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ABSTRACT

The validity of introducing reading on the preschool level is the premise behind this study. The objective was to determine the effectiveness of the Categorical Sound System (CSS) developed by the author, as a highly structured linguistic-based readiness and beginning reading program, on kindergarten children from underprivileged and privileged populations. The latter group was further divided into those in private kindergartens and those in public school. CSS is a simplified and accelerated readiness and beginning reading program designed to take the child from reading readiness to the 2.7 grade level. Four hundred and five kindergarten pupils took part in the study for which the major hypothesis stated that the introduction of a formalized and highly structured individualized reading readiness and beginning reading program on the kindergarten level would be more effective in developing basic prereading and early reading skills than a less formal routine kindergarten program for all groups tested at all ability levels. Control and experimental groups were used, with both receiving pretests and post-tests. The hypothesis proved to be valid for all groups tested. Tables, a bibliography, and samples of the prereading check and the teacher's rating scale are included. (NH)

TRENTON STATE KINDERGARTEN STUDY

OF THE

CATEGORICAL SOUND SYSTEM

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I. INTRODUCTION

Educational research is replete with studies on beginning reading. However, very few of these reports consider longitudinal studies involving kindergarten reading. The concept of early reading is relatively new in terms of American educational philosophy.

Three longitudinal studies, the Durkin studies (1966) and the Denver study (McKee, 1966) both conclude that the children who start ahead (at the kindergarten or prekindergarten level) stay ahead, that the age at which reading instruction commences is a significant factor in future achievement.

While these concepts slowly are being accepted in the United States, they are established and practiced pedagogical principles of Russia and Israel. Of all the countries in the world the early educational systems of Russia and Israel excel. Educators in both Russia and Israel know that young minds can be stimulated and developed.

Israel has a highly organized preschool program. To help solve the problem of the Oriental immigrants, whose large majority are culturally disadvantaged, free nursery schools have been organized that introduce the four year old Oriental to reading. This has resulted in greatly lessening the gap between the Israeli privileged and underprivileged groups.

Russia also introduces reading on the preschool level. If a parent should choose not to send his child to preschool the parent is supplied with the necessary information and books to teach the child to read before he enters first grade.

II. OBJECTIVE OF THE TRENTON STATE KINDERGARTEN STUDY OF THE CATEGORICAL SOUND SYSTEM (CSS)

The objective of the Trenton State Kindergarten Study was to determine the effectiveness of the Categorical Sound System, a highly structured linguistic based readiness and beginning reading program, on kindergarten children from underprivileged and privileged populations.

III. DESCRIPTION OF THE CATEGORICAL SOUND MATERIALS

The CSS (Crane, 1968) is a simplified and accelerated readiness and beginning reading program. The materials take the child from reading readiness to the 2.7 grade level (1526 words). The child with a mental age of four has the intellectual capabilities of developing basic prereading and early reading skills with the Categorical Sound materials.

The CSS has been designed to bring out the best in every child. The faster learner is able to move ahead and continually be challenged. The slower learner is able to have success at his level of capability. The bright child is able to learn at an earlier age and at an accelerated pace. The slow child develops an improved self-image through a feeling of success.

Success, the key to achievement, is built into the CSS materials. Learning proceeds from simple to complex in many easy but rapid steps. The pupils establish the habit of working out new words for themselves through easy self-discovery techniques presented in the practice books. Early independence is developed with the problem of word recognition reduced to a minimum.

The CSS materials start with a reading readiness program of eleven puzzles and a record that helps develop spacial orientation and visual and auditory discrimination. The puzzle program is followed by a series of books -A through J. Each level consists of a practice book and a reader. The practice books and readers are self-pacing and promote learning through self-discovery. If the program is paced so that three practiced book pages are completed each day and the child reads in the parallel reader, the program will be completed in one school year's time.

The art work in the texts represents the child's primitive concept of art, which provides a background for child identification and motivation. The "me," the main character in the stories, represents the concept of the universal child. Any child from any ethnic or socioeconomic background can identify himself with the "me," for this is the way a young child draws himself. The adventures of the "me" are the sometimes real and the sometimes imaginary adventures that any child any place in the world can have.

IV. DESIGN

Four hundred and five kindergarten pupils participated in the study. The distribution of the student population is presented in table I.

TABLE I

Distribution of the kindergarten pupils

	Experimental	Control
Underprivileged	42	33
Privileged Private	16	14
Privileged Public	135	165
Totals	193	212

The selected populations included an underprivileged and a privileged group. The privileged population was subdivided into private and public segments. The public segment was further subdivided into suburban and semirural groups.

The following schools and school systems provided the kindergarten children:

Trenton, New Jersey Public Schools - underprivileged center city population (experimental and control groups)

Newtown Friends School, Newtown, Pennsylvania - privileged private school (experimental group)

Buckingham Friends School, Buckingham, Pennsylvania - privileged private school (control group)

Lawrence Township Public School, Lawrenceville, New Jersey - privileged suburban population (experimental and control groups)

East Windsor Public Schools, Hightstown, New Jersey - privileged semirural population (experimental and control groups)

The experimental groups of each population used the CSS materials and the control groups continued with their routine kindergarten activities. Only one segment of the control population, the privileged private school population, considered the formal introduction of basic reading skills as routine. This control reading program consisted of systematic phonics and word picture association.

Both treatment groups were administered a battery of pretests (Appendix A) early in the school year. Every child in the study received the Lorge-Thorndike IQ Test. Selected groups were administered the Frostig Developmental Test of Visual Perception and the Wepman Auditory Discrimination Test.

Posttests (Appendix A) consisted of readiness analyses - the Murphy-Durrell Reading Readiness Analysis for the underprivileged population and the Gates MacGinitie Readiness Skills Test for a random sample of the privileged population, the Lorge-Thorndike IQ Test for the total underprivileged population and for a random sample of the privileged population, Frostig and Wepman retests for those students who received such tests in the fall.

In order to eliminate the frustrations of a child taking a standardized test that he could not possibly succeed in doing with any level of proficiency, the children were given a reading check designed for the study (Appendix B) to identify those children who may have entered kindergarten as readers. A child who was able to identify five of the easy words on the reading check was given the Gates MacGinitie Reading Test. There were only two readers from the experimental group (1.6 and 1.8 vocabulary level) and one reader from the control group (3.5 vocabulary level). The children identified as early readers were all from the privileged public school population.

The tests were administered by a small group of eight trained testers. Since Frostig and Wepman tests have scores that could be effected by the style of presentation and the arbitrary opinion of the scorer, these tests were administered and scored by a team of two testers.

Wepman, in his test manual, establishes a criteria for valid auditory tests. All Wepman tests that did not meet these criteria were eliminated from the study. The pretest scores of those children who did not remain in the school system also were eliminated from the study. No posttests were administered to students

who were absent for the pretests.

One of the variables to be considered is teacher effectiveness, since it is obvious that the more effective the teaching skills the more effective the learning process. In May a teacher's rating scale (Appendix C) was given to the supervisory staff of the participating school systems requesting that two qualified persons independently and anonymously, if so desired, rate the participating teachers in experimental and control groups. As seen in table II, the rating showed high intro-rater reliability and experimental and control group compatibility.

TABLE II

Teacher's Rating Scale

Comparison of the data on the Teacher Rating Scale for the teachers in the experimental and control classes.

	N	Mean	S.D	t	Reliability Coefficient
Experimental Classes					
Rating I	18	33.5	6.21	N.S.	0.95
Rating II	18	34.0	4.96		
Average	18	33.7 (1)	5.67		
Control Classes					
Rating I	17	35.9	6.26	N.S.	0.93
Rating II	17	36.0	6.15		
Average	17	36.0 (1)	6.20		

(1) t tests of average ratings between 33.7 and 36.0, not significant.

The Hawthorne effect should have been neutralized for many of the teachers had never had the experience of teaching reading; they were using new and unfamiliar materials; many were insecure and anxious, and not all were optimistic about the results. The control teachers, knowing they were part of a study, naturally would be inspired to have a well organized program. The children in both groups knew they were part of a study. Under the circumstances it would seem that the final results would be adversely affected rather than the reverse.

V. HYPOTHESES

A. Major general hypothesis

The introduction of a formalized and highly structured individualized reading readiness and beginning reading program on the kindergarten level will be more effective in developing basic prereading and early reading skills than a less formal routine kindergarten program for both underprivileged and privileged groups at all ability levels.

B. Specific correlary hypotheses

(1). There will be a significant difference in achievement favoring the experimental groups on reading readiness analyses at the end of the kindergarten year in the total population.

(2). There will be a significant difference in achievement favoring the experimental groups on vocabulary and comprehension reading skills in the privileged population.

(3). There will be significant IQ rises in all groups introduced to formal reading.

(4). There will be significant IQ declines in the underprivileged control populations.

(5). There will be no significant IQ change in the privileged control population.

(6). There will be significant achievement in motor-visual development favoring the populations that are introduced to formal reading.

(7). There will be significant achievement in auditory perception favoring the populations that are introduced to formal reading.

(8). There will be no significant sex differences in the experimental populations on the reading readiness analyses and vocabulary and comprehension scores.

(9). There will be a significant sex difference in the control population favoring the girls on reading readiness and vocabulary and comprehension scores.

(10). There will be significant positive correlations between IQ scores and all reading skill tests.

(11). There will be no significant positive correlations between CA and the reading readiness analyses or reading skill tests.

(12). There will be significant positive correlations between CA and the Frostig and Wepman tests

VI. ANALYSES OF RESULTS

A. Underprivileged Center City Kindergarten Population

1. Pretest Data

The underprivileged five year old populations (N-75) were equivalent on fall chronological age (CA) but not on fall IQ pretests. The experimental group's mean IQ of 78 was significantly lower at the .06 level of confidence than the mean IQ of 82 of the control group (Table III).

