DOCUMENT RESUME

ED 049 017 RE 003 494

AUTHOR	Brickner, Ann; Senter, Donald R.
TITLE	Reading Rates Attained by First-Year LISTEN LOOK LEARN Students.
INSTITUTION	Educational Developmental Labs., Inc., Huntington, N.Y.
REPORT NO	EDL-R&I-2
PUB DATE	Feb 69
NOTE	15p.
EDRS PRICE	EDRS Price MF-$0.65 HC-$3.29
DESCRIPTORS	*Beginning Reading, *Eye Movements, *Grade 1, Multimedia Instruction, Perceptual Development, Reading Programs, Reading Research, *Reading Speed, Tachistoscopes, *Teaching Machines

ABSTRACT

The reading rates achieved by first graders taught reading by the Listen Look Learn (LLL) materials and procedures were compared to available norms of children who have had no instrument use as a part of their reading instruction. In the LLL program the Aud-X, Tach-X, and Controlled Reader Instruments were used to increase sight vocabulary, perceptual accuracy, and visual efficiency in order to affect reading rate as determined by the Controlled Reader dial setting. Data collected from a sample of 664 first-year LLL students indicated that these children read at rates beyond those reported for the norming sample and that reading rate achievement may be, in large part, a function of instrument use since rate increases appeared to be consistently related to LLL cycles completed. Cycles completed reflect the amount of instrument use to which the children have been exposed. The average reading rate attained with comprehension was 137.5 words per minute after 16-20 cycles of LLL instruction. Reading rate growth was more consistent for the children who read in small groups. Tables and graphs are included. (Author/DH)

