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The Predictive Value of the Individual Kuhlmann-Anderson Subtests Regarding Reading Improvement

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THE PREDICTIVE VALUE OF THE INDIVIDUAL KUHLMANN-ANDERSON
SUBTESTS REGARDING READING IMPROVEMENT

by

Carolyn M. (Iuser) Cabanski

A Thesis Submitted to the Faculty of the Graduate School
of Loyola University in Partial Fulfillment of
the Requirements for the Degree of
Master of Arts

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CHAPTER I

STATEMENT OF PROBLEM

In recent years, one of the more serious educational problems has been the inability of students in grade and high schools to read at the level of their grade placement. In general, the many attempts to remedy this difficulty have followed two main directions. One procedure, which is preventive, is that of intensifying the teaching of the fundamentals of reading to beginning students. The other procedure, which is remedial, attempts to develop short, intensive methods of reading improvement for students who are deficient in reading ability, with the goal of correcting bad habits and instilling the fundamentals of good reading habits.

There are a number of methods of bringing about reading improvement which are currently in use, one of which is the use of the phonetic methods, more commonly known as phonics. Through this approach, the fundamentals of reading are established by helping the students to identify the separate sound elements within a word, and then to blend the sounds into correctly pronounced words. Among the many group methods of teaching phonics is the audio-visual method. Standard phonograph records are employed which begin with the proper pronunciation of the basic phonetic elements in the English language and later exemplify the blending of these elements into different words. The phonograph records are supplemented with various charts (one chart corresponding with each
record) which enable the students to associate the auditory stimuli with the corresponding visual stimuli.

In planning remedial work, teachers are interested in evaluating the student's probable ability to profit from it. The mental age and the intelligence quotient should ordinarily be significant factors in making such prognoses. But unfortunately, in many tests, including the Kuhlmann-Anderson, many items are dependent upon reading ability. It is a common practice to scan the tests not requiring reading ability as a basis for inferring probable intelligence level and consequently, the probable capacity for learning. This practice suggests the desirability of comparing both the relation between the mean IQ based on such tests and the mean IQ of the total test battery to actual reading improvement in a remedial group.

An initial difficulty is experienced in identifying the tests which are considered relatively free from the influence of reading ability. Previous investigators have not agreed on this point.

For example, Spache (24) states that in grades above the first, the number of non-language tests in the Kuhlmann-Anderson is probably too small to warrant the calculation of separate language and non-language measures.

On the other hand, Allen (2) reports that she was able to distinguish five non-verbal subtests (5, 16, 18, 19, and 24) and three verbal subtests (21, 22, and 23) by correlating the ten subtests of the Kuhlmann-Anderson with three reading measures. Furthermore, she concludes that the three verbal subtests are just as good a measure of intelligence as the total MA determined from the ten subtests.

In the present study, the predictive values of the means and the media of
the five tests which demand so little development of language skill that they could be administered by pantomime are being compared with the predictive value of the five others which demand acquired skills in reading and spelling on the basis of their ability to predict a capacity to profit from special reading instruction.

Therefore, the purpose of this thesis is to determine whether an empirical basis can be found for supporting the clinical opinion that certain subtests of the Kuhlmann-Anderson can predict improvement in reading. It is felt that this is necessary; because, as Meehl (19) says, "Statements based on such evidence cannot be accepted as having been proven. In many cases, the relationships which clinicians have felt to be true, on the basis of clinical experience, have been proven to be lacking in objective validation."

In order to accomplish this end, the group of subjects selected for this study was first given the Gray Standardized Oral Reading Paragraphs Test. After administration of these reading paragraphs to the group was completed, there was a period of intensive phonetic training, using the audio-visual aid mentioned previously in this paper. Finally, the group was retested with the Gray Standardized Paragraphs Test. The first score for each individual student on the Gray Oral Test was subtracted from the second score on the Gray Oral Test, and the remainder was employed as a measure of reading improvement. This measure was correlated with the ten individual subtests of the Kuhlmann-Anderson, Form D, in an attempt to verify any significant relationships. The hypothesis stated formally, therefore, is:

Certain Kuhlmann-Anderson subtests predict improvement in reading as defined by improvement on the Gray Standardized Oral Reading Paragraph Test scores, more accurately than by chance.
CHAPTER II

REVIEW OF LITERATURE

There are various individual methods of attempting to teach students how to read, but it seems that all of them are based upon one of two basic principles. One approach, of which phonics is an example, attempts to help the students to identify the separate sounds in a word, and then to combine the particular sounds into the complete word. The other approach, commonly referred to as the "look and say" method, attempts to teach the students to recognize the entire word as an integrated whole. It may be said, therefore, that the phonics method of teaching reading can be considered as an analytical approach, whereas the "look and say" method can be considered as a Gestalt approach (9, 20, 22).

