environmental forces. Methods of study range from sporadic observation of an individual child, through longitudinal studies involving singletons, twins, and triplets, to scientifically controlled experiments making use of a large population sample.

Since investigations in oral language development are very extensive in number and range, it is necessary to impose some limitation for this review. Therefore, it will be concerned mainly with reports that have appeared in the literature since 1950, because these recent studies are often based upon and include concepts from earlier studies.

The studies are divided into three categories:

1) language patterns and structures,

2) socioeconomic influence on language, and

3) language and academic achievement.

Language patterns and structures

Feifel and Lorge (1950) attempted to gain knowledge concerning the successive stages of concept formation and the development of children's thinking by qualitatively analyzing verbatim responses to the revised Stanford-Binet Vocabulary Test. Nine hundred children between the ages of six and fourteen were the subjects. The findings indicated that significant differences existed between the responses of older and younger children. The younger children tended to perceive words as concrete ideas and did not generalize as well as the older children.

Burrough's (1957) main purpose was the construction of a word list for use in producing reading materials for children between the ages of five and six-and-one-half years. A sample of 330 children was taken from a large number of infant schools in England. Investigators recorded the words spoken by each child in eleven ten-minute periods within a two-week time. An alphabetized list of words spoken by the children was prepared and comparisons were made with other word lists, including Dolch's list of basic sight words.

DeGraff (1961) studied the oral language of children enrolled in first, third, and fifth grades in order to determine (1) the extent to which various patterns existed in the syntax of children's speech and (2) whether there was a difference in the language used by children in formal structured situations and informal, unstructured situations. The sample included sixty children (twenty from each grade) whose intelligence quotients ranged from 90 to 110. DeGraff found that there is a great deal of similarity between the patterns at each grade level, but enough variation and difference exists to indicate that maturity and linguistic experience have some effect upon the speech of children as they progress through the three grade levels. He concluded that children are verbally challenged more in structured situations than they are in unstructured situations.

A study utilizing Chomsky's principles of transformational grammar was designed by Menyuk (1963). Two hours of speech from a single day were recorded for 48 nursery-school and 48 first-grade

children. Also considered was the language these children used in response to projected pictures, individual responses in a personal interview between the experimenter and each child, and conversation within the group during role playing in a family setting. All responses were analyzed into (1) simple, active, declarative sentences and (2) the transformations derived from each. The investigator separated what she called "children's grammar" from adult constructions. Conclusions were:

1) Most of the structures were used at an early age and used consistently.

2) If we look at the nature of the structures which are used by all the children it would seem that the theory of Piaget and others, which states that language is an expression of children's needs and is far from a purely imitative function even at a very early age, is a valid one.

3) A need for social instrumentation and a method of categorizing the environment would motivate the usage of these structures.

M. E. Hocker (1963) compiled a vocabulary list from 2,500 separate oral responses of a heterogeneous group of first-grade children. Language patterns, vocabulary, and the interests indicated or expressed were recorded by tape recorder or stenographic notes. Although the sample size was small and confined to a small geographic area, some interesting indications were obtained. Children moved from simple basic patterns to more complex patterns, indicating the developmental nature of sentence patterns. Sentence pattern selection was influenced by the situations in which the language occurred. Also influenced by the situation was the sentence length.

Strang and Hocker (1965) drew some interesting conclusions based on Templin's, McCarthy's, and Strickland's method of collecting data on beginning readers' oral language. Strang and Hocker's main conclusion was that children used different language in different situations.

Socioeconomic influence on language

In a study designed to find what influence social class membership had upon the language patterns of kindergarten children, Khater (1951) evaluated the language patterns of 133 children. He classified fifteen boys and thirteen girls in the upper social class and

fifteen boys and fourteen girls in the lower social class. Recordings were made of the children's speech during free conversation and planning periods in kindergarten. It was found that children in the upper social class were superior to children in the lower social class in both functional use of language and language development. In spite of the differences that were shown, Khater concluded that the language patterns were basically similar and that the speech of the children from both the upper and lower social classes followed a common developmental trend.

Strickland's (1962) results included these findings:

1) The lengths of the phonological units used by children varied more within a grade than from grade to grade.

2) Length of phonological unit appeared in this study to be unsatisfactory as a measure of the maturity of language.

3) Some differences appeared in the use of patterns when children were grouped on the basis of the education of fathers and mothers.

It must be noted that the population of this study had a narrow range of ethnic background. Also, the sample for some grades was skewed somewhat toward the upper level in intelligence, occupational status, and parental education.