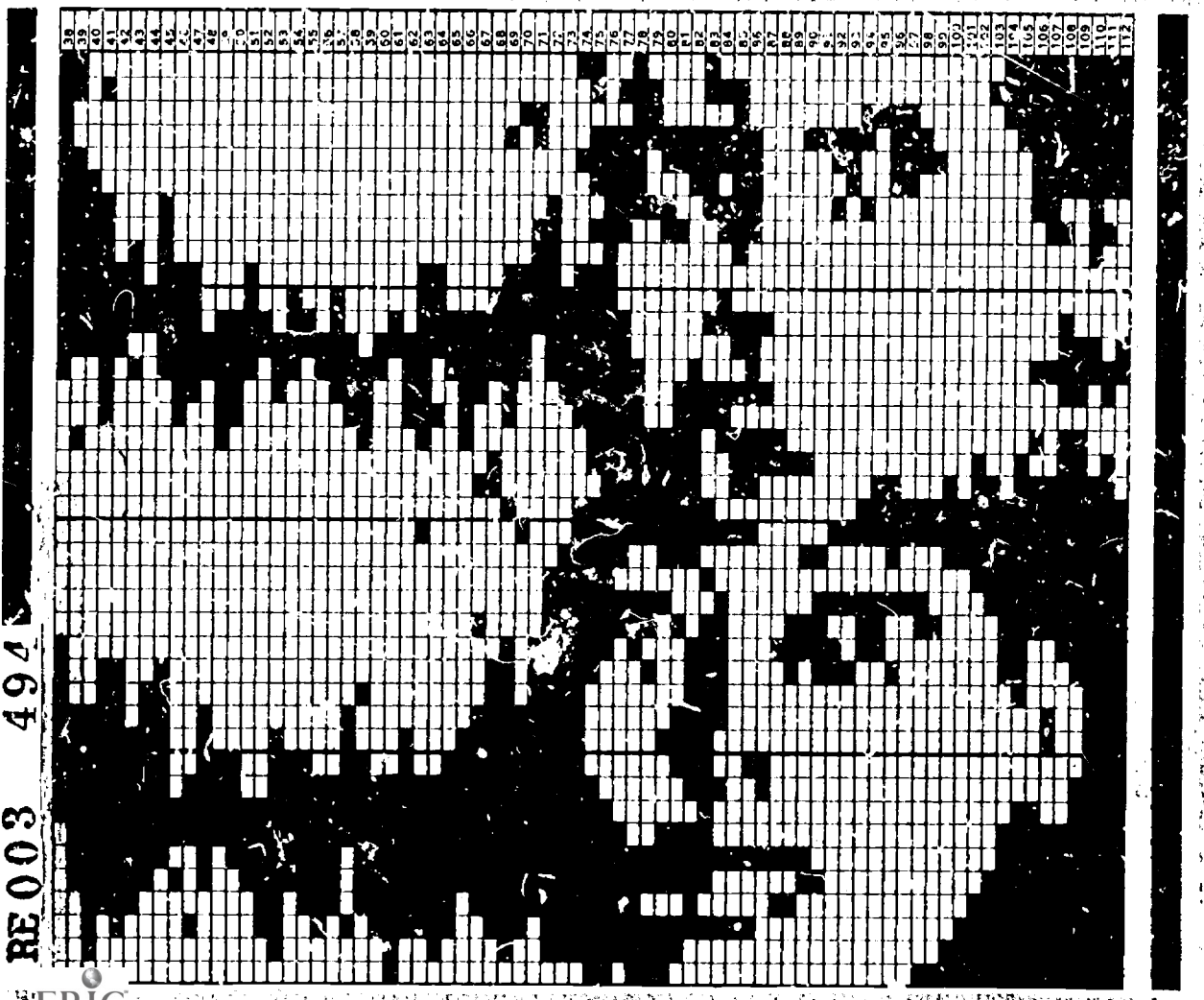
DL RESEARCH & INFORMATION REPORT

RE

No. 2

February 1969

Reading Rates Attained By First-Year LISTEN LOOK LEARN Students



Research and Information Report No. 2
EDL Research Department, February 1969

Reading Rates Attained By First-Year LISTEN LOOK LEARN Students

Ann Brickner, Ph.D.
LLL Research Coordinator

Donald R. Senter, Ed.D.
Research Director

EDUCATIONAL DEVELOPMENTAL LABORATORIES, INC., HUNTINGTON, NEW YORK
A DIVISION OF McGRAW-HILL

3-24-70 Printed in U.S.A. Order No. 380562

The Listen Look Learn multimedia system is a total communication skills program designed to be used with children in the primary grades. Inherent in the structure of this ungraded individualized approach to the reading process is the use of instrumentation.

The use of the instruments serves to create high levels of visual efficiency, perceptual accuracy, and an extensive sight vocabulary. Proficiency in these three skills is required before reading fluency can be achieved by a child.

The approach taken by the LLL system in developing reading fluency in young children should not be confused in any way with an attempt to develop speed readers. It can be assumed that a child enters school with the ability to communicate orally and to listen to others speaking at a rate of 125 to 175 words per minute. It can also be assumed that the rate at which a child thinks is beyond his speaking and listening rate. It should, therefore, be implicit in the design of any reading program to develop, as rapidly as possible, a reading fluency rate equal to the child's speaking and listening rates in order to return him to his usual rate of communication in reading situations. In fact, reading rates for children do not usually reach this range of 125-175 words per minute before mid-third to mid-fifth grade (see Table I). If the child could achieve a relative balance in speaking, listening, and reading rates, it is natural to assume that he might not only read more material but more rapidly learn to enjoy reading. So long as reading is a slow, bothersome process that cannot challenge his ability to assimilate patterns of meaning, he will not relate to it as an integral part of his ability to communicate.

At this point, it is important to consider the design of the LLL system and how the interrelation of the system parts develops reading fluency. Before a child can read at any consistent fluency rate, he must have a sight vocabulary large enough to allow him to read words in context rather than use a system of trial-and-error learning behavior on each word. The first segment of the skill-building portion of the LLL cycle is, therefore, the introduction of new vocabulary words with the Aud-X lesson. During the Aud-X lesson, the child acquires a larger sight vocabulary, learns word attack skills that will help him to understand additional words not in his sight vocabulary, and is introduced to additional experience building and comprehension skills. The second segment of an LLL cycle should include extensive practice with the Tach-X instrument. Words previously introduced by the Aud-X are flashed by the Tach-X at a rapid rate in order to drive down recognition time. Normally, children in beginning reading make about three eye stops per second (the average duration of fixation is approximately .33 seconds, see EDL Research and Information Bulletin No. 6). The goal of Tach-X training in the LLL structure is to develop each child's ability to recognize all taught words in less than .33 seconds, thus increasing his ability to recognize words more efficiently.