When the experimental and control populations were divided and compared on the basis of sex, the t tests revealed no significant differences between experimental and control groups on IQ, probably explicable because of the small numbers involved. The experimental and control girls were unquestionably equivalent with mean IQs respectively at 83 and 82. This was not so with the male population where there was a 9 point mean IQ differential favoring the control group. The mean IQ for the experimental boys was 72. The mean IQ for the control boys was 81 (Table IV).

The same situation occurred with the comparison of boys and girls mean IQ scores within the experimental and control groups. The t test showed no significant differences presumably because of the small numbers. The control boys and girls were equivalent with mean IQs respectively of 81 and 82. The experimental boys and girls had an IQ differential of 11 points, the boys testing a mean score of 72, and the girls testing a mean score of 83 (Table V).

The two treatment groups were comparable on fall CAs with no significant differences between the experimental and the control groups (Table 111,1V).

2. Results

The experimental readiness and beginning reading program was of considerable value for the underprivileged child. In terms of initial ability the experimental population was significantly inferior on pretest IQs to that of the control population. Despite this disadvantage the experimental group scored significantly superior to the control group on all posttest measures (Table III).

On pretest IQ scores the experimental group scored significantly lower than the control group at the .06 level of confidence; on posttest IQ scores the experimental group scored significantly higher than the control group at the .03 level of confidence (Table III). It is noteworthy that 74% of the experimental pupils had IQ rises, while only 36% of the control group had IQ rises. These IQ changes are significant at the .005 level between the experimental and control groups (Table VI). The IQ rise in the experimental group showed a highly significant trend at the .001 level of confidence; the declining IQ s in the control group approached significance at the .10 level of confidence (Table VII).

The boys in both treatment groups showed the greater change. The boys in the experimental group showed more improvement than the girls. The boys in the control group showed a larger IQ decline than the girls. It would be expected for the boys in the experimental group to have larger IQ rises than the girls because the boys started from a lower base (11 points lower) and therefore had more room for improvement. However, the control boys' and girls' IQ pretests were comparable.

The Murphy-Durrell Reading Readiness Analysis showed that the underprivileged experimental group as a whole, in May of their kindergarten year, approached average September readiness for first grade. 43% of the experimental group tested in the top 50 percentile, while only 11% of the control group tested in the top 50 percentile. The experimental population scored significantly higher than the control population on the total test score of the reading readiness analysis at the .03 level of confidence, and on the phonemes section at the .001 level of confidence (Table III).

In the experimental group the girls approached a higher level of significance than the boys on the reading readiness analysis total and the girls scored significantly higher than the boys on the phonemes section of the test. All, or part, of this difference probably was due to the 11 point IQ pretest difference favoring the girls. In the control group where there was no obvious difference in pretest IQ scores, there was a considerable sex difference favoring the girls on the readiness total score, although the extremely low scores of the control group on the phonemes section showed no sex differences (Table VIII).

Table IX shows that there were significant correlations between the reading readiness analysis scores and the IQ pretests and posttests. No significant correlations existed between CAs and readiness scores, as was expected.

The original hypotheses concerning the underprivileged population were supported by the findings with the possible exception of numbers 8 and 9. Because of the imbalance of experimental IQs by sex, hypothesis 8 could not be verified. Hypothesis 9

was partially proven to be true. There was a significant sex difference favoring the control girls on the total reading readiness scores, but the extremely low scores on the phoneme section did not show any statistically significant sex differences. The control boys did show a trend of testing lower than the girls on this section.

3. Discussion

The underprivileged experimental population did not have the advantage of using the CSS for a full year or a five day week because of scheduling problems, a late start, and poor student attendance. The program was used for six months, two to three times a week for half-hour sessions. In spite of this time handicap, the experimental program proved to be most beneficial for the underprivileged five year old, although only a fraction of the CSS program was covered.

The declining IQs within the control group was not unusual. The intellectual gap between the underprivileged and the privileged child widens each year as the children progress through school. The CSS program proved that the gap can be lessened by moving the child forward in the pursuit of basic abstract concepts. These children partially overcame insufficient readiness, not by going backwards to try to recreate missing experiences, but by forging ahead and having the advantage of a structured learning situation with built-in success.

Perhaps if the program had been used for a full year the differences between the sexes in the experimental group would have been minimized as the boys, who started out with an eleven point IQ disadvantage, developed abstract concepts which would

possibly in time raise their IQs closer to the level of the girls.

The IQ correlations with the spring readiness scores, the raising of the experimental IQs, and the lack of any significant CA correlation with the spring readiness analysis indicates that it is to the kindergartener's advantage to begin the enrichment program early in the school year.

B. Privileged Public School Kindergarten Population

1. Pretest data

The privileged public school kindergarten population was comprised of 300 students; 212 students were from the suburbs and 88 were from a semirural area. The t test revealed no significant IQ differences either between the suburban group and the semirural group, or between the experimental group and the control group, or between the sexes. The total experimental group had a mean IQ of 100.5. The total control group had a mean IQ of 99.3. Both groups are consistent with national IQ norms (Table X).

In the suburbs there were no significant differences on CA between the experimental or control group or between the sexes. In the semirural area the experimental group averaged six and one half months younger than the control group, significant at the .001 level. The total experimental group was younger than the total control group at the .01 level of significance. There were no sex differences within the experimental and control populations (Table XI).

The Lorge-Thorndike IQ posttest, Gates MacGinitie Readiness Skills, Wepman Auditory Discrimination Test, and Frostig Visual Perception Test were administered to random samples of the population. The three subpopulation samples (segment #1 - IQ posttest and reading readiness sample, segment #2 - Wepman sample, segment #3 - Frostig sample) were representative of the total population on CA and pretest IQ means with the exception of segment #1 (Tables XII, XIII, XIV).

Segment #1's control group had a mean IQ at the .03 level of significance higher than the total control population sample. Within segment #1 there was no significant IQ difference between the experimental and control groups or between the sexes within the groups (Table XII, XV, XVI). Segment #1's experimental population was older than the control population at the $<.001$ level of significance. Both the boys and the girls were significantly older in the experimental group than in the control group. Within either treatment group there were no significant sex differences on CA (Table XII,XV, XVI). Since the study showed no significant correlations between the CA and readiness tests, the CA difference proved to be unimportant. Segment #1 was unique in the study for both the experimental and control groups had the same teacher.

2. Results

The program in the experimental groups confirmed the pedagogical advantages of teaching privileged kindergarteners to read. The faster learners, so frequently the forgotten children in our traditional school systems, were immediately identified and given the opportunity to live up to their capabilities by working at their own pace and seeking their own challenges. The average and slower learners were able to work with abstractions at their ability level and to continually build the foundations that lay the background for all further learning.

Although the experimental and control groups were comparable on IQ in the fall, the experimental group significantly out-

performed the control group on spring reading readiness scores, and vocabulary and comprehension scores (Table XVII). On the Gates MacGinitie Reading Readiness Analysis the experimental group scored higher than the control group at the .02 level of significance. The experimental group's score was 5.9 standard score points above the representative score for the 99th percentile. It is stated in the Gates manual that scores above the highest standard score given in the table are obtained by relatively few children. This high level of achievement would be expected from a group who had median scores well into the first grade level on the Gates MacGinitie Reading Test (Segment #1, Table XIX).

There were no significant sex differences on reading readiness scores revealed by the t test in either treatment group (Table XVIII). Both experimental boys and girls tested at the 99th percentile with only a three point mean standard score difference favoring the girls. The trend in the control population suggested a larger sex difference favoring the girls who had a 9 point mean standard score differential and a 14 point percentile differential. The mean score for the control boys was at the 82nd percentile and the mean score for the control girls was at the 96th percentile.

Since the reading readiness subpopulation had the same teacher for the experimental and control groups it can be postulated that some of the ideas from the experimental program must have had an impact on the control population. Nevertheless,

the experimental group significantly outperformed the control group.

The mean reading scores of the total experimental population were - vocabulary, 1.03 and comprehension, 0.94 (Table XVII). Of the 95 boys and 70 girls in the control group only 11 boys and 8 girls were able to obtain any score on either the vocabulary or comprehension tests. Their mean scores were essentially zero, making it impossible to complete a statistical test comparing the treatment groups.

The experimental section of segment #1 outperformed the total experimental population on the mean vocabulary scores at the .06 level of confidence and approached significance with higher mean comprehension scores at the .10 level of confidence (Table XXII). Segment #1 was the only section in the experimental population that had the advantage of an aid three days a week. This freed the instructor's time so that she was able to give her pupils more individual attention which was reflected in the results.

No significant differences were revealed by the t test between the performance on the vocabulary and comprehension scores either by the total experimental population, by the experimental population in segment #1, by the experimental population when divided by sex, or between the sexes (Tables XIX -XXI).

On IQ pretests both treatment groups were comparable. The IQ posttests revealed rises in the experimental population approaching significance at the .10 level. There were no significant IQ changes within the control population (Table XV, XXIII).

The results of the Wepman tests revealed no significant differences between the two treatment groups in pretest scores or posttest scores and no significant sex differences. There were significant changes within each group at the $<.01$ level of significance. The pretest mean scores showed adequate development for five year olds. Since the pretest mean scores proved to be in an area of normal development, and parallel development occurred in both groups, it is possible that the development was one of normal maturation (Table XXIV).

There were no significant changes in PQ scores either within the treatment groups or between the treatment groups and there were also no significant PQ sex differences. Although there was an upward trend in both groups between pretest and posttest PQ scores, the t test did not reveal any significant changes. This presumably was due to the fact that most of the pretest scores fell within a range that was average or above average, that the range was restricted, and therefore there was little opportunity for further development (Table XXV).

