DOCUMENT RESUME

ED 217 168 CE 032 582

AUTHOR Sticht, Thomas G.
TITLE Evaluation of the "Reading Potential" Concept for Marginally Literate Adults.
INSTITUTION Human Resources Research Organization, Alexandria, Va.
SPONS AGENCY Office of the Assistant Secretary of Defense for Manpower and Reserve Affairs (DOD), Washington, D.C.
REPORT NO HumRRO-FR-ETSD-82-2
PUB DATE Jan 82
CONTRACT MDA903-80-C-0588
NOTE 32p.

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS Adult Basic Education; *Adult Learning; *Adult Literacy; *Adult Reading Programs; *Adult Students; Aptitude; Learning Processes; *Literacy Education; Military Training; *Reading Instruction; Reading Skills

ABSTRACT

Three studies were conducted to determine the validity of the idea that adult literacy students have greater reading potential (and thus can learn in much shorter periods of time) than school children who score at comparable levels to the adults on standardized reading tests, and that adults are more efficient learners than such children. The results indicated that (1) marginally literate men (MLM) reading at the fifth grade level on a standardized reading test performed comparably to typical fourth and fifth grade students on tests of comprehension by auding and reading when the materials were presented at 128 words per minute; (2) MLM reading near the fifth grade level performed more poorly than typical fifth graders on tests of learning from audio-visual materials; (3) MLM showed approximately 0.5 to 1.0 years of reading potential on an auding and reading test; (4) MLM in a military job-related reading program of 6-weeks' length showed a median gain of 0.7 grade levels in general reading and 1.6 levels in job-related reading--there was no relationship of reading potential to gain. From these findings it was concluded that one should not assume that adult literacy students will perform better or learn more quickly than children at comparable reading levels. It was also decided, however, that adults learned job-related reading more quickly than general reading skills. (KC)

CE

Final
Report
82-2

HumRRO
FR-ETSD-82-2

HumRRO

Evaluation of the "Reading Potential" Concept for Marginally Literate Adults

Thomas G. Sticht

HUMAN RESOURCES RESEARCH ORGANIZATION
300 North Washington Street • Alexandria, Virginia 22314

January 1982

Submitted to:

Office of the Assistant Secretary of Defense
(Manpower, Reserve Affairs and Logistics)

In partial fulfillment of Contract No. MDA903-80-C-0588

PREFACE

The present report is one of a series resulting from research under Contract No. MDA903-80-C-0588 Evaluation of the Predictive Validity of the Literacy Assessment Battery (LAB). This research is sponsored by the Office of the Assistant Secretary of Defense (Manpower, Reserve Affairs, and Logistics), Directorate for Accession Policy. Dr. W.S. Sellman is the technical monitor for this work. The assistance of Drs. John S. Caylor and James H. James, and of Mr. Lawrence Beck in the collection and analysis of the data reported herein is gratefully acknowledged.

EXECUTIVE SUMMARY

BACKGROUND

This paper explores possible reasons for the fact that, in the United States, adult basic education programs in organizational settings are typically planned to be brief, concentrated programs in which years of lack of achievement are to be overcome by dint of intensive effort by teachers and learners.

Two basic beliefs regarding adult education were identified as underlying the use of brief, remedial literacy programs in adult basic education. On the one hand, our cultural conceptions of human resources development and utilization lead us to consider that childhood is the time when basic skills and the basic knowledge needed to apply these skills are to be developed, and the K-12 school system and curriculum is societies' instrument for bringing about this development of human resources.

Adulthood, then, is the time for the utilization of human resources. If people reach adulthood without developing what are thought to be requisite basic skills, then there is reluctance on the part of employers, in industry or in government, to provide extensive basic skills education because "that is the school's job".

Given the foregoing cultural orientation with regard to conceptions of human resources development and utilization, policymakers and industry and government managers are receptive to the use of brief, concentrated programs of adult basic education, primarily as stop-gap measures to contend with what are anticipated to be passing work force crises.

The use of brief literacy programs has been reinforced by the second belief examined in this study. This is the more-or-less common-sense notion that adult literacy students can acquire basic skills more rapidly than children in schools, due to their higher oral language skills and world experience, which gives adults higher "reading potential" than elementary school children. In turn, this belief is reinforced by the use of grade-school-referenced standardized tests that report gains in grade levels. Thus, when it is demonstrated that adults in a brief, concentrated program make one or two years gain in reading, this may be interpreted to mean that the adults learned as much in a few hours as children do both in and out of school in one or two years.

EVALUATION OF THE READING POTENTIAL CONCEPT

Three studies were conducted to determine the validity of the idea that adult literacy students have greater reading potential than school children who score at comparable levels to the adults on standardized reading tests, and that adults are more efficient learners than such children. The results indicated that:

- Marginally literate men (MLM) reading at the fifth grade level on a standardized reading test performed comparably to typical fourth and fifth grade students on tests of comprehension by auding and reading when the materials were presented at 128 wpm. Thus the oral language skills of the MLM did not exceed those of the children.

- Marginally literate adult men reading near the fifth grade level performed more poorly than typical fifth grade students on tests of learning from audio-visual materials presented for simultaneous auding and reading at rates of 228 and 328 wpm.
- Marginally literate adult men showed approximately 0.5 to 1.0 years of reading potential when administered an auding and reading test that was standardized and normed on children in the grade schools. Actual reading scores were at the fifth grade level while reading potential scores were in the upper fifth and lower sixth grade range.
- Marginally literate adult men in a military job-related reading program of six-weeks duration showed a median gain of 0.7 grade levels in general reading and 1.6 grade levels in job-related reading of the type being taught in the program. There was no relationship of reading potential to gain regardless of the students' entering reading skill levels.

CONCLUSIONS

These studies, though limited in number and types of adult literacy students and grade school children involved, suggest:

(1) One should not take the reading tests based on children in the school grades at face value when applied to adult literacy students. Adult literacy students who scored at the fifth grade level on a standardized reading test normed on children were not as effective and efficient processors of oral and written language as were typical fifth grade children like those on which the reading tests were normed.

(2) One should not assume that adult literacy students have greater "reading potential" than do grade school children who are at the grade level that adults score at on standardized tests. Marginally literate adults reading at the fifth grade level had auding scores that were also at the fifth grade level which, when converted to reading potential scores fell at the sixth grade level. This is far short of the 10th grade level, which represented the years of education completed by 80 percent of the adult literacy students.

(3) One should not expect rapid, large increments in basic literacy skills of adult literacy students in brief, concentrated programs of general literacy. Such programs require that adult students have a fairly high level of oral language skills for large gains to be rapidly made in general literacy.

However, in the research of Study 3, marginally literate adults in a job-related reading program made twice the gain in job-related reading that they did in general reading, suggesting that more rapid learning of particular types of reading will occur when training is specifically focused on that type of reading rather than on "general" literacy. Hence, if adult literacy students need to read "functional" materials more than academic textbooks, it would seem more efficient to provide direct practice in reading functional materials than in reading "college prep" materials. The reading grade levels of most standardized tests are derived from school children using academically-oriented texts and exercises that require highly developed language and analytic reasoning skills for successful execution. Such skills, applicable in a wide-range of situations, would seem to be difficult for adult literacy students to develop in brief, concentrated programs.

(4) The present results and conclusions are based on a very limited data base of comparative studies of children and adult literacy students performing a restricted set of school-like oral and written language tasks. How school grade children and marginally literate adults compare in the performance of oral and written language tasks needed for coping outside the school environment is not known. In fact, a literature search reveals that comparative studies of children and adults who are both learning language and literacy skills are practically non-existent. Yet many presuppositions regarding similarities and differences in how children and adults learn to read appear to influence decisions about how and what to teach adult literacy students, the "reasonable" amount of time to allocate for adult literacy programs, and methods of evaluating adult literacy development. The present research challenges some of these presuppositions. But much more research is needed to discover methods for adult literacy development that satisfy the cost-benefit requirements of labor market concepts of human resources development and utilization, and that build on valid understandings of the learning skills and capacities of adult literacy students.

TABLE OF CONTENTS

Evaluation of the "Reading Potential" Concept for Marginally Literate Adults

INTRODUCTION

Since the Revolutionary War the Armed Services have found it necessary to offer remedial literacy training to new recruits whose numbers fluctuate depending upon whether the country is in a period of mobilization or in a period of relative stability, as exists at present. Even now, however, the Military Services offer basic skills education to large numbers of marginally literate personnel. In FY 1979, for instance, the Services offered remedial literacy programs to some 160,000 personnel (Defense Audit Service Report No. 81-041), while this figure exceeded 200,000 in FY 1980 (Sticht, 1982).