Many teachers have indicated that repetitive game activities with the Tach-X are very helpful. Children can, individually or as a group, call out words flashed on the screen. In this way, review of words learned in previous cycles can become an entertaining competitive experience rather than a session of rote learning. As children acquire writing skills this review can be expanded to include writing the tachistoscopically flashed word in addition to or rather than calling the word out loud.

During the Processing Training segment of the cycle, these same words are presented one word at a time on the same screen location in the form of reading selections to further drive down recognition time and to develop the ability to fuse words into units of meaning.

During the Controlled Reader exercises, the child has an opportunity to combine his perceptual accuracy and visual efficiency skills and use his sight vocabulary to read stories of an appropriate level at a fluency rate that challenges his word recognition and thinking ability.

The rationale of this approach is based upon the multimodal aspects of learning, upon the value to the child of word recognition, increased reading rate and motility training, and upon the value of careful, infinitely patient review for the individual child.

It must be assumed that any normal child, as he learns to rapidly recognize more words, will increase his eye-movement efficiency and, therefore, his reading efficiency. Several studies indicate that beginning readers make more eye fixations per line, more regressions per line, and fixations of longer duration than do more mature and experienced readers. As reading ability improves, reading rate is increased because a more efficient organizational attack or pattern is developed by the reader. A large scale norming study was sponsored by EDL in 1959 to obtain average reading rates for children at different grade levels. The data was collected by participating college and university personnel in nineteen states and in Canada. The total sample consisted of more than 12,000 children; 8,290 were students in grades one through six. Table I is a reproduction of a part of the norms established by this study (see EDL Research and Information Bulletin No. 3 for the complete study including procedural and sampling methods and complete results). Children who had previously had the opportunity to use any type of reading instrument training were not included in the sample.

To accurately assess the ability of an individual to read efficiently, eye-movement photography is used. Reading efficiency can, by this technique, be reflected in the number of fixations per line of reading, duration of fixation, span of recognition, and number of regressions made while a subject's eye movements are being photographed in the act of reading. Figure I is a reproduction of characteristic reading eye

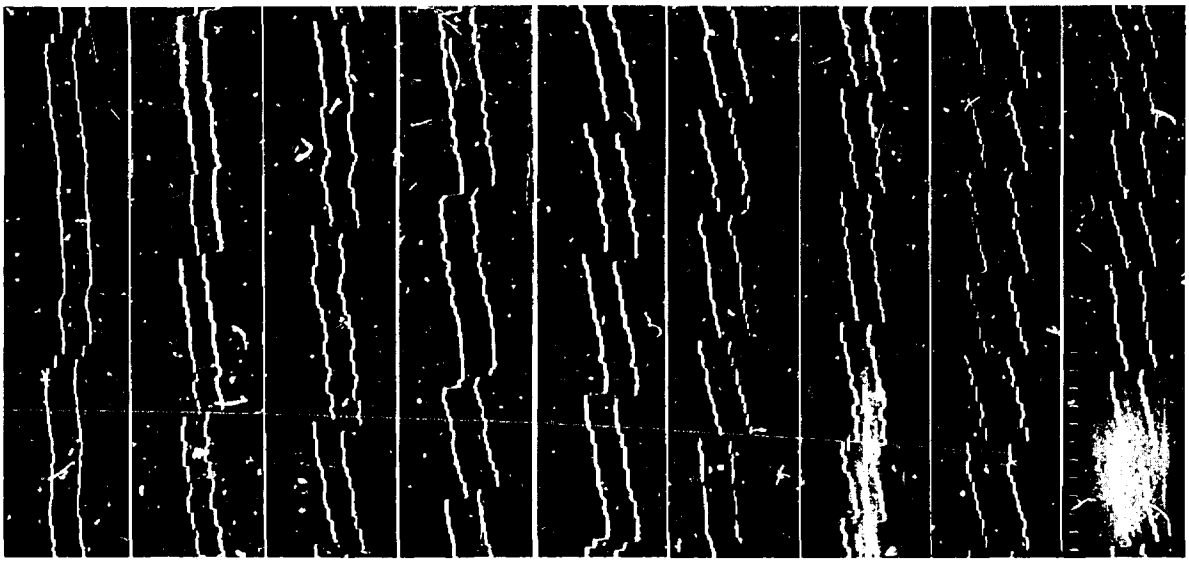
photographs for individuals in various grades reading materials appropriate for their ability and comprehension levels. For the purpose of this paper, it is important to note the general pattern of reading performance. A manifestation of a child's reading performance, his development of an efficient pattern of reading, is reflected by the rate at which he is able to read material with good comprehension and the extent and type of visual and perceptual ability he maintains during reading. As a student gains more experience, attains greater sight vocabulary, and develops perceptual accuracy and visual efficiency he will mature and become more efficient in the reading activity he employs.