Historically, the phonetic method preceded the "look and say" method in American educational systems. Until about 1920, the basic approach to the teaching of reading was to help the students to learn the basic sounds of the language and then to use these basic elements in pronouncing the words which they would encounter in their reading. Originally, this was accomplished in a rote manner, employing unrelated words and sentences. Later, however, attempts were made to increase the motivation of the students by using such devices as short stories and fairly tales.

After 1920 educators begun a strong revolt against the phonetic method. It was found that students could pronounce many words, but they were not
progressing adequately in their knowledge of the meanings of the words which they were reading. As a result, the entire emphasis shifted to the teaching of students to associate meanings with words. In the 1930's supervisors demanded that the teachers forget about breaking down words into their parts, and emphasized teaching students to perceive and to recognize words as integrated wholes. Therefore, for ten or fifteen years, students' reading vocabularies were dependent upon how many words they could recognize visually.

By the 1940's however, it became quite obvious that the "look and say" method of reading had many glaring inadequacies. In the first place, the English language with its many intricate combinations of letters results in many words which are spelled almost the same way, but which have completely different pronunciations and meanings. In many instances, students depending upon quick discrimination and recognition of gestalts which were very similar as visual stimuli made mistakes in their reading. Furthermore, the "look and say" method of reading left a student almost completely incapable of reading unfamiliar words. Once again, the educators were forced to admit that some ability to analyze the basic elements of the different words is essential to adequate reading. The most unfortunate aspect of the over-emphasis on the "look and say" method was the vast number of students who were left with inadequate reading ability. This necessitated the development of remedial reading programs. The understandably slow process of re-introducing analytical methods of teaching the basic principles of reading into our entire educational system, has meant that the problem still exists at the present time.

It must be emphasized at this time, that the author does not conclude
that the gestalt approach to reading is not beneficial. Rather, it would seem that an over-emphasis upon one approach is inadequate by itself. For this same reason, an over-emphasis upon phonetic instruction without sufficient training in associating meaning with the words perceived and enunciated has also proven inadequate in the past.

Actually, the English language is not a highly phonetic language, and the numerous variations in pronunciations of word elements that are so similarly spelled makes it almost impossible to read adequately, solely upon the basis of phonetic principles. Furthermore, phonetic instruction is not too beneficial until the students' minds have matured to a point at which they are capable of comprehending the process of word analysis in an adequate meaningful manner. For that reason, Dolch (5) has recommended that phonetic instruction should not be introduced until the second grade level or later.

The essential conclusion to be drawn from the above-mentioned facts is that ability in phonetic analysis as an aid in recognizing words in context is an important skill in reading ability. There is a substantial amount of empirical evidence to support this conclusion.

For example, Agnew (1) studied the effects of varied lengths of phonetic training upon phonetic ability, word pronunciation, vocabulary, oral and silent reading. His results showed that when phonic training is consistently given, it increases independence in recognizing words previously learned, aids recognition of unknown words, gives aid in correct pronunciation, and increases the quality of oral reading.

Gill and Gill (6) investigated the use of phonics in bringing about reading improvement. Third, fourth, fifth, and sixth grade children in a school
system in which phonics had not been taught for over five years were subjects. Special phonetic training was given to the children for eight months. The Gates Silent Reading Test and the Kuhlmann-Anderson were then administered. Correlations between IQ and reading for the four grades were from \( \gamma = .85 \) to \( \gamma = .88 \). Reading grade average for each grade was above the normal reading grades. The results gave further evidence that the proper use of phonics as a tool is a useful device to aid in the teaching of reading.

Harrington and Durrell (12), using a sample of five hundred Boston school children, reported a correlation of \( \gamma = .56 \) between phonetic training and reading improvement.

Tate, Herman, and Zeaman (26) tested the effect of the use versus the non-use of phonics upon 78 first grade children in a two year study. They concluded that without using phonics, reading at a normal rate can be attained, but incidental phonics excel in developing comprehension and ability to recognize words.