Despite the long-term experience that the Services have had in delivering remedial literacy programs, there is still considerable controversy about the effectiveness of such programs (Sticht, 1982). Repeatedly, it has been found that while the Services' basic skills programs have typically made one or two "years" of gain on standardized reading tests, such outcomes have had little impact on the servicemember's subsequent performance in job technical skills training or on the job (Sticht, 1982). Similar conclusions hold for adult basic skills education programs conducted by various civilian institutions (Hunter and Harman, 1979; Weber, 1975; Ryan and Furlong, 1975).

It is not certain just why adult basic skills education programs, whether in the military or civilian sectors of society, seem to achieve so little and yet are turned to so often by military and social program managers. However, there seem to be a set of common assumptions about adult illiterates or marginal literates that may account, in large measure, for why the programs are like they are, why they are turned to, and why they often achieve so little. This paper reviews some of these assumptions about adult marginal literates and presents the results of several exploratory research studies that assess the validity of these assumptions.

ASSUMPTIONS ABOUT MARGINALLY LITERATE ADULTS AND HUMAN RESOURCES DEVELOPMENT

A major feature of most adult literacy programs conducted by the military, human resources development programs in industry, job skills upgrading schools, and similar organizational settings, is their brevity. In the military, remedial literacy programs are typically three to six weeks in duration, permitting some 100 to 200 hours of instruction. The length of such programs appears to be based on two sets of beliefs, one socio-economical that reflects societal concepts of human resources development and utilization, and the other psychological that reflects beliefs about adult illiterates and marginal literates as learners.

CONCEPTS OF HUMAN RESOURCES DEVELOPMENT AND UTILIZATION

The brevity of adult basic education programs in the military and other organizational settings appears to reflect, in part, labor market economist's conceptions

of human resources development that place a cost/benefit utility on education. From a labor economist's perspective, 12 years of public schooling are allocated to the development of people, who are then available to be utilized as part of the work force. In this approach, schools develop people, and employers utilize people. Ginzberg and Bray (1953) illustrated this point of view among senior Army staff some 30 years ago in reporting Army doctrine that "Education is not a primary function of the Armed Forces. Armies in democratically organized nations with an industrial economy must utilize in an emergency, personnel with a general educational level which civilian educational systems have produced." (p. 210).

In 1977, the Congress of the United States reaffirmed the position of the Army senior staff of the early 1050s when both houses expressed ". . . considerable concern over the implications of attempting to correct educational deficiencies (of military personnel) with programs that require school attendance during duty hours . . . (The Congress went on to express the belief that) ". . . more effective use of these (education) monies would result from programs that emphasize basic educational skills prior to enlistment." (Congressional Record, August 4, 1977, PH8742).

With respect to the development of basic skills in our society, the prevailing view appears to be rooted in labor market concepts of human resources development and utilization that lead to brief programs of adult basic skills education because:

(1) Our economic system allocates childhood and youth as times for human resources development, and provides the K-12 education system as the primary means for literacy and other cognitive skills development.

(2) As adults, however, the economic focus is upon the utilization of human resources for productive work.

(3) Investment in adult literacy development in the military or other work organizations is counted against productivity because it places people in a training rather than a production position.

(4) Because the improvement of adult literacy skills requires an investment in human resources development beyond the K-12 years and curriculum, programs of adult literacy development are eschewed and, when implemented, are considered as "remediation" rather than development. They are expected to be of limited duration, fast-acting, far-reaching, and to bring about improvement not only in literacy skills, but in job performance, parenting, community participation, etc., etc.

CONCEPTS OF ADULT MARGINAL LITERATES AS LEARNERS

The press for brevity in adult basic skills programs due to labor market economic concepts of human resources development and use held by military and other organizational managers is reinforced by the willingness of many to offer such programs on the strength of beliefs that adults can and will learn at much faster rates than children in the school system. This belief is frequently supported by statistics that show that adult literacy students in a particular program make one, two, or even more "years" of gain in reading in as few as 14, or 50, or 100 or so hours of instruction (Sticht, 1982). Thus, what the typical child in the public school system requires up to two years to learn, the adult illiterate is said to learn in just a few hours. How can this be so?

Rather than suspecting the psychometric tests and procedures by means of which improvement in reading is assessed in adult basic skills programs (in which in most cases a year or two of "learning" can be achieved simply by answering three to five items correctly), the common assumption seems to be that, if adult literacy students score at a given grade level on a basic skills test, then the adult student is probably just as proficient, or more so, in that skill, as the student in the grade school who scores the same as the adult. If an adult literacy student scores on a reading test at the fifth grade level, the assumption may be made that the adult can now perform fifth grade literacy tasks as effectively and efficiently as can a typical fifth grade child.

The "Reading Potential" Concept. The belief that adult marginal literates can make rapid increases in literacy is frequently expressed in textbooks for adult literacy teachers. For instance, in their textbook entitled *Teaching Reading in Adult Basic Education*, Bowren and Zintz (1977) state:

> "Since his experiences are much broader, the adult nonreader generally has more words in his oral vocabulary that can be converted to the reading vocabulary than does the child non-reader. This is one of the reasons that the reading skills may be taught more quickly to adults than to children." (p. 61)

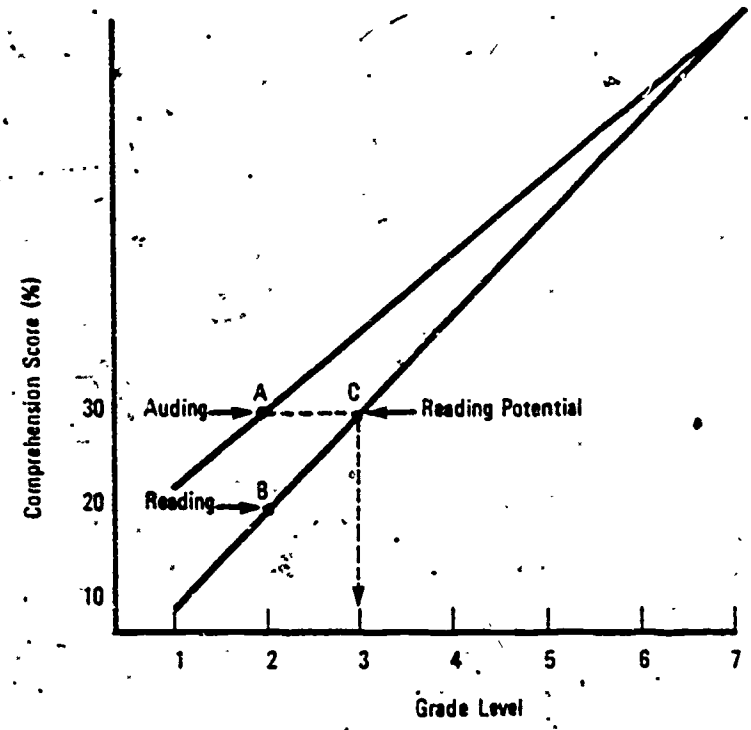
The presumed higher capability in oral language of marginally literate adults as compared to grade school children is said to provide the adult with a higher "reading potential". Therefore, it is possible for adult marginal literates to make more rapid increases in learning to read as they close the "gap" between what they can already comprehend in oral language and what they can comprehend in the written language.

The reading potential concept mentioned above is central to the issue being explored here as to why it is believed that marginally literate adults can make rapid progress in brief literacy programs. The reading potential concept states that, in the typical case, people first develop vocabulary and comprehension skills by means of the oral language skills of auding[1] and speaking. Then, when they begin to learn to read, they learn to comprehend by reading what they previously could comprehend only by auding. Stated otherwise, in the typical case of the person who is learning to read, he or she will begin training with a relatively large capability of comprehending the spoken language. In learning to read, one of the person's major tasks is to learn to comprehend the printed form of language with the same accuracy and efficiency as he or she comprehends the spoken form of language.

Because people typically learn to comprehend language by auding before they can comprehend it by reading, it is possible to consider that, in learning to read, they "close the gap" between the auding skill and the reading skill, both of which permit them to comprehend linguistic message displays. This process is illustrated in Figure 1, where it is seen that, at the beginning of schooling, children can comprehend language better by auding than by reading. As they progress through the school grades, they acquire more and more skill in reading, and eventually close the gap between auding and reading skills.