Templin (1957) compiled normative and descriptive data from 480 children ranging in age from three to eight years. Fifty verbal utterances were collected and studied according to the techniques of McCarthy (1954). Consistent differences in performance were found between the children in the upper and lower socioeconomic status groups. Significantly longer responses and more mature language usage were found in this study than were found by Davis and McCarthy.

Each of 100 culturally disadvantaged children were asked the same questions in interviews by Dominic Thomas (1965), and their answers were recorded on tape. More than 26,000 words were tabulated and classified. Analyses were made of over 5,000 remarks to ascertain such items as the number of different words used, length of the response, the level of maturity of sentence structure, frequency of grammatical errors, and parts of speech used. Results from the study were compared with results obtained from Templin's (1957) report of upper social status groups. On the basis of the

findings for the various language categories investigated, the children included in the present sample showed a deficiency in language development when compared with upper social status children studied by Templin. This deficiency is observed in terms of the amount, maturity, and correctness of oral expression.

In 1952, comparisons of the language development of Negro and white children were made by Anastasi and D'Angelo. Their sample included 100 children who were within six months of their fifth birthday and who were in attendance at Day Care Centers in New York City. Twenty-five Negro children and 25 white children were selected from mixed neighborhoods; the same number of Negro and white children were selected from unmixed neighborhoods. The children were equated for age, sex, socioeconomic status, and intelligence. Using a method similar to that used by McCarthy (1954), sixty consecutive responses were obtained. The last fifty responses were analyzed as to sentence length and sentence structure. No significant differences in intelligence quotient were discovered among the subgroups. However, the girls did excel in all subgroups. In the Negro group, the boys excelled better than the girls in mean sentence length. More mature sentence types were found among the white children.

Language and reading achievement

Martin (1955) attempted to discover some of the significant factors in the language development of children and some of the developmental interrelationships among language variables in first-grade children. Coefficients of correlation among seven variables were determined for 240 children at the beginning and end of the first grade. Only one oral language measure, the number of different words used, showed a positive relationship to reading readiness at the beginning of, and to achievement at the end of, the first year. Even this relationship was low. Spache (1964) felt group data such as that used by Martin tend to conceal the true relationships. In other words, these language abilities are most significant when they differ greatly from the average.

Morrison (1962) reported a study of 83 children from various socio-economic groups in four kindergartens. During their sharing period, recordings were made of their oral language. Teachers encouraged participation by asking questions and obtained samples of at least 100 words from each child. The data were weighted according to the level of sentence structure and correlated with scores on the Lee-Clark Readiness Test. An extremely high correlation of 0.722 was obtained.

In another study, 44 children had the story "Peter Rabbit" read to them nine times, plus an additional private reading just before they stated orally as many incidents as they could remember. Of the 33 incidents, results were from zero to thirty. The ability to remember the incidents was correlated with the Lee-Clark Readiness Test with a result of 0.78. The ability to follow sequence was also high. These studies certainly show that language development should be given a great deal of attention.

Loban (1963) is conducting a longitudinal study which has been planned for a period to include the subjects' school years from kindergarten through grade twelve. Only the first seven years (1952-1965) have been reported. There were 338 kindergarten children as subjects in 1952. At regular intervals over a period of eleven years, comparable samples of their language have been collected. Loban concluded that the length of a phonological unit appears to be a satisfactory measure of essential language capability. (A phonological unit is defined as an utterance between definite pauses accompanied by a definite drop in pitch. Some phonological units embrace more than one conventional sentence; others are shorter than a complete sentence. Spache (1968) criticizes this unique definition of a sentence in his chapter in the Sixty-seventh Yearbook of the National Society for the Study of Education.)

Loban has concluded that children who had the largest vocabulary and highest achievement in oral language in kindergarten continued to exceed other children in reading achievement as they progressed through grades one to six. He also concluded that those who were high in general language ability were also high in reading skill. Those who were low in general language ability were also low in reading skill. In addition, the gap between the high and the low groups was apparently widening from year to year.

Thackery (1965) found that vocabulary and ratings of language and speech by the teachers, along with other factors in home environment, showed some importance in early reading success. Alshan (1965) found that the lowest predictive value stemmed from the oral language factor and would therefore raise questions regarding the recent concern about the importance of oral language for success in beginning reading of all children. It should be noted, also that Strickland (1967) and Loban (1963) failed to find a significant relationship between oral language and reading achievement at the primary level. It may very well be that language, while important for success in reading, does not become apparent until

the later grades when the reading matter takes on a higher order of conceptual and structural complexity.