Also, Tate (25), with a sample of 73 first grades concluded that phonics instruction and drill were far more efficient than the "look and say" method in developing the ability to recognize words.

Tiffin and McKinnis (28), who worked with 55 Indiana school children, concluded that phonetic ability was significantly correlated \( \gamma = .66 \) to \( \gamma = .70 \) with reading ability and achievement.

The data for the present study were gathered as part of another study also designed to test the efficiency of intensive phonics training in improving reading ability. In this study, Doyle, Luser, and Stanton (6) worked with a group of more than 200 third and fourth grade children chosen from schools in
lower socio-economic neighborhoods. The total number of subjects was then divided into an experimental and a control group. The following tests were then administered to the entire sample: Kuhlmann-Anderson Intelligence Test, Form D, Gray Standardized Oral Reading Paragraphs Test, Ayres Written Spelling Test, and the Stanford Achievement Test, Form D, Paragraph Meaning and Word Meaning. The experimental group was then given 43 twenty minute sessions of phonics, using the audio-visual method (the Bremner-Davis phonics records) during their regular classroom reading periods. When the phonics sessions were completed, the entire battery previously mentioned was readministered to the total groups (both experimental and control) and the amount of reading improvement in the two groups was then compared. The authors concluded that intensive phonetic training improves reading ability at a rate faster than ordinary classroom instruction with a consistency beyond that which could be expected by chance.

Therefore, it may be concluded that there is sufficient historical and empirical evidence to warrant the use of phonics as a good method of improving reading ability.

The Kuhlmann-Anderson is one of the most widely used groups tests of intelligence. The process of standardization has been a continuous one, with more and more cases being added since the test's initial publication in 1927. The sixth edition of the Kuhlman-Anderson manual (18) describes the method of standardization up to the present.

More than 30,000 school children in the grades and high school were examined with the tests in their various stages before publication. These results included a survey of all school age children in public, private, parochial, urban, and rural schools, in one Minnesota county. The earliest published norms were based upon a minimum of
350 school children at each age from representative Minnesota Communities. Periodic checks in the norms since the first publication have added more than 15,000 cases from representative Minnesota, New York, New Jersey, and Pennsylvania communities.

In general, the validity of the Kuhlmann-Anderson IQ scores has been substantiated in terms of age differentiation, intercorrelation of subtests, and school retardation or acceleration.

In his study, Kuhlmann (16) lists the respective correlations between Kuhlmann-Anderson IQ scores and school marks at different grade levels (Table I).

In another study, Allen (2) reported that Kuhlmann-Anderson IQ scores of the fourth grade children correlated .86 with average reading scores on the Stanford Achievement Battery and .66 with the average arithmetic test scores.

Hilden and Skeels (14) found that Kuhlmann-Anderson IQ's of 765 children correlated .84 with the "educational quotients" of the same children on the Unit Scales of Attainment Achievement Battery.

The Kuhlmann-Anderson manual (18) also list split-half reliability coefficients for a number of grade levels from third to ninth under timed conditions (Table II).

Furthermore, Hilden and Skeels (14) in the above mentioned study, state that the Kuhlmann-Anderson IQ's show

......less variability, greater consistency, less extreme deviation, and a smaller probable error of estimate than another group test and an individual test of mental ability.

According to Kuhlmann (16, 18), the reason for the greater consistency of the Kuhlmann-Anderson is the unique method of scoring. The final score of the ten Kuhlmann-Anderson subtests is the median MA, which lies midway between the MA scores of the fifth and the sixth subtests. It is contended that the use of a
median score reduces the effect of one or two extremely high or low subtest scores, and that this method of scoring is superior to a mean score of subtests, which is more greatly effected by highly deviant scores, because many times, extreme scores are the result of uncontrolled chance factors and are not a valid measure of intellectual ability.

As was previously mentioned, some educators are of the opinion that certain subtests of the Kuhlmann-Anderson are useful in predicting to what extent a student would benefit from reading instruction. Furthermore, they feel that the verbal subtests of the Kuhlmann-Anderson are the best predictors of reading improvement. Therefore, it might appear that the calculation of separate language measures from the verbal subtests of the Kuhlmann-Anderson might be most useful in predicting reading improvement. But to again quote Spache (24), it is seen that:

In grades above the first, the number of non-language tests in the Kuhlmann-Anderson is probably too small to warrant the use or calculation of separate language and non-language measures.