In the reading potential concept, a person's capabilities in auding are considered to establish a potential for reading. In Figure 1, the auding curve represents, at each grade level, the level to which reading skill would rise if, by some magical process, the

[1] Auding is a word coined by Brown (1954) to name the special kind of listening we do when we listen to speech. Just as reading is a special kind of looking, i.e., looking at printed language to get meaning, auding is a special kind of listening: listening to spoken language to get meaning.



A — Indicates the normative auding score for the 2nd grade, called auding at the 2nd grade level.

B — Shows the normative reading score for the 2nd grade, called the 2nd grade level.

C — Shows conversion of the normative auding score to a reading "potential" score by drawing a horizontal from A to intersect with the reading curve, and then dropping a perpendicular line to the abscissa.

The example shows a reading potential score of 3rd grade.

Thus, the case illustrated shows a person auding and reading at the 2nd grade level, with a reading potential score of 3rd grade level.

Figure 1. **Schemata Showing Relationships Among Auding and Reading Comprehension Scores as a Function of School Grade Level**

person could be instantly taught reading decoding skills. Thus, if a person was very unskilled in auding, his or her reading potential would be said to be low, being limited by poorly developed oral language skills. On the other hand, persons highly skilled in auding would have the potential to become highly skilled readers, and in a relatively brief time. This is because reading comprehension would be limited mostly by fairly simple-to-learn decoding skills rather than by the more difficult-to-teach and-to-learn language comprehension skills and knowledge (vocabulary; concepts).

Figure 2 contrasts the reading potential concept as it may be considered for children versus marginally literate adults. In the hypothetical case illustrated in

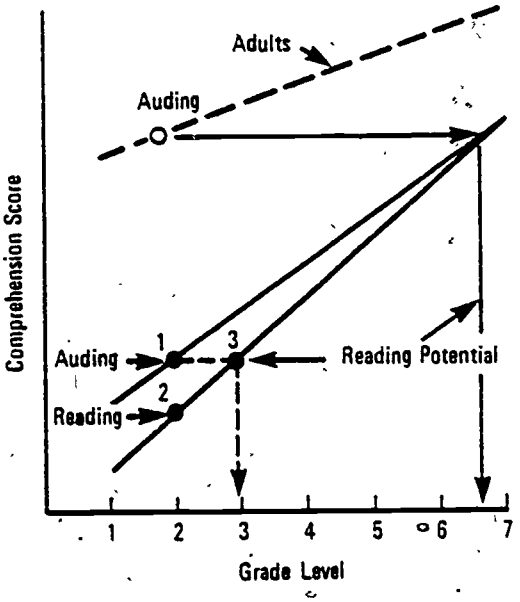


Figure 2. **Comparison of the Reading Potential Concept Applied to Marginally Literate Adults and to School Children**

Figure 2, a child who reads at the second grade level has a slightly higher auding score that translates to a reading potential grade score of third grade. The top dotted line illustrates the auding score as it might be assumed for adult basic skills students. For an adult student scoring on a reading test at the second grade level, a fairly high level of skill in oral language comprehension is assumed, which in the case illustrated, translates into a grade 6.5 reading potential level. Thus, the adult reading at the second grade level is thought to have over four times the reading potential (6.5–2 = 4.5 grades of reading potential) of the second grade student (3–2 = 1 grade of reading potential).

Coupled with the concepts of human resources development and utilization discussed above, in which it was noted that there is reluctance to commit resources to adult basic education in our society because the culturally accepted appropriate time for literacy development is the school years of K-12, the idea that marginally literate adults have high reading potential may lead policymakers and manpower program administrators to suggest that brief programs of remedial literacy can be instituted to relieve problems of job skills training and job performance that arise due to the necessity of having to use marginally literate personnel. These expectations may frequently be reinforced by adult educators who, holding the concept of reading potential discussed above, assure management that it is reasonable to expect that adult basic skills students can achieve one, two, or even three or more "years" of growth in basic skills in brief, three to 12 week courses.[1]

[1] In one adult basic skills program, teachers' estimates of how much gain students would make in the six-week, six-hour per day program went as high as 3.5 years for general reading and 4.8 years in job-related reading, estimates that were 2 to 3 times the actual measured gains (Sticht, 1975, pp. 137-138).

Because of the centrality of the concept of the reading potential of marginally literate adults to the formulation of human resources development and utilization policy and the conduct and evaluation of adult basic education programs, it has seemed useful to examine the reading potential of children and marginally literate adults empirically. This report presents the results of two different approaches to the study of the reading potential of adult literacy students. In one approach, the performance of children in grade school on measures of oral and written language comprehension skills is compared to that of adult literacy students to determine if the latter do, indeed, show greater reading potential than do the children. In a second approach, reading potential scores were derived and compared to the amount of improvement the adult literacy students made in a six-week literacy program conducted by the U.S. Army. The aim here was to determine if those literacy students with the greatest reading potential achieved the greatest gain in the literacy program.

It should be noted at the outset, however, that the methodology for assessing reading potential is in its infancy. Hence, the research reported herein is considered as exploratory and should be regarded more for its potential than for its specific results.

STUDIES OF THE READING POTENTIAL CONCEPT WITH CHILDREN AND ADULTS[1]

The studies to be described here are concerned with the comparison of auding and reading task performance of children and adult literacy students. Two studies will be discussed that reveal differences in the information processing skills of marginally literate adults and children. Next, a study will be described that explores the relationship between reading potential and achievement in an adult literacy program.

AUDING AND READING SKILLS OF CHILDREN AND MARGINALLY LITERATE ADULTS

Study 1. The effect of presentation method on the retention of prose material by children and adult literacy students.

In this study, grade school children and students in an adult literacy program were compared with respect to how well they remembered information presented either in spoken or written form.

Method

Subjects

A group of 27 marginally literate men (MLM) enrolled in an experimental literacy program at Fort Ord, California participated in the study. The average reading grade level of ability for these MLM was 5.5, with individual scores ranging from 3.4 to 7.4. The elementary school children participating in the study were attending a middle-class, California elementary school. Eighteen children who were reading at grade level were drawn from each of the third, fourth, and fifth grades. Of these 54 elementary school children, 29 were female and 25 male.

[1] Drs. John S. Caylor and James H. James, and Mr. Lawrence Beck contributed in a variety of ways to the accomplishment of these studies.

Materials

A narrative prose passage, titled Roland, served as the to-be-retained material. This passage was 2,807 words in length with a Dale-Chall readability level of 5.4, and was taken from a study by Clark and Woodcock (1967) in which an audio-taped version of the Roland story was produced as a standard listening passage for research purposes. Both the taped and printed copies of the passage were used. For the present research, the Roland passage was divided into three approximately equal sections—one to be read, another auded, and the remaining simultaneously read and auded. For each section, a 15 item, multiple-choice (memory for detail) exam was constructed using the questions prepared by Clark and Woodcock plus three items prepared for this study.

A Wollensack tape recorder, model 1520, was used for the tape presentation, in which a speech rate of 128 wpm was used. In the reading conditions, time limits on the reading of the material were controlled by a stopwatch.

Procedure

A repeated measures design was used allowing each student to be tested for retention after being presented with the material for auding, reading, and combined auding-reading. Counterbalancing of the order in which the students encountered the three methods of presentation (auding, reading, combined auding-reading) and also the pairing of presentation (auding, reading, combined auding-reading) and also the pairing of presentation method with parts 1, 2, and 3 of the story was employed. When the material was presented for reading, the reading time was kept equal to the time needed to present the material for auding. These procedures were introduced to make sure that differences in retention scores would not reflect differences among the three parts of the story, the questions accompanying these parts, or the amount of time allowed for presentation.

Instructions were brief and similar for all students. They were told that the examiner was involved in developing new procedures and materials for assessing reading ability, and that their cooperation was essential to this endeavor. They were asked to pay strict attention to the story since they would be required to answer questions about it.

The students then were presented with part 1 of the story. Immediately following the end of part 1, the students responded to the first set of test questions. This was followed by the presentation of part 2 of the story and subsequently its questions, and finally part 3 and its questions. All testing was in the combined auding-reading mode.