TABLE I

AVERAGES FOR MEASURABLE COMPONENTS OF THE FUNDAMENTAL READING SKILL

Grades[a]	Number in Sample	Fixations (incl. regressions) per 100 Words	Regressions per 100 Words	Average Span of Recognition (in words)	Average Duration of Fixation (in seconds)	Rate with Comprehension (in words per minute)
1	1028	224	52	.45	.33	80
2	1185	174	40	.57	.30	115
3	1371	155	35	.65	.28	138
4	1453	139	31	.72	.27	158
5	1617	129	28	.78	.27	173
6	1636	120	25	.83	.27	185

[a] Averages were computed for first-grade children who were able to silently read material of rated difficulty of 1.8 with at least 70% comprehension. Above grade 1, averages were computed for students who silently read materials rated at mid-year with at least 70% comprehension.



The Maturation of the Fundamental Reading Skill

The above graphs show characteristic performances for the various grade levels. As an average pupil advances academically, the pattern reflects fewer fixations to the line, indicating a broadening of the span of recognition; shorter duration of fixation, indicating a more rapid reaction to the reading material; and a more rapid rate of reading. In general, the pattern becomes more regular and uniform, reflecting an increase in overall organization.[a]

Figure 1

[a] Reproduced from EDL Research and Information Bulletin No. 3

During 1967-68, reading rate data were collected for a sample of 664 first-grade children who had previously had at least seven months of instruction with the LLL system. This reading rate was determined by noting the Controlled Reader dial setting at which the child could read with good comprehension. The instrument can be accurately set to present material from 20 to 130 lines per minute. In Cycles 1-40 of the LLL system, Controlled Reader materials contain a range of 4.18 to 4.57 words per line. Reading rates were computed for the present study by multiplying the dial setting representing lines per minute by the number of words per line for the cycle selection at which the child was reading. The sample included children in low-, average-, and high-ability ranges as measured by the Pintner-Cunningham Primary Test, and from all socioeconomic levels which were represented in these public schools. Reading rates, determined by Controlled Reader settings, were collected for the cycle material the students were using in May, 1968. Mean or average rates were computed for these students at five cycle intervals and are reported in Table II. Means were then computed at ten cycle intervals and these data are given in Table III.

TABLE II

MEAN VALUES AVERAGED OVER FIVE CYCLES OF CONTROLLED READER READING RATES FOR CHILDREN WHO HAD USED THE LLL SYSTEM AS A FIRST-YEAR LANGUAGE ARTS PROGRAM

Cycles Completed[a]	Number of Children	Mean Controlled Reader Reading Rate (words per minute)
1-5	26	88.6
6-10	40	83.7
11-15	111	108.9
16-20	189	134.8
21-25	76	141.7
26-30	77	177.3
31-35	57	158.7
36-40	88	174.8
Total Sample =	664	137.5 = Average for Total Sample