In the present study, the form D of the Kuhlmann-Anderson was used. This consists of subtests 15 to 24 (according to the Kuhlmann-Anderson master manual numbering system), and according to Spache, only subtests 15, 16, and 24 are the non-verbal. Furthermore, Spache concluded that the IQ's derived from the language section of the Kuhlmann-Anderson battery are not significantly better than non-language sections as predictive measures of reading ability at the end of first grade. Therefore, Spache's conclusions preclude any valid distinction between verbal and non-verbal subtests on the Kuhlmann-Anderson.

In Allen's study (2) which was cited before in this thesis, conflicting
conclusions were drawn. She reported that she was able to distinguish five non-verbal subtests (5, 16, 18, 19, and 24) and three verbal subtests (21, 22, and 23) by correlating the ten subtests of the Kuhlmann-Anderson with three reading measures. Furthermore, she concluded that the three verbal subtests are just as good a measure of intelligence as the total MA determined from the ten subtests.

In view of the conflicting results reported by Spache and Allen, an attempt was made to exhaust all possibilities in treating the data. Therefore, subtests 15, 16, 18, 19, and 24 were considered as non-verbal and subtests 17, 20, 21, 22, and 23 were considered as verbal. The mean and median of both the verbal and non-verbal subtests were determined and correlated with the measure of reading improvement.

However, because of Allen's conclusions it was also decided to correlate a mean of the three verbal subtests, 21, 22, and 23, which she distinguished, with the measure of improvement in reading in an attempt to determine whether a significant relationship exists. Furthermore, since Allen's three verbal subtests were reported to correlate very highly with the total IQ, it was decided to correlate the IQ determined from the ten subtests of the Kuhlmann-Anderson with the measure of improvement in reading, in order to test the possibility that ability to profit from phonetic training is simply a function of general intellectual ability. In other words, it is quite possible that those students who profit most from phonetic training are simply those who are generally brighter and who profit most from any particular learning situation.

Because of the possibility that intelligence may have been an uncontrolled variable in the original sample, it was also decided to extract a smaller
sample from the original sample, in which intelligence was held constant, and to correlate these data with the Kuhlmann-Anderson subtests.

The treatment of the verbal and the non-verbal subtests of the Kuhlmann-Anderson will be discussed more completely in the chapters on Procedure, Results, and Conclusions.
CHAPTER III

THE PROCEDURE

SUBJECTS: The subjects used in this study were selected from third and fourth grade children in four schools (two parish and two public) located in a lower socio-economic area where reading problems are prevalent. The total sample consisted of 100 subjects. One complete class from each of the four schools was used.*

The mean age of the subjects was ten years and the standard deviation was eleven months. The range of the CA's was from seven years, ten months, to thirteen years, nine months. Therefore, the sample tested was somewhat older and had greater age variability than would be expected from the third and fourth grades in an average socio-economic neighborhood. It was felt that the greater variability in age and intellectual ability of the sample would increase the possibility of obtaining significant relationships between the variables correlated. Therefore, any application of results obtained in this study to different or more homogeneous groups should be undertaken with the above mentioned differences in mind.

*The data used in this study were gathered during an earlier study (6) which employed an experimental and a control group. The subjects used in the present study comprised only the experimental groups. Although there were 105 subjects in the original experimental group, five K-A test booklets were unavailable to the author at the time of the present study and the published study did not include the subtest scores of each student. Therefore in this thesis N = 100.
PROCEDURE: After the 100 subjects had been selected, the Kuhlmann-Anderson Intelligence, Form D, and the Gray Standardized Oral Reading Paragraphs were administered. After the administration of the tests, the groups received forty-three twenty-minute sessions of audio-visual drill in phonics, spaced three times a week throughout a period of fifteen weeks. These sessions were administered by the same persons who had done the testing. There was no attempt made toward motivating the students other than that which the phonograph recordings included. The experiment was limited to fifteen weeks because the pre-tests had to be administered after the mid-year promotions, and the retests had to be completed before the final examinations in June.

The commercial phonograph records used were the Bremner-Davis phonics records, The Sound Way to Easy Reading (4). Each record had individual pupil charts corresponding to it.

Upon the completion of the phonics sessions, each subject was retested with the Gray Oral Test. Amount of improvement in reading was determined by the difference between the pre-phonics Gray Oral scores and the post-phonics Gray Oral scores.