Results

The retention scores (mean percent correct) are presented in Table 1. An overall analysis of variance was performed on the elementary school children's retention data. Here, METHOD OF PRESENTATION proved to be a significant source of variance, $F(2,102) = 26.870$, $p. < .01$. For the three grade levels combined, retention was greatest with the combined Auding + Reading presentation, intermediate with the Auding presentation, and poorest with the Reading presentation, or, A + R > A > R. The only deviation from this scheme, occurring within a grade level, was found with the fifth grade students with A + R = A.

The GRADE LEVEL factor also proved to be significant, $F(2, 51) = 17.127$ $p. < .01$, indicating that overall, the fifth grade children retained more information than the fourth grade children who in turn retained more than the third grade children. As seen in Table 1, this relationship held regardless of the method of presentation used.

Table 1

Comparison of Auding and Reading Performance of School Children and Marginally Literate Men (MLM)

(Entries are Percent Correct)

Mode of Presentation	Reading Ability Groups			
	Grade Levels			MLM
	3.6[a]	4.6[a]	5.6[a]	5.5[b]
Reading	43	60	69	71
Auding	52	71	84	68
Aud & Read	62	80	84	78

[a]Children in the 6th month of the 3rd, 4th, or 5th grades.
[b]Reading ability level measured by a standardized test.

The MLM data were analyzed separately. As with the children, METHOD OF PRESENTATION was a significant source of variance (repeated measures analysis) $F(2, 52) = 4.81$, $p. > .025$. Here, performance varied with method of presentation in the following way: $A + R > R > A$.

A major difference between the performance of the elementary school children and the MLM is found with the auding vs. reading comparison. While the children, at all three grade levels, retained substantially more information after auding the material as opposed to reading it, this was not the case with the MLM. For these students, retention was slightly better when the material was read. Another point of interest is the finding that, when required to read the material, the MLM performed like the fifth grade children.

Figure 3 presents a graphic plot of the auding and reading data for the children and marginally literate men and also includes data subsequently obtained using more highly literate Army personnel (reading grade levels exceeding grade 11). The data indicate that the MLM resemble the HLM in the pattern of their scores (reading better than auding), though the MLM are more like the fifth grade students in terms of the amount recalled in the retention test.

In this study, then, the grade school children appear to show reading potential (auding better than reading) while the marginally literate men and highly literate men seem to be reading at (MLM) or beyond (HLM) their "potential" (their auding scores are lower than their reading scores). However, the latter data must be regarded with some caution inasmuch as the high literacy men actually performed less well on the auding task than did the fifth grade children, suggesting that extraneous factors other than modality of presentation may have interferred with the auding testing of the high-literacy group, e.g., lack of attention, interest, etc.

An interesting finding from Table 1 is that the third, fourth and MLM groups performed best under the combined auding and reading task. Why this is so is not clear, although it may occur as an attentional phenomenon in which, given two displays of the same message, the probability that the individual will attend to the message is

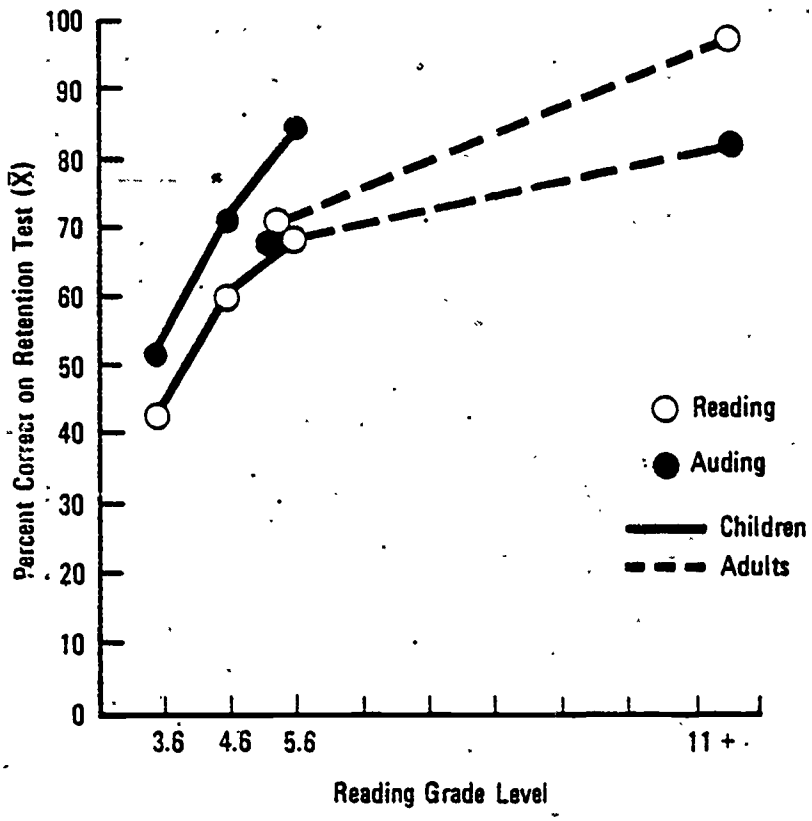


Figure 3. Comparisons of Retention of Prose Material by Children and Marginally Literate Men and Highly Literate Men

increased, and hence learning will be increased. Whatever the basis for this finding, the results suggest that the combined auding and reading task produces the most sensitive measure of how much children or marginally literate adults are likely to learn from a narrative passage such as used in this study. This simultaneous reading and auding task was therefore chosen to further explore similarities and differences between children and adult literacy students in a second study.

Study 2. The effects of the rate of presentation on the retention of prose material by children and adult literacy students.

The preceding study indicated that, when presented with materials of a fifth grade readability level, marginally literate men (MLM) reading at the fifth grade level performed very much the same as fourth and fifth grade students on tests of information retained after combined auding and reading of the material. In that study, the rate of presentation of the auding message was 128 words per minute (wpm). This is a rate of presentation comparable to the reading rate of typical second graders, in the late spring, who are reading silently with 70 percent comprehension (Taylor, 1964).

Using Taylor's data as a standard, the rate of presentation used in Study 1 would appear to have been well within the capability of both the grade school students

and the MLM. It is reasonable to ask how well the MLM compare with grade school students when the rate of presentation is increased. It might be expected that, whereas the MLM retain about as much as the fourth-fifth grade students after combined auding and reading at 128 wpm, they could actually achieve the same level of retention at a faster rate, because adults are typically more rapid at cognitive activities than are elementary school age children (Gibson, 1968; Comali, 1970). Thus, one might conjecture that the MLM are more efficient processors of the information in the message, even though their maximum level of retention is no greater than that of the grade school children.

Method

Subjects

Two groups of marginally literate men (MLM) were used. One group consisted of men reading below the sixth grade level (n = 18; $\bar{X}$ RGL = 4.6), the second group consisted of men reading at and above the sixth grade level (n = 17; $\bar{X}$ RGL = 8.0). All MLM students were enrolled in the same Fort Ord, California experimental literacy program that was included in Study 1. A third group of students was made up of fifth grade children reading at grade level, who were enrolled in the same middle class elementary school of Study 1 (n = 25).

Materials

Two taped narrative passages, and printed copies of these passages, were used. These passages were taken from a study by Clark and Woodcock (1967) where the tapes were constructed as standard listening passages for research purposes. The first passage, titled Marco Polo, was 1,053 words in length and had a reading difficulty level of 5.5 as measured by the Dale-Chall (1948) readability formula. Accompanying this passage was a 10-item multiple-choice test requiring memory for details. The second passage, titled Roland, was 2,807 words in length with a Dale-Chall readability level of 5.4.

For the present research, the Roland passage was divided into three approximately equal sections. For each section, a 15 item, multiple-choice retention (memory for detail) test was constructed using the questions prepared by Clark and Woodcock, plus three items prepared for this research.

The speech rate of the tape recorded passages was altered through use of an Eltro Information Rate Changer. This process resulted in a speech rate of 128 words per (wpm) for the Marco Polo passage; 128 wpm for the first section of the Roland passage; 228 wpm for the second section; and 328 wpm for the third section. A Wollensak tape recorder, model 1520, was used for tape presentation.