An analysis of the previous studies on oral language appears to support the following conclusions:

1) There is a common developmental pattern in language growth.

2) Children's language patterns are largely set by the time they reach school age.

3) Mean sentence length and total number of sentences increase with age.

4) Younger children tend to perceive words as concrete ideas and do not generalize as well as the older children.

5) Sentence pattern selection is influenced by the situations in which the language occurs.

6) Children of upper socioeconomic status are superior in language maturity (as commonly measured) to children of lower socioeconomic status.

7) Children with the greatest proficiency use the same basic patterns as those who lack proficiency. The difference lies in the preciseness and complexity of thinking.

8) There is a positive relationship between reading success and oral language ability, especially as children grow older.

INTELLIGENCE FACTORS AND THEIR RELATION TO BEGINNING READING

Perhaps the earliest study correlating reading and intelligence scores was made by True in 1922. The range of correlation was from -0.10 to 0.87. The variations in the correlations could possibly be explained by the fact that several different aspects of reading were measured. Another monument in relating reading skill and intelligence was a study by Washburne and Morphett (1931). They reached the conclusion that a mental age of six-and-one-half is

required to make progress in beginning reading. Since this study, extensive research has been conducted in an effort to explore the relationship of intelligence to beginning reading.

Gates and Bond (1936) included four large classes of first graders in a correlation study. The variables investigated were mental age; readiness skills such as knowledge of letters, ability to recognize real and nonsense words, ability to recognize geometric figures, tests of oral ability, rhyming ability, phonetic aptitude, hearing, vision, hand-eye dominance, motor coordination, speech defects, home background; and previous school experience.

These factors were tested and correlated with the criterion variable, reading achievement, at the end of the year. Hearing, vision, hand-eye dominance, motor coordination, speech defects, foreignness in speech, and general richness of home background showed little or no correlation with reading achievement. Mental age was slightly correlated. Readiness skills were fairly correlated but failed to indicate those pupils having greatest reading difficulties. Only the general quality of oral composition and previous reading instruction, either at home or kindergarten, gave high correlations with reading achievement.

In 1937, Gates specially studied the relationship of mental age to success in beginning reading, using four variations of the reading program with different groups. The first group consisted of two classes (78 subjects) of first-grade pupils. This group was taught by better-than-average teachers, and in addition to the usual supply of books, these students had access to supplementary practice materials, teach-and-test materials, a large amount of easy reading, and self-diagnostic material. The second group included 45 pupils in a New York City school who were taught by teachers judged to be more expert than average. Their materials consisted on experimental products developed by the author. These were various types of seatwork and practice materials, teach-and-test materials, and easy supplementary reading which was largely limited to the vocabulary in the basal books. The third group consisted of 43 pupils in a rather superior urban public school. The class had good teaching and a better-than-average amount of typical classroom reading matter and other equipment, but not the large amount of specially prepared types of materials used by the first two groups. The fourth group consisted of eighty pupils from two public school classes in a metropolitan area. Both classes were large, the teachers were judged somewhat below average, and the reading materials were

inferior. These children were taught largely by mass methods, with much oral instruction and little individual work.

The reading achievement of each group, the criterion variable, was determined by the Gates Reading Test after approximately eight months of instruction. The achievement scores were then related to the mental age of each group. For the first group the correlation was 0.62. For the second group this correlation was 0.55, for the third it was 0.44, and for the fourth it was 0.34. Gates suggested that the usual statements concerning the necessary mental age at which a pupil can learn to read are essentially meaningless. The necessary mental age at which a pupil can learn to read depends on the program and the methods, with the relationship between mental age and achievement highest where instruction is best.

In a similar study, Scott (1965) used the Detroit Beginning First Grade Intelligence Examination and the Stanford Achievement Test, Primary Series. Nine hundred and five pupils were involved in the study. They were given the achievement test when at grade level 2.8. All correlations between total intelligence scores and grade scores on each subtest of the achievement test were significant beyond the 0.01 level. Highest coefficient of correlation was between intelligence test scores and tests of (1) arithmetic reasoning, (2) paragraph meaning, (3) word meaning, (4) spelling, and (5) arithmetic computation. Scott concluded that school success cannot be predicted from mental tests alone. For example, there were fifteen cases that did not achieve as expected. Teaching geared to the so-called average child did not permit learning to proceed according to the potentiality of every child.

In her award winning dissertation, Vilscek (1964) found that mental age level is a powerful variable affecting a first-grade pupil's success in reading. She studied a population of 416 first-grade pupils from two socioeconomic strata.