The pretest IQ's proved to be the best predictor of achievement in both treatment groups with significant correlations between reading readiness scores, vocabulary and comprehension scores, Wepman pretest scores, and PQ posttest scores (Table XXVI, XXVII). In the experimental group there also were significant correlations between PQ pretest scores and vocabulary and comprehension scores, between Wepman pretest scores and reading readiness scores, and between Wepman posttest scores and IQ posttest scores. The significant posttest PQ and pretest IQ correlations and the not significant pretest PQ and pretest IQ correlations in both treatment groups suggest that a structured learning environment is necessary

to fully develop motor-visual potential. The significant Wepman posttest and IQ posttest correlations in the experimental group but not in the control group indicate that the auditory development in the experimental group was in accordance with the children's intellectual development, but the auditory development in the comparison group was not. There were no significant positive correlations between CA and any of the skill tests.

The results supported the original hypotheses with the exceptions of numbers 6, 7, 9, and 12. Hypotheses 6, 7 and 12 concerned the auditory and visual test results. As was previously stated, the test results of these measures fell into a limited range generally of average or above average development. This probably put the pupils auditory and visual skills beyond the developmental level where reading achievement would be influenced by perceptual skills. The scores were also at a level where much improvement became an improbability, although improvement was evident in auditory development. Even though development of auditory and visual skills occurs with maturity, there were no significant positive CA correlations with the auditory and visual test results, probably because the group had already reached a mature level of development at the time the pretests were administered.

Hypothesis number 9 predicted sex differences in the control population on reading readiness scores. No significant sex differences were revealed by the t test for either of the treatment group. Nevertheless, there was a trend in the control population favoring the girls on the reading readiness analysis. There were no apparent sex differences within the experimental group.

3. Discussion

The privileged public school population with an average IQ of 99.9 on the fall pretests was most representative of the average middle class child. However, the experimental group had the advantage of being exposed to and being part of an enrichment program. In the fall the two treatment groups were comparable. By spring the experimental group had moved significantly beyond the control group in developing basic prereading and early reading skills as well as in developing intellectual processes.

Intelligence is developmental. The pupils in the experimental group, through enriched experiences, had accelerated their intellectual development and therefore showed an IQ increase. The comparison group, on the other hand, had the type of experiences for their age level that is characteristic of a kindergarten program. They moved ahead, developed some skills, and learned at the typical pace. They were representative of the norm and their IQs remained unchanged.

There is no reason to believe that the child who has had this accelerated mental development should regress. It is up to his instructors to build upon this foundation of knowledge. The more knowledge the child has gained, the more he should be capable of learning. His intellectual resources should continue to develop as long as he is presented with challenges.

Since there were no significant positive CA correlations with any of the achievement tests, and the results of any developmental process reflect the amount of time devoted to the acquisition

of skills, the study indicated that it would be to the pupils best advantage to begin the enrichment program early in the school year.

C. Privileged Private School Kindergarten Population

1. Pretest data

The privileged private school kindergarten experimental and control groups (N-30) were comparable on pretest CA, IQ, PQ, and Wepman scores (Table XXVIII). There were no significant differences between the sexes within the groups or between the groups.

The private school experimental population was similar to the privileged public school experimental population on fall IQ. The private school control group had higher IQs than the privileged public school control group approaching significance at the .10 level of significance. The CAs were comparable in private and public populations (Table XXIX).

2. Results

Both the experimental group and the control group took part in an enriched kindergarten program which included the teaching of reading. The experimental group used the CSS materials. The control group's program stressed phonics and picture word associations. Both treatment groups developed prereading and early reading skills. The experimental group outperformed the control group by .6 of a year on the mean vocabulary scores, significant at the .03 level of confidence, and by .86 of a year on the mean comprehension scores significant at the .001 level of confidence (Table XXX). The mean reading scores were - experimental vocabulary, 1.81, comprehension, 1.21; control vocabulary, 1.59, comprehension, 0.73. The range in both groups was from early third grade to zero.

There was no significant difference between the mean vocabulary and comprehension scores in the experimental group. The control mean vocabulary scores were higher than that of the control mean comprehension scores significant at the .05 level of confidence (Table XXXI). It would appear from these results that the experimental program was a more balanced reading program than that of the control group. There were no significant sex differences in either treatment group.

Both treatment groups showed IQ rises significant at the .04 level for the experimental group and significant at the .01 level for the control group (Table XXXII). This was predictable for both groups were part of an accelerated and enriched kindergarten program.

It is most interesting to note that the pretest Wepman scores in both treatment groups were at a level that Wepman considered to represent inadequate development for five year olds. Wepman states in his manual that those with inadequate development are likely to have difficulty learning to use the phonics necessary for reading. However, this did not prove to be true. Both treatment groups developed reading skills based on phonetic programs and both treatment groups showed significant auditory improvement on the posttests, greater than the .01 level of significance, which brought their posttest mean scores into the better than adequate developmental level (Table XXXII). This improvement came about without any special training, but from a combination of maturation and auditory skill development through the learning to read process.

The experimental group showed no significant PQ changes presumably because of the high initial PQ scores and the limited range, which left little opportunity for improvement. The control group, whose initial PQ scores were in the above average range but lower than that of the experimental group, had a significant PQ rise at the .05 level of confidence (Table XXXII).

The achievements of the experimental and control groups were quite similar with the exception of the experimental group's significantly higher level of accomplishment on the reading skill tests (Table XXX). Both treatment groups were comparable on the posttest IQ, PQ, and Wepman scores (Table XXXIII).

IQ proved to be the best predictor of success with the experimental program having significant correlations with vocabulary mean scores at the .05 level of confidence and with comprehension mean scores at the .02 level of confidence (Table XXXIV). There were no significant IQ correlations in the control group between the mean vocabulary and comprehension scores (Table XXXV). Conceivably, the experimental program was reaching the children at their individual level of intellectual development which was not true of the comparison group.

Both the Wepman posttest scores and the PQ posttest scores showed significant correlations with reading skill tests in the experimental group; the Wepman posttest scores showed significant correlations with the reading skill tests in the control group. This supports the authors' convictions that auditory and visual skills can be learned through appropriate experiences. These children must have developed perceptual skills through the learning to read process, since there were no significant Wepman or PQ pretest correlations with the reading skill tests.

The IQ pretests correlated with the PQ posttests in both experimental and control groups, but not with the PQ pretests. Evidently the child needs some form of structured learning situation to be able to develop his visual abilities in accordance with his intellectual capabilities.

There were no positive significant CA correlations which supported the findings in the other experimental and control populations.

The results supported the original hypotheses with the exceptions of numbers 6, 9, 10 and 12. Hypothesis number 6 related to motor-visual development. The privileged experimental population had come close to reaching optimum PQ development as measured by the Frostig Test with 38% of the pupils going over the top of the test in the fall pretests. Because of the small range, low number, and superior pretest scores, the group had reached a level at which further notable development was improbable. The control group, which started from an above average base, but a lower base than the experimental group, showed significant motor-visual improvement as was predicted.

Hypothesis number 9 predicted sex differences in the control population favoring the boys. No sex differences were revealed in either the experimental or control groups. Although sex differences are so frequently noted, it is possible that the boys as well as the girls had responded to the methodologies of this privileged private school population with its small classes and individualized instruction.

Hypothesis number 10 predicted significant correlations between IQ scores and reading skill tests. There were significant correlations for the experimental population, but not for the control population. Evidently, the logical development of skills in the experimental materials made it possible for these students to work at their individual levels of capabilities. This did not prove to be the case in the control group.

Hypothesis number 12 predicted correlations between CA and Frostig and Wepman tests. No CA correlations of positive significance were noted in the entire study.

3. Discussion

The philosophies and educational idealogies of the experimental and control groups were similar in the privileged private school populations. These ideas included the exposure to a challenging educational program with much individualized instruction facilitated by small classes. This framework made it possible to produce highly commendable results in both treatment groups.

The privileged private school experimental population excelled. These pupils were comparable to the privileged public school population on fall IQ - the major predictor of success with the CSS materials. However, their posttest reading skill tests were superior to that of the public school population. The vocabulary mean scores of the private experimental population were .78 of a year superior to that of the privileged public school experimental population and the comprehension mean scores were superior by .65 of a year to that of the privileged public experimental

population. The private school mean scores likewise were superior to segment #1 of the privileged public school population, the privileged public school segment with an aid, by .25 of a year in vocabulary development and .43 of a year in comprehension development.

The control group of the privileged private school population also surpassed the privileged public school population by developing reading skills in their five year olds. The control populations in the public schools did not have the advangages of accelerating their intellectual development through a structured reading readiness and beginning reading program.

The inescapable conclusion is that the privileged private school population, both experimental and control, succeeded in taking five year olds and presenting them with the challenges to develop their intellectual capabilities. The results clearly indicated that this was a superior educational system that represents the fulfillment of the kindergarten ideal.

D. Tables of Results

1. Underprivileged Five Year Old Center City Population

TABLE III

Underprivileged Five Year Olds in a Center City School

Comparison of experimental and control groups on CA, IQ pretests, IQ posttests, reading readiness analysis (RR) total test scores, and reading readiness analysis phonemes section

	Experimental N= 42		Control N= 33		t (1)	Level of Significance
	Mean	S.D.	Mean	S.D.		
CA	65	4.37	63	3.44	—	N.S.
IQ pretest	78	10.96	82	11.15	1.81	.06
IQ posttest	85	12.99	77	15.68	2.33	.03
RR total	38.9	25.85	25.9	20.03	2.42	.03
RR phonemes	45.3	23.31	13.6	10.37	7.88	.001

(1) Formula for all t-tests, Edwards (1950, page 168)

TABLE IV

Underprivileged Five Year Olds in a Center City School

Comparison of experimental group and control group on CA and IQ pretests by sex

Measures	Experimental Group			Control Group			Level of Significance
	N	Mean	S.D.	N	Mean	S.D.	
CA Boys	24	65	3.87	16	63	3.74	N.S.
CA Girls	18	65	4.88	17	63	3.12	N.S.
IQ Boys	24	72	8.64	16	81	12.71	N.S.
IQ Girls	18	83	12.62	17	82	9.55	N.S.