Because very fast rates of presentation were to be used in the present study, there was concern that students might just ignore one or the other modality in the combined auding and reading task, i.e., they might simply aud and ignore the reading passage or vice versa. To stimulate attention to both the auding and reading materials, a special modification of the materials was made that resulted in what was called a "tracking" task. This modification consisted of the insertion of semantically reasonable alternative words into the original text at various points. The following is an example of a sentence as it stood in the original text and that same sentence following modification:

ORIGINAL — With the air of a lord he walked towards the Emperor's table.

prince

MODIFIED — With the air of a king he walked towards the
lord

Emperor's table.

By grouping a pair of alternative words with a correct word at points throughout each story, the tracking items were created.

The location of these tracking items within a story was determined on the basis of two requirements. First, an original (correct) word could be chosen as the location for a tracking item only if it was replaceable by two alternative words such that either replacement would provide a semantically meaningful link in the story itself. Secondly, a minimum number of words (15) had to separate this item from surrounding items. The first requirement eliminated the possibility of the correct word being guessed (with a frequency greater than chance) on the basis of grammatical or semantic cues, while the second requirement precluded a clustering of these tracking items.

The modified Marco Polo passage contained a total of 15 tracking items, while the first, second, and third sections of the Roland passage contained 20, 15, and 10 items, respectively. The number of items was systematically decreased as the speech rate was increased so that students could recover attention between circling responses before encountering the next item.

Procedure

As in Study 1, students were told that research was underway to develop new methods for assessing reading ability and that their cooperation was essential to this endeavor. They were told that two taped stories would be supplied with printed copies of these stories to allow them to read along with the taped presentations.

Printed copies of the Marco Polo story were then given to the students and their attention was directed to the tracking items. The examiner explained that only one of the three words contained in each item would be used in the taped presentations which they were to hear, and that their task would be to circle those words on the printed text as they heard them on the tape. The examiner then read aloud the first sentence containing a tracking item, using the correct word only in this reading. The students were required to circle the tracking item, and their performance was monitored to insure that all of them understood this task. The Marco Polo tape was then played, and following it, the students administered the retention test. This procedure was used as a warm-up period to familiarize the students with both the tracking task and the retention test.

The three sections of the Roland story were then presented with the story being interrupted at the end of each section to allow for the administration of that section's retention test. Between parts 1 and 2 and 2 and 3, students were advised that the speech rate of the taped passage would be increased.

During retention testing, students were provided with printed copies of the test at the same time that the examiner read aloud each question and its four possible answers. The entire testing procedure lasted approximately one hour.

Results

Figure 4 presents the results of both the tracking task (Part A) and retention test (Part B) at each speech rate for each of the three student groups. A separate SPEECH RATE x SUBJECT GROUP analysis of variance was performed with each of the two

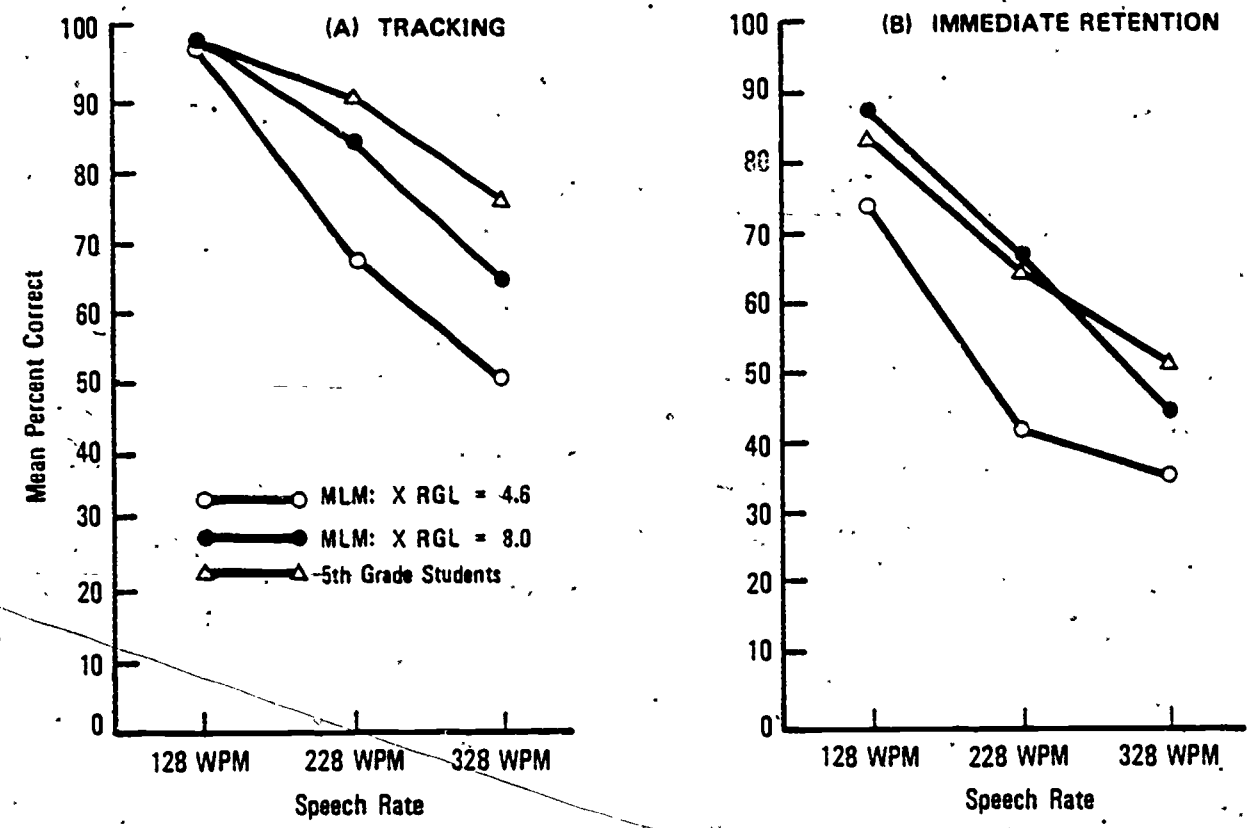


Figure 4. Mean Percent Correct on Tests of Tracking and Immediate Retention at Three Speech Rates for 5th Grade Students and Two Groups of Marginally Literate Men (MLM)

measures (tracking and retention). In both analyses, the speech rate and subject grouping factors were found to be significant sources of variance ($p. > .005$).

These significant effects are readily seen in Figure 4. With the tracking measure (Figure 4A), the effect of the increases in speech rate was a decrease in the accuracy of tracking performance for all student groups. Also apparent in Figure 4A is that the degree of this decrease in performance accuracy was a function of the student grouping variable.

At the 128 wpm rate, all groups were performing with near perfect accuracy. At the 228 wpm rate, the fifth grade children (91%) were outperforming the MLM reading at the eighth grade level (84%) who in turn were outperforming the MLM reading at the 4.6 grade level (67%). This same rank ordering of subject groups is found at the 328 wpm rate where the performance levels of these three groups were approximately 13 mean percentage points apart (76% vs. 64% vs. 50%).

With the retention measure (Figure 4B), the overall effect of the speech rate variable is the same; performance declines as the speech rate is increased. The effect of student groups on this measure is slightly different from that found with the tracking measure. Here, the fifth grade children and the MLM reading at the eighth grade level achieved highly similar performance levels. But, as with the tracking measure, both these groups outperformed the group of MLM reading at the 4.6 grade level.

Discussion of Studies 1 and 2

The results of Studies 1 and 2 are contrary to the expectation that adult literacy students have greater reading potential (i.e., auding greater than reading skills) than do children in grade school, as suggested by the hypothetical graphs in Figure 2. In fact, although the reading potential concept was accurate for the grade school children in grades three, four, and five, in showing auding better than reading, the reverse was found for marginally literate adults reading at the fifth grade level, indicating that information processing in both oral and written language modes was low for the adults studied.

Study 2 indicated that a group of fifth grade students was more effective than a group of adult literacy students of a comparable reading level, as measured by a standardized test, in tracking and remembering a message presented in a combined auding and reading mode at speech rates of 228 and 328 wpm. These data suggest that, contrary to prevailing understandings[1] about the learning skills of literacy students in adult basic skills programs, such students may not be as efficient at learning as are typical grade school children. Many adult literacy students may actually require more time to acquire higher levels of literacy than the time required by typical school children of comparable tested reading levels to advance to the same higher levels of literacy. Again, however, it should be noted that the present work is too limited in scope to permit firm conclusions.

Study 3. Reading potential and achievement in an adult literacy program.