The degree of reading improvement was then correlated with the MA scores for each of the ten subtests of the Kuhlmann-Anderson in an attempt to determine whether any of the individual Kuhlmann-Anderson subtests was a good predictor of reading improvement. The next possibility to be explored was that a cumulative score of a number of the subtests might be a better predictor of reading improvement than any of the subtests taken individually. Therefore, the measure of reading improvement was correlated with the mean and
median of the tests which demanded little or no language skill (subtests 15, 16, 18, 19, and 24) and with the mean and the median of those tests dependent upon some skill in reading and/or spelling (subtests 17, 20, 21, 22, and 23). Furthermore, in order to explore every possibility, Allen's contention that subtests 21, 22, and 23 are the purest measures of verbal ability was investigated by correlating the degree of reading improvement with the mean of subtests 21, 22, and 23.

The next step was to correlate the measure of reading improvement with the median IQ scores of the Kuhlmann-Anderson tests in order to investigate the relationship between general intelligence and ability to profit from experience.

Finally, the possibility that general intellectual ability functioned as an uncontrolled variable in the original sample was investigated. Therefore, a sub-sample of 39 subjects was selected from the original sample for the purpose of controlling IQ. The mean IQ of the original sample was 88.09 with an IQ range of 62 to 119. The mean IQ of the sub-sample was 91.13 with an IQ range of 85 to 95. An IQ range of 85 to 95 was selected for the sub-sample because it included the largest number of subjects and was reasonably close to an average intelligence group.

The measure of reading improvement of these 39 subjects was then correlated with their MA scores for the ten Kuhlmann-Anderson subtests, the mean and median scores for subtests 15, 16, 18, 19, and 24, and the mean and median scores of subtests 17, 20, 21, 22, and 23.

Before the statistical operations were performed, it was necessary to ascertain whether or not the basic assumptions underlying the use of the
product-moment correlation coefficient were fulfilled. In order to determine this, the MA scores of the ten Kuhlmann-Anderson subtests, the mean and median of subtests 17, 20, 21, 22, and 23, and the median IQ score of the subtests were all plotted against the measure of reading improvement (the post-phonic Gray Oral score minus the pre-phonic Gray Oral score). Visual observation of the graphs revealed that, in all cases, there was a linear relationship between the two variables. In a few cases, the distribution of the plots was practically random, but it is generally stated that as long as no other curvilinear relationship is evident, the assumption of linearity can be considered as being fulfilled. It is also stated that the assumption of homoscedasticity can be considered fulfilled if the two variables are shown to be linearly related and visual observation of the variance between the respective variables also indicated that they were homoscedastic. Finally, it must be reported that the distributions were not normally distributed, but the current literature has demonstrated that it is not necessary to assume normality of distributions as a basic requirement for the Pearson product-moment coefficient of correlation. To quote Nefzger (21):

The general case does not require normal margins; the statistic is applicable whenever scores are obtained in pairs, the variables are continuous, and the linearity assumption is tenable.
CHAPTER IV

RESULTS AND CONCLUSIONS

The first step in the treatment of the data was the calculation of the mean and the standard deviation of all the variables to be correlated. Tables I and II list the values of the respective variables.

Mention should be made regarding the high standard deviations of some of the individual Kuhlmann-Anderson subtests, and some of the mean and median scores. These high standard deviations are the result of the fact that there was a considerable number who scored zero on some of the Kuhlmann-Anderson subtests. This resulted in a significant increase in the variability of the group.

Then, utilizing the entire sample of 100 subjects, the measure of reading improvement (post-phonic Gray Oral scores minus pre-phonic Gray Oral scores) was correlated with each of the following variables: the ten Kuhlmann-Anderson subtests, the mean and median scores of subtests 15, 16, 18, 19, and 21, the mean and median scores of subtests 17, 20, 21, 22, and 23, the mean score of subtests 21, 22, and 23, and the median score of IQ. Finally, the measure of reading improvement of the 39 subjects comprising the sub-sample selected to control for intelligence was determined and was correlated with each of the following variables: the ten Kuhlmann-Anderson subtests, the mean and median scores of subtests 15, 16, 18, 19, and 21, and the mean and median scores of subtests 17, 20, 21, 22, and 23. Tables III, IV, V and VI list the resulting correlational coefficients.
# TABLE I

Means and standard deviations (in months) of the measure of reading improvement, the ten K-A subtests, the mean of subtests 15, 16, 18, 19, & 21, the mean of subtests 17, 20, 21, 22, & 23, the mean of subtests 21, 22, & 23, the median of subtests 15, 16, 18, 19 & 21, the median of subtests 17, 20, 21, 22, & 23, the median score of I.Q. Calculations are based on the total sample of 100 subjects.