[a] Data collected in May, 1968

TABLE III

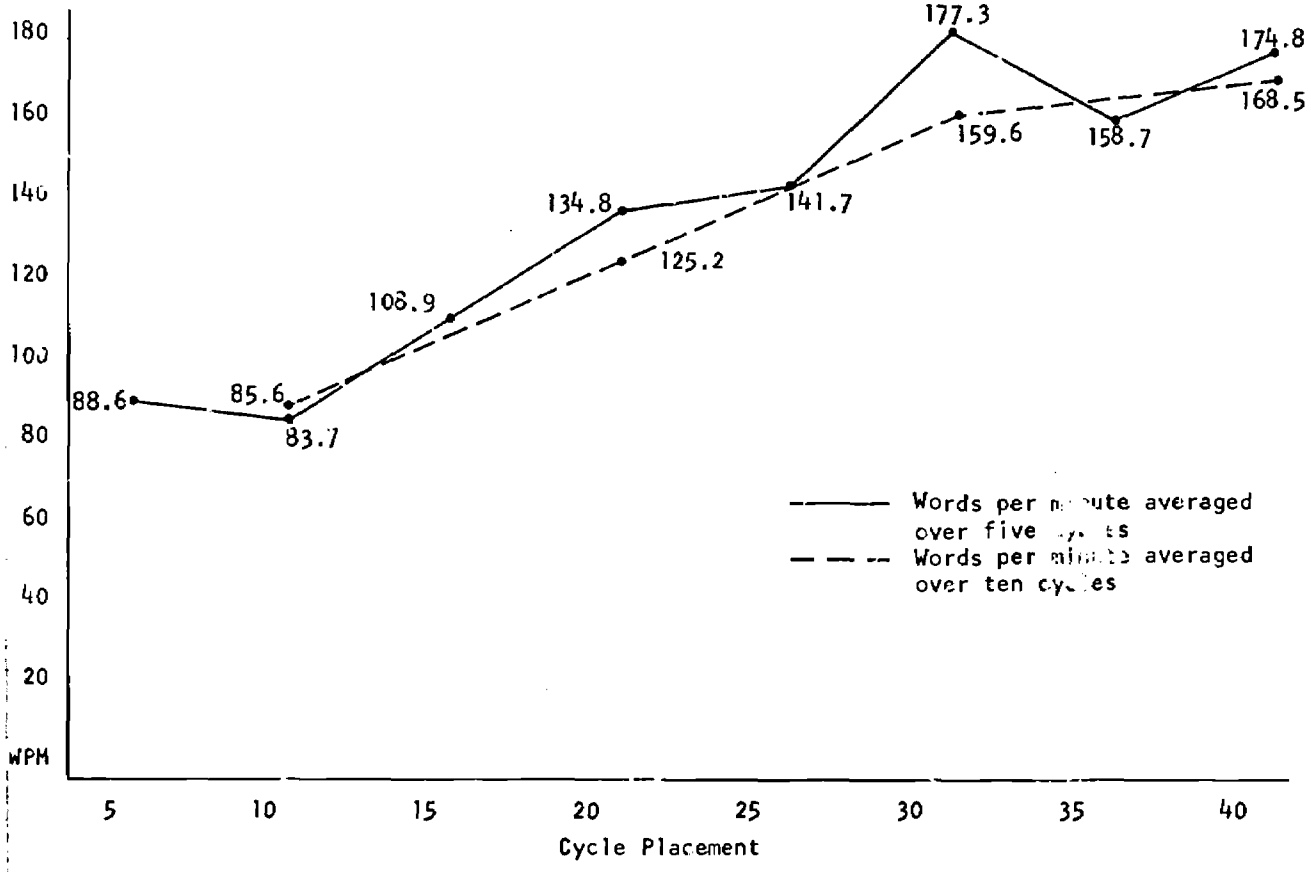
MEAN VALUES AVERAGED OVER TEN CYCLES OF CONTROLLED READER READING RATES FOR CHILDREN WHO HAD USED THE LLL SYSTEM AS A FIRST-YEAR LANGUAGE ARTS PROGRAM

Cycles Completed[a]	Number of Children	Mean Controlled Reader Reading Rate (words per minute)
1-10	66	85.6
11-20	300	125.2
21-30	153	159.6
31-40	145	163.4
Total Sample =	664	137.5 = Average for Total Sample

[a] Data collected in May, 1968

The average child in this sample completed 22.3 cycles of the LLL system during the 1967-68 school year and had an average reading rate of 137.5 words per minute. It can be assumed from schedule data received from the cooperating teachers that the average child had an opportunity to use the Tach-X and Controlled Reader instruments only once in each cycle of instruction. It can further be assumed that children who complete 40 cycles of instruction will have had instrument exposure more than once each week, but children who have completed only 20 cycles may have had access to instrument practice only once during a two-week period. This means that the recommended use of these instruments, at least one practice session with each instrument once each week, was not achieved by all students. As a result of the data collected, it can be inferred that more frequent and consistent instrument use could result in even higher levels of proficiency in the future. It can be argued that the use of the instruments to drive down recognition time and concurrently increase rates of comprehension could be of greatest value to the child in the initial learning stage. If he can quickly acquire the skills needed to read at rates near his speaking and listening rate, he will more easily integrate the act of reading into his behavioral pattern as a natural logical adjunct to his previously learned methods of communication.