The objective of the present study was to determine the relationships among reading potential scores and improvement in reading skills due to participation in an adult literacy program. As mentioned earlier in this report, one assumption that may underlie the implementation of brief adult basic skills programs is that adult literacy students have fairly highly developed speaking and auding language skills, compared to grade school children. Consequently, adult literacy students can be expected to make rapid progress in acquiring literacy skills. In this case, brief programs can be productive of large gains, relative to the gains made by school children in the school system.

Although the results of Studies 1 and 2 did not support the foregoing assumptions regarding the oral language skills of adult students, the conclusions of those studies were limited by the methodology used to assess reading potential. In those studies, reading potential was assessed using experimental materials having little (known) generalizability. To overcome this limitation, the present study used a commercially available, standardized, and nationally normed test to assess differences in auding and reading comprehension. This test permitted the derivation of reading potential scores as defined in Figure 1. Using this instrument, research was conducted to (1) determine the reading potential of a sample of adult literacy students in relation to national norms for reading potential of grade school children, and (2) determine the relationship between reading potential and achievement in an adult literacy program.

[1] Regarding learning skills of adults, Bowren and Zintz state "Their life experiences give them considerable advantage over children. A dull adult with an IQ of 85 (below average) may learn considerably faster than a child of six or seven with average ability." (1977, p. 293). A decade earlier Wallace stated that "Adults have better visual perception than children, larger speaking and listening vocabularies than children, and they know a good deal more about the world than children. . . . Such people coming to class with a new motivation for reading can learn very quickly . . ." (1965, p. 74).

Method

Subjects

The subjects consisted of 61 male students enrolled in the same experimental literacy program participating in Studies 1 and 2. As determined by the United States Armed Forces Institute (USAFI) Intermediate Achievement Test administered upon entry into the literacy program, the average reading grade level of the students was 5.3 with a standard deviation of 1.3 years.

Materials

There were three measurement instruments used in this study. Two of these were reading tests used for pre- and post-test summative evaluation of the improvement in reading skills that students gained as a consequence of participating in the experimental literacy program. These tests included the United States Armed Forces Institute (USAFI) Intermediate Achievement Test and the Job Reading Task Test (JRTT) that was specially designed to evaluate the outcomes of the job-oriented literacy programs (Sticht, 1975). The third test, the Durrell Listening-Reading Series, was used to assess reading potential (Durrell and Brassard, 1970).

The USAFI Intermediate Achievement Test is an Army printing of the Metropolitan Achievement Test published by Harcourt, Brace, and World, Inc. (1968). The USAFI test assesses vocabulary word knowledge, paragraph comprehension, and arithmetic computation. In the present work only the paragraph comprehension subtest was administered. Raw scores were converted to reading grade level (RGL) scores using the published norms given in the examiner's manual.

The Job Reading Task Test (JRTT) is a specially developed test that measures skills in performing critical military reading tasks. The JRTT is a group test that requires one hour for administration. It consists of four parts: locating information using an index, extracting information from tables, extracting information from narrative prose, and following procedural directions in filling out forms. Norming and validation of the JRTT were conducted on a sample of 750 adult Army recruits who were tested on both the JRTT and the USAFI test. Norm tables were constructed that permit interpretation of JRTT raw scores in terms of their reading grade level (RGL) equivalents. A detailed description of the JRTT development and use is given elsewhere (Sticht, 1975).

The Durrell Listening-Reading Series (DLRS):[1] Intermediate Level, Form DE (Durrell and Brassard, 1970) was designed to provide a comparison of children's reading and auding abilities. It measures discrepancies between the comprehension of spoken and written language using a vocabulary subtest and a paragraph subtest. With these two subtests, and a total score, one can obtain three estimates of reading potential (i.e., auding scores converted to reading grade level equivalents as indicated in Figure 1). The DLRS is a standardized test that was normed on a national sample of some 22,000 students in grades one through eight. The test requires approximately two hours and 45 minutes to administer both auding and reading versions of the vocabulary and paragraph subtests.

[1] Though Durrell refers to his tests as listening tests, we will use the more precise term auding in this report.

Procedure

Students who entered the job literacy program were Army personnel who had been identified as poor readers upon entry into the Army. During basic military training, these poor readers were retested to confirm their low reading scores, and those so confirmed were assigned to the literary program following basic military training and prior to entering job skill training.

At entry into the literary program, the students' reading skills were once again assessed using the USAFI Intermediate Achievement Test to confirm low reading skills and to reduce gain that might occur due to regression to the mean. The Job Reading Task Test was also administered upon entry into the school and again one or two days later to estimate gain that might occur due to simple familiarization with the types of tasks assessed on the JRTT. Alternate forms of these tests were administered six weeks later when the time allotted by military managers for attending literacy training was completed. The difference between students' highest pre-training scores and six-week post-training scores on the USAFI and JRTT were used to estimate gains in general reading skill (USAFI) and job reading task performance (JRTT).

For the present study, in addition to the USAFI and JRTT, the DLRS was administered during the first week of literacy training. The administration of the DLRS was accomplished as directed by the examiner's manual. Students were tested in groups of from four to 24 students over a 12-week period until the sample of 61 was obtained. In presenting the auding: paragraph material, a speech rate of approximately 130 wpm was used.

In scoring the DLRS, auding raw scores were converted first to auding grade level (AGL) scores to indicate how well the adult literacy students auded in comparison to the children in the school grades used to norm the tests. This provides a normative auding grade level as defined in Figure 1. Next, auding raw scores were converted to reading potential scores to indicate how well the adult literacy students would be reading if they read at the same level they auded. Finally, the DLRS reading subtest scores were converted to reading grade level (RGL) normative scores as described in Figure 1.

Results

Table 2 presents frequency distributions of test scores, stated in grade levels, for the USAFI and JRTT pre- and post-tests, the DLRS normative auding and reading scores, and the reading potential scores. The DLRS data are given separately for the vocabulary and paragraph subtests, and then for the total score which combines the vocabulary and paragraph scores.

Regarding the first objective of this study (i.e., to determine the auding skill and reading potential of adult literacy students using a nationally normed test), Table 2 indicates that the literacy students were auding at the fifth grade level (median scores), while their reading potential scores were at the sixth grade level for the DLRS vocabulary and total scores, and the fifth grade level for the DLRS paragraph subtest.

Figure 5 shows the relationships between the DLRS normative reading and reading potential scores as a function of score on the USAFI reading achievement test given on entry into the literacy program. The dotted lines of Figure 5 are linear fits to the empirical data. Both the empirical data and the linear functions indicate that, as the entering reading level of students increases, the differences between the

Table 2

Frequency Distributions of Adult Literacy Students' Scores on Auding and Reading Tests (N=61)

Grade Level	Durrell Listening – Reading Series												
	USAFI[1]		JRTT[2]		Auding			Reading			Reading Potential		
	Pre	Post	Pre	Post	Vocab.	Para.	Total	Vocab.	Para.	Total	Vocab.	Para.	Total
11+	0	1	0	2	0	0	0	0	0	0	0	0	0
10	0	1	0	3	0	3	1	0	1	0	0	2	1
9	0	1	2	4	1	2	0	0	0	0	1	1	0
8	1	3	1	8	2	2	1	0	2	0	2	2	1
7	5	7	3	14	4	5	2	5	3	4	10	3	5
6	14	20	15	14	15	6	17	9	12	11	19	13	23
5	21	13	18	10	14	15	13	16	12	16	18	14	15
4	13	13	14	4	14	7	13	14	15	14	10	14	14
3	7	2	8	2	9	14	13	12	10	11	1	8	2
2–	0	0	0	0	2	7	1	5	6	5	0	4	0
Median	5.5	6.2	5.5	7.1	5.4	5.2	5.3	5.0	5.0	5.0	6.1	5.4	6.0

[1] United States Armed Forces Institute Intermediate Achievement Test.

[2] Job Reading Task Test.