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N=100
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<td>Mdn. of Subtests 17, 20, 21, 22 &amp; 23</td>
<td>98.90</td>
<td>7.68</td>
</tr>
</tbody>
</table>

N=39
Before discussing the results, it is felt that the hypothesis should be restated. The hypothesis of this study is the following:

Certain Kuhlmann-Anderson subtests predict success in reading (as defined by improvement on the Gray Oral scores) more accurately than by chance.

The correlation coefficients between the measure of reading improvement and the ten Kuhlmann-Anderson subtests, utilizing the sample of 100 subjects, indicate that the hypothesis was not substantiated (Table III). Of the ten correlations, only one (the correlation between the measure of reading improvement and the Kuhlmann-Anderson subtest 22) was significant at the .05 level of confidence \( (r = \frac{1}{.211}) \). Furthermore, even subtest 22 cannot be considered a good predictor of reading improvement, since level of significance is not an indication of predictive value. The numerical value of the correlation necessary to achieve significance is directly dependent upon the size of the sample. In other words, as the sample increases, the numerical value of the correlation necessary for significance becomes smaller. Prediction, on the other hand, does not depend primarily on the size of the sample, but upon the absolute degree to which change in one variable coincides with changes in another variable. The coefficient of determination \( (r_{xy})^2 \) is a measure of the percentage of changes in variable \( x \) which directly coincide with changes in variable \( y \). Therefore, it can be stated that differences among the subjects observed in subtest 22 are a direct indication of only 4.5\% \( (.211^2 = .045) \) of the differences observed among the subjects in the measure of reading improvement. Conversely, 95.5\% of the differences in the measure of reading improvement are related to factors other than those observed in Kuhlmann-Anderson...
TABLE III

LIST OF PEARSON PRODUCT-MOMENT CORRELATIONS BETWEEN THE MEASURE OF READING IMPROVEMENT AND THE TEN K-A SUBTESTS, USING THE TOTAL SAMPLE OF 100 SUBJECTS

<table>
<thead>
<tr>
<th>Kuhlmann-Anderson Subtests</th>
<th>15</th>
<th>16</th>
<th>17</th>
<th>18</th>
<th>19</th>
<th>20</th>
<th>21</th>
<th>22</th>
<th>23</th>
<th>24</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reading Improvement</td>
<td>-.101</td>
<td>.120</td>
<td>-.063</td>
<td>.021</td>
<td>-.136</td>
<td>.066</td>
<td>.156</td>
<td>.211</td>
<td>.126</td>
<td>.056</td>
</tr>
</tbody>
</table>

N=100

*Significant beyond the .05 level of confidence.

subtest 22. Therefore, it can be stated that none of the individual subtests of the Kuhlmann-Anderson Intelligence Test are good predictors of reading improvement.

Another possibility to be considered is that some of the Kuhlmann-Anderson subtests in combination might be better predictors of improvement in reading than any particular Kuhlmann-Anderson subtest considered individually. As was stated in the chapter on the review of literature, some educators believe that a comparison of the verbal and the non-verbal subtests of the Kuhlmann-Anderson might be the best method of predicting improvement in reading. Therefore it was hypothesized that possibly a mean of the verbal or non-verbal subtests might correlate significantly with reading improvement.

In order to investigate this possibility, the measure of reading ability
was correlated with the mean and median scores of those subtests which are generally assumed to require little or no language skill (subtests 15, 16, 18, 19, and 24), and with the mean and median scores of those subtests generally assumed to require some skill in reading or spelling (subtests 17, 20, 21, 22, and 23). The measure of reading ability was also correlated with a mean score of subtests 21, 22, and 23. This was undertaken for two reasons. Allen (2) concluded that of the ten Kuhlmann-Anderson subtests, number 21, 22, and 23 correlated the highest with reading ability. Secondly, inspection of Table IV reveals that in the present study also, subtests 21, 22, and 23 correlate higher with reading improvement than any of the other subtests in the Kuhlmann-Anderson. Finally, the measure of reading improvement was correlated with the median score of IQ. Table IV lists the resulting coefficients of correlation.