Parsley and Powell (1961) examined the relationship between scores on the Lee-Clark Reading Readiness and scores on the Stanford-Binet Test of Intelligence. They felt that the Lee-Clark was not really a good indicator of general mental maturity at the lower levels. The relationships between the Lee-Clark raw scores and intelligence and mental age were 0.34 and 0.25 respectively. They concluded that there is no way of adequately predicting readiness on the basis of the mental age analysis.

Deputy (1930) devised several tests in an attempt to develop one that could be used instead of, or in connection with, a test of intelligence for the purpose of determining which pupils have the ability necessary to be successful in the first semester of reading. Among them were (1) a visual-visual association test, (2) a visual auditory association test (individual), (3) a test of word selection, and (4) a test of content comprehension and recall. The Pintner-Cunningham Primary Mental Test was also used. The results of the tests of significance on the devised tests scores and reading test scores were significant. Of the factors considered, intelligence was the most significant in determining a child's success in first-grade reading. But when the four individual tests were combined with the mental test, the predictive power of the combination was greater than that of the mental test alone.

In conducting a correlation study to determine the best predictor of reading achievement at mid-year first grade, Shea (1964) administered the Visual Discrimination Word Test; the Metropolitan Reading Readiness Test, Form R; and the Lorge-Thorndike Intelligence Test. She also administered an investigator-constructed word recognition test after five months of first-grade instruction. Her conclusions were:

1) The Lorge-Thorndike Intelligence Test and the Visual Discrimination Word Test had the highest correlations with the Word Recognition Test.

2) There was a high correlation between achievement on the Visual Discrimination Word Test and Achievement on the Word Recognition Test.

Charles D. Dean (1934) conducted a study using the pupils of five first-grade rooms in Billings, Montana, public schools. He used Monroe's Reading Aptitude Test for Prediction and Analysis of Reading Abilities and Disabilities. The Metropolitan Achievement Test was given to all pupils after six months of instruction. Little relation was found when results of the visual tests were compared with reading achievement. The data pointed to the conclusion that mental age has a definite relation to reading success in grade one.

> It is extremely doubtful whether children with a mental age of less than six years and six months should attempt the reading process unless they have other talents which might reasonably point to success. (Dean, 1930)

The readiness tests seem to have special significance as predictive instruments. Mental age was superior to the readiness test for predicting reading achievement for first-grade entrants.

The mental age criterion, however, has been refuted in several cases. Little relationship between intelligence and reading success in first grade was found by Balow (1963). Barrett (1965 Reading Teacher) also found little relationship between intelligence and early reading success. Hillerich (1965) in his summary stated, "Schram pointed out the influence of television on the vocabulary of pre-school children" and "Anderson found that mental age was not a significant factor in learning certain prereading skills."

A possible reason for these conflicting findings might be that children of average and lower intelligence can learn to read; therefore, high intelligence does not show up in superior reading at lower levels--thus a low correlation.

Fransella and Gerver (1965) tested 500 children at the children's department of Maudsley Hospital in England. The children ranged in age from six years-two months to fifteen years. The researchers found that the correlation of reading age with intelligence quotient increases with increase in chronological age, while the correlations of reading age with chronological age decreases with increase in age. Although this finding seems logical, the reader must consider the abnormality of population and environment and be wary of generalizing results.

The conclusions reached after the consideration of these studies and expert opinions on intelligence and beginning reading are:

1) Reading and intelligence in general correlate moderately high.

2) Correlation of reading age with mental capacity increases with an increase in chronological age. (Consequently, correlation of reading age with chronological age decreases with increase in age.)

3) Verbal intelligence scores give a somewhat better prediction of academic achievement than do nonverbal scores.

4) Intelligence tests do their best job of predicting success at the extremes on the normal curve--those who will

probably succeed and those who will probably fail in beginning reading.

5) The relationship between mental age and achievement is highest where instruction is tailored to fit the child's needs.

STUDIES OF A MORE DIVERSE NATURE

Several studies have attempted to explore a far larger section of the child's perceptuo-motor and linguistic organization than do most studies. One was conducted by de Hirsch, Jansky, and Langford (1966). A sample of 53 children from the general population and a sample of 53 prematurely born children were studied. The investigation of the children from the general sample was designed to help reach the practical goal of shaping a predictive instrument for use by schools.

The heart of the investigation consisted of an attempt to determine which of 37 tests administered in kindergarten would prove to be potential predictors of reading, writing, and spelling ability two-and-one-half years later. A further goal was to combine the best potential predictors in a way which would yield an instrument of widespread applicability.