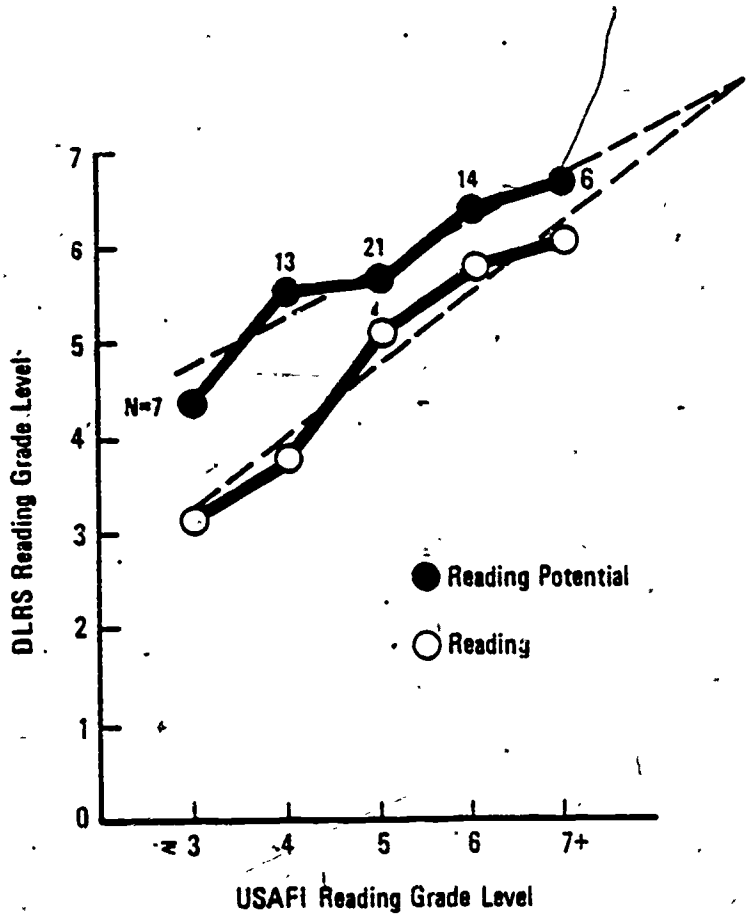


Figure 5. **Reading and Reading Potential Grade Level Scores of Adult Literacy Students as a Function of Reading Skill Level on Entry into Literacy Training (USAFI Reading Grade Level)**

DLRS normative-reading-and-auding potential scores decrease from about 1.5 grade level difference with persons entering with USAFI scores at grade three or below, to about half a grade level for students who enter reading at a USAFI grade level of seven or above.

The data of Table 2 and Figure 5 indicate that, typically, these adult literacy students did not exhibit high auding normative scores. Even though 84 percent had completed 10 or more years of education, their median auding score was comparable to that of children in the fifth or sixth grade. Further, the data indicate that, while these students did show reading potential, as defined in Figure 1, their reading potential did not greatly exceed their normative reading scores, as suggested by the hypothetical situations of Figure 2. Overall, then, these data are consistent with those of Studies 1 and 2 in showing that at least some marginally literate adults who read at the fourth or fifth grade level, do not possess oral language skills that are more highly developed than those of fourth or fifth grade children. The present study increases the generalizability of this conclusion through the use of a nationally normed and standardized test.

The second objective of this study was to determine the relationship between reading potential and achievement in an adult literacy school. Figure 6 shows the amount of gain made on the USAFI and JRTT as a function of the amount of reading potential calculated by subtracting normative total reading scores from reading potential total scores. The "negative potential" (< 0.0) category resulted from subtracting normative reading grade level scores from reading potential scores that were less than the normative reading scores. As Figure 6 indicates, there is no systematic increase in gain (post-test minus pre-test) scores on the USAFI and JRTT as the amount of reading potential increases from negative to three years or more of potential for reading.

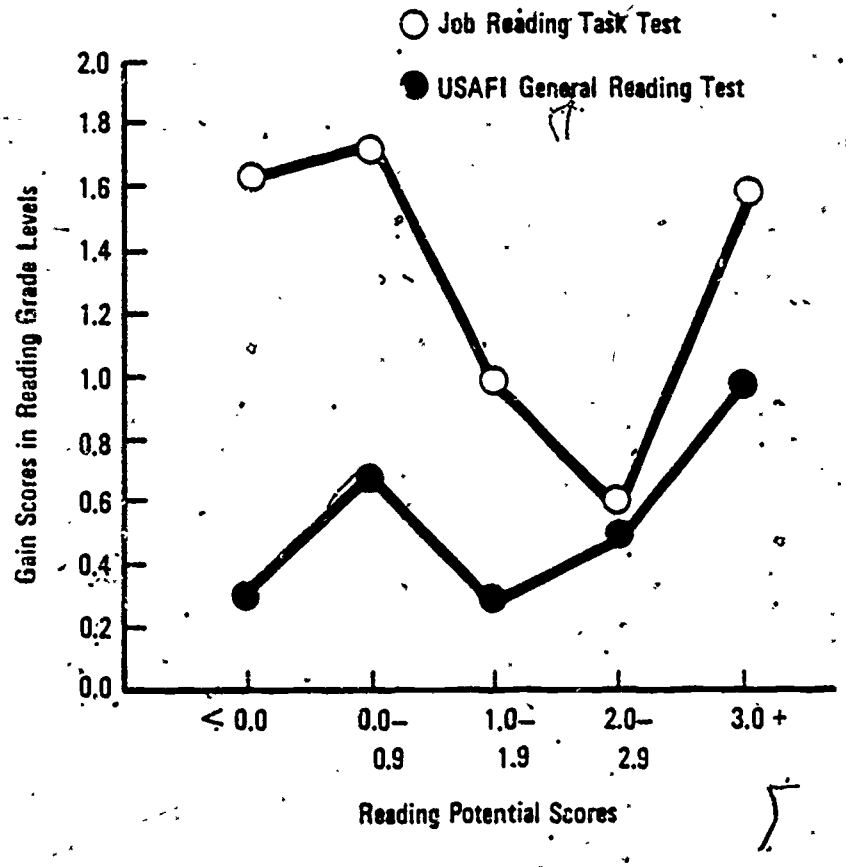


Figure 6. Gain in General and Job-Related Reading as a Function of Amount of Reading Potential (Reading Potential Minus Normative Reading) on the Durrell Listening-Reading Series

Table 3 presents intercorrelations among USAFI and JRTT gain scores and reading potential minus normative reading scores for the DLRS vocabulary, paragraph, and total scores. These correlations confirm the data of Figure 6 in showing little relationship between the amount of reading potential and the actual gain made in the literacy program. Additional analyses indicated that there was no systematic gain in general or job-related reading as a function of reading potential for students scoring at the third to

Table 3

Intercorrelations Among Auding and Reading Difference Scores

	USAFI Gain (Wk. 6–Wk. 1)	JRTT Gain (Wk. 6–Wk. 1)	Vocab. (P-N)[1]	DLRS Para. (P-N)	Total (P-N)
USAFI Gain	–				
JRTT Gain	.026	–			
DLRS					
Vocab.	.006	–.048	–		
Para.	–.105	–.032	.593	–	
Total	–.017	–.055	.911	.859	–

[1] (P-N) = Reading Potential minus normative reading on DLRS.

fourth grades, the fifth grade, or the sixth to seven grades on the entry week USAFI general reading test when these three groups were studied separately. Therefore, the correlations of Table 3 are reasonable indicators of the lack of relationship between reading potential and gain in the literacy program regardless of the students' entering reading grade levels.

SUMMARY, DISCUSSION, AND CONCLUSIONS

In a review of adult literacy programs in industry, the Armed Forces, and penal institutions commissioned by the National Academy of Education, Ryan and Furlong (1975) note that the programs they reviewed ". . . have been of short duration—from 16 to 20 weeks—and the average progress has been only 1.5 to 2 grade levels." (p. 187). They go on to state that for these programs to have practical effects upon employability or other uses of reading, ". . . it is obvious that the programs must be extended in length and that the trainees must be motivated to continue." (p. 135).

This paper has explored possible reasons for the fact that, in the United States, adult basic education programs in organizational settings are typically planned to be brief, concentrated programs in which years of lack of achievement are to be overcome by dent of intensive effort by teachers and learners.

CONCEPTS OF HUMAN RESOURCES DEVELOPMENT AND UTILIZATION

Two basic beliefs regarding adult basic education were identified as major factors contributing to the brief, remedial literacy program approach to adult basic education. On the one hand, it was observed that our cultural conceptions of human resources development and utilization lead us to consider that childhood is the time when basic skills and the basic knowledges needed to apply these skills are to be developed, and

the K-12 school system and curriculum is societies' instrument for bringing about this development of human resources.