Upon examining the results summarized in Table IV, it was concluded that, of all the mean and median measures correlated with degree of reading improvement, the only one which indicated a significant relationship was the median score of IQ. Therefore, it can be concluded that the attempt to use a combination of certain subtests of the Kuhlmann-Anderson as a better predictor of reading improvement cannot be supported by the present findings.

The correlation between general intelligence and degree of reading improvement was significant well beyond the .01 level of confidence and the coefficient of determination was $.74$, indicating good predictive value. The highly significant relationship between general intelligence and ability to profit from reading instruction does not preclude the existence of other variables which are also significantly correlated with reading improvement, since it is most tenable that degree of reading improvement is the result of more than one factor. However, in
TABLE IV

LIST OF PEARSON PRODUCT-MOMENT CORRELATIONS BETWEEN THE MEASURE OF READING IMPROVEMENT AND THE FOLLOWING VARIABLES: MEAN OF SUBTESTS 15, 16, 18, 19 & 24, MEAN OF SUBTESTS 17, 20, 21, 22, & 23, MEDIAN OF SUBTESTS 15, 16, 18, 19, & 24, MEDIAN OF SUBTESTS 17, 20, 21, 22 & 23, AND MEDIAN SCORE OF IQ.

CALCULATIONS ARE BASED ON THE TOTAL SAMPLE OF 100 SUBJECTS

<table>
<thead>
<tr>
<th></th>
<th>Mean of Subtests</th>
<th>Mean of Subtests</th>
<th>Mean of Subtests</th>
<th>Median of Subtests</th>
<th>Median of Subtests</th>
<th>Median of Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>15, 16, 18, 19 &amp; 24</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17, 20, 21, 22, &amp; 23</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15, 16, 17, 20, 21, 22, &amp; 23</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18, 19, 21, 22, &amp; 23</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16, 19, 21, 22, &amp; 24</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reading Improvement</td>
<td>-.022</td>
<td>.165</td>
<td>.135</td>
<td>-.053</td>
<td>.187</td>
<td>.860*</td>
</tr>
</tbody>
</table>

*N=100

*Significant beyond the .01 level of confidence

In view of these results, it seems that any attempt to investigate the possibility of other significant relationships with reading improvement should control for intelligence, since, if this were not done, the very high correlation between intelligence and ability to profit from reading improvement might very well obscure any other less significant relationship. Furthermore, although the general intelligence score is probably the best predictor of reading improvement, that does not mean the discovery of a less significant relationship is of no value. One may have a group of children, with about the same intellectual ability, selected for special instruction in reading and still want to divide them into smaller groups. In such a case, a method of predicting reading
improvement other than by general intelligence would be very helpful. Therefore the final aspect of the present study was to select a sub-sample from the total sample of 100 subjects in which intelligence was a controlled variable.

The sub-sample selected consisted of 39 subjects. The mean IQ of the sub-sample was 91.13 with an IQ range of 85 to 95. The degree of reading improvement of the 39 subjects was then determined and correlated with the following variables: the MA scores of the ten Kuhlmann-Anderson subtests, the mean and median scores of subtests 15, 16, 18, 19, and 21, the mean and median scores of subtests 17, 20, 21, 22, and 23. Tables V and VI list the resulting correlational coefficients. Examination of these results indicates that, even when one controls for intelligence, none of the Kuhlmann-Anderson subtests, taken separately or in combination, can predict degree of reading improvement at a significant level of confidence.

Therefore, it must be concluded that the only manner in which the Kuhlmann-Anderson Intelligence Test can be used as a predictor of reading improvement is as an over-all measure of general intelligence. These results are not surprising, as one would expect individuals of higher general intellectual ability to profit most from any particular learning experience.

In conclusion, the expectation that a quick reliable method of predicting reading improvement by using certain subtests of the Kuhlmann-Anderson Intelligence Test was not borne out in this study.
## TABLE V


<table>
<thead>
<tr>
<th>Kuhlmann-Anderson Subtests</th>
<th>15</th>
<th>16</th>
<th>17</th>
<th>18</th>
<th>19</th>
<th>20</th>
<th>21</th>
<th>22</th>
<th>23</th>
<th>24</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reading Improvement</td>
<td>-.506</td>
<td>-.064</td>
<td>-.112</td>
<td>-.197</td>
<td>-.263</td>
<td>.111</td>
<td>.252</td>
<td>.152</td>
<td>-.162</td>
<td>.159</td>
</tr>
</tbody>
</table>

NOTE: Correlation of .304 required for .05 level of significance.