TABLE V

Underprivileged Five Year Olds in a Center City School

Comparison of experimental boys and girls and control boys and girls on IQ pretests

Groups	Boys			Girls			Level of Significance
	N	IQ	S.D.	N	IQ	S.D.	
Experimental	24	72	8.64	18	83	12.62	N.S.
Control	16	81	12.71	17	82	9.55	N.S.

TABLE VI

Underprivileged Five Year Olds in a Center City School

Changes in posttest IQ scores

	Total N	N with IQ rise	N with IQ decline or no change	% increase	Chi-square	Level of significance
Experimental boys	24	20	4	83	11.289	<.001
Control boys	16	4	12	25		
Experimental girls	18	11	7	61	<1	N.S.
Control girls	17	8	9	47		
Experimental total	42	31	11	74	9.117	<.005
Control total	33	12	21	36		

TABLE VII

Underprivileged Five Year Olds in a Center City School

Mean differences in pretest and posttest IQ

	N	Mean IQ difference	S.D.	t	level (1) of Significance
Experimental boys	24	8.33	1.60	4.96	.001
Experimental girls	18	4.17	2.53	1.65	.10
Experimental total	42	6.55	1.45	4.52	.001
Control boys	16	-5.19	2.56	2.03	.05
Control girls	17	-1.53	3.03	< 1	N.S.
Control total	33	-3.30	1.98	1.67	.10

(1) One-tail test justified, a priori hypotheses were that experimental group would increase in IQ and control group would decrease in IQ

TABLE VIII

Underprivileged Five Year Olds in a Center City School

Comparison of experimental and control groups on Murphy-Durrell Reading Readiness Analysis on phonemes and total test scores by sex

Murphy-Durrell Reading Readiness Analysis	Experimental Group			Control Group			t	Level of Significance
	N	Mean	S.D.	N	Mean	S.D.		
RR Total								
girls	18	46.3 (2)	28.17	17	30.9 (1)	21.78	1.76	0.10
boys	24	33.4 (2)	24.11	16	19.3 (1)	18.18	2.08	0.05
RR phonemes								
girls	18	57.4 (1)	24.63	17	16.0	11.42	6.44	0.001
boys	24	36.3 (1)	22.32	16	11.1	9.25	4.82	0.001

(1) Mean differences between sexes are significant at .01 level.
(2) Mean differences between sexes approach significance at 0.10 level.

TABLE IX

Underprivileged Five Year Olds in a Center City School

Product moment correlations between Murphy - Durrell Reading Readiness Analysis phonemes and totals and CA, IQ pretests and IQ posttests

	Experimental Group				Control Group			
	Boys N= 24		Girls N= 18		Boys N= 16		Girls N=17	
	phonemes	total	phonemes	total	phonemes	total	phonemes	total
CA	.19	.15	.22	.00	-.16	.25	-.10	.02
IQ - pretest	.45(1)	.33	.65(2)	.61(2)	.70(2)	.77(2)	.65(2)	.61(2)
IQ - posttest	.67(2)	.70(2)	.50(1)	.49(1)	.66(2)	.80(2)	.75(2)	.85(2)

(1). Significant at .05 to .03 level

(2). Significant at .01 level

2. Privileged Public School Kindergarten Population

TABLE X

Privileged Public School Kindergarten Population

Comparison of IQ within and between the suburban and semi-rural populations

IQ Pretests						
		N	Mean	S.D.	t	Level of significance
Suburban						
	Experimental boys	45	104	15.76	1.56	N.S.
	Experimental girls	46	99	14.29		
	Control boys	70	98	13.54	-	N.S.
	Control girls	51	101	13.16		
	Experimental total	91	101.5	15.01	-	N.S.
	Control total	121	99.3	13.29		
Semi-Rural						
	Experimental boys	24	100	16.93	-	N.S.
	Experimental girls	20	99	13.37		
	Control boys	25	98	14.61	-	N.S.
	Control girls	19	100	10.13		
	Experimental total	44	99.5	15.31	-	N.S.
	Control total	44	98.9	12.68		
Suburban Experimental		91	101.5	15.01	0.71	N.S.
Semi-Rural Experimental		44	99.5	15.31		
Suburban Control		121	99.3	13.29	-	N.S.
Semi-Rural Control		44	98.9	12.68		
Experimental total		135	100.5	15.11	0.72	N.S.
Control total		165	99.3	13.19		

TABLE XI

Privileged Public School Kindergarten Population

Comparison of CA for experimental and control groups

Area	Experimental CA			Control CA			t	Level of Significance
	N	Mean	S.D.	N	Mean	S.D.		
Suburban								
Boys	45	65 (1)	3.37	70	64 (1)	3.21	–	N.S.
Girls	46	64	3.26	51	63	3.43	–	N.S.
Semi-rural								
Boys	24	61 (1)	3.39	25	67 (1)	3.80	4.60	.001
Girls	20	60	3.42	19	67	2.40	7.29	.001
Total	135	63.2	3.34	165	64.5	3.27	3.25	.01

(1) There is no significant difference between the sexes within the groups

TABLE XII

Privileged Public School Kindergarten Population

Comparison of segment #1 of privileged public school population and total privileged public school population on IQ pretests and CA

	Segment #1 IQ posttest, reading readiness sample			Total Public School Population			t	Level of Significance
	N	Mean	S.D.	N	Mean	S.D.		
Experimental IQ	21	102.8	14.59	135	100.5	15.11	.64	N.S.
Control IQ	25	105.5	11.29	165	99.3	13.19	2.38	.03
Experimental CA	21	68	2.34	135	63.2	3.34	8.51	<.001
Control CA	25	63	3.47	165	64.5	3.27	-	N.S.

TABLE XIII

Privileged Public School Kindergarten Population

Comparison of Wepman pretest sample (segment #2) with total population on IQ pretest and CA.

	Segment #2 Wepman sample			Total Population			t	Level of Significance
	N	Mean	S.D.	N	Mean	S.D.		
Experimental IQ	51	101.8	13.69	135	100.5	15.11	-	N.S.
Control IQ	52	102.16	14.34	165	99.3	13.19	-	N.S.
Experimental CA	51	63.0	3.29	135	63.2	3.34	—	N.S.
Control CA	52	63.2	3.08	165	64.5	3.27	—	N.S.

TABLE XIV

Privileged Public School Kindergarten Population

Comparison of Frostig pretest sample (segment #3) within total population on IQ pretests and CA

	Segment #3 Frostig sample			Total Population			t	Level of Significance
	N	Mean	S.D	N	Mean	S.D.		
IQ Experimental	58	99.4	14.14	135	100.5	15.11	—	N.S.
IQ Control	64	97.1	13.74	165	99.3	13.19	—	N.S.
CA Experimental	58	61.1	2.86	135	63.2	3.34	—	N.S.
CA Control	64	65.6	3.37	165	64.5	3.27	—	N.S.

TABLE XV.

Privileged Public School Kindergarten Population

Pretest comparison of experimental and control groups on CA and IQ in segment #1

	Experimental			Control			t	Level of Significance
	N	Mean	S.D.	N	Mean	S.D.		
CA boys	13	68	2.77	13	63	2.54	4.42	.001
CA girls	8	67	1.64	12	62	4.03	3.79	.001
Total CA	21	68	2.34	25	63	3.47	5.60	.001
IQ pretest boys	13	104	13.55	13	106	11.74	–	N.S.
IQ pretest girls	8	101	16.29	12	105	10.90	–	N.S.
Total IQ pretest	21	102.8	14.59	25	105.5	11.29	–	N.S.

TABLE XVI

Privileged Public School Kindergarten Population

Comparison of segment # 1 on CA and IQ pretests by sex within the experimental group and control group

	Experimental Boys (N=13)		Experimental Girls (N=8)		Level of Significance
	Means	S.D.	Means	S.D.	
CA	68	2.77	67	1.64	N.S.
IQ pretest	104	13.55	101	16.29	N.S.
	Control Boys (N=13)		Control Girls (N=12)		Level of Significance
	Means	S.D.	Means	S.D.	
CA	63	2.54	62	4.03	N.S.
IQ pretest	106	11.74	105	10.90	N.S.

TABLE XVII

Privileged Public School Kindergarten Population

Comparison of experimental and control groups on spring reading readiness, vocabulary and comprehension scores

	Experimental			Control			t	Level of Significance
	N	Mean	S.D.	N	Mean	S.D.		
Reading Readiness	21	78.93	18.27	25	63.61	23.28	2.45	.02
Vocabulary	135	1.03	0.85	165	-	-	-	-
Comprehension	135	0.94	0.79	165	-	-	-	-

TABLE XVIII

Privileged Public School Kindergarten Population

Comparison of experimental boys and girls and control boys and girls on the Murphy-Durrell Reading Readiness Analysis.

Murphy-Durrell	Experimental Boys			Experimental Girls			Level of Significance
	N	Mean	S.D.	N	Mean	S.D.	
Reading Readiness	13	80.10	18.32	8	77.02	18.20	N.S.

Murphy-Durrell	Control Boys			Control Girls			Level of Significance
	N	Mean	S.D.	N	Mean	S.D.	
Reading Readiness	13	59.69	22.37	12	68.25	24.35	N.S.