Adulthood, then, is the time for the utilization of human resources. If people reach adulthood without developing what are thought to be requisite basic skills, then there is reluctance on the part of employers, in industry or in government, to provide extensive basic skills education because "that is the schools job." Managers in these organizations" . . . point out that their institutions are not rightfully burdened with the failures of public education." (Ryan and Furlong, 1975, p. 185).

Given the foregoing cultural orientation with regard to conceptions of human resources development and utilization, policymakers and industry and government managers are receptive to the use of brief, concentrated programs of adult basic education, primarily as stop-gap measures to contend with what are anticipated to be passing work force crises (the crisis approach to adult basic skills education is amply documented by Cook, 1977).

The use of brief literacy programs has been reinforced by the second belief examined in this study. This is the belief of policymakers, managers, and educators who have held the more-or-less common-sense notion that adult literacy students can acquire basic skills more rapidly than children in schools, due to their higher oral language skills and world experience, which gives adults higher "reading potential" than elementary school children (Figure 2). In turn, this belief is reinforced by the use of grade-school referenced standardized tests that report gains in grade levels. Thus, when it is demonstrated that adults in a brief, concentrated program make one or two years gain in reading, this may be interpreted to mean that the adults learned as much in a few hours as children do both in and out of school in one or two years: "Adult learners, on the average, do progress faster than children if we can take the reading tests at face value."[1] (Ryan and Furlong, 1975, p. 178).

EVALUATION OF THE READING POTENTIAL CONCEPT

Three studies were conducted to determine the validity of the idea that adult literacy students have greater reading potential than school children who score at comparable levels to the adults on standardized reading tests, and that adults are more efficient learners than such children. The results indicated that:

- Marginally literate men (MLM) reading at the fifth grade level on a standardized reading test performed comparably to typical fourth and fifth grade students on tests of comprehension by auding and reading when the materials were presented at 128 wpm. Thus, the oral language skills of the MLM did not exceed those of the children.
- Marginally literate adult men reading near the fifth grade level performed more poorly than typical fifth grade students on tests of learning from audio-visual materials presented for simultaneous auding and reading at rates of 228 and 328 wpm.

[1] Emphasis added.

- Marginally literate adult men showed approximately 0.5 to 1.0 years of reading potential when administered an auding and reading test that was standardized and normed on children in the grade schools. Actual reading scores were at the fifth grade level while reading potential scores were in the upper fifth and lower sixth grade range.
- Marginally literate adult men in a military job-related reading program of six-weeks duration showed a median gain of 0.7 grade levels in general reading and 1.6 grade levels in job-related reading of the type being taught in the program. There was no relationship of reading potential to gain regardless of the students' entering reading skill levels.

CONCLUSIONS

These studies, though limited in number and types of adult literacy students and grade school children involved, suggest:

(1) One should not take the reading tests based on children in the school grades at face value when applied to adult literacy students. Adult literacy students who scored at the fifth grade level on a standardized reading test normed on children were not as effective and efficient processors of oral and written language as were typical fifth grade children like those on which the reading tests were normed.

(2) One should not assume that adult literacy students have greater "reading potential" than do grade school children who are at the grade level that adults score at on standardized tests. Marginally literate adults reading at the fifth grade level had auding scores that were also at the fifth grade level which, when converted to reading potential scores fell at the sixth grade level. This is far short of the 10th grade level, which represented the years of education completed by 80 percent of the adult literacy students.

(3) One should not expect rapid, large increments in basic literacy skills of adult literacy students in brief, concentrated programs of general literacy. Such programs require that adult students have a fairly high level of oral language skills for large gains to be rapidly made in general literacy.

However, in the research of Study 3, marginally literate adults in a job-related reading program made twice the gain in job-related reading that they did in general reading, suggesting that more rapid learning of particular types of reading will occur when training is specifically focused on that type of reading rather than on "general" literacy. Hence, if adult literacy students need to read "functional" materials more than academic textbooks, it would seem more efficient to provide direct practice in reading functional materials than in reading "college prep" materials. The reading grade levels of most standardized tests are derived from school children using academically-oriented texts and exercises that require highly developed language and analytic reasoning skills for successful execution. Such skills, applicable in a wide-range of situations, would seem to be difficult for adult literacy students to develop in brief, concentrated programs.

(4) The present results and conclusions are based on a very limited data base of comparative studies of children and adult literacy students performing a restricted set of school-like oral and written language tasks. How school children and marginally literate adults compare in the performance of oral and written language tasks needed for coping outside the school environment is not known. In fact, a literature search reveals that

comparative studies of children and adults who are both learning language and literacy skills are practically non-existent. Yet many presuppositions regarding similarities and differences in how children and adults learn to read appear to influence decisions about how and what to teach adult literacy students, the "reasonable" amount of time to allocate for adult literacy programs, and methods of evaluating adult literacy development.[1] The present research challenges some of these presuppositions. But more research is needed to discover methods for adult literacy development that satisfy the cost-benefit requirements of labor market concepts of human resources development and utilization, and that build on valid understandings of the learning skills and capacities of adult literacy students.

[1]These matters are of special concern in developing nations in which decisions about allocating limited resources to childhood or adult literacy programs must be made. In a planning paper for the World Bank, Noor summarizes generalizations about adult learning that result from practical experience: "Adults usually learn faster than children". "The level of basic training that could be acquired by a primary school pupil over a period of two years, or about 3000 hours of instruction, was achieved by adult learners during periods varying from 270 hours to 750 hours. Even in the slowest case, adult learning took about one-fourth of the time required by children. In monarchial Iran, a five-year equivalency was (achieved) by adults in two different programs having durations varying from a minimum of 200 hours to a maximum of 500 hours." (1980, p. 42) Because of the differences between adults in developing countries and those of the present research, all of whom had had several years of education and had not achieved high levels of skill, it is not certain whether the present results are generalizable to adults in developing countries. An important issue is whether or not children in grade schools actually spend 3000 hours actively involved in learning, or whether they might actually spend only as many hours in active learning as adults do in literacy programs.

REFERENCES

Bowren, F. and Zintz, M. *Teaching Reading in Adult Basic Education.* Dubuque, Iowa: Wm. C. Brown, 1977.

Brown, D.P. *Auding as the Primary Language Ability.* Doctoral Dissertation, Stanford University, 1954.

Clark, C., and Woodcock, R. *Standardized listening passages.* IMRID: George Peabody College, Vol. IV, No. 2, 1967.

Comalli, P.E. Life-span changes in visual perception. In: L. Goulet and P. Bolter (Eds.) *Life-span Developmental Psychology.* New York: Academic Press, 1970.

Cook, W. *Adult Literacy Education in the United States.* Newark, Delaware: International Reading Association, 1977.

Dale, E., and Chall, J. A formula for predicting readability. *Educational Research Bulletin* (Ohio State University), 1948, 27, 11-20.

Defense Audit Service, *Report on the Review of Installation-Sponsored Education Programs for DoD Personnel.* Report No. 81-041, January 1981.

Durrell, D., and Brassard, M. *Durrell Listening-Reading Series: Intermediate Level.* New York: Harcourt, Brace, Jovanovich, 1970.

Gibson, E. *Principals of Perceptual Learning and Development.* New York: Appleton-Century-Crofts, 1969.

Ginzberg, E., and Bray, D. *The Uneducated.* New York: Columbia University Press, 1953.

Hunter, C., and Harmon, D. *Adult Illiteracy in the United States.* New York: McGraw-Hill, 1979.

Noor, A. *Planning for Literacy Training.* World Bank, Education Department, Central Projects Staff, July 1980.

Ryan, T., and Furlong, W. Literacy programs in industry, the armed forces, and penal institutions. In: J. Carroll and J. Chall (Eds.) *Toward a Literate Society.* New York: McGraw-Hill, 1975.

Sticht, T. *A Program of Army Functional Job Reading Training.* HumRRO-FR-WD-CA-75-7. Alexandria, VA: Human Resources Research Organization, June 1975.

Sticht, T. *Basic Skills in Defense.* Alexandria, VA: Human Resources Research Organization, November 1981.

Taylor, S.E. *Listening.* Washington, D.C.: National Education Association, 1964.

Wallace, M. *Literacy Instructor's Handbook.* Chicago: Follett Publishing Company, 1965.

Weber, R. Adult Illiteracy in the United States. In: J. Carroll and J. Chall (Eds.) *Toward a Literate Society.* New York: McGraw-Hill, 1975.