## TABLE VI

LIST OF PEARSON PRODUCT-MOMENT CORRELATIONS BETWEEN THE MEASURE OF READING IMPROVEMENT AND THE FOLLOWING VARIABLES: MEAN OF SUBTESTS 15, 16, 18, 19, & 24, MEAN OF SUBTESTS 17, 20, 21, 22, & 23, MEDIAN OF SUBTESTS 15, 16, 18, 19, & 24, MEDIAN OF SUBTESTS 17, 20, 21, 22 & 23. CALCULATIONS ARE BASED ON THE SUBSAMPLE OF THIRTY-NINE SUBJECTS

<table>
<thead>
<tr>
<th>Mean of Subtests 15, 16, 18, 19, &amp; 24</th>
<th>Mean of Subtests 17, 20, 21, 22, &amp; 23</th>
<th>Median of Subtests 15, 16, 18, 19, &amp; 24</th>
<th>Median of Subtests 17, 20, 21, 22, &amp; 23</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reading Improvement</td>
<td>.268</td>
<td>.063</td>
<td>-.211</td>
</tr>
</tbody>
</table>

NOTE: Correlation of .304 required for .05 level of significance.
CHAPTER V

SUMMARY

The primary purpose of this thesis was to determine whether or not certain subtests of the Kuhlmann-Anderson Intelligence Test could predict success in reading more accurately than by chance.

This problem was investigated in order to test empirically the opinion of some educators that scores on certain subtests of the Kuhlmann-Anderson are good predictors of reading improvement.

The procedure employed was the following: the 100 subjects were chosen from four third and fourth grades of four grammar schools (two public and two parish) in a lower socio-economic area where reading problems are more prevalent than in average socio-economic areas. The subjects were administered the Gray Standardized Oral Reading Paragraphs and the Kuhlmann-Anderson Intelligence Test, Form D. Each of the four classroom groups received 43 twenty-minute sessions of phonics drill using the Bremner-Davis phonic records with individual pupil charts. The sessions were spaced three times a week for a period of fifteen weeks. At the end of the 43 sessions, the Gray Oral Test was again administered to all of the subjects. The difference between the post-phonics and the pre-phonics Gray Oral scores was employed as a quantitative measure of reading improvement.

The measure of reading improvement was then correlated with the following variables: the ten Kuhlmann-Anderson subtests, the mean and median scores of
subtests 15, 16, 18, 19, and 21, the mean and median scores of subtests 17, 20, 21, 22, and 23, a mean score of subtests 21, 22 and 23, and the median score of IQ.

The results indicated that only one subtest, twenty-two, of all ten Kuhlmann-Anderson subtests correlated significantly with the measure of reading improvement. Furthermore, the relationship between subtest 22 and reading improvement was so small that it could be expected to have little or no predictive value.

Of the other measures correlated with reading improvement, it was found that only general intelligence correlated highly with reading improvement. This suggested that if general intelligence was held constant, one might still find significant relationship between reading improvement and one or more of the Kuhlmann-Anderson subtests. Therefore, a sub-sample of 39 subjects was selected from the total sample of 100 subjects for the purpose of controlling for intelligence. The degree of reading improvement of the 39 subjects was determined and correlated with the following variables: the ten Kuhlmann-Anderson subtests, the mean and median score of subtests 15, 16, 18, 19, and 21, the mean and median scores of subtests 17, 20, 21, 22, and 23. However, none of the resulting correlation coefficients were significant.

Therefore, it was concluded that the median score of IQ was the only means by which the Kuhlmann-Anderson subtests could be used as a good predictor of ability to profit from reading instruction.

Finally, it was pointed out that the use of particular parts of an instrument which was standardized as an entire battery is a questionable procedure.
BIBLIOGRAPHY


The thesis submitted by Carolyn M. (Inser) Cabanski has been read and approved by three members of the Department of Psychology.

The final copies have been examined by the director of the thesis and the signature which appears below verifies the fact that any necessary changes have been incorporated, and that the thesis is now given final approval with reference to content, form, and mechanical accuracy.

The thesis is therefore accepted in partial fulfillment of the requirements for the Degree of Master of Arts.

January 16, 1959

Date

Signature of Adviser