Figure 2 is a graphical representation of the reading rates achieved by first-year LLL students as they progress through the cycle organization of the LLL system. Mean values were computed over five and ten cycle intervals. Since Controlled Reader selections are graduated in difficulty to correspond to the new sight vocabulary words and the new skills acquired by the child, the increased rates depicted by the graph may reflect, at least in large part, the influence of extended instrument practice. For example, children who have completed forty cycles have had at least forty Tach-X and Controlled Reader training sessions.



Reading Rates for 664 Children in First-Year LLL System Averaged Over Five and Ten Cycle Intervals.

Figure 2

It is of interest to examine specific research installations and the amount of individualization incorporated into the classroom schedule by the teachers. It can be assumed that teachers who tend to have fewer children in reading groups working at a particular Controlled Reader setting tend to be using the individualized aspect of the LLL system to best advantage.

Theoretically, each child will have a reading rate range within which he can successfully read. At the maximum of this range, he will be challenged but not to the point of frustration. At the minimum of the range, it is possible that he will be reading more slowly than his capabilities warrant. Thirty children in a classroom will theoretically have thirty reading rate ranges. The larger the number of children working together at a Controlled Reader, the greater will be the range of reading rates. The instrument must be set at a point that will allow the slower children within the group to read at a comfortable rate. If the reading group is large and, therefore, the range of rates is wide, the children who potentially could read at much faster rates may be reading at speeds well below their minimum level. Complete individualization can occur only with one child working at the Controlled Reader or with the Controlled Reader Jr., but satisfactory or adequate individualization can be accomplished if teachers limit group size and, therefore, limit the range of reading rate within the group.

It was of interest, for the purpose of this study, to test the stated theory that children working in smaller groups and, therefore, more nearly within their appropriate reading rate range, will actually increase their reading rates more quickly as they progress through cycles and do so in a more consistent manner. It is suggested by the EDL editorial staff that six or less students be included in these reading groups. All data returned from cooperating teachers were sorted according to reading group size during Controlled Reader practice. Mean values for reading groups of five children or less and for six children or more were computed. Table IV is a summary of these data.

This table must be examined with care in order to clearly understand which results are meaningful. In general, the larger the size of the sample in the column labeled "Number of Students," the more reliable is the average obtained. In Table IV, when the number of students is twenty or more, the average can be considered to be more reliable. Simple examination of mean or average reading rates for the smaller and larger groups indicates that children reading in small groups where more individualization of reading rates is possible show a more consistent growth pattern. Growth is less consistent for children working in larger groups where their individual growth is more restricted. There is an unusual drop in rate for children in larger groups in Cycles 31-35. This is a relatively small sample ($n = 20$) and eight of the children in one classroom were reading at a Controlled Reader setting of approximately 100 words per minute.

TABLE IV

MEAN VALUES AND VARIANCE OF READING RATES FOR CHILDREN IN SMALL AND LARGE GROUPS

Cycle Placement[a]	5 or Less Students per Group			6 or More Students per Group		
	Number of Students	Mean CR Reading Rate	Standard Deviation	Number of Students	Mean CR Reading Rate	Standard Deviation
1-5	6	78.8[b]	8.6	20	84.8[b]	6.8
6-10	12	95.0	9.5	28	86.4	0.0
11-15	64	111.7	9.9	47	101.2	10.[illegible]
16-20	69	132.3	12.1	120	137.6	15.3
21-25	30	148.5	17.5	46	139.9	14.4
26-30	39	178.1	14.2	38	177.2	17.8
31-35	37	188.1	17.2	20	114.8	6.6
36-40	26	204.3	19.6	62	142.8	13.1

[a] Data collected in May, 1968

[b] Average words per minute (dial setting multiplied by actual words per line in selections)

The standard deviations provided in Table IV are a reflection of how much dispersion (variance) occurred in the sample for the mean value. For example, at the cycle range of 36-40 cycles completed, the small-group category read at an average of 204.3 words per minute. The standard deviation for that sample of twenty-six children was 19.6 words [illegible]. This means that sixty-eight per cent of the children (approxima[illegible] eighteen children) read in the range of 184.7 to 223.9 words pe[illegible] This statistic (the standard deviation) is then a measure of the s[illegible] dispersion.