TABLE XIX

Privileged Public School Kindergarten Population

Comparison between vocabulary and comprehension in experimental groups

		Gates Mac-Ginitie			
	N	Mean	S.D.	t	Level of Significance
Segment #1					
Vocabulary	21	1.56	1.23	1.18	N.S.
Comprehension	21	1.16	0.99		
Total Population					
Vocabulary	135	1.03	.85	-	N.S.
Comprehension	135	0.94	.79		

TABLE XX

Privileged Public School Kindergarten Population

Comparison of Vocabulary and Comprehension scores for experimental population by sex

	Vocabulary			Comprehension			t	Level of significance
	N	Mean	S.D.	N	Mean	S.D.		
Experimental boys	69	1.01	.82	69	.95	.80	.43	N.S.
Experimental girls	66	1.05	.89	66	.92	.78	.84	N.S.

TABLE XXI

Privileged Public School Kindergarten Population

Comparison of scores made by boys and girls in experimental group on vocabulary and comprehension tests.

Gates MacGinitie	Experimental Boys (N = 69)		Experimental Girls (N = 66)		Level of Significance
	Mean Grade Level	S.D.	Mean Grade Level	S.D.	
Vocabulary	1.01	.82	1.05	.89	N.S.
Comprehension	.95	.80	.92	.78	N.S.

TABLE XXII

Privileged Public School Kindergarten Population

Comparison of segment #1 of experimental population and total experimental population on vocabulary and comprehension scores

	Experimental group of segment #1			Total experimental group			t	Level of Significance
	N	Mean	S.D.	N.	Mean	S.D.		
Vocabulary	21	1.56	1.23	135	1.03	.85	1.89	.06
Comprehension	21	1.16	0.99	135	0.94	.79	1.05	.10

TABLE XXIII

Privileged Public School Kindergarten Population

Comparison of IQ pretests and IQ posttests within the experimental group and control group

	IQ pretest			IQ posttest			t	Level of Significance
	N	Mean	S.D.	N	Mean	S.D.		
Experimental	21	102.8	14.59	21	110	16.55	1.62	.10
Control	25	105.5	11.29	25	106	11.71	—	N.S.

TABLE XXIV

Privileged Public School Kindergarten Population

Comparison of experimental and control groups on Wepman pretest and posttest scores; comparison within experimental and control groups on Wepman pretest and Wepman posttest scores

Wepman	Experimental			Control			t	Level of Significance
	N	Mean	S.D.	N	Mean	S.D.		
Pretest	51	6.54	4.13	52	6.96	4.16	0.51	N.S.
Posttest	51	4.30	3.66	52	5.03	2.94	1.69	N.S.
t		3.80			3.78			
Level of Significance		<.01			<.01			

TABLE XXV

Privileged Public School Kindergarten Population

Comparison of PQ pretest and PQ posttest means for experimental and control groups; comparison of PQ pretest and PQ posttest within experimental and control groups

PQ	Experimental N= 58		Control N= 64		Level of Significance
	Mean	S.D.	Mean	S.D.	
Pretest	110	9.32	107	8.84	N.S.
Posttest	113	8.18	111	8.58	N.S.
Level of Significance	N.S.		N.S.		

TABLE XXVI

Privileged Public School Kindergarten Population

Product – moment correlations for experimental group

Experimental								
	IQ pretest N = 135	PQ N = 58		Wepman N = 51		Reading Readiness N = 21	Vocabulary N = 135	Comprehension N = 135
		pretest	posttest	pretest	posttest			
CA	-.12	-.04	-.33 (2)	.02	-.04	-.32	-.15	-.11
PQ pretest				.12			.37 (2)	.34 (2)
PQ posttest					.18		.49 (2)	.59 (2)
Wepman pretest						.42 (1)	.13	.19
Wepman posttest							.09	.13
IQ pretest		.13	.68 (2)	.31 (1)	.09	.78 (2)	.47 (2)	.44 (2)
IQ posttest					.44 (2)		.25	.32

(1) Significant at the .03 level of confidence
(2) Significant at the .01 level of confidence or better
(3) There were no significant sex differences

TABLE XXVII

Privileged Public School Kindergarten Population

Product-moment correlations for control group

Control						
	IQ pretest N=165	PQ N=64		Wepman N=52		Reading Readiness N=25
		pretest	posttest	pretest	posttest	
CA	.02	-.05	-.19	.05	-.01	.30
PQ pretest				.15		
PQ posttest					.16	
Wepman pretest						.12
Wepman posttest						
IQ pretest		.18	.53(2)	.34(1)	.08	.64(2)
IQ posttest					-.04	

(1) Significant at the .03 level of confidence

(2) Significant at the .01 level of confidence or better

(3) There were no significant sex differences

3. Privileged Private School Kindergarten Population

TABLE XXVIII

Privileged Private School Kindergarten Population

Summary of fall CA, IQ, PQ, and Wepman for experimental and control groups

	N	Mean	S.D.	t	Level of Significance
CA Experimental	16	63	4.92	—	N.S.
CA Control	14	64	3.85		
IQ Experimental	16	101	10.96	—	N.S.
IQ Control	14	105	12.15		
PQ Experimental	15	115	3.37	—	N.S.
PQ Control	11	111	5.74		
Wepman Experimental	12	10.6	3.90	1.42	N.S.
Wepman Control	13	8.0	4.86		

TABLE XXIX

Privileged Private School Kindergarten Population

Comparison of Privileged Private School with Privileged Public School Population

	Private School			Total Privileged Public School Population			t	Level of Significance
	N	Mean	S.D.	N	Mean	S.D.		
Experimental IQ prettest	16	101	10.96	135	100.5	15.11		N.S.
Control IQ prettest	14	105	12.15	165	99.3	13.19	1.62	0.10
Experimental CA	16	63	4.92	135	63.2	3.34		N.S.
Control CA	14	64	3.85	165	64.5	3.27		N.S.

TABLE XXX

Privileged Private School Kindergarten Population

Comparisons on Gates Mac-Ginitie Reading Test scores for experimental and control groups.

	N	Mean	S.D.	t	Level of Significance
Vocabulary					
Experimental	16	1.81	0.75	2.25	.03
Control	14	1.21	0.66		
Comprehension					
Experimental	16	1.59	0.69	3.43	.001
Control	14	0.73	0.64		

TABLE XXXI

Privileged Private School Kindergarten Population

Comparison between vocabulary and comprehension

Gates Mac-Ginitie					
	N	Mean	S.D.	t	Level of Significance
Experimental					
Vocabulary	16	1.81	0.75	0.80	N.S.
Comprehension	16	1.59	0.69		
Control					
Vocabulary	14	1.21	0.66	2.06	.05
Comprehension	14	0.73	0.64		

TABLE XXXII

Privileged Private School Kindergarten Population

Comparison of fall and spring IQ, PQ, and Wepman scores for experimental and control groups

	N	Mean	S.D.	t	Level of Significance
Experimental					
IQ pretest	16	101	10.96	2.19	.04
IQ posttest	16	110	11.57		
Control					
IQ pretest	14	105	12.15	2.93	.01
IQ posttest	14	117	10.45		
Experimental					
PQ pretest	15	115	3.37	—	N.S.
PQ posttest	15	116	5.56		
Control					
PQ pretest	11	111	5.74	2.31	.05
PQ posttest	11	116	3.68		
Experimental					
Wepman pretest	12	10.6	3.90	5.61	< .01
Wepman posttest	12	3.3	1.87		
Control					
Wepman pretest	13	8.0	4.86	2.98	< .01
Wepman posttest	13	3.5	1.93		

TABLE XXVIII

Privileged Private School Kindergarten Population

Summary of IQ, PQ and Wepman spring posttest for experimental and control groups

IQ Experimental	16	110	11.57	1.68	N.S.
IQ Control	14	117	10.45		
PQ Experimental	15	116	5.56	—	N.S.
PQ Control	11	116	3.68		
Wepman Experimental	12	3.3	1.87	0.25	N.S.
Wepman Control	13	3.5	1.93		

TABLE XXXIV

Privileged Private School Kindergarten Population

Product - moment correlations for experimental group

Experimental N = 16							
	IQ pretest	PQ		Wepman		Vocabulary	Comprehension
		pretest	posttest	pretest	posttest		
CA	.18	.07	-.21	.14	.36	.08	.16
PQ pretest				.09		.06	.03
PQ posttest					-.03	.57(2)	.39
Wepman pretest						.21	.27
Wepman posttest						.29	.54(2)
IQ pretest		.11	.63(4)	.21	.35	.50(1)	.59(3)
IQ posttest					.06		

(1) Significant at the .05 level of confidence

(2) Significant at the .04 level of confidence

(3) Significant at the .02 level of confidence

(4) Significant at the .01 level of confidence

TABLE XXXV

Privileged Private School Kindergarten Population

Product - moment correlations for control group

Control N = 14							
	IQ pretest	PQ		Wepman		Vocabulary	Comprehension
		pretest	posttest	pretest	posttest		
CA	.06	.12	-.01	.00	.35	.24	.13
PQ pretest				.22		.02	.03
PQ posttest					.13	.28	.29
Wepman pretest						.17	.10
Wepman posttest						.64 (2)	.39
IQ pretest		.26	.58 (2)	.28	.49	.18	.05
IQ posttest					.42		

(1) Significant at the .05 level of confidence

(2) Significant at the .02 level of confidence

(3) Significant at the .01 level of confidence

VII. INTERPRETATIONS and RELATED RESEARCH

Dolores Durkin (1966) has conducted long term studies of children who entered first grade as readers. A six year study that was initiated in 1958 and involved the total Oakland, California first grade population of 5,103 students, was reviewed in "Children Who Read Early." The following is a quote from the conclusion of this book:

> "Even after six years of school instruction in reading, the early readers, as a group, maintained their lead over classmates of the same mental age who did not begin to read until the first grade" (Durkin, 1966, page 133).