It was found that 22 of the 37 tests administered at kindergarten age had predictive possibilities. A number of specific reading readiness tests were significantly related with later achievement. The Bender-Visuo-Motor Gestalt Test ranked near the top of the predictive tests. The number of words used by a child in the telling of a story was by far the best predictor among the expressive language tests. Organization of a story and the capacity to verbally group objects also showed a statistically significant association with end-of-second-grade reading. Intelligence measured by Form L, Stanford-Binet Scale (1937 revision) was associated to a statistically significant degree with second-grade performance. However, intelligence ranked only twelfth as a predictor. Ambiguous lateralization was not significantly correlated with end-of-second-grade performance.

Ten tests finally were chosen for their contribution to the effectiveness of the instrument as a whole. However, MacGinitie (1969) suggests with so many tests given to so few children, sampling

error makes it almost impossible to interpret differences between the correlations. He further suggests that there is "virtually no justification for selecting any group of the 37 predictors as more useful than any other group." There is also a question as to the reliabilities of the different tests and as to whether they were in fact studied.

Sixty pupils in a South Chicago suburb attending first grade for the first time were the subjects for a study by Bougere (1969). In this study Bougere administered the Metropolitan Readiness Test, experimental measures of syntactic and vocabulary factors in oral language, the Kuhlman-Anderson Intelligence Test, the Gray Oral Reading Test, and the Stanford Achievement Test. The coefficients of correlation found between the syntactic and the vocabulary measures were not enough for reasonable prediction of reading achievement. The Metropolitan Readiness Test accounted for from 20.4 percent to 38.7 percent of the variance in first-grade reading achievement which was higher than the experimental linguistic measures. It was concluded that a sample of oral language from a single interview does not provide a reliable or representative sample of what the subject might produce at different times.

A similar study was conducted by Livo (1969). The purpose of this study was to determine what combinations of total scores and subtest scores from the Wechsler Preschool and Primary Scale of Intelligence, (WPPSI) the Sartain Reading Readiness Test (experimental), and an Oral Language Sample which was investigated for nine selected language measures and the level of picture interpretation would be the most successful in predicting a pupil's achievement in beginning reading as measured by success on the Metropolitan Achievement Test.

All tests given were significantly related to word knowledge and word discrimination at the .01 level of confidence; all except two tests were significantly related to the Reading (Comprehension) Test at the .01 level; and all except one test were significantly related to the Total Reading Test scores at the .01 level. The Sartain Reading Readiness Test provided the highest simple correlation with the total reading scores producing an r=.60. The WPPSI, although somewhat helpful, does not appear to be the most effective and efficient test to use for predicting success in beginning reading. (The performance scores were slightly more valuable than the verbal scores.)

While the tests showed language maturity to be very significantly related to reading success, such scores alone were not highly effective

nor efficient in predicting reading success. The level of picture interpretation was consistently a bit higher than the oral language measures in relation to the reading scores. Any combination of parts of all the tests contributed to a higher estimation of reading achievement than the use of any of the tests separately.

SUMMARY

Certain generalizations can be made as a result of the conclusions of research in all areas of reading readiness.

1) A variety of tests would indicate the individual child's strengths and weaknesses in a variety of intellectual and behavioral tasks.

2) There is no single factor of outstanding significance.

3) Instruments presently available to measure skills and abilities are of varying degrees of adequacy.

4) The search for new measures must continue.

5) A combination of tests would have greater predictive value for success in beginning reading than specific measures when used alone.

It would seem that we can be fairly secure in the knowledge of certain of the well-researched areas of reading readiness.

What will be needed in the future is to examine specifically the effects of many of the unmeasured factors and create and refine procedures to analyze and measure them. These factors might include self-confidence, motivation, independent work habits, memory span, teacher expectations, methods, materials, and teaching techniques.

Other needs for further research would include:

1) An exploration of qualitative as well as quantitative measures of reading readiness

2) Comparative investigations

3) Longitudinal studies to determine if the relationship

between reading readiness competency and early reading achievement is strong enough to be useful for predicting and planning specific educational programs for groups and individuals

4) Development of types of evaluation to measure the quality and the spontaneity of c language development in children

5) A reevaluation of the adequacy of standardized measures of first-grade achievement.

These are some of the thrusts future research in reading readiness should take. Certainly as MacGinitie (1969) pointed out, new questions must be asked. With these new questions must come new approaches to study the learning atmosphere of this crucial period in a child's education.

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