When the t-test is used to test the significance of differences between means, heterogeneity of variance, reflected in the column of standard deviations in Table IV, can be allowed (the normally used t-test is appropriate) if sample size is equal. In this study, however, both size of sample and size of variance are unequal. When this occurs, extreme care must be taken in accepting computed "t" values as being significant. It would be easy to accept a value as being significant when, in fact, significance has not been achieved. Unfortunately, this is not a well-known or often-mentioned aspect of the t-test. It occurs when sample numbers are unequal and if sample variance does not vary in the same manner (i.e., small sample size with small variance and large sample size with large variance). When these conditions occur the computed t-test value is far too liberal. For example, computed "t" values may be assumed from tabled values of "t" to be significant at a .05 level when, in fact, their level of significance may only achieve a .25 level. This means that the results could have occurred once in four times (.25) by chance rather than once in twenty replications of the study (.05). Therefore, in order to examine the reading rates obtained in as stringent a light as possible, obtained "t" values and "t" values adjusted for unequal sample size and unequal variance are provided in Table V. (This method is suggested by Edwards.[1])

Table V is a summary of the "t" values computed from each set of data. The small-group and large-group mean values were compared at every cycle range to determine whether they attained reading rates that were significantly different or whether the mean values differed by only chance amounts.

For the seven possible mean comparisons, four favored the small-group categories, two mean differences were not significant, and one favored the large-group category.

The purpose of this study was to examine the reading rates achieved by LLL children compared to available norms of children who have had no instrument use as a part of their reading instruction. It had been theorized that use of the Aud-X, Tach-X, and Controlled Reader instruments would increase sight vocabulary, perceptual accuracy, and visual efficiency to the extent that reading rate as determined by the Controlled Reader dial setting would be positively affected. Data collected from a sample of 664 first-year LLL students indicates that these children do read at rates beyond those reported for the norming sample and that reading rate achievement may be, in large part, a function of instrument use since rate increases appear to be consistently related to LLL cycles completed. Cycles completed in the LLL system reflect the amount of instrument use to which the children have been exposed. The amount of individualization of the program was determined for the purpose of this study to be manifest in the size of the Controlled Reader reading groups. It was found that reading rate growth was more consistent for the children from this sample who read in small groups. This difference significantly favored small groups rather than large groups in four of the seven comparisons.

[1]Edwards, Allen L., Experimental Design in Psychological Research, Revised Edition, Holt, Rinehart and Winston, New York, June 1966.

TABLE V

COMPUTED "t" VALUES AND "t" VALUES REQUIRED FOR SIGNIFICANCE FOR DIFFERENCES BETWEEN READING RATES FOR SMALL AND LARGE CONTROLLED READER GROUPS

Cycle Placement[a]	t-test Values Computed from Data	Required t-test Value[b] at .05 Level	Significance for Difference Between Means
1-5	1.57	2.06	
6-10[c]			
11-15	5.35	1.67	.05 favoring small group
16-20	2.63	1.66	.05 favoring large group
21-25	2.28	1.69	.05 favoring small group
26-30	.24	1.69	
31-35	23.05	1.70	.05 favoring small group
36-40	14.71	1.70	.05 favoring small group

[a] Data collected in May, 1968

[b] Corrected for unequal sample size and unequal variance as suggested by Edwards

[c] t-test could not be computed for this cycle range because there was no variance in the large-group sample.

It may be inferred from this study that instrumentation, if used to best advantage, can aid the child in attaining reading rates more nearly consistent with his speaking and listening rates. It can further be assumed that as these higher rates are attained, the child will integrate reading into his natural structure of communication skills.

Conclusions

1. For a sample of 664 children who used the LLL system, the average reading rate attained with comprehension was 137.5 words per minute as determined by Controlled Reader dial settings.

2. The average child achieved this reading rate after 16-20 cycles of LLL instruction.

3. It can be assumed that more opportunity for instrument use, a function of the cycles completed according to reports by teachers, contributed to this increase in reading rate.

4. Children who read in smaller groups, six or less, and, therefore, had more opportunity for individualization of rates, showed more consistent growth rates with respect to increased reading rate than did children in larger, less individualized reading groups.

5. When mean or average reading rates were compared for children reading in the defined smaller or larger groups, four of the seven possible comparisons favored the small groups and two comparisons yielded non-significant results.