In discussing the mental age and IQ of her subjects, Durkin (1966) states that her comments and conclusions assume that the Stanford-Binet IQs are accurate measurements of these young children. She proceeds to quote Bloom (1964) who has written that there is a correlation of +.80 between intelligence at age 5 and age 17 when ideally measured.

Durkin (1966) failed to take into consideration a very possible distortion in her IQ matching in grade one. The early readers which comprised the experimental group were matched with a control group of equal IQ after the experimental group had learned to read. This gives an unbalanced match favoring the control group since reading at an early age introduces the child to abstract thinking at an early age, and the mental development that accompanies abstract thinking raises a child's thinking abilities, and likewise his IQ.

In pretest studies with the CSS and in the Trenton State Study of the CSS, there were IQ rises (approximately a 10% rise) in the groups that were introduced to formal reading before first grade. This was true in all experimental populations, underprivileged and privileged. This was also true of the one kindergarten control group that was introduced to reading. From the results of these studies, the authors hypothesize that Durkin's experimental group had an IQ rise prior to their being matched with a control group.

Therefore, Durkin's experimental group most probably started out with an IQ lower than the control group prior to their learning to read. Even with this disadvantage of the unbalanced match, the results revealed that the early readers as a group continued to show higher achievement in reading than the nonearly readers with whom they were matched.

Durkin's (1966) second study of children who entered first grade as readers took place in New York City from 1961 to 1964. There were 156 early readers (3%)among the 5,000 students in the forty schools selected for the study. As in the case of the Oakland, California test groups, the children with the earlier start were still ahead after almost three years of formal reading instruction.

Durkin states that "when the initial study began in 1958, it was rather generally assumed that early readers would have problems later." The findings in her two studies in no way reflect the pessimistic predictions. She concludes that these children profited from their early start at all IQ levels.

Another longitudinal research study designed to determine the long range effects of beginning the teaching of reading in kindergarten was initiated in the Denver Public Schools in 1960 (McKee, 1966). The study involved the total kindergarten population of 4000 pupils. Approximately half the children were in the experimental group and approximately half served as controls. The pupils in the experimental group received twenty minutes per day of instruction in beginning reading activities. The control group followed a traditional kindergarten curriculum which did not include reading. The results showed that the introduction to formal reading on the kindergarten level can be highly successful.

The overall conclusions of the Denver study are as follows:

1. Kindergarten children who had been instructed in reading did better in first grade than those in a traditional kindergarten program.

2. Early readers who continued in an adjusted program by the end of fifth grade were on the average two years ahead of children in a traditional program.

3. Early readers who were returned to a program that kept them in books at their grade level after kindergarten lost their advantage by fifth grade.

4. Early readers who continued in an adjusted program read faster, had better comprehension skills, did better in curriculum areas dependent upon reading, did more reading on their own, and had significantly larger vocabularies than those who were not introduced to reading until first grade.

5. There was no evidence to indicate that early reading caused any social, psychological or physical problems.

Both the Durkin studies and the Denver studies pointed out that optimum reading achievement was obtained when adjustments were made to take advantage of the gains of early reading. In the Durkin studies the brighter students were accommodated by double promotion. In the Denver studies half of the kindergarteners who were introduced to reading went into an adjusted program in the first and later grades. The other half of the experimental group went into a regular first and later grade program. The students in the accelerated programs retained their gains through five and six years of school.

Once reading was established on the kindergarten level, the Denver Public Schools began a parallel study (Brzeinski, 1964) to determine how effectively parents could prepare their preschool children for reading. The parents of the children in the experimental group were supplied with a specially prepared guidebook. A special series of sixteen educational television programs were produced for the children. The study indicated that a preschool child can be taught beginning reading skills, providing he has a mental age of four and a half years.

Fowler (1965) concluded from his work with three year olds that a child was capable of learning to read if he had a mental age of four. Prior to the mental age of four, Fowler found children had difficulty apprending the abstract relationships necessary to be successful in reading. However, those who did not achieve

reading skills remained in an individualized prereading program and showed no signs of emotional stress. The children were able to experience success at their level of participation.

A study was conducted by Davidson (1931) to determine if children with a mental age of four could be taught to read and whether children with the same mental age but different chronological ages would have equal achievement. The subjects comprised a group of children from three to five years old all having a mental age of four years. For four and a half months the children received ten minutes of instruction in reading each day. The results showed that the children could be taught to read; and the bright younger children were more successful than the older children, even though the mental ages were the same.

Other studies have concluded that a child should have a mental age of six, six and a half, or even seven before being taught to read (Morphett and Washburne, 1931; Sheldon, 1962; Harris, 1961). Harris, in "How to Increase Reading Ability," bluntly states that it is futile to start children on systematic reading instruction before they reach a mental age of six. He then presents a table showing at what age children will reach a mental age of six if their IQs are from 90 to 60.

These studies with six to seven year old children have mistakenly considered the child's mental age as a dependent variable when the dependent variable should have been the materials and the method of presentation. As was previously mentioned, children are being taught to read in Russia and Israel at the age of four.

These children are not innately more intelligent than American children. However, the Russian and the Hebrew languages generally are easier for native speakers to learn to read than the English language is for English speakers because of an almost perfect relationship between the letters and the sounds in Russian and Hebrew. Traditionally the Hebrew language was written without vowels, but vowel markings are inscribed in the early readers to simplify learning to read. Traditionally the Russian language contained letters that had more than one sound and sounds that had more than one letter, but when Lenin was premier he revised the Russian alphabet to eliminate inconsistencies. An average native child of Russia or Israel is able to learn to read his language fluently in three months time.

The CSS program parallels the learning to read process in Russia and Israel. In CSS letter sounds and spelling patterns are controlled so the child has one sound for each pattern with constant reinforcement for the first five hundred words, except for a very few memory words. Once the basic skills are developed more complex spelling patterns are gradually introduced. With this form of programmed learning a child with a mental age of four is able to learn to read English with facility.

Reading disability is caused either by environmental limitations: the methods of instruction, the types of materials, cultural deprivation; or by individual limitations: acquired defects, both physical and emotional, and innate factors.

Vernon's (1960) review of the research on reading disability leads her to conclude that innate factors account for relatively

few of the reading disability problems. Children with an IQ over 70, 97% of the population, have sufficient intelligence to learn to read and some children with IQs under 70 succeed in learning to read. Research indicates that left-handedness need not be a handicap and there is no conclusive evidence that cross or mixed dominance is a handicap in learning to read (Vernon, 1960; Strang, 1968). Vernon further recognizes that many of the auditory and visual problems in the children who are retarded in reading may be an effect of not succeeding in learning to read rather than a cause. Vernon concludes that backwardness in reading is frequently the result of general cognitive confusion and immaturity.

In the majority of Fernald's (1943) clinical cases of extreme reading disability the subjects were defective in visual and auditory acuity. However, these subjects were successful in learning to read through a tactile-kinaesthetic approach and subsequently developed visual and auditory acuity.

Auditory and visual perception appear to be closely related to success or failure in beginning reading. Most children learn to read by association of sounds with visual symbols. Disabled readers as a group test lower on auditory and visual discrimination tests than the general population. Gifted readers test higher on perception tests than the general population (Wepman, 1962; Chang and Chang, 1967).

Some of the research has not shown high correlations between auditory and visual discrimination and early success in reading. Results may in part be confused or influenced by IQ. Usually

the higher IQ children also have higher auditory and visual test scores (Mortenson, 1968). It also is probable that auditory and visual discrimination are factors that influence IQ scores. Positive relationships are further negated since once a level of proficiency is reached in these perceptual skills, these skills should no longer be a contributing factor in reading achievement.

Birch and Belmont (1964, 1965) tested audio-visual integration and their relationship to reading while holding IQ constant. The normal readers were higher on audio-visual integration than the retarded readers.

Bond and Dykstra (1967) found in their analysis of the United States Office of Education First Grade Studies that auditory perception and visual perception (as well as intelligence and cultural opportunities) are related to success in beginning reading.

Deutsch(1964) found differences that were highly significant between good readers and poor readers on the Wepman Auditory Discrimination Test.

The observations of disabled readers in clinical settings by Durrell and Murphy (1953) showed that nearly every disabled reader whose reading achievement was below the first grade level had an inability to discriminate sounds in words.

Elkind, Larson, and Van Doorninck (1965) studied the differences on perceptual performance between poor readers and good readers while holding CA and IQ constant. They concluded that the poor readers were less efficient on perceptual performance than the better readers.

Highly significant predictions of reading achievement from performance on the Frostig Developmental Test of Visual Perception as well as a battery of other perception tests were found by Bryant (1964) and Goins (1958).

The Lions Club of Winter Haven, Florida in 1965 arranged for a two year study at the University of Miami to research perceptual visual-motor concepts and procedures for kindergarten (Bosworth, 1967; DiMeo, 1967). The study concluded that achievement in word discrimination appeared highly related to visual-motor skills and that visual-motor skills could be developed.

Numerous other investigations have recognized significant correlations between auditory and visual perception and beginning reading achievement. Significant auditory relationships have been noted by Thompson (1963), Wepman (1960), and Dykstra (1966). Significant visual correlations have been reported by Barrett (1965) and Goins (1958).

Correlations between pretest IQs, pretest reading readiness scores, and subsequent reading scores generally range from moderate to high (Panther, 1967 ; Stauffer, 1966 ; Thompson, 1963 ; Birch and Belmont, 1964, 1965 ; Dykstra, 1966). Many researchers are of the opinion that a child's IQ is the major predictor of future reading achievements (Dykstra, 1966 ; Stauffer, 1966) .

However, some studies show much higher correlations than other studies. Once again, part of the answers must lie in the type of materials used and the learning environment. A child with a high IQ may rebel against rote learning and a teacher authority environment; while the same child may be extremely successful with self-

pacing exercises in inductive learning where the initiative comes from within.

In a discussion on reversals Vernon (1960) points out that there are more reversal problems in sight methods (where the pupils are introduced to whole words) than in phonic methods (where the pupils learn to associate letters with sounds), and that an early emphasis on spatial orientation of the letters in the words reduces reversal problems.

Readiness is a concept that emerges through development. Like any other type of development it needs to be nurtured. By providing children with well structured sequential tools for learning it is possible to develop readiness. Without a sequentially structured and flexibly paced program some children - and it may be bright children - fail to develop one or more of the important skills necessary for initial success in learning to read. The child must not experience failure. Success is the key to achievement. Once the child has developed the preliminary steps necessary to enable him to read, HE WILL READ.

Our goal in kindergarten should be to provide the child with a foundation that will enable him to have success in first grade, in second grade, and all through school. If a second grader needs remedial help it is obvious that the child failed to read in first grade. For one reason or another, he was unable to organize basic prereading concepts.

A major problem of reading retardation is reversals. Many reversal problems arise from the lack of understanding of the

spatial orientation concept of two dimensional figures on paper. To a young child a book is a book no matter how it is held, so to his untutored way of thinking why shouldn't a W be a W right side up or upside down?

Children in their kindergarten art work often experience reversal tendencies. These reversal tendencies are frequently missed and not recognized until the child starts a structured language arts program involving writing in the first grade. If the error is repeated, each time the child reverses he reinforces the reversal concept in his mind. Once the child has gone through a considerable period of time reversing, it becomes very difficult for him to relearn the correct rule of spatial orientation.

Through a program emphasizing spatial orientation at the reading readiness and beginning reading stages, reversal tendencies can be recognized early and more easily corrected. Those children who still show reversal tendencies can be identified and helped before a problem develops.

A well-structured reading readiness and beginning reading program develops a child's auditory acuity, visual acuity, visual-motor coordination, speech, and vocabulary. The child's ear becomes attuned to speech sounds as he learns about rhyming words and words that begin alike. Along with auditory development comes speech improvement for those who need it.

Sex differences favoring girls has characterized beginning reading studies (Konski, 1951 ; Balow, 1963) . A disproportionate number of boys are later found in the remedial groups. Among the reasons given for this disparity are that girls are

more reticent, less energetic, and more willing to accept authority than boys. They are therefore more willing to learn by rote. Boys seem to do well in tasks requiring arithmetical ability and inductive reasoning.

The suggestions made by some educators (Weintraub, 1966) that reading instruction should be delayed for boys is preposterous. These educators are confusing the basic issues. The young male is as capable of learning to read as the young female. He needs a well-designed program that is based on logic and materials that are challenging for him. Such materials would also benefit his female counterparts. Sex differences should then be eliminated or minimized.

In the investigation undertaken by Konski (1951) there was an indication of equal readiness and development between the sexes within this population sample prior to the formal teaching of reading. At the beginning of first grade there were no significant sex differences on reading readiness scores. By the end of first grade the girls were superior to the boys on reading achievement. Perhaps we should consider what takes place after the readiness tests are given to cause those discrepancies. It is obvious that the young male population in such studies has rebelled. Has he rebelled against the materials? Has he rebelled against the learning environment?

Both the Denver studies, Hillerich (1965), and the CSS study of beginning reading programs on the kindergarten level showed a reduction in achievement differences between boys and girls. It would appear that this resulted from a combination of reaching the

children at a prime age as well as the style of presentation.

Reading is an integral part of total child development. By delaying the learning to read process the child's development is being delayed and he is being deprived of the right to learn.

The reader will move ahead of the nonreader not only in reading but also in developing his mental resources. Reading provides the groundwork for developing abstract concepts. Letters are symbols. Words are abstractions. By introducing a child to symbolic concepts at an early age we are giving the child a greater opportunity to develop his mind and reach his intellectual potential. All evidence reveals that intelligence is a developmental process. Most psychologists agree that the basis of intelligence is abstract thinking. The basis of abstract thinking is symbolism.

Language like intelligence is a developmental process. Our thoughts are limited by our language concepts. Our view of ourselves and our world is influenced by our language development. Language development is accelerated through reading.

The foregoing leads us to the conclusion that there is no substitute for reading where mental development is concerned. The development of young minds is accelerated through educational enrichment and challenges. The young child needs tools, materials, and skillful guidance to be able to develop his mind. He needs outlets for his creative energies. He is easily bored with most of his "playthings" because they do not provide him with the ever increasing challenges he craves. Our school systems have tended to underestimate the young child's ability to engage in abstract thinking. No one knows to what level the human mind has the

capabilities of reaching or whether there is a limit to intellectual development. What we do know is that the earlier a child is challenged and guided toward thinking, the sooner he acquires the foundations upon which his later abilities will build.

Since reading lays the foundation for total academic achievement the child who is instructed in a sound kindergarten reading readiness program and beinning reading program is in a better position to cope with his future academic studies. Boys and girls enter kindergarten with a zest for learning and intellectual curiosity. It is the responsibility of the kindergarten teacher to provide each child with the stimulation and tools to enable him to move forward.

VIII. CONCLUSION

The Trenton State Study demonstrated that kindergarten pupils who were introduced to the Categorical Sound System had both the capabilities and desires to develop basic prereading and early reading skills. The CSS proved to be significantly more effective in developing these basic skills (measurable on the Murphy-Durrell Reading Readiness Analysis, the Gates MacGinitie Readiness Skills Test, and the Gates MacGinitie Reading Test—vocabulary and comprehension scores) than less structured kindergarten programs for both the underprivileged and privileged groups at all ability levels.

The students instructed with CSS materials significantly outperformed all the control populations on posttest reading readiness and reading skill tests. Those populations who received formal instruction in reading, including the one control group with reading instruction, had significant IQ rises. The control populations that were not instructed in reading either had unchanged IQ scores (privileged population) or declining IQ scores (underprivileged population). The IQ rise brought about through the learning to read process indicates that most young children are not being given sufficent challenges.

The CSS Study further demonstrated that experiences and opportunities can create readiness, and that one need not wait for readiness to occur as measured by standardized tests before introducing a child to reading. There were groups of children in the study that according to the traditional readiness concept were not ready to move forward into reading. These children defied the readiness

concepts for they succeeded in developing prereading and early reading skills. The private school privileged populations, both experimental and control, showed inadequate pretest auditory development by the standards of the Wepman Auditory Discrimination Test. Theoretically these children should have had problems learning to read. Besides succeeding in phonetic programs, these children developed auditory skills without any special auditory training. Their auditory ability developed through their reading experiences. The center city underprivileged experimental population virtually scored zero on readiness. It was impossible to give these children a readiness pretest. Either they could not comprehend the directions or lacked the discipline and motivation to take a test. However, they were enriched through a structured readiness and beginning reading program as was shown by average or above average posttest readiness scores by 43% of the experimental population and subsequent IQ rises. The authors conclude that expectations for the young child frequently are below their capabilities.

Many educators are of the opinion that maturation is one of the important factors that occurs in the kindergarten and first grade child and leads to the development of readiness for reading which includes auditory and visual development. There were no significant positive CA correlations among the kindergarten children with any of the pretest or posttest skills (auditory perception, visual perception, readiness tests, reading skill tests). It is obvious that a certain level of perceptual skill development must take place before a child can be taught to read. But it appears that

by the time the child reaches kindergarten age, CA no longer is an important consideration and more can be accomplished through training than through waiting.

Abstract thinking is the basis of intelligence. Reading provides a foundation for abstract thinking. The sooner one gains reading skills the greater is his opportunity for comprehending complex concepts. A person's mature intellect is a function of the time span of education. Time lost in early years never can be regained.

We have expected far too little from our children. A happy well adjusted child is a child with intellectual challenges and success. Many of our social and discipline problems could be solved through early education. The time to reach our youth is in their early years, when they are in the stages of their most rapid intellectual development.

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X. APPENDICES

A. Standardized Texts Used in the Trenton State Study

Lorge-Thorndike Intelligence Tests. Lorge, I. and Thorndike, R. Level 1, Form A (pretest), Form B (posttest). Boston: Houghton Mifflin. 1954, 1957.

Murphy-Durrell Reading Readiness Analysis. Murphy, H. and Durrell, D. New York: Harcourt, Brace & World. 1965.

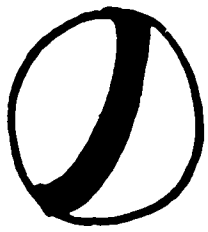
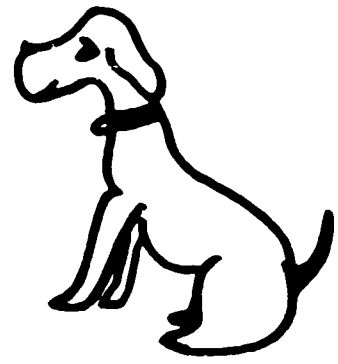
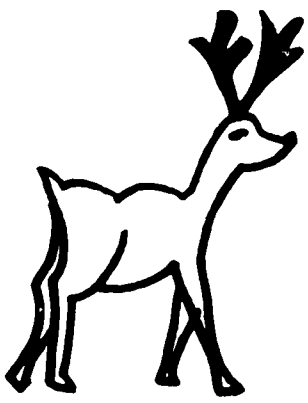
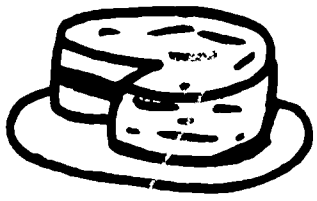
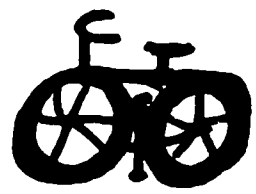
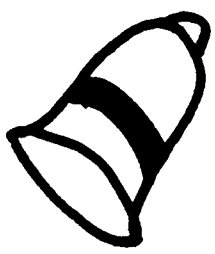
Gates-MacGinitie Reading Tests. Gates, A. and MacGinitie, W. Readiness Skills; Primary A, Form 1 (pretest), Form 2 (posttest); Primary B, Form 1 (posttest). New York: Teachers College Press, Columbia University. 1968.

Wepman Auditory Discrimination Test. Wepman, J. Chicago: Language Research Associates. 1958.

Frostig Developmental Test of Visual Perception. Frostig, M.; Lefever, D. W.; Whittlesey, J.; Masow, P. Palo Alto, California: Consulting Psychologist Press. 1961-64.

Name

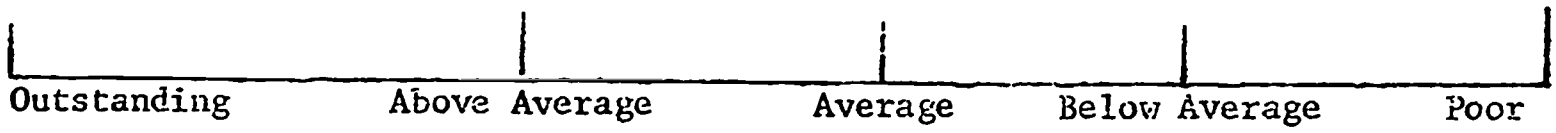
B. Prereading Check

	see ball make two		stop run dog dish
	big get deer eat		cat kite deep king
	cake father go sleep		skip bike jet fix
	run sing fish bell		take ax train boat
	sink mother hot little		bee monkey gate tree

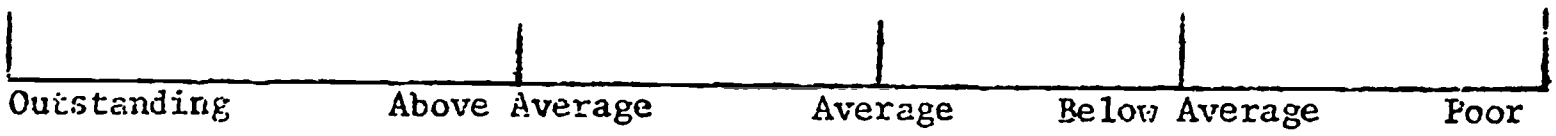
C. Teacher's Rating Scale

RATINGS:

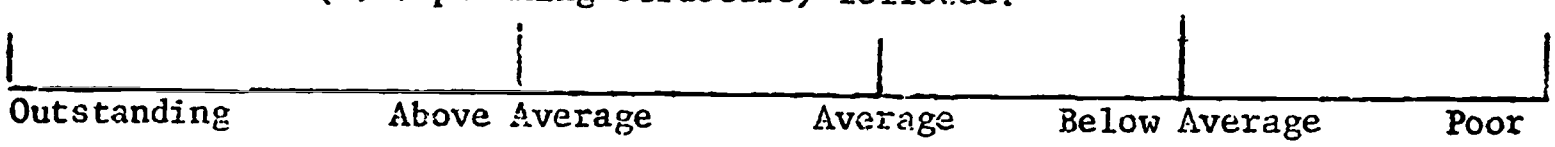
1. Class Discipline



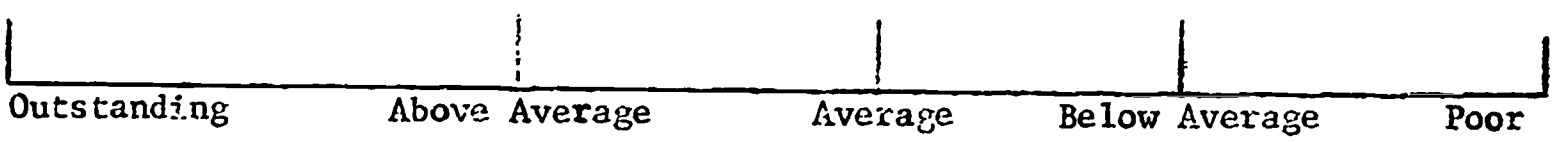
2. Methods Used (i.e. tools)



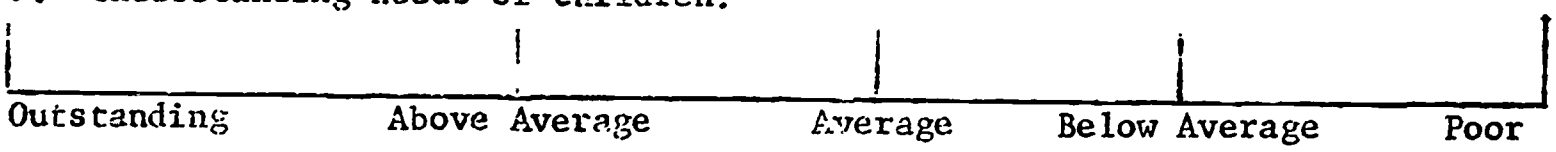
3. Procedures (i.e. planning structure) followed:



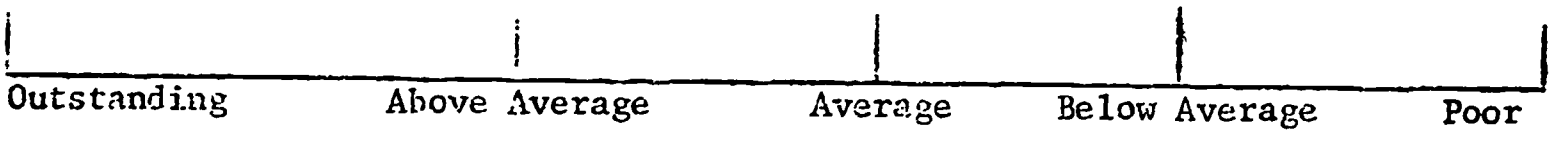
4. Teacher Attitudes



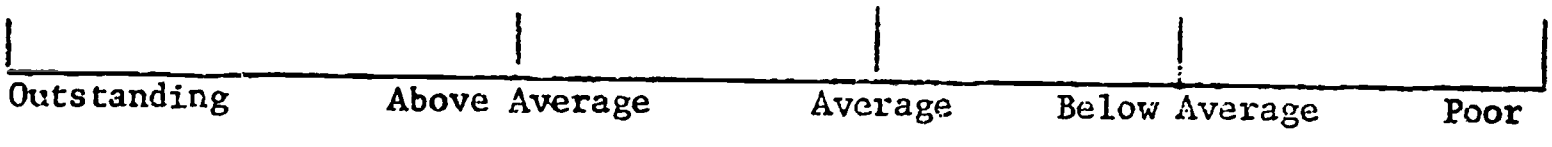
5. Understanding needs of children:



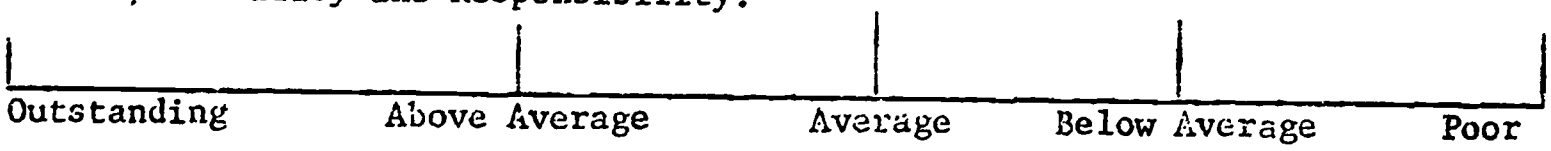
6. Success in meeting needs of children:



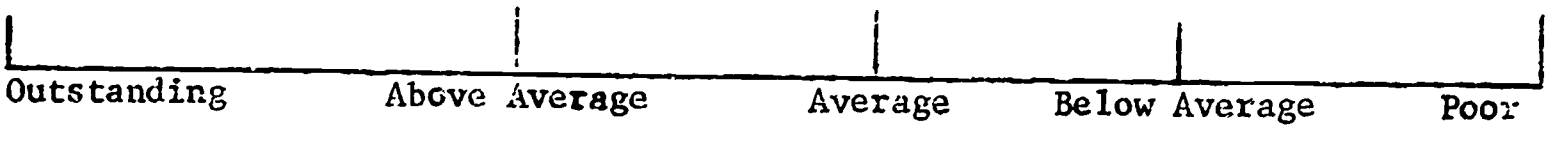
7. Adaptability to new techniques:



8. Dependability and Responsibility:



9. Attendance:



10. Overall Quality (check only one)

A. Excellent-Exceptional ☐

Outstanding in at least 7 of the 9 areas above; no significant weaknesses in any area; rare problems.

B. Very Good-Above Average ☐

Outstanding in 5-6 of the areas; no significant weaknesses in any areas; occasional problems in 1-2 areas.

C. Average-Typical ☐

Outstanding in only 2-3 areas; significant weaknesses in 2-3 areas; and occasional problems.

D. Below Average-Weak ☐

No outstanding areas of strength; mediocre in most respects with significant deficiencies in 3-4 areas; fairly frequent problems.

E. Very Poor-Deficient ☐

Overall deficienties in 4-6 areas; weaknesses in most all areas; with serious, chronic problems in most areas of classroom activities